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OSTEOPOROSIS INTERNATIONAL

with other metabolic bone diseases

EDITORS-IN-CHIEF JOHN A. KANIS AND FELICIA COSMAN

WCO-IOF-ESCEO

World Congress on Osteoporosis, Osteoarthritis
and Musculoskeletal Diseases

23–26 March, 2017

Florence, Italy



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WORLD'S LEADING
CLINICAL CONFERENCE
ON BONE, JOINT AND
MUSCLE HEALTH

WCO-IOF-ESCEO Florence

2017

WORLD CONGRESS ON OSTEOPOROSIS,
OSTEOARTHRITIS AND
MUSCULOSKELETAL DISEASES

March 23rd - 26th, 2017

Fortezza da Basso
Florence, Italy



International Osteoporosis
Foundation

ESCEO

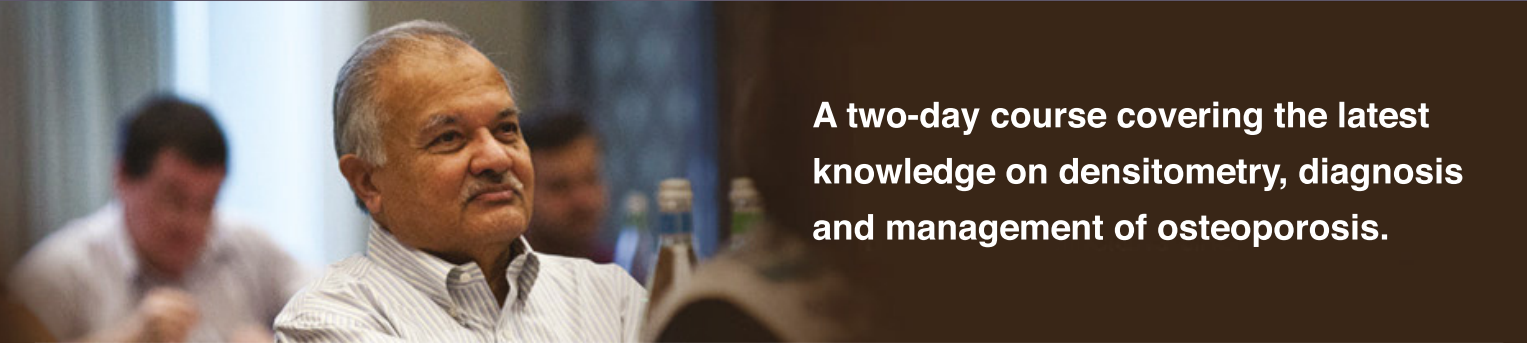
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A two-day course covering the latest knowledge on densitometry, diagnosis and management of osteoporosis.

An international course of IOF and ISCD

The International Society for Clinical Densitometry (ISCD) and the International Osteoporosis Foundation (IOF) have combined their resources and expertise in order to introduce a single course which is available worldwide.

The Osteoporosis Essentials Course covers the latest knowledge on densitometry, diagnosis and management of osteoporosis, with separate tracks for Clinicians and Technologists.

Courses are hosted by Local Organizing Committees, and course material may be translated and customized in order to improve local applicability.

For complete information on how to host a course or find a course near you, visit

www.osteoporosis-essentials.org



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(Osteoporosis International vol. 28 supplement 1) found on link.springer.com

This supplement was not sponsored by outside commercial interests ; it was funded entirely by the society's own resources

LOVE YOUR BONES

Protect your future

#LoveYourBones



Be part of World Osteoporosis Day

World Osteoporosis Day (WOD), is a key date in the bone, muscle and joint community. It's an occasion when people around the globe unite to put the spotlight on the immense burden caused by osteoporosis and related diseases. Sparking activities by member societies and organizations, WOD generates widespread media attention as well as public and health professional awareness in all regions of the world.

Take action




Despite the serious impact of osteoporosis, a majority of people at high risk of potentially life-threatening fractures remain undiagnosed and untreated. IOF urges people worldwide to lead bone-healthy lives and to take early action for prevention. Help raise awareness of this serious disease on October 20th!

October 20th

Start planning now !

Make sure you check out the WOD website and download all of the latest 2017 campaign materials coming soon!

www.worldosteoporosisday.org

 [facebook.com/worldosteoporsisday](https://www.facebook.com/worldosteoporsisday)
 twitter.com/iofbonehealth
 [instagram.com/worldosteoporsisday](https://www.instagram.com/worldosteoporsisday)

WorldOsteoporosisDay
October20

LOVE YOUR
BONES



International Osteoporosis
Foundation



ABOUT ESCEO

The European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) is a not-for-profit organization, dedicated to a close interaction between clinical scientists dealing with bone, joint and muscle disorder, pharmaceutical industry developing new compounds in this field, regulators responsible for the registration of such drugs and health policy makers, to integrate the management of Osteoporosis and Osteoarthritis within the comprehensive perspective of health resources utilization.

The objective of ESCEO is to provide practitioners with the latest clinical and economic information, allowing them to organize their daily practice, in an evidence-based medicine perspective, with a cost-conscious perception. – www.esceo.org



ABOUT IOF

The International Osteoporosis Foundation (IOF) is a non-profit, non-governmental organization dedicated to the worldwide fight against osteoporosis, the disease known as “the silent epidemic”. IOF’s members – committees of scientific researchers, patient, medical and research societies and industry representatives from around the world – share a common vision of a world without osteoporotic fractures. IOF now represents 234 societies in 99 locations around the world. – www.iofbonehealth.org

Mission

- | Increase awareness and understanding of osteoporosis.
- | Motivate people to take action to prevent, diagnose and treat osteoporosis.
- | Support national osteoporosis societies in order to maximize their effectiveness



**International Osteoporosis
Foundation**

DEAR COLLEAGUES,

It is with great pleasure that we welcome you to Florence and the 2017 IOF-ESCEO World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases.

The Congress' scientific programme has been developed by a team comprising members of the Committee of Scientific Advisors of the International Osteoporosis Foundation (IOF) and the Scientific Advisory Board of the European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (ESCEO). We would like to thank the Scientific Chairs, Professors Cyrus Cooper and René Rizzoli, for taking the lead in setting up an exciting and comprehensive programme that brings together the world's best in the field of musculoskeletal health and disease, and takes advantage of the synergies and combined expertise of our two organisations.

We are all meeting in Florence with a common aim - to gather new knowledge, skills and tools in the prevention and treatment of osteoporosis and osteoarthritis, the two most disabling conditions in elderly people. An important addition is a focus on sarcopenia because of its intimate relation to bone and joint disease. It is our hope that this Congress will move the field one step forward on all fronts; from new understanding of bone metabolism and pathology, to new strategies and options in prevention, diagnosis and treatment.

The core scientific programme consists of 10 plenary lectures by renowned speakers and 51 oral communications selected from the very best of hundreds of submitted abstracts, and 20 oral presentations of selected posters. In addition, participants can choose among 9 different Meet-The-Expert sessions and 12 special sessions and symposia on issues of clinical importance. We also encourage you to attend many of the scheduled poster sessions. 7 industry sponsored satellite symposia and to visit the large commercial exhibition presented by the leading companies in the bone field.

The city of Florence offers a most convenient and pleasant setting for international congresses. We hope that you will also take the opportunity to explore its many attractions, or simply savour 'la bella vita' in this truly wonderful city!

Thank you for your participation. We will do our best to ensure that this meeting is a memorable, enriching experience for all.

John A. Kanis
IOF President




Jean-Yves Reginster
ESCEO President



EVENT

WCO-IOF-ESCEO
March 23-26, 2017

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

CONGRESS CHAIRMEN

Jean-Yves REGINSTER
 ESCEO President

John A. KANIS
 IOF President

PROGRAMME COMMITTEE

Cyrus COOPER
 Chair, IOF Committee Scientific Advisors
 (CSA)

René RIZZOLI
 Chair, ESCEO Scientific Advisory Board
 (SAB)

John A. KANIS
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Jean-Yves REGINSTER
 ESCEO President

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 4800 Verviers, Belgium
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 08039 Barcelona, Spain
 Tel: +34 96 352 81 61
 registration-wco-iof-esceo@pacificworld.com

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OPENING CEREMONY VENUE (MARCH 23)

Fortezza da Basso
Viale Filippo Strozzi 1
50129 Firenze, Italy
Tel: +39 055 49721
Fax: +39 055 4973237
www.firenzefiera.it

CONGRESS VENUE (MARCH 24-26)

Fortezza da Basso
Viale Filippo Strozzi 1
50129 Firenze, Italy
Tel: +39 055 49721
Fax: +39 055 4973237
www.firenzefiera.it

OPERATING DATES AND HOURS

Congress Opening Hours

| | |
|-------------------------|-------------|
| Thursday March 23, 2017 | 17.30-20.20 |
| Friday March 24, 2017 | 08.00-18.30 |
| Saturday March 25, 2017 | 08.00-18.30 |
| Sunday March 26, 2017 | 08.00-12.30 |

Registration Desks Opening Hours

| | |
|-------------------------|-------------|
| Fortezza da Basso | |
| Friday March 24, 2017 | 07.30-19.00 |
| Saturday March 25, 2017 | 07.30-19.00 |
| Sunday March 26, 2017 | 07.30-12.30 |

Congress Exhibition Hours

| | |
|-------------------------|-------------|
| Fortezza da Basso | |
| Friday March 24, 2017 | 08.00-18.30 |
| Saturday March 25, 2017 | 08.00-18.30 |
| Sunday March 26, 2017 | 08.00-13.00 |

POSTER VIEWING

Poster Viewing Session I (P101-P625)

| | |
|-----------------------|-------------|
| Friday March 24, 2017 | 14.00-15.00 |
|-----------------------|-------------|

Poster Viewing Session II (P626 and above)

| | |
|-------------------------|-------------|
| Saturday March 25, 2017 | 14.00-15.00 |
|-------------------------|-------------|

Oral Presentation of Selected Posters

| | |
|-------------------------|-------------|
| Friday March 24, 2017 | 14.00-15.10 |
| Saturday March 25, 2017 | 14.00-15.10 |

ACCREDITATIONS

European

The WCO-IOF-ESCEO 2017 Florence Congress was granted 15 European CME credits (ECMEC) by the European Accreditation Council for Continuing Medical Education (EACCME).

American

EACCME credits can be converted to AMA credits for American delegates.

Belgian

The WCO-IOF-ESCEO Florence 2017 Congress was also granted: 3,5 Belgian CME credits (INAMI/RIZIV) under the numbers 16022048 (CP 0,5), 16022051 (CP 0,5), 16022197 (CP 1), 16022219 (CP 0,5), 16022222 (CP 1) in category 6 "Ethics & Economy" and 12 Belgian CME credits under the number 16025326 in category 4 "International meeting".

Italian

in process

BADGES

For registered participants, personalized badges will be requested for entry to all scientific programmes and to access the exhibition and posters areas. Blank badges are prohibited.

Lost badges : 65 euros fee/badge

CERTIFICATE OF ATTENDANCE

A certificate of attendance may be printed at the self-printing stations available in the Registration Area on Saturday March 25, 2017 (afternoon). This system will issue your certificate with date from the barcode printed on your badge.

Please ensure that you have your badge with you.

CLOAKROOM

A cloakroom service for clothing and reasonably sized items is available during the opening hours of the Congress. It is located next to the registration desk. Items of value should not be left in the cloakroom. Please make sure to collect all belongings at the end of each day.

HOTEL INFORMATION DESK

The Hotel Desk is located in the Registration Area during Registration opening hours.

INTERNET ACCESS**Courtesy of ESCEO**

A free Wireless internet connexion is available in the Congress Center. A Multimedia Center with computers will be also available to all delegates in the exhibition area during the Congress Exhibition Hours.

CONGRESS BAGS**Courtesy of Abiogen****CONGRESS UMBRELLAS****Courtesy of Rousselot Peptan****LUNCHES, COFFEE AND REFRESHMENTS**

In order to comply with international compliance rules, no official lunches or coffee breaks will be provided. Coffee, beverages and snacks can be purchased from the cafeteria located in the exhibition area and opened during Congress hours.

MEDIA

The WCO-IOF-ESCEO 2017 Congress will not provide any Media Center, however Media representatives are free to use the Multimedia Center available during Congress hours.

CITY MAPS**Courtesy of Radius Health****POCKET PROGRAMME****Courtesy of Radius Health**

A Pocket programme is included with your badge.

TOURIST INFORMATION

www.firenzeturismo.it

GENERAL EMERGENCY NUMBER

European Telephone Number: 112

WELCOME COCKTAIL**Courtesy of Mylan**

All WCO-IOF-ESCEO 2017 participants are invited to the Welcome Cocktail on Thursday March 23, 2017

Venue

Fortezza da Basso
Viale Filippo Strozzi 1
50129 Firenze, Italy

FUTURE MEETINGS

2018 – WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

WCO-IOF-ESCEO 2018

Kraków – Poland
April 19-22, 2018

LANGUAGE

English will be the official language of the Congress. No translation is provided.

FROM THE FLORENCE-PERETOLA INTERNATIONAL AIRPORT

The Airport, also called Amerigo Vespucci Airport, is located only 6 km away from the Fortezza da Basso.

TAXI

Taxis are stationed in front of the terminal.

Estimated travel time: 15 minutes.

BUS

BusItalia: «Vola in Bus»

The bus stop is next to the Santa Maria Train Station which is very close to the Fortezza da Basso, about 10 minutes walking distance.

Estimated travel time: 20 minutes.

Frequency: about 30 minutes.

Fares Single Ticket: 6 €.

CAR

Estimated travel time: about 15 minutes.

Take the Viale Alessandro Guidoni, Via Enrico Forlanini and Viale Francesco Redi. Turn left on Via Guido Monaco and then turn left on Viale Filippo Strozzi/SS67.

FROM THE SANTA MARIA NOVELLA TRAIN STATION

TAXI

Taxis can be found at the main entrance of the Santa Maria Novella train station.

WALK

The Fortezza da Basso is only at 600 meters from the Santa Maria Novella train station, at about 7 minutes walking distance, heading northeast.

FROM THE CITY CENTER

TAXI

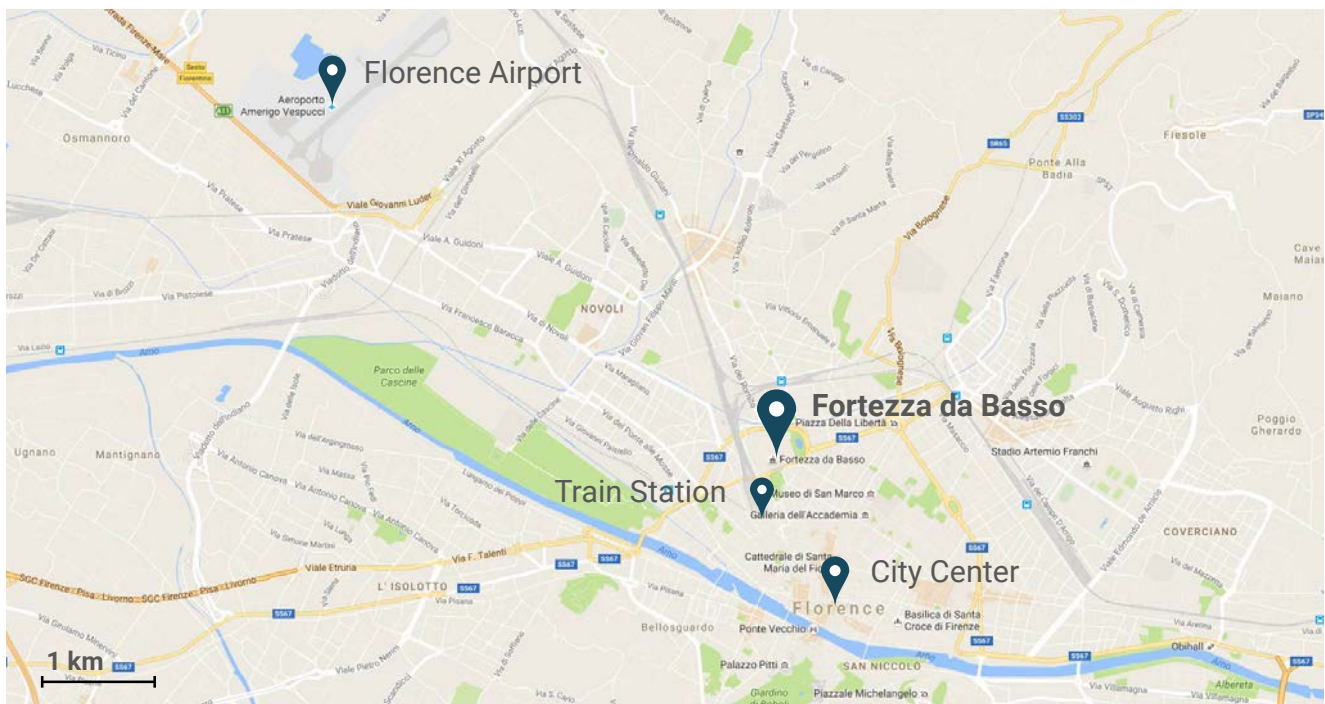
Taxis can be found in the city center.

WALK

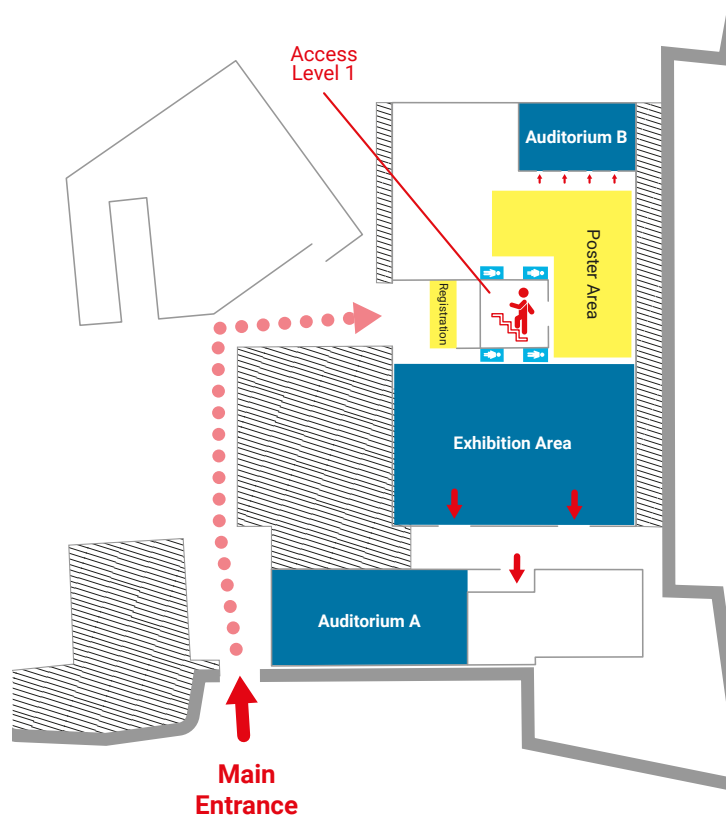
The Fortezza da Basso is close to the city center. Depending on where you are, there is a 10 to 30 minutes walk to arrive to the congress center.

CAR

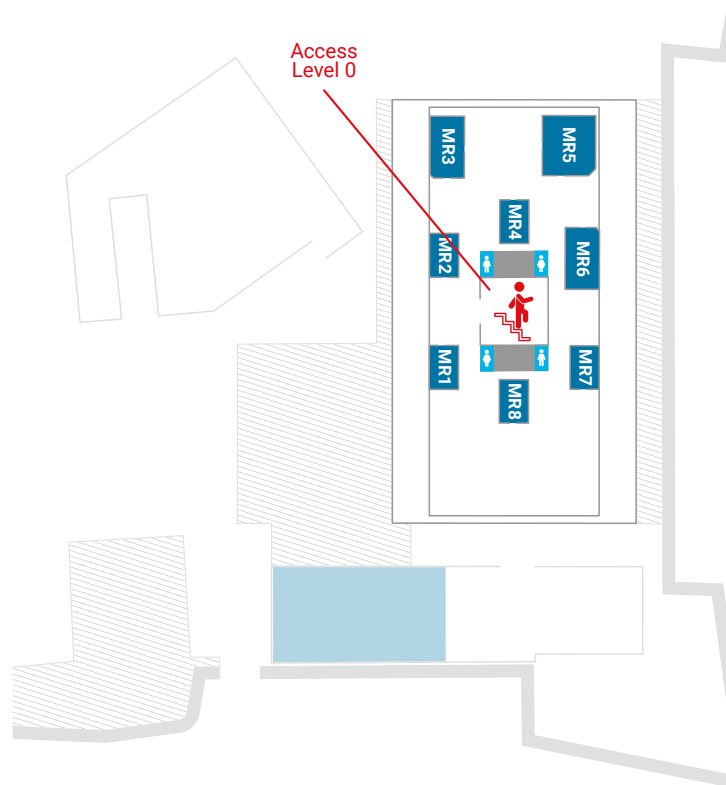
The main highways are the A1, coming north from Milan and south from Naples and the A11, coming west from the coast. When arriving in Florence, follow the directions to the Stazione di Santa Maria Novella and the Fortezza da Basso.

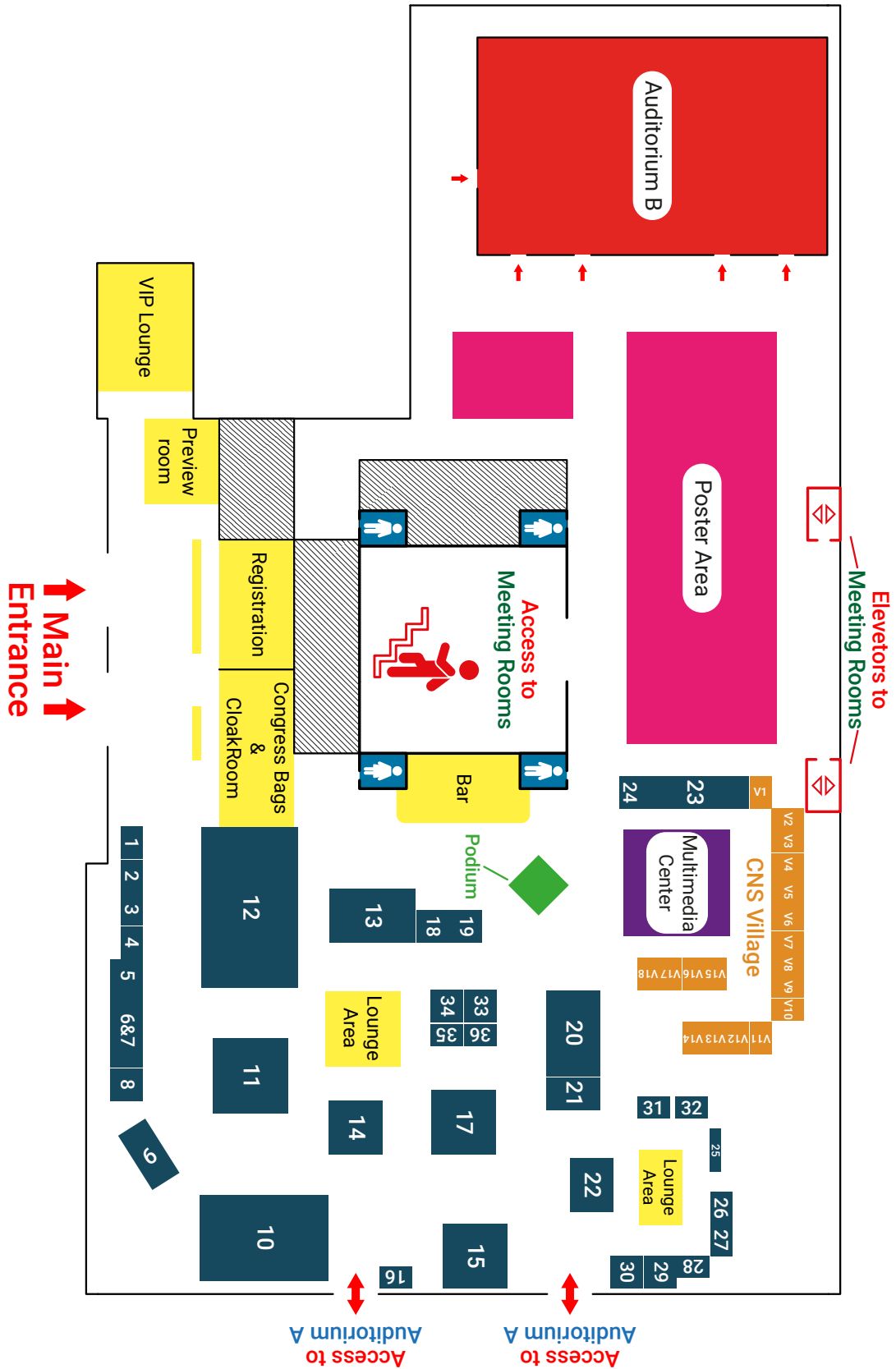


LEVEL 0



LEVEL 1





WORLD'S LEADING
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WORLD CONGRESS ON OSTEOPOROSIS,
OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

2018 **Krakow**



April 19-22

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Congress Organizer: Sinklar Congress Management B.V. | Congress Secretariat: www.humacom.com

17.30 - 20.20

Auditorium A

WCO-IOF-ESCEO - OPENING CEREMONY

Chairpersons: John A. Kanis, Jean-Yves Reginster

17.30

Auditorium A

Best clinical papers published in 2016

René Rizzoli

18.30

Auditorium A

Opening of the meeting

Maria Luisa Brandi

18.35

Auditorium A

WHO's new approach to Healthy Ageing and its implications for research and clinical practice

John R. Beard (Director of the Department of Ageing and Life Course, World Health Organization – Geneva)

18.55

Auditorium A

Healthy aging: a major challenge for the European Commission

Karim Berkouk (European Commission Brussels)

19.05

Auditorium A

Baseline stratification of patients on the basis of frailty, and the CHMP pilot on geriatric assessment

Francesca Cerreta (European Medicines Agency – London)

19.20

Auditorium A

HONORARY LECTURE

► *Between Tradition and Innovation of the Officina Profumo Farmaceutica di Santa Maria Novella from 1612 to today*

Eugenio Alphantery (President Officina Profumo Farmaceutica di Santa Maria Novella – Florence)

19.50

Auditorium A

Calcium intake worldwide

Bess Dawson-Hughes

19.55

Auditorium A

Launch of the « Global Patient Charter » (IOF)

Cyrus Cooper

20.00

Auditorium A

Presentation of the 2017 ESCEO Medal of Excellence

Jean-Yves Reginster

20.05

Auditorium A

Presentation of the ESCEO-IOF Herbert Fleisch Medal

Jean-Yves Reginster

20.10

Auditorium A

Presentation of the IOF Medal of Achievement

Cyrus Cooper

20.15

Auditorium A

Presentation of the IOF Olof Johnell Science Award

Cyrus Cooper

20.20 - 21.20

Auditorium A

INDUSTRY-SPONSORED WELCOME COCKTAIL

See detailed programme on [page 33](#)

08.00

Opening of the commercial exhibition

08.00 - 09.00

NON-SPONSORED SYMPOSIA**Meeting Room 1****Bone health: A reflection of the social mosaic**

Chairperson: Gustavo Duque

- ▶ *Medieval evidence: Reconstructing social status from British Medieval skeletons* Justyna Miskiewicz
- ▶ *Contemporary evidence: Social gradient of osteoporosis* Sharon Brennan-Olsen
- ▶ *Epigenetic evidence: Chronic stress, inflammatory response and osteoporosis risk* José Riancho
- ▶ *Moderated panel and audience questions* All

Meeting Room 2**IOF-ASBMR Symposium: Fracture risk assessment to target treatment: Effectiveness and cost-utility**

Chairpersons: Bo Abrahamsen, John A. Kanis

- ▶ *Innovations in Approach to absolute risk assessment* Cyrus Cooper
- ▶ *Prospective RCTs to evaluate effectiveness of such strategies* Michael R. McClung
- ▶ *Economic Consequences of Treatment on basis of fracture risk assessment* Eugene McCloskey

Meeting Room 3**Can exercise counter inflammation in the aged?**

Chairperson: Ivan Bautmans

- ▶ *Immunosenescence and impact of exercise on cellular markers* Hung Cao Dinh
- ▶ *Chronic low-grade inflammation and effects of exercise* Keliame Liberman
- ▶ *Anti-inflammatory effects of resistance training: dose-response relationship* Louis Nuvagah Forti

Meeting Room 4**Diagnosis and Management of Fibrous dysplasia / McCune Albright syndrome: A global patient pathway**

Chairperson: Kassim Javaid

- ▶ *Introduction and Mission Statement of the International Consortium* Kassim Javaid
- ▶ *Pathophysiology of skeletal and extra-skeletal manifestations of FD/MAS* Neveen Hamdy
- ▶ *Consensus Clinical Care Pathway* Kassim Javaid
- ▶ *Therapeutic options in FD/MAS (including surgical, skeletal and endocrine; current and future)* Roland D. Chapurlat
- ▶ *Panel Discussion* All

Meeting Room 6**Global differences in dietary calcium intake**

Chairperson: Bess Dawson-Hughes

- ▶ *Introduction : including the role of calcium in bone growth and preservation* Bess Dawson-Hughes
- ▶ *Presentation of the Calcium Map results* Ethan Balk
- ▶ *Presentation on the skeletal consequences of inadequate calcium intake* Peter R. Ebeling

08.00 - 09.00

BREAKFAST EDUCATIONAL LECTURE - BY INVITATION ONLY (SUPPORTED BY AN EDUCATIONAL GRANT FROM INDUSTRY)See detailed programme on [page 33](#)

08.00 - 09.00

Meeting Room 5**EDUCATIONAL LECTURE - CALCIFEDIOL: PERSPECTIVES FOR CLINICAL APPLICATIONS IN 2017**See detailed programme on [page 33](#)

09.00 - 12.10

Auditorium A**SCIENTIFIC SESSION I**

Chairpersons: John A. Kanis, Jean-Yves Reginster

09.00

Auditorium A**Plenary Lecture 1**

- ▶ *Who and when to treat in osteoporosis?* John A. Kanis

09.30

Auditorium A

Oral communications selected from abstracts

09.30

Auditorium A

OC1

ABALOPARATIDE-SC DECREASES VERTEBRAL, NONVERTEBRAL, MAJOR OSTEOPOROTIC, AND WRIST FRACTURES IN A SUBSET OF POSTMENOPAUSAL WOMEN AT HIGH RISK OF FRACTURE BY FRAX SCORE

Presenting author: E. V. McCloskey

Authors: L. A. Fitzpatrick, M. Hu, J. A. Kanis

09.40

Auditorium A

OC2

ABALOPARATIDE-SC SIGNIFICANTLY REDUCES VERTEBRAL AND NONVERTEBRAL FRACTURES AND INCREASES BONE MINERAL DENSITY REGARDLESS OF BASELINE RISK: RESULTS FROM THE ACTIVE PHASE 3 CLINICAL TRIAL

Presenting author: L. A. Fitzpatrick

Authors: G. Hattersley, P. D. Miller, M. Hu, L. A. Russo, B. J. R. Riis, G. C. Williams, F. Cosman

09.50

Auditorium A

OC3

FRACTURE RISK REDUCTION WITH ROMOSUZUMAB: RESULTS OF A PHASE 3 STUDY IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

Presenting author: F. Cosman

Authors: D. B. Crittenden, J. D. Adachi, N. Binkley, E. Czerwinski, S. Ferrari, L. C. Hofbauer, E. Lau, E. M. Lewiecki, A. Miyauchi, C. A. F. Zerbini, C. E. Milmont, L. Chen, J. Maddox, P. D. Meisner, C. Libanati, A. Grauer

10.00

Auditorium A

OC4

ROMOSUZUMAB RAPIDLY REDUCES CLINICAL VERTEBRAL FRACTURE INCIDENCE: RESULTS FROM THE FRAME STUDY

Presenting author: P. Geusens

Authors: M. Oates, A. Miyauchi, J. D. Adachi, M. Lazaretti-Castro, P. R. Ebeling, C. A. Perez Nino, C. J. Milmont, A. Grauer, C. Libanati

10.10

Auditorium A

OC5

EFFECT OF DENOSUMAB COMPARED WITH RISEDRONATE IN GLUCOCORTICOID-TREATED INDIVIDUALS: RESULTS FROM THE 12-MONTH PRIMARY ANALYSIS OF A RANDOMIZED, DOUBLE-BLIND, ACTIVE-CONTROLLED STUDY

Presenting author: K. G. Saag

Authors: R. B. Wagman, P. Geusens, J. D. Adachi, O. D. Messina, R. Emkey, R. D. Chapurlat, N. S. Daizadeh, N. Pannacciulli, W. Lems

10.20

Auditorium A

OC6

DISCONTINUATION OF DENOSUMAB AND ASSOCIATED VERTEBRAL FRACTURE INCIDENCE: ANALYSIS FROM FREEDOM AND ITS EXTENSION

Presenting author: S. Ferrari

Authors: J. P. Brown, N. Gilchrist, J.-E. Beck Jensen, N. Pannacciulli, C. Recknor, C. Roux, S. Smith, O. Törring, I. Valter, R. B. Wagman, A. Wang, S. R. Cummings

10.30

Auditorium A

Plenary Lecture 2

► *What can we expect from bone forming agents in the management of osteoporosis?* Serge Ferrari

11.00

Auditorium A

Presentation of the ESCEO-IOF-UCB Awards

Cyrus Cooper, Pascale Richetta

11.10

Auditorium A

Oral communications selected from abstracts

11.10

Auditorium A

OC7

A NEW SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS OF LONG-TERM TRIALS OF PHARMACOLOGICAL TREATMENTS IN KNEE OSTEOARTHRITIS

Presenting author: L. C. Rovati

11.20

Auditorium A

OC8

PHARMACEUTICAL-GRADE CHONDROITIN SULFATE IS AS EFFECTIVE AS CELECOXIB AND SUPERIOR TO PLACEBO IN SYMPTOMATIC KNEE OSTEOARTHRITIS: THE CHONDROITIN VS CELECOXIB VS PLACEBO TRIAL (CONCEPT)

Presenting author: J.-Y. Reginster

Authors: J. Dudler, T. Blicharski, K. Pavelka, A. Lanzarotti

11.30

Auditorium A

OC9

DISCOVERY OF A SMALL MOLECULE WNT PATHWAY INHIBITOR (SM04690) AS A POTENTIAL DISEASE MODIFYING TREATMENT FOR KNEE OSTEOARTHRITIS

Presenting author: N. E. Lane

Authors: V. Deshmukh, C. Barroga, H. Hu, S. KC, Y. Yazici

11.40

Auditorium A

OC10

THE ASSOCIATION OF KNEE OSTEOARTHRITIS AND PREMATURE MORTALITY IN THE COMMUNITY: AN INTERNATIONAL INDIVIDUAL PATIENT LEVEL META-ANALYSIS IN SIX PROSPECTIVE COHORTS

Presenting author: K. M. Leyland

Authors: L. S. Gates, M. T. Sanchez-Santos, D. Prieto-Alhambra, A. Fudge, G. Collins, R. Cleveland, D. Felson, J. M. Jordan, L. F. Callahan, M. Nevitt, F. Saberi Hosnijeh, J. B. J. van Meurs, G. Jones, J. L. Newton, M. Batt, D. Altman, C. Cooper, N. K. Arden

11.50

Auditorium A

OC11

OSTEOARTHRITIS INCREASES THE RISK OF CARDIOVASCULAR DISEASE: DATA FROM THE OSTEOARTHRITIS INITIATIVE

Presenting author: N. Veronese

Authors: T. Smith, J.-Y. Reginster, S. Maggi

12.00

Auditorium A

OC12

A RANDOMISED DOUBLE-BLIND PLACEBO-CONTROLLED CROSSOVER TRIAL OF ADALIMUMAB FOR EROSION HAND OSTEOARTHRITIS – THE HUMOR TRIAL

Presenting author: D. Aitken

Authors: L. L. Laslett, F. Pan, N. Bellamy, P. Bird, I. Haugen, G. Jones

12.15 - 13.45

Auditorium A

INDUSTRY-SPONSORED LUNCH SYMPOSIUM

See detailed programme on [page 33](#)

12.15 - 13.45

Auditorium B

INDUSTRY-SPONSORED LUNCH SYMPOSIUM

See detailed programme on [page 33](#)

14.00 - 15.00

Meeting Room 6

ESCEO-EUGMS HONORARY LECTURE

- ▶ *IL-17 in bone, cartilage and muscle diseases : State of the art and practical consequences for the patient*
Pierre Miossec

14.00 - 15.00

WHO SYMPOSIUM

Meeting Room 3

Integrated Care for Older People (launch of the ICOPE Guidelines)

Chairpersons: Roger Fielding, John Beard

- ▶ *Introduction* John Beard
- ▶ *Community care model for optimizing trajectories of intrinsic capacity* Islene Araujo de Carvalho
- ▶ *Screening for declines in intrinsic capacity in older people: a personalized approach to promote healthy ageing* Matteo Cesari
- ▶ *Role of nutrition and physical exercise in maintaining intrinsic capacity* Olivier Bruyère
- ▶ *Closing the evidence to practice gap: WHO ICOPE guideline recommendations*
Jotheeswaran Amuthavalli Thiyagarajan
- ▶ *Discussion*

14.00 - 15.00

MEET-THE-EXPERT SESSIONS

Meeting Room 1

What can we expect from biomarkers in osteoarthritis?

Gabriel Herrero-Beaumont

Meeting Room 2

Diabetes and bone

Serge Ferrari

Meeting Room 4

Bone fragility during childhood, young adulthood and before the menopause

Ego Seeman

14.00 - 15.00

ESCEO SYMPOSIUM

Meeting Room 5

Identification and management of patients at imminent risk of osteoporotic fracture

Chairpersons: Bernard Cortet, Bo Abrahamsen

- ▶ *Welcome and scope of the problem* Cyrus Cooper
- ▶ *How can we define a patient at imminent risk of fracture?* Nicholas Harvey
- ▶ *Efficacy of currently available treatments in patients at imminent risk of fracture* Thierry Thomas
- ▶ *Discussion : Leader:* Salvatore Minisola
- ▶ *Wrap-up and conclusion* Cyrus Cooper
Panel: Bo Abrahamsen, Maria Luisa Brandi, Jorge Cannata Andia, Cyrus Cooper, Bernard Cortet, Hans Peter Dimai, Serge Ferrari, Peyman Hadji, Nicholas Harvey, John A. Kanis, Marius Kraenzlin, Andreas Kurth, Eugene McCloskey, Salvatore Minisola, Jean-Yves Reginster, René Rizzoli, Thierry Thomas

14.00 - 15.00

Poster area

Poster Viewing Session I

14.00 - 15.10

Podium

Oral presentation of selected posters

Chairperson: Elaine M. Dennison

14.00

Podium

P564*BONE MICROARCHITECTURE ANALYSIS BY HR-PQCT OF YOUNG ADULTS WITH KLINEFELTER SYNDROME REVEALED SEVERE BONE FRAGILITY*

Presenting author: C. B. Confavreux

Authors: A. Piot, P. S. Szulc, J. Baccheta, S. Ailloud, H. Lejeune, R. D. Chapurlat, S. Boutroy, I. Plotton

14.07

Podium

P810*FACTORS INFLUENCING END OF LIFE COST AND SURVIVAL IN ELDERLY OSTEOPOROTIC FRACTURE COHORTS*

Presenting author: T. D. Tosteson

Authors: Q. Yang, A. N. Tosteson, J. Munson, Z. Li

14.14

Podium

P133*PREPUBERTAL IMPACT OF PROTEIN INTAKE AND PHYSICAL ACTIVITY ON WEIGHT BEARING PEAK BONE MASS AND STRENGTH IN HEALTHY MALES*

Presenting author: T. Chevalley

Authors: J.-P. Bonjour, M.-C. Audet, F. Merminod, B. van Rietbergen, R. Rizzoli, S. Ferrari

14.21

Podium

P667*MUSCLE STRENGTH AND PHYSICAL PERFORMANCE FROM MIDLIFE AND BONE HEALTH IN EARLY OLD-AGE: THE MRC NATIONAL SURVEY OF HEALTH AND DEVELOPMENT*

Presenting author: K. A. Ward

Authors: D. Kuh, S. Muthuri, A. Moore, C. Cooper, R. Cooper

14.28

Podium

P375*RELATIONSHIPS BETWEEN MARKERS OF INFLAMMAGING AND BONE MICROARCHITECTURE: FINDINGS FROM THE HERTFORDSHIRE COHORT STUDY*

Presenting author: N. R. Fuggle

Authors: L. D. Westbury, H. E. Syddall, N. A. Duggal, E. M. Dennison, J. Lord, C. Cooper

14.35

Podium

P841*ANALYZING THE CORTICAL AND TRABECULAR BONE OF TENOFOVIR-TREATED HIV PATIENTS USING 3D-DXA.*

Presenting author: R. Güerri-Fernandez

Authors: L. H. Humbert, X. Nogués, N. Garcia-Giralt, L. Mellibovsky, H. Knobel, A. Diez-Perez

14.42

Podium

P756*CLUSTER ANALYSIS OF BONE MICROARCHITECTURE FROM HIGH RESOLUTION PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY (HR-PQCT) AND FRACTURE IN THE GLOW STUDY*

Presenting author: A. E. Litwic

Authors: L. D. Westbury, D.E. Robinson, K. A. Ward, C. Cooper, E. M. Dennison

14.49

Podium

P1040*THE ELEVATED LEVELS OF BONE TURNOVER MARKERS IN YOUNG MEN ARE ASSOCIATED WITH BONE LOSS: A LONGITUDINAL STUDY IN HEALTHY YOUNG ADULTS*

Presenting author: C. Verroken

Authors: S. Goemaere, H. Zmierzczak, K. Toye, B. Lapauw, J.-M. Kaufman

14.56

Podium

P676

EFFECTS OF ABALOPARATIDE-SC ON BONE MINERAL DENSITY AND RISK OF FRACTURE IN POSTMENOPAUSAL WOMEN AGED 80 YEARS OR OLDER WITH OSTEOPOROSIS

Presenting author: M. R. McClung

Authors: N. C. Harvey, L. A. Fitzpatrick, P. D. Miller, G. Hattersley, Y. Wang, F. Cosman

15.03

Podium

P747

COST-EFFECTIVENESS OF COMPLYING WITH TREATMENT GUIDELINES IN SWEDEN

Presenting author: E. Jonsson

Authors: A. Hansson-Hedblom, O. Ljunggren, K. Åkesson, A. Spangeus, F. Borgström, J. A. Kanis

15.00 - 16.45

Meeting Room 6

IOF COMMITTEE OF NATIONAL SOCIETIES SPECIAL PLENARY SESSION

Chairperson: Jean-Yves Reginster

15.03

Meeting Room 6

OCs1

BONE MINERAL DENSITY AT PATIENTS OF EARLY ONSET RHEUMATOID ARTHRITIS

Presenting author: B. Rexhepi

Authors: S. Rexhepi, M. Rexhepi, V. Sahatçiu-Meka, M. Qorolli

15.11

Meeting Room 6

OCs2

ASSOCIATION BETWEEN GENETIC FACTORS OF OSTEOPOROSIS AND FRAX® CALCULATED TEN-YEAR FRACTURE PROBABILITY

Presenting author: P. Marozik

Authors: E. Rudenka, K. Liaonchyk, A. Rudenka, O. Samakhavets

15.19

Meeting Room 6

OCs3

IN-OFFICE PROTEOMIC PLATFORM FOR BONE MARKER MEASUREMENT

Presenting author: B. Larijani

Authors: P. Khashayar, G. Amoabediny, J. Vanfleteren

15.27

Meeting Room 6

OCs4

BODY MASS INDEX, VITAMIN D DEFICIENCY AND PHYSICAL ACTIVITY IN OSTEOPOROSIS

Presenting author: R. Alimanovic-Alagic

Authors: S. Sokolovic, M. Vrcic, A. Kapetanovic, E. Rabari, S. Hodzic

15.35

Meeting Room 6

OCs5

COMPARATIVE STUDY OF FRAX® SCORE IN ECUADORIAN POPULATION

Presenting author: O. D. Messina

Authors: G. Maldonado, C. Paredes, R. Guerrero, M. Miele, C. Rios

15.43

Meeting Room 6

OCs6

DEVELOPMENT AND VALIDATION OF ANTHROPOMETRIC PREDICTION MODEL FOR ESTIMATION OF MUSCLE MASS IN THE ELDERLY

Presenting author: B. Larijani

Authors: R. Heshmat, G. Shafiee, A. Keshtkar

15.51

Meeting Room 6

OCs7

IMPORTANCE OF THE JOURNAL AND WEBSITE BONE HEALTH FOR PATIENTS WITH OSTEOPOROSIS AND OTHER MUSCULOSKELETAL DISEASES

Presenting author: M. Mukane

Authors: S. Upmale, M. Mukans, I. Rasa

15.59

Meeting Room 6

OCs8

TBS, VFA AND HANDGRIP IN A GROUP OF POSTMENOPAUSAL WOMEN WITH VERTEBRAL FRACTURE

Presenting author: E. Czerwinski

Authors: J. Amarowicz, A. Kumorek, M. Warzecha

16.07

Meeting Room 6

OCs9

DISCRIMINATIVE POWER OR ROMANIAN VERSION OF SARQOL QUESTIONNAIRE: PRELIMINARY RESULTS

Presenting author: A. I. Gasparik

Authors: G. Mihai, C. Socaliuc, I. M. Pascanu

16.15

Meeting Room 6

OCs10

IN PATIENT CARE FOR DIABETIC AND NON-DIABETIC PATIENTS WITH OSTEOPOROTIC HIP FRACTURES IN A FRACTURE LIAISON SERVICE AT AN ASIAN HOSPITAL: BRINGING THE BURDEN INTO THE SPOTLIGHT

Presenting author: M. Chandran

Authors: X. F. Huang, K. Choo, D. Tay, Y. Hao

16.23

Meeting Room 6

OCs11

BALLOON KYPHOPLASTY COMPARED TO PERCUTANEOUS VERTEBROPLASTY: WHAT IS THE EVIDENCE?

Presenting author: P. R. Ebeling
 Authors: A. J. Rodríguez, H. A. Fink, L. Mirigian,
 N. Guanabens, R. Eastell, K. Åkesson, D. C. Bauer

16.35

Meeting Room 6

Presentation of the IOF Committee of National Societies Medal

Jean-Yves Reginster

15.00 - 17.00

Auditorium A

SCIENTIFIC SESSION II

Chairpersons: Cyrus Cooper, René Rizzoli

15.00

Auditorium A

Plenary Lecture 3

► *Implication of bone biomechanics in daily practice*

Mary L. Bouxsein

15.30

Auditorium A

Presentation of the IOF President's Awards

John A. Kanis

15.40

Auditorium A

Oral communications selected from abstracts

15.40

Auditorium A

OC13

PREMENOPAUSAL WOMEN WITH EARLY BREAST CANCER TREATED BY OESTRADIOL SUPPRESSION HAVE SEVERELY DETERIORATED BONE MICROSTRUCTURE

Presenting author: S. K. Ramchand
 Authors: E. Seeman, X.-F. Wang, A. Ghasem-Zadeh,
 P. A. Francis, E. J. Ponnusamy, M. S. Bardin, M. Bui,
 J. D. Lajac, M. Grossmann

15.50

Auditorium A

OC14

WOMEN IDENTIFIED AT HIGH RISK BASED ON FRAX HIP FRACTURE PROBABILITY ARE RESPONSIVE TO APPROPRIATE OSTEOPOROSIS MANAGEMENT: ANALYSIS FROM THE SCOOP STUDY OF POPULATION SCREENING

Presenting author: E. V. McCloskey
 Authors: N. C. Harvey, H. Johansson, L. Shepstone,
 E. Lenaghan, C. Cooper, J. A. Kanis

16.00

Auditorium A

OC15

CAN INDIVIDUALISED RISK FEEDBACK PRODUCE LONG-TERM HEALTH BENEFITS? A 10-YR FOLLOW-UP OF A 2-YR RANDOMISED CONTROLLED TRIAL OF FEEDBACK OF FRACTURE RISK

Presenting author: F. Wu
 Authors: K. Wills, L. L. Laslett, M. Riley, B. Oldenburg,
 G. Jones, T. Winzenberg

16.10

Auditorium A

OC16

MOBILITY RELATED RISK FACTORS PREDICT INCIDENT FRACTURES INDEPENDENTLY OF FRAX: THE OSTEOPOROTIC FRACTURES IN MEN (MROS) STUDY

Presenting author: N. C. Harvey
 Authors: A. Odén, E. Orwoll, J. Lapidus, T. Kwok,
 M. Karlsson, B. Rosengren, O. Ljunggren, C. Cooper,
 J. A. Kanis, C. Ohlsson, D. Mellström, H. Johansson,
 E. V. McCloskey

16.20

Auditorium A

OC17

IMMINENT RISK OF HIP FRACTURE AFTER RECENT (SENTINEL) FRACTURE – COMPARISON OF SENTINEL FRACTURE SITES (REYKJAVIK STUDY)

Presenting author: H. Johansson
 Authors: K. Siggeirsdottir, N. C. Harvey, A. Odén,
 V. Gudnason, E. V. McCloskey, G. Sigurdsson, J. A. Kanis

16.30

Auditorium A

Plenary Lecture 4

► *Emerging treatments for the management of osteoarthritis* Tim McAlindon

17.00 - 18.30

Auditorium B

INDUSTRY-SPONSORED SATELLITE SYMPOSIUMSee detailed programme on [page 33](#)

08.00 - 09.00

EDUCATIONAL LECTURE

Meeting Room 3

Patient-reported outcomes : is this the future for the development of treatments in musculoskeletal diseases

Maarten Boers

08.00 - 09.00

NON-SPONSORED SYMPOSIA

Meeting Room 1

Osteosarcopenia: a practical approach for the prevention of falls and osteoporotic fractures

Chairperson: Gustavo Duque

- ▶ *Introduction* Gustavo Duque
- ▶ *Clinical and biochemical phenotype of osteosarcopenia* Alberto Frisoli
- ▶ *Musculoskeletal imaging and osteosarcopenia* Neil Binkley
- ▶ *Therapeutic interventions for osteosarcopenia* Gustavo Duque
- ▶ *Questions & Answers* All

Meeting Room 2

How can exercise counter muscle weakness in the aged?

Chairperson: Ivan Bautmans

- ▶ *Muscle weakness and fatigue: does the type of contraction matter?* Liza De Dobbeleer
- ▶ *Can exercise counter muscle activation deficits?* Pauline Arnold
- ▶ *Strength gain and functional benefits of resistance training: dose-response relationship* Evelien Van Roie

Meeting Room 4

Closing the gap in the assessment of quality of life in sarcopenia

Chairpersons: Olivier Bruyère, Francesco Landi

- ▶ *Importance of patient-centred outcomes (PCOs) in the assessment of chronic disorders* Francesca Cerreta
- ▶ *Assessment of quality of life in sarcopenia: what can we learn from osteoporosis?* René Rizzoli
- ▶ *SarQoL: a validated tool for the assessment of quality of life in sarcopenia* Charlotte Beaudart

Meeting Room 6

Chronic Imuno-inflammation and bone structure

Chairpersons: Osvaldo D. Messina, Cristiano A. F. Zerbini

- ▶ *Introduction – Inflammation and bone structure* Cristiano A. F. Zerbini
- ▶ *Published data related to biologic agents and bone loss in chronic arthritis* Osvaldo D. Messina
- ▶ *Quantification and Impact of Secondary Osteoarthritis using HR-pQCT in Anti-citrullinated protein antibody Rheumatoid Arthritis Patients* Camille Figueiredo
- ▶ *Bone impairment assessed using HR-pQCT and vertebral fractures in juvenile systemic lupus erythematosus* Rosa Maria Pereira
- ▶ *Discussion* Osvaldo D. Messina

Meeting Room 7

Long-Term Therapy - Clinical Practice Cavaets

Chairperson: Bruno Muzzi Camargos

- ▶ *Treatment Evidences Beyond 5 years* Oscar Rosero Olarte
- ▶ *Treatment failure* Luis Fernando Vidal Neira
- ▶ *Bone Imaging and Biochemical Monitoring on Long-Term Treated Patients* Bruno Muzzi Camargos
- ▶ *What happen after stopping denosumab* Maria Belen Zanchetta

Meeting Room 8

Parental influences on offspring bone: Multidisciplinary evidence

Chairperson: Sharon Brennan-Olsen

- ▶ *Introduction to symposium session by Chair* Sharon Brennan-Olsen
- ▶ *Life-course epidemiology: Developmental Origins of Health and Disease* Natalie Hyde
- ▶ *Animal models: Adverse conditions in utero and bone* Ahmed Al Saedi
- ▶ *Public health: Health literacy, role modelling and prevention* Sarah Hosking
- ▶ *Moderated panel discussion, and audience questions* All

08.00 - 09.00

ESCEO Symposium under the auspices of WHO-EUGMS-IAGG-GARN and IOF

Meeting Room 5

Does nutrition play a role in the prevention and management of sarcopenia?

Chairpersons: Maria Luisa Brandi, Roger Fielding

- ▶ *Welcome* Islene Araujo de Carvalho
 - ▶ *Scope of the meeting* Matteo Cesari
 - ▶ *Role of proteins* Luc J. C. van Loon
 - ▶ *Role of calcium, dairy products and vitamin D* Heike A. Bischoff-Ferrari
 - ▶ *Role of other nutrients* Yves Rolland
 - ▶ *Discussion - Leader:* Marjolein Visser
 - ▶ *Wrap-up* Roger Fielding
- Panel: Sophie Allepaerts, Nasser Al-Daghri, Jotheeswaran Amuthavalli Thiyagarajan, Islene Araujo de Carvalho, Ivan Bautmans, John Beard, Heike A. Bischoff-Ferrari, Maria Luisa Brandi, Olivier Bruyère, Tommy Cederholm, Francesca Cerreta, Matteo Cesari, Antonio Cherubini, Cyrus Cooper, Alfonso Cruz Jentoft, Bess Dawson-Hughes, Roger Fielding, John A. Kanis, Jean-Marc Kaufman, Francesco Landi, Andrea Laslop, Alessandro Laviano, Stefania Maggi, Vincenzo Malafarina, Eugene McCloskey, Jean Petermans, Jean-Yves Reginster, René Rizzoli, Sian Robinson, Yves Rolland, Ricardo Rueda, Luc J. C. van Loon, Bruno Vellas, Marjolein Visser

09.00 - 12.00

Auditorium A

SCIENTIFIC SESSION III

Chairpersons: Eugene McCloskey, Olivier Bruyère

09.00

Auditorium A

Plenary Lecture 5

- ▶ *Can we improve bone health through nutrition?* Cyrus Cooper

09.30

Auditorium A

Oral communications selected from abstracts

09.30

Auditorium A

OC18

ABALOPARATIDE-SC FOR POSTMENOPAUSAL OSTEOPOROSIS: ANALYSIS OF THE NUMBER NEEDED TO TREAT COMPARED WITH TERIPARATIDE

Presenting author: J.-Y. Reginster
 Authors: D. M. Black, G. Hattersley, G. Williams, M. Hu, L. A. Fitzpatrick, E. M. Lewiecki

09.40

Auditorium A

OC19

A RANDOMIZED, OPEN-LABEL PHASE 2 STUDY OF KRN23, AN INVESTIGATIONAL FULLY HUMAN ANTI-FGF23 MONOCLONAL ANTIBODY, IN CHILDREN WITH X-LINKED HYPOPHOSPHATEMIA (XLH): 64-WEEK RESULTS

Presenting author: T. Carpenter

Authors: E. Imel, A. Boot, W. Högl, A. Linglart, R. Padidela, W. van't Hoff, M. Whyte, M. Mao, A. Skrinar, J. San Martin, A. Portale

09.50

Auditorium A

OC20

EFFECT OF 10 YEARS OF DENOSUMAB TREATMENT ON BONE HISTOLOGY AND HISTOMORPHOMETRY IN THE FREEDOM EXTENSION STUDY

Presenting author: D. W. Dempster

Authors: N. Daizadeh, A. Fahrleitner-Pammer, J.-E. Beck Jensen, D. Kendler, I. Valter, R. B. Wagman, S. Yue, J. P. Brown

10.00

Auditorium A

OC21

REDUCTION IN FRACTURE RATES WITH DENOSUMAB COMPARED TO ALENDRONATE IN TREATMENT NAÏVE PATIENTS: A PROPENSITY-MATCHED 'REAL WORLD' COHORT AND INSTRUMENTAL VARIABLE ANALYSIS

Presenting author: D. Prieto-Alhambra

Authors: M. S. Ali, A. Judge, N. K. Arden, T. P. Van Staa, C. Cooper, K. Javaid, S. Khalid

10.10

Auditorium A

OC22

A FRACTURE LIAISON SERVICE UTILIZING EMERGENCY DEPARTMENT INFORMATION SYSTEMS TO IDENTIFY PATIENTS WITH FRAGILITY FRACTURE IMPROVED TREATMENT AND RECURRENT FRACTURE RATES AND IS COST EFFECTIVE: A 12 MONTH ANALYSIS

Presenting author: C. Inderjeeth

Authors: W. Raymond, A. Briggs, E. Geelhoed, D. Oldham, J. McQuade, K. Briffa, D. Mountain

10.20

Auditorium A

OC23

A BONE SPECIFIC PERIOSTEIN FRAGMENT IS ASSOCIATED WITH INCIDENT FRACTURES RISK IN POST-MENOPAUSAL WOMEN FROM THE GERICO COHORT

Presenting author: N. Bonnet

Authors: E. Biver, T. Chevalley, R. Rizzoli, P. Garnero, S. Ferrari

10.30

Auditorium A

Plenary Lecture 6

► *Calcium and Vitamin D : the true story*
Bess Dawson-Hughes

11.00

Auditorium A

Oral communications selected from abstracts

11.00

Auditorium A

OC24

IMPACT OF SARCOPENIA ON FUNCTIONAL OUTCOMES AMONG OLDER HIP-FRACTURED PATIENTS UNDERGOING IN-HOSPITAL REHABILITATION

Presenting author: R. Calvani
Authors: E. Marzetti, E. Ortolani, S. Salini, A. M. Martone, A. Picca, F. Landi

11.10

Auditorium A

OC25

HEALTH OUTCOMES OF SARCOPENIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

Presenting author: C. Beaudart
Authors: M. Zaaria, F. Pasleau, J.-Y. Reginster, O. Bruyère

11.20

Auditorium A

OC26

ECONOMIC BURDEN ASSOCIATED WITH SARCOPENIA: ESTIMATIONS FROM AN ENGLISH COHORT STUDY

Presenting author: L. D. Westbury
Authors: R. Pinedo-Villanueva, H. E. Syddall, M. T. Sanchez-Santos, E. M. Dennison, S. M. Robinson, C. Cooper

11.30

Auditorium A

OC27

SARCOPENIA DOES NOT PREDICT ONE-YEAR-MORTALITY AFTER A HIP FRACTURE

Presenting author: A. Merello-de-Miguel
Authors: C. Miret-Corchado, C. Sanchez-Castellano, M. N. Vaquero-Pinto, A. C. Ramirez-Archundia, A. J. Cruz Jentoft

11.40

Auditorium A

OC28

INTEREST IN 10 CURRENT DEFINITIONS OF FRAILTY TO PREDICT THE INCIDENCE OF FALLS AND DEATHS AMONG ELDERLY NURSING HOME RESIDENTS

Presenting author: F. Buckinx
Authors: C. Lenaerts, T. Brunois, X. Rygaert, J.-Y. Reginster, J. Petermans, O. Bruyère

11.50

Auditorium A

OC29

EFFECTS OF 24 MONTHS TREATMENT OF TERIPARATIDE COMPARED WITH RISEDRONATE ON NEW FRACTURES IN POSTMENOPAUSAL WOMEN WITH SEVERE OSTEOPOROSIS: A RANDOMIZED, DOUBLE-DUMMY, CLINICAL TRIAL

Presenting author: D. L. Kendler
Authors: C. A. F. Zerbin, L. Russo, S. Greenspan, V. Zikan, A. Bagur, J. Malouf, P. Lakatos, A. Fahrleitner-Pammer, E. Lespessailles, S. Minisola, J.-J. Body, P. Geusens, R. Moericke, P. Lopez-Romero, F. Marin

12.15 - 13.45

Auditorium A

INDUSTRY-SPONSORED LUNCH SYMPOSIUM

See detailed programme on [page 33](#)

12.15 - 13.45

Auditorium B

INDUSTRY-SPONSORED LUNCH SYMPOSIUM

See detailed programme on [page 33](#)

14.00 - 15.00

MEET-THE-EXPERT SESSIONS

Meeting Room 1

Management of corticosteroid-induced osteoporosis
Jonathan D. Adachi

Meeting Room 2

Rare bone disease: approaches to classification
Kassim Javaid

Meeting Room 4

Connected devices in musculo-skeletal health
Olivier Bruyère

14.00 - 15.00

Poster area

Poster Viewing Session II

14.00 - 15.10

Podium

Oral presentation of selected posters

Chairperson: Elaine M. Dennison

14.00

Podium

P266

BONE QUALITY ASSESSMENT AMONG SARCOPENIC AND NON-SARCOPENIC ELDERLY SUBJECTS FROM THE SARCOPHAGE STUDY

Presenting author: M. Locquet
Authors: C. Beaudart, L. Delandsheere, J.-Y. Reginster, J. A. Kanis, O. Bruyère

14.07

Podium

P216

RELATIONSHIPS BETWEEN MARKERS OF INFLAMMAGING AND MUSCLE MASS, STRENGTH AND FUNCTION: RESULTS FROM THE HERTFORDSHIRE COHORT STUDY

Presenting author: L. D. Westbury

Authors: N. R. Fuggle, H. E. Syddall, N. A. Duggal, E. M. Dennison, J. Lord, C. Cooper

14.14

Podium

P152

CHARACTERIZATION OF MOLECULAR PROFILE OF SARCOPENIA IN OSTEOPOROTIC AND OSTEOARTHRITIC PATIENTS

Presenting author: J. Baldi

Authors: M. Scimeca, E. Bonanno, E. Piccirilli, E. Gasbarra, R. Iundusi, U. Tarantino

14.21

Podium

P220

ADHERENCE TO A MEDITERRANEAN DIET IS ASSOCIATED WITH LOWER INCIDENCE OF FRAILTY: DATA FROM THE OSTEOARTHRITIS INITIATIVE

Presenting author: N. Veronese

Authors: B. Stubbs, M. Noale, M. Solmi, R. Rizzoli, G. Crepaldi, S. Maggi

14.28

Podium

P128

HEALTH BENEFITS AND CONSEQUENCES OF THE EASTERN ORTHODOX FASTING IN MONKS OF MOUNT ATHOS: A CROSS-SECTIONAL STUDY

Presenting author: A. Persynaki

Authors: S. Karras, A. Petroczi, E. Barkans, H. Mulrooney, M. Kypraiou, T. Tzotzas, K. Tziomalos, K. Kotsa, A. Tsioudas, C. Pichard, D. Naughton

14.35

Podium

P804

VITAMIN D CORRECTION IMPROVES APOLIPOPROTEIN LEVELS IN A SEX-SPECIFIC MANNER

Presenting author: N. Al-Daghri

Authors: M. Alokail, A. Manousopoulpou, A. Heinson, O. Al-Attas, Y. Al-Saleh, S. Sabico, N. Aljohani, C. Woelk, G. Chrousos, S. Garbis

14.42

Podium

P372

PRIOR FALLS PREDICT INCIDENT FRACTURES INDEPENDENTLY OF FRAX: THE OSTEOPOROTIC FRACTURES IN MEN (MROS) STUDY

Presenting author: N. C. Harvey

Authors: A. Odén, E. Orwoll, J. Lapidus, T. Kwok, M. Karlsson, B. Rosengren, O. Ljunggren, C. Cooper, E. V. McCloskey, J. A. Kanis, C. Ohlsson, D. Mellström, H. Johansson

14.49

Podium

P850

A NURSE-LED FRACTURE LIAISON SERVICE HAS POTENTIAL TO MAXIMISE THE DIAGNOSIS AND TREATMENT OF OSTEOPOROSIS: RESULTS OF THE HOOV PROJECT

Presenting author: C. Armstrong

Authors: F. Heaney, S. R. Kearns, W. Curtin, J. P. McCabe, C. G. Murphy, M. F. Delaney, J. J. Carey

14.56

Podium

P828

RELATIONSHIPS BETWEEN DNA METHYLATION AND MUSCULOSKELETAL HEALTH FROM AN EPIGENOME WIDE ASSOCIATION STUDY: THE HERTFORDSHIRE COHORT

Presenting author: E. M. Curtis

Authors: P. Titcombe, M. Edwards, S. Barton, P. Tsai, E. M. Dennison, J. Bell, T. Spector, A. Valdes, C. Bell, N. C. Harvey, C. Cooper

15.03

Podium

P115

MICROSTRUCTURAL ANALYSIS OF SUBCHONDRAL BONE IN KNEE OSTEOARTHRITIS

Presenting author: L. A. Holzer

Authors: M. Kraiger, A. Leithner, G. Holzer

14.00 - 15.00

ESCEO SYMPOSIA

Meeting Room 5

Recommendations for the appropriate use of Hyaluronic Acid in the daily management of osteoarthritis

Chairpersons: Cyrus Cooper, François Rannou

- ▶ *Welcome and scope of the problem* Cyrus Cooper
- ▶ *Mode of action of Hyaluronic Acid in osteoarthritis* Gabriel Herrero-Beaumont
- ▶ *Recommendations for the appropriate use of Hyaluronic Acid in daily management of osteoarthritis* François Rannou
- ▶ *Discussion - Leader* François Rannou
- ▶ *Wrap-up and conclusion* Cyrus Cooper
Panel: Roy D. Altman, Olivier Bruyère, Cyrus Cooper, Gabriel Herrero-Beaumont, Tim McAlindon, Alberto Migliore, Karel Pavelka, François Rannou, Jean-Yves Reginster, Daniel Uebelhart

Meeting Room 6

ESCEO Working Group: Regulatory aspects of Rheumatoid Arthritis, in Europe, in 2017

Chairpersons: Maarten Boers, Pierre Miossec

- ▶ *Welcome and introduction* Jean-Yves Reginster
- ▶ *New EMA guidelines on clinical investigation of medicinal products for the treatment of RA* Pierre Miossec
- ▶ *ESCEO consensus advice to EMA regarding the guidelines* Maarten Boers
- ▶ *Discussion*
- ▶ *Conclusion* Maarten Boers
Panel: Maarten Boers, Pierre Miossec, Thierry Thomas, Chris Edwards, Jean-Yves Reginster

14.00 - 15.00

ESCEO-FIRMO SYMPOSIUM

Meeting Room 3

The Research Agenda on Non-classical Actions of Cholecalciferol

Chairpersons: Maria Luisa Brandi, Maurizio Cutolo

- ▶ *Actions of Cholecalciferol on Cardiovascular and Immune Functions* Heike A. Bischoff-Ferrari
- ▶ *The Role of Cholecalciferol on Malignancy* Francesco Bertoldo
- ▶ *Discussion - Leader* Maria Luisa Brandi
- ▶ *Conclusion and Wrap-up* Maurizio Cutolo
Panel: Francesco Bertoldo, Heike A. Bischoff-Ferrari, Maria Luisa Brandi, Olivier Bruyère, Cyrus Cooper, Maurizio Cutolo, John A. Kanis, Jean-Marc Kaufman, Jean-Yves Reginster, René Rizzoli

15.00 - 17.00

Auditorium A

SCIENTIFIC SESSION IV

Chairpersons: Bess Dawson-Hughes, Stefania Maggi

15.00

Auditorium A

Plenary Lecture 7

- ▶ *New perspectives in the treatment of frailty and sarcopenia* Bruno Vellas

15.30

Auditorium A

Presentation of the ESCEO-AgNovos Healthcare Young Investigator Awards

Jean-Yves Reginster

15.35

Auditorium A

Presentation of the Best CNS Booth

Jean-Yves Reginster, Philippe Halbout

15.40

Auditorium A

Oral communications selected from abstracts

15.40

Auditorium A

OC30

25-HYDROXYVITAMIN D RESPONSE TO GESTATIONAL CHOLECALCIFEROL SUPPLEMENTATION IS ASSOCIATED WITH COMMON VITAMIN D RELATED GENETIC VARIANTS: FINDINGS FROM THE MAVIDOS TRIAL

Presenting author: R. J. Moon

Authors: N. C. Harvey, C. Cooper, S. D'angelo, E. M. Curtis, S. R. Crozier, S. M. Robinson, N. J. Graham, J. W. Holloway, N. J. Bishop, S. Kennedy, A. T. Papageorghiou, I. Schoenmakers, R. Fraser, S. V. Gandhi, A. Prentice, H. Inskip, K. Javaid

15.50

Auditorium A

OC31

FERMENTED DAIRY PRODUCTS CONSUMPTION IS ASSOCIATED WITH ATTENUATED CORTICAL BONE LOSS INDEPENDENTLY OF TOTAL CALCIUM, PROTEIN AND ENERGY INTAKES IN POSTMENOPAUSAL WOMEN

Presenting author: E. Biver

Authors: C. Durosier-Izart, F. Merminod, T. Chevalley, S. Ferrari, R. Rizzoli

16.00

Auditorium A

OC32

PUBLIC HEALTH AND ECONOMIC IMPACT OF VITAMIN D-FORTIFIED DAIRY PRODUCTS FOR FRACTURE PREVENTION IN FRANCE

Presenting author: M. Hiligsmann

Authors: N. Burlet, P. Fardellone, N. Al-Daghri, J.-Y. Reginster

16.10

Auditorium A

OC33

THE DETERIORATION OF BONE MICROSTRUCTURE IS ASSOCIATED WITH INCIDENT FRAGILITY FRACTURE. THE OFELY STUDY.

Presenting author: R. D. Chapurlat

Authors: R. D. Chapurlat, R. Zebaze, Y. Peng, B. Lucy, E. Seeman, E. Sornay-Rendu

16.20

Auditorium A

OC34

CALCIUM INTAKE ASSESSMENT BY CALCIUM CALCULATOR IN AN ITALIAN POPULATION: VALIDATION STUDY

Presenting author: L. Vannucci

Authors: B. Pampaloni, L. Cianferotti, I. Faggiani, G. Gronchi, M. L. Brandi

16.30

Auditorium A

Plenary Lecture 8

► *What do genetics studies bring to the understanding of osteoporosis?* Maria Luisa Brandi

17.00 - 18.30

Auditorium A

INDUSTRY-SPONSORED SATELLITE SYMPOSIUMSee detailed programme on [page 33](#)

17.00 - 18.30

Auditorium B

INDUSTRY-SPONSORED SATELLITE SYMPOSIUMSee detailed programme on [page 33](#)

18.40 - 19.40

Cocktail offered by ESCEO and IOF to all recipients of prizes, awards, fellowships and scholarships - by invitation only

08.00 - 09.00

ESCEO Symposium under the auspices of WHO-EUGMS-IAGG-GARN and IOF

Meeting Room 5

Pitfalls in the measurement of Lean Body

Mass: a need for standardization

Chairpersons: John Beard, Bruno Vellas

- ▶ *Welcome* Islene Araujo de Carvalho
- ▶ *Scope of the meeting* Cyrus Cooper
- ▶ *Why do we need standardization of Appendicular Lean Body Mass (ALBM) Assessment?* Marjolein Visser
- ▶ *How can we achieve standardization of Appendicular Lean Body Mass (ALBM) Assessment?* Klaus Engelke
- ▶ *Discussion - Leader* Francesco Landi
Panel: Nasser Al-Daghri, Sophie Allepaerts, Jotheeswaran Amuthavalli Thiyagarajan, Islene Araujo de Carvalho, Ivan Bautmans, John Beard, Maria Luisa Brandi, Olivier Bruyère, Fanny Buckinx, Tommy Cederholm, Francesca Cerreta, Matteo Cesari, Antonio Cherubini, Cyrus Cooper, Alfonso Cruz Jentoft, Bess Dawson-Hughes, Elaine M. Dennison, Klaus Engelke, Roger Fielding, John A. Kanis, Jean-Marc Kaufman, Francesco Landi, Andrea Laslop, Stefania Maggi, Eugene McCloskey, Jean Petermans, Jean-Yves Reginster, René Rizzoli, Sian Robinson, Yves Rolland, Ricardo Rueda, Bruno Vellas, Marjolein Visser

08.00 - 09.00

NON-SPONSORED SYMPOSIA

Meeting Room 1

Cortical Porosity and Trabecular Bone Score: Are both important?

Chairperson: Eugene McCloskey

- ▶ *Skeletal determinants of fracture risk – can we do better?* Eugene McCloskey
- ▶ *Role of cortical porosity in fracture risk and potential implication for clinical practice* Ego Seeman
- ▶ *Role of trabecular bone Score in fracture risk and use in clinical routine* Neil Binkley

Meeting Room 2

Osteoporosis management in the Balkan countries

Chairpersons: Sekib Sokolovic, Sansin Tüzün

- ▶ *Opening remarks* Sekib Sokolovic
- ▶ *Osteoporosis diagnosis and management in Serbia* Aleksandar Dimic
- ▶ *Osteoporosis diagnosis and management in Turkey* Ülkü Akarirmak
- ▶ *Management of the silent disease in Romania* Andrea Ildiko Gasparik
- ▶ *Strategy for the treatment of osteoporosis in Greece: the ELECOST paradigm* George Lyritis
- ▶ *Osteoporosis diagnosis and management in Bosnia and Herzegovina* Sekib Sokolovic
- ▶ *Closing remarks* All

08.00 - 09.00

Meeting Room 4

Osteoporosis in Turkey: National osteoporosis prevention health programs by The Turkish Osteoporosis Society

Chairpersons: Ozlen Peker, Sema Oncel

- ▶ *Welcome and introduction* Ozlen Peker
- ▶ *Welcome and introduction* Sema Oncel
- ▶ *Current Status of Osteoporosis in Turkey* Ozlem El
- ▶ *Prevention of Osteoporotic Fractures in Turkey: Similarities and Differences with Europe* Funda Calis
- ▶ *Male Osteoporosis: Turkish Data* Yesim Gokce Kutsal
- ▶ *Presentation of an epidemiological study named TUR-BOR-OS* Yesim Kirazli

Meeting Room 7

Assessment and management of sarcopenia : The Liège experience.

Chairpersons: Jean Petermans, Olivier Bruyère

- ▶ *Sarcopenia in community dwelling subjects : the SarcoPhAge study* Charlotte Beudart
- ▶ *Sarcopenia in nursing home residents : the SENIOR cohort* Fanny Buckinx
- ▶ *Nutritional needs of sarcopenic patients : a study using indirect calorimetry in a geriatric unit* Sophie Allepaerts

09.00 - 10.00

EDUCATIONAL LECTURE

Meeting Room 3

Does bone microstructure matter?

Ego Seeman

09.00 - 10.00

MEET-THE-EXPERT SESSIONS

Meeting Room 1

Rare bone disease: novel treatment approaches

Maria Luisa Brandi

Meeting Room 2

Assessment of frailty and sarcopenia in daily practice

Stefania Maggi

Meeting Room 4

Management of osteoporosis in males

Jean-Marc Kaufman

10.00 - 12.10

Auditorium B

SCIENTIFIC SESSION V

Chairpersons: Maria Luisa Brandi, Nicholas Harvey

10.00

Auditorium B

Plenary Lecture 9

▶ *When is it time to stop osteoporosis treatment?*

Eugene McCloskey

10.30

Auditorium B

Presentation of the 2017 ESCEO-IOF Pierre Meunier Young Scientist Award

René Rizzoli

10.40

Auditorium B

Oral communications selected from abstracts

10.40

OC35

DNA METHYLATION AT THE RXRA PROMOTER AT BIRTH IS ASSOCIATED WITH GESTATIONAL VITAMIN D SUPPLEMENTATION: RESULTS FROM THE MAVIDOS TRIAL

Presenting author: E. M. Curtis

Authors: E. Cook, N. Krstic, S. D'angelo, S. Crozier, R. Moon, R. Murray, E. Garrat, P. Costello, N. J. Bishop, S. Kennedy, A. Papageorgiou, I. Schoenmakers, R. Fraser, S. Gandhi, A. Prentice, K. Javaid, H. Inskip, K. Godfrey, C. Bell, C. Cooper, K. Lilycrop, N. C. Harvey

10.50

Auditorium B

OC36

HIP AND OTHER FRACTURE RISK IN PATIENTS RECEIVING TERIPARATIDE IN REAL-WORLD CLINICAL PRACTICE: POOLED DATA FROM FOUR PROSPECTIVE OBSERVATIONAL STUDIES

Presenting author: S. L. Silverman

Authors: K. G. Saag, B. Langdahl, N. Napoli, S. Fujiwara, S. Soen, D. P. Disch, F. Marin, H. Enomoto, J. H. Krege

11.00

Auditorium B

OC37

BRIEF HIGH INTENSITY EXERCISE IMPROVES BONE, POSTURE AND FUNCTIONAL RISK FACTORS FOR FALLING IN POSTMENOPAUSAL WOMEN WITH OSTEOPENIA AND OSTEOPOROSIS: THE LIFTMOR TRIAL

Presenting author: B. R. Beck

Authors: B. K. Weeks, L. J. Weis, A. T. Harding, S. A. Horan, S. L. Watson

11.10

Auditorium B

OC38

BALLOON KYPHOPLASTY COMPARED TO PERCUTANEOUS VERTEBROPLASTY: WHAT IS THE EVIDENCE?

Presenting author: P. R. Ebeling

Authors: A. J. Rodriguez, H. A. Fink, L. Mirigian, N. Guanabens, R. Eastell, K. Åkesson, D. Bauer

11.20

Auditorium B

OC39

LONG-TERM PROSPECTIVE COHORT STUDY OF A LOCAL OSTEO-ENHANCEMENT PROCEDURE (LOEP) TO TREAT PROXIMAL FEMURS OF POST-MENOPAUSAL OSTEOPOROTIC WOMEN

Presenting author: J. Howe

Authors: B. Huber, D. Favell, R. Hill, M. Bouxsein, K. Engelke, H. Genant

11.30

Auditorium B

OC40

SPINAL LOADING ESTIMATES FROM A DETAILED MUSCULOSKELETAL MODEL OF THE THORACOLUMBAR SPINE EXPLAIN THE HIGH INCIDENCE OF VERTEBRAL FRACTURES AT THE THORACOLUMBAR REGION

Presenting author: M. L. Bouxsein

Authors: A. G. Bruno, B. Allaire, H. Mokhtarzadeh, D. E. Anderson, K. Burkhart

11.40

Auditorium B

Plenary Lecture 10► *Can we reduce falls and fractures?* René Rizzoli

12.30

End of the Congress

THURSDAY, MARCH 23

20.20 - 21.20
Auditorium A

MYLAN WELCOME COCKTAIL

FRIDAY, MARCH 24

08.00 - 09.00
Meeting Room 5

BRUNO FARMACEUTICI EDUCATIONAL LECTURE

Calcifediol: Perspectives for Clinical Applications in 2017

Chairperson: Maria Luisa Brandi

- ▶ *Introduction* Maria Luisa Brandi
- ▶ *Control of Mineral Metabolism: the ADDID Study* Salvatore Minisola
- ▶ *Comparison of in vivo Function of Calcifediol vs. Cholecalciferol* Heike A. Bischoff-Ferrari
- ▶ *General Discussion*
- ▶ *Conclusions* Maria Luisa Brandi

08.00 - 09.00

AGNOVOS HEALTHCARE BREAKFAST EDUCATIONAL LECTURE - BY INVITATION ONLY

2017 ESCEO-AgNovos Young Investigator Award Event

- ▶ *Welcome* James Howe
- ▶ *Building a Career in Research and Clinical Practice* Serge Ferrari
- ▶ *Presentation of Research: 2017 Young Investigators*

12.15 - 13.45
Auditorium A

MYLAN LUNCH SYMPOSIUM - REAL-LIFE ENDORSEMENT OF THE ESCEO ALGORITHM FOR THE MANAGEMENT OF KNEE OA

Chairpersons: Cyrus Cooper, Maurizio Cutolo

- ▶ *Survey of ESCEO algorithm: methodology and results* Olivier Bruyère
- ▶ *The need for evidence-based assessment of the long-term efficacy of medications in knee osteoarthritis: a new systematic review and network meta-analysis* Lucio C. Rovati
- ▶ *Interactive session: evaluating the results of the survey of ESCEO algorithm. Presentation of new ESCEO projects* Jean-Yves Reginster

12.15 - 13.45
Auditorium B

RADIUS HEALTH LUNCH SYMPOSIUM - ADVANCING THE MANAGEMENT OF OSTEOPOROSIS

Chairperson: Serge Ferrari

- ▶ *Mechanisms of Improved Bone Strength Through Pharmacological Interventions* Serge Ferrari
- ▶ *Addressing the Unmet Need and Burden of Osteoporosis* René Rizzoli
- ▶ *Treating to Goal, Is Now the Time?* Michael R. McClung

17.00 - 18.30
Auditorium B

IBSA SATELLITE SYMPOSIUM - TIME TO IMPROVE THE MANAGEMENT OF OSTEOARTHRITIS: LET US FORGET THE OLD STEREOTYPES

Chairpersons: Jean-Yves Reginster, Marc Hochberg

- ▶ *Welcome and introduction* Marc Hochberg
- ▶ *Advanced knee osteoarthritis: surgical versus pharmacological treatment?* Lee Simon
- ▶ *Osteoarthritis-related increase in all-cause mortality: implications for pharmacological management* Cyrus Cooper
- ▶ *Daily management of knee osteoarthritis: from the ESCEO algorithm to the CONCEPT study* Jean-Yves Reginster
- ▶ *Discussion and conclusion* Jean-Yves Reginster

SATURDAY, MARCH 25

12.15 - 13.45
Auditorium A**CERIN-EMF-GDP LUNCH SYMPOSIUM - DAIRY PRODUCTS AND BONE IN 2017: FROM HEALTH BENEFITS TO HEALTH ECONOMICS**

Chairperson: René Rizzoli

- ▶ *Dairy products: Facts or fantasy*
Jean-Yves Reginster
- ▶ *Dairy and Older People: evidence to support the policies* Miriam Casey
- ▶ *Saving lives and resources by preventing osteoporotic fractures with dairy products*
Mickaël Hilgsmann

12.15 - 13.45
Auditorium B**AMGEN LUNCH SYMPOSIUM - MAKING FRACTURE PREVENTION A PRIORITY**

Chairperson: Maria Luisa Brandi

- ▶ *Welcome and introduction* Maria Luisa Brandi
- ▶ *Finding the patient with increased risk of fracture – A call to action!* Juliet Compston
- ▶ *Optimizing osteoporosis patients management in the short and long term* Serge Ferrari
- ▶ *Patient case discussion – what would you do for this patient?* All

17.00 - 18.30
Auditorium A**ELI LILLY SYMPOSIUM - TREATING PATIENTS WITH SEVERE OSTEOPOROSIS - WHAT'S NEW?**

Chairperson: Salvatore Minisola

- ▶ *Welcome and introduction* Salvatore Minisola
- ▶ *Recent Evidence of the Effects on Human Bone Tissue of Anti-osteoporosis Drugs*
David W. Dempster
- ▶ *Treating Severe Osteoporosis Patients with Teriparatide: A Clinical Update* David L. Kendler
- ▶ *Questions and answers* All
- ▶ *Summary and Symposium close*
Salvatore Minisola

17.00 - 18.30
Auditorium B**KYOWA KIRIN SYMPOSIUM - PHOSPHATE WASTING DISORDERS OF INTEREST TO THE BONE METABOLISM EXPERT**

Chairperson: Maria Luisa Brandi

- ▶ *Metabolism of phosphate and phosphatonins*
Maria Luisa Brandi
- ▶ *XLH in childhood – challenges in diagnosis and treatment* Outi Mäkitie
- ▶ *The XLH clinic: Assessment of an adult XLH patient* Kassim Javaid
- ▶ *Clinical cases of XLH in adults: A wide spectrum of presentations* Carola Zillikens

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Gainesville USA



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Alfonso Cruz-Jentoft
Madrid, Spain



Stephen Donahue
Savannah, USA



Tommy Cederholm
Uppsala, Sweden



Roger Fielding
Boston, USA

Topics

SARCOPENIA

- Biology • Animal models • Preclinical studies
- Clinical trials • Functional assessment
 - Biomarkers and imaging
- New drug developments • Physical exercise
 - Nutrition intervention • Epidemiology

FRAILTY

- Biology of frailty and aging • Cognitive frailty
 - Physical frailty and age-related body composition modifications
- Frailty in clinical practice and public health
 - Clinical trials and therapeutics

OSTEOPOROSIS

- Osteoporosis & Frailty
- Osteoporosis & Sarcopenia

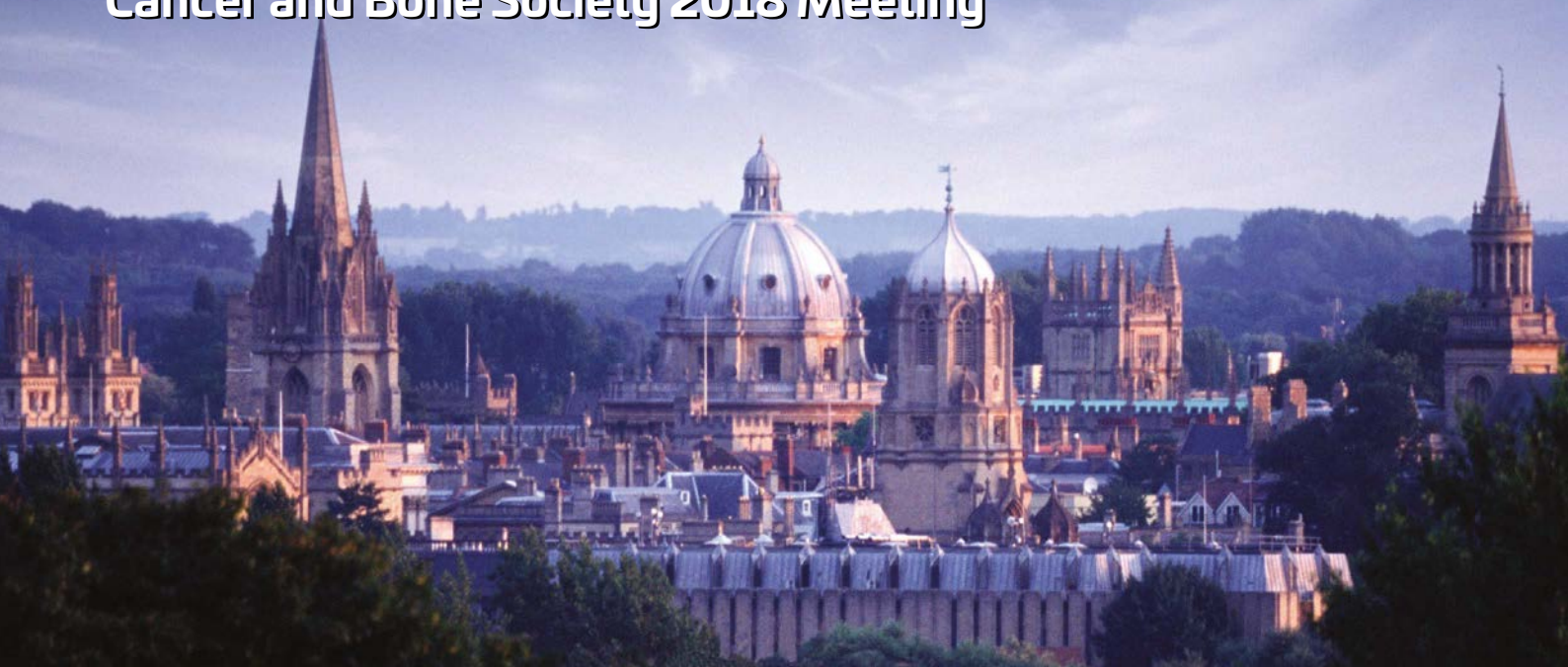
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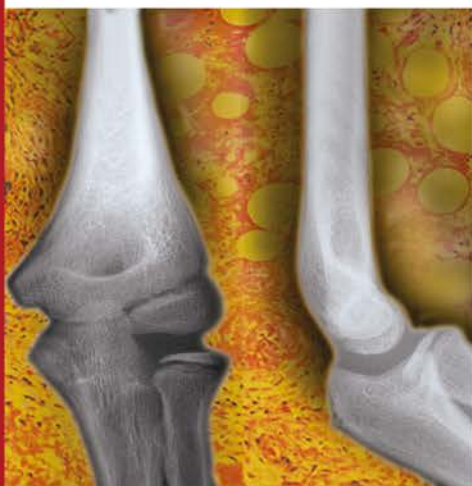
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EL1

CALCIFEDIOL: PERSPECTIVES FOR CLINICAL APPLICATIONS IN 2017 –CONTROL OF MINERAL METABOLISM: THE ADDID STUDY

S. Minisola¹, L. Cianferotti², P. Biondi¹, J. Pepe¹, C. Cipriani¹, C. Fossi², F. Giusti², F. Franceschelli², G. Leoncini², M. L. Brandi²

¹Department of Internal Medicine and Medical Disciplines, “Sapienza”, Rome University, Rome, Italy, ²Metabolic Bone Diseases Unit, Department of Surgery and Translational Medicine, University of Florence, Florence, Italy

Correction of vitamin D status is required to maintain optimal mineral and skeletal homeostasis. To date, cholecalciferol (vitamin D₃) is the most commonly used drug for vitamin D supplementation; however, the more hydrophilic compound calcidiol (25-hydroxyvitamin D₃) can be administered as daily, weekly and monthly regimens to reach in the short term the target levels of serum 25-hydroxyvitamin D [25(OH)D]. In the Administration of Different Doses of calcidiol pharmacokinetic study (ADDI-D study) the efficacy and safety of daily and weekly dosages of calcidiol were tested. A total of 87 Caucasian, community-dwelling, postmenopausal women, aged 55 years or older, with vitamin D inadequacy were randomized to receive 3 different dosages of calcidiol: 20 µg/day, 40 µg/day and 125 µg/week for 3 months. The attained level of serum 25(OH)D was selected as primary endpoint to assess efficacy; other parameters of mineral metabolism were assessed as secondary endpoints to establish safety. The ANOVA on absolute change of 25(OH)D levels from baseline showed statistical difference between the final attained 25(OH)D concentration versus baseline levels in each group ($p < 0.0001$). Post-hoc Bonferroni multiple comparison showed statistical difference between dosage 1 and 2 ($p < 0.0001$) and dosage 2 and 3 ($p < 0.0001$); no statistical difference was detected between

dosage 1 and 3. All dosage schemes enabled a significant increase in serum 25(OH)D levels at the end of treatment period with restrained variability as demonstrated by 95% confidence limits. All patients after fourteen days of treatment reached lower limit for serum 25(OH)D sufficiency; then, we observed a further increase, maintaining serum concentration in the safety window (30–100 ng/ml). While 25(OH)D levels were similar for the groups receiving 20 mg/day or 125 mg/week at each time points, they almost doubled in the group supplemented with 8 mg/day. No difference was observed in serum 25(OH)D concentrations between 30 and 90 days of treatment, indicating a plateau phase in the short-medium term. The dosages were also equally effective in controlling secondary hyperparathyroidism. No significant changes in calcium, phosphate metabolism and bone turnover markers were observed.

The results of this study demonstrate the efficacy and safety of different daily or weekly dosages of calcidiol to correct vitamin D inadequacy or deficiency in postmenopausal women. SM and MLB were consultant and received research support from Bruno Farmaceutici.

EL2

CALCIFEDIOL: PERSPECTIVES FOR CLINICAL APPLICATIONS IN 2017 - COMPARISON OF IN VIVO FUNCTION OF CALCIFEDIOL VS. CHOLECALCIFEROL

H. A. Bischoff-Ferrari¹

¹Department of Geriatrics and Aging Research University Hospital and University of Zurich, Zurich, Switzerland

Several studies suggest that calcifediol, the liver metabolite of vitamin D, may be 2 to 3-times more potent in shifting individuals to higher 25-hydroxyvitamin D level compared with a dose-equivalent amount of cholecalciferol (vitamin D₃).

Calcifediol is more hydrophilic, has a much shorter half-life of 8 to 12 days after oral administration, and causes a rapid and sustained increase in plasma 25-hydroxyvitamin D concentrations. This presentation will review the efficacy and safety of calcifediol versus cholecalciferol (vitamin D3) with respect to clinical endpoints of bone metabolism, muscle function and falls. Special consideration will be given to daily versus bolus applications and risk profile of the target population.

Conflict of interest: Speaker invitations / advisory board activities for Pfizer, Sanofi, Diasorin, Roche, Sandoz, and Roche Diagnostics. Investigator initiated research support by DSM Nutritional Products, Besins, and WILD.

EL3

PATIENT-REPORTED OUTCOMES: IS THIS THE FUTURE FOR THE DEVELOPMENT OF TREATMENTS IN MUSCULOSKELETAL DISEASES?

M. Boers¹

¹Professor of Clinical Epidemiology Department of Epidemiology and Biostatistics; Amsterdam Rheumatology and immunology Center VU University Medical Center, Amsterdam, Netherlands

This educational lecture discusses the current and future role of patient-reported outcomes in clinical research, more specifically in trials of new treatments (most frequently drugs) for musculoskeletal disease. The first part focuses on definitions. The Outcome Measures in Rheumatology (OMERACT) initiative distinguishes: domain: a concept, a specific aspect of health that can be measured; outcome: any identified result in a domain arising from exposure to a causal factor or a health intervention; outcome measurement instrument: a tool to measure a quality or quantity of a variable, in this case outcome. OMERACT focuses on the definition of ‘core sets’ that specify what (and how) should be measured in every trial of a specific rheumatologic disease (health condition). It has proposed a framework of measurement that defines 3 core areas that should be present in every core set: Death, Life Impact, and Pathophysiological Manifestations; and a fourth area, Resource Use/Economical Impact that is strongly recommended.

Patient-reported outcomes mostly fall in the core area of Life Impact. ‘Patient-reported’ simply means the patient is his/her own measuring device, but the object of measurement/reporting is usually something important to the patient, such as pain, physical function, etc. However, patients can also be asked to report the extent and number of painful joints, which may not be the thing they are most concerned about.

Traditionally, trialists were strongly focused on ‘objective’ measurement of the disease, with as little interference as possible from outside sources, including the patient, the assessor and

so forth. These outside sources were seen as a source of both unwanted variability (measurement error) and bias distracting from the ‘true’ result. Hence the strong focus on biomarkers measured in blood (e.g. acute phase reactants) or obtained through imaging (e.g. bone mass by DEXA scanning). These can be categorized as Pathophysiological Manifestations. More recently, aided by input from patients, researchers have realized that results of trials are only meaningful to patients if they are expressed in outcome areas of importance to them. These are summarized in the OMERACT areas of Death and Life Impact, with Resource Use being more about Societal Impact (unless the patient pays!).

Contrary to expectations, many patient-reported measurement instruments have been shown to have less variability than the ‘objective’ instruments. Bias remains a problem, but this can be countered by double-blinding.

The second part of the lecture demonstrates two examples of patient-reported measurement instruments to characterize ‘the present’ and ‘the future’: the Pincus MDHAQ/Rapid-3, and the PROMIS system, respectively.

The Pincus MDHAQ/Rapid-3 is a two page questionnaire that incorporates: the 8-item MHAQ physical function questionnaire, two 21-point Likert scales on pain and patient global assessment; these 3 variables are recoded and added to calculate the Rapid-3 score; the RADAI painful joint count; 42 symptom list; change question; morning stiffness; fatigue; sporting question; question on significant life events, including med side effect, visit to doctor or hospital, change of job/retirement etc. PROMIS is a very wide-ranging, generic set of questions aimed at health and well-being, developed from existing sources and optimized where necessary. These items are grouped into item banks representing different domains (eg mobility, pain, fatigue). The great advantages of PROMIS are: all items are calibrated to a common scale of ‘difficulty’ or ‘severity’ that is based on scores of a normal population, so results are immediately interpretable, also for patients PROMIS can be applied as ‘short form’ (a selection of fixed items, like a traditional questionnaire), or as computer-adapted test (CAT). In the latter form, the computer picks items based on previous responses of the patient, greatly reducing the number of questions needed for assessment.

EL4

CIRCADIAN PAIN MANAGEMENT IN CHRONIC RHEUMATIC INFLAMMATORY DISEASES

M. Cutolo¹

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It is evident that the morning symptoms including pain and stiffness characterizing several chronic rheumatic

inflammatory diseases, (i.e. rheumatoid arthritis-RA and spondyloarthritis-SPA) are linked to circadian abnormal increase of night inflammation, favoured by inadequate cortisol secretion under conditions of active disease.

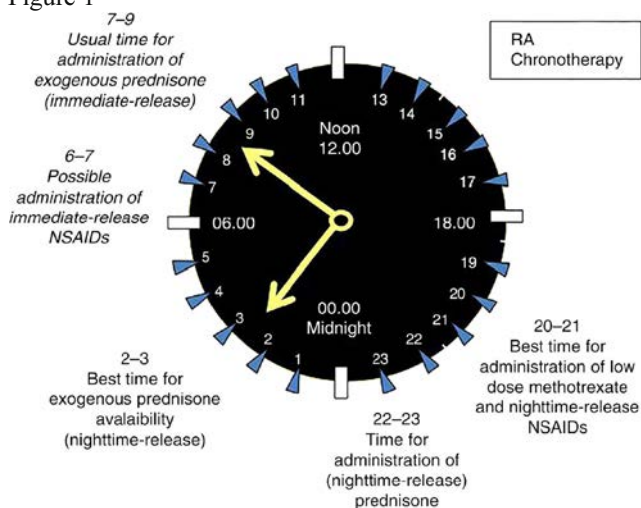
The prevention/treatment of the night up-regulation of the immune/inflammatory reaction (and related flare of cytokine synthesis) has been shown more effective when exogenous glucocorticoid administration is obtained with a nighttime-release formulation following the concept of chronotherapy. Large-scale trials documented that modified-release low dose prednisone has greater efficacy than morning immediate-release prednisone for long-term low-dose glucocorticoid treatment in RA patients, showing at least a more significant reduction in morning joint stiffness and pain.

Moreover, since different cell populations involved in the inflammatory process (i.e. neutrophils, macrophages) are particularly activated during the night, other therapeutical approaches used in RA, for example conventional disease-modifying antirheumatic drugs (DMARDs) and non steroidal antiinflammatory drugs (NSAIDs) should follow the same concepts of glucocorticoid chronotherapy.

Indeed, bedtime methotrexate chronotherapy was found to improve RA symptoms compared to the current standard dosing methods, and several available NSAIDs (ie indomethacin, aceclofenac, ketoprofen, flurbiprofen, lornoxicam) have been very recently modified in their formulation, in order to obtain chronotherapeutical effects in RA (Figure 1).

Reference: Cutolo M. Glucocorticoids and chronotherapy in rheumatoid arthritis. *RMD Open*. 2016 Mar 18;2(1):e000203.

Figure 1



EL5

BONE MICROSTRUCTURE – DOES IT MATTER?

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Bone must be rigid; able to resist the initiation and progression of microcracks during bending so that it functions effectively as a lever. This is achieved by bone's hierarchical structure. At the nanoscopic level, the triple helices of type 1 collagen form fibrils. They are strong in tension like rope. To resist bending, the fibrils are stiffened by mineral platelets of hydroxyapatite. Ironically, these platelets are the most brittle component of bone. However, they are protected from deforming by being interconnected by osteopontin and osteocalcin, glue-like helical non-collagenous proteins that unwind providing 'hidden length' by breaking 'sacrificial' hydrogen bonds. By unwinding, these noncollagenous proteins reduce the load imposed on these mineral platelets.

At the microscopic level, the mineralized collagen fibers are organized as bone structure units (BSUs) or osteons in cortical bone and hemiosteons in trabecular bone, structures formed by remodelling during growth. The cement line, alternating concentric lamellae of high and low density fibers orientated in different directions, and the central fluid filled Haversian canal, each obstruct the passage and limit the lengthening of microcracks, and prevent their entry into the osteon. The greater the osteonal density (number per unit matrix volume), the greater the resistance to progression of microcracks which form most often in interosteonal (interstitial) bone, regions that are more densely mineralized and more crosslinked by advanced glycation end products (AGEs) like pentosidine, features that facilitate microcrack propagation.

Bone must also be light to facilitate movement at low energy cost. At the macroscopic level, bone matrix volume is minimized by assembling it with varying volumes of void. Resistance to bending is a 4th power function of the radius so bones can achieve a larger size and greater strength using a thinner cortex relative to the bone's total cross sectional area by displacing this cortex further from the neutral axis. Lightness is also achieved in larger bones by assembling them with a higher cortical porosity (more osteons or osteons with a larger medullary canal). Smaller bones are assembled more robustly with a thicker less porous cortex and a smaller medullary canal relative to their size. The highest porosity is found at the metaphyses of long bones where matrix is formed as sponge-like trabecular plates and sheets.

Advancing age, menopause, diseases and drug therapy may compromise these material and microstructural properties. Accumulation of AGEs like pentosidine crosslink collagen molecules limiting the ability of non-collagenous proteins to unwind and protect mineral platelets which leads to diffuse damage. Suppression of remodelling using antiresorptives allows matrix to undergo more complete mineralization and glycosylation which increases its brittleness facilitating microcrack propagation. Suppressed remodelling also results in the formation of fewer and smaller osteons with a relative increase in interosteonal bone, features that facilitate microcrack

propagation. Menopause worsens remodeling imbalance and increases the rapidity of remodelling. Trabeculae perforate, are lost and become disconnected. This reduction in trabecular volumetric density reduces trabecular stiff-

ness to the 3rd power. Increased intracortical porosity reduces cortical stiffness to the 7th power; changes that are markedly out of proportion to the amount of bone matrix lost. Microstructure matters.

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HL1

HEALTHY AGEING IS EVERYBODY'S BUSINESS: A PUBLIC HEALTH FRAMEWORK FOR GLOBAL ACTION

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Populations around the world are rapidly ageing, and this demographic transition will impact on almost all aspects of society. Although population ageing can be viewed as a rich new opportunity for both individuals and societies, evidence that increasing longevity is being accompanied by an extended period of good health is scarce. Therefore, a coherent and focused public health response that spans multiple sectors and stakeholders is urgently needed. To guide this global response, WHO has released two radical documents: a) the first World report on ageing and health, reviewing current knowledge and gaps and providing a public health framework for action, b) Global strategy and action plan on ageing and health that provides a policy framework to ensure that societal responses to population ageing are aligned with this ambitious development agenda.

These two reports are built around a redefinition of healthy ageing that centres on the notion of functional ability: the combination of the intrinsic capacity of the individual, relevant environmental characteristics, and the interactions between the individual and these characteristics. This opening session of the symposium will introduce WHO new public health framework for Health Policy highlights key findings and recommendations of the normative work.

HL2

IL-17 IN BONE, CARTILAGE AND MUSCLE DISEASES: STATE OF THE ART AND PRACTICAL CONSEQUENCES FOR THE PATIENT

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IL-17 now IL-17A, was first identified in 1995 as a T cell derived cytokine with effects on inflammation and neutrophil activation. Using the example of rheumatoid arthritis, it was shown that its inhibition reduced the production of inflammatory mediators by explants of inflamed synovitis. This effect results from synergistic interactions between IL-17 and proinflammatory cytokines such as TNF or IL-1. In addition to its effect on inflammation and related destruction, the role of IL-17 was shown in inflammation chronicity through an effect on reduced apoptosis of mesenchymal cells and induction of anti-apoptotic molecules. At the site of inflammation, increased local production of IL-17 results from local interactions between activated T cells with various mesenchymal cells, either from bone marrow, skin, muscle or synovium.

On bone and cartilage matrix, the effect of IL-17 can be opposite, depending to the nature of the cell interactions. In destructive arthritis, with direct interactions between osteoblasts and osteoclasts, IL-17 particularly in combination with TNF leads to massive destruction and defect in repair. When such interactions are not present, as in the syndesmophytes of AS, the very same cytokines now induce ectopic bone matrix formation.

Taken together, these results support the early targeting of IL-17 in chronic inflammation. Reduced effect of IL-17 inhibition can be expected when inflammation had a long-term effect on mesenchymal cells. Recent clinical results are in line with these observations. Impressive results with anti-IL-17A antibodies have been observed in psoriasis, with the registration of the first anti-IL-17A antibody in January 2015. Later

results have allowed registration in psoriatic arthritis and spondylarthritis in 2016. Other options include the inhibition of TNF and IL-17A with two or a single bispecific molecule. As the family members IL-17A and IL-17 F share proinflammatory activities, another option is the dual inhibition of IL-17A and IL-17 F. New tools are now ready to be tested in a growing number of diseases.

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PL1

OSTEOPOROSIS: WHO AND WHEN TO TREAT

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The past 30 years has seen significant milestones in assessment and management of osteoporosis. These include the development of DXA and FRAX to identify individuals at high risk of fragility fracture and the development of interventions that have been shown to significantly decrease the risk of fracture in well-designed clinical trials. A major challenge has been how to apply these treatments. Measurements of bone mineral density (BMD) are used for diagnosis and for fracture risk prediction. Facilities for BMD testing are patchy and many countries have inadequate resources to service the societal needs. In addition, BMD has poor sensitivity for the prediction of fracture so that the majority of fractures occur in individuals with T-scores > -2.5 SD. The development of FRAX has improved the sensitivity of fracture risk prediction. Despite these advances, there are a number of challenges to be faced. Of paramount importance is that few patients with a prior fracture and even less with osteoporosis alone actually receive treatment. In Europe, there is wide inter-country variation in the treatment of women at high risk for osteoporotic fractures. The treatment gap varies from 25% in Spain to 95% in Bulgaria. Large treatment gaps were identified in countries with populations at both high and low risk of fracture. In total in the EU, it is estimated that, out of the 18.4 million women that exceed the risk level in 2010, 10.6 million were untreated. These figures are conservative since an undetermined proportion of low-risk women will have received treatment. Moreover, the treatment gap is increasing in many countries.

Thus the disease is under-recognised by the medical community.

Urgent action is required to address the under-recognition of osteoporosis and fragility fracture. Simple measures include:

- The development of country-specific guidelines,
- Piloting screening strategies in the elderly,
- Identifying the determinants of imminent risk,
- The development of fracture liaison services.

Whereas osteoporosis is recognized, worldwide, as a major Public Health issue, with one in two women and one in five men over the age of 50 years presenting a fragility fracture, a vast proportion of women at high risk remain untreated. Case-finding strategies prioritizing assessment of men and women with prior fracture are required to alleviate this problem.

PL2

WHAT CAN WE EXPECT FROM BONE FORMING AGENTS IN THE MANAGEMENT OF OSTEOPOROSIS?

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In contrast to antiresorptive agents, which are most commonly used as first line therapy for osteoporosis, bone forming agents derived from PTH, and more recently PTHrP, namely teriparatide and abaloparatide, stimulate osteoblasts to deposit packets of new bone on existing surfaces, with predominant effects on trabecular and endocortical surfaces. However because of the coupling of bone formation to bone resorption, they globally increase bone turnover, with variable effects on aBMD at cortical sites due mostly to intracortical bone remodeling. Hence compared to the spine and cancellous bone sites in general, the effects of teriparatide on hip BMD have been modest, and BMD at distal radius actually decreases. The resulting effects has been a very significant reduction of spine

and non-vertebral fractures, whereas the efficacy on the hip remains unknown. In patients previously treated with bisphosphonates, BMD gains on teriparatide may be slowed, but eventually reach similar levels as in naïve patients. In contrast to teriparatide, abaloparatide, which acts on the same receptor but through potentially different signaling mechanisms, induces bone formation with less bone resorption and therefore increases hip BMD more compared to teriparatide, whereas the effects on the spine are similar. Likewise, vertebral anti-fracture efficacy is similar, but abaloparatide has achieved an impressive 43% reduction of non-vertebral fracture in the ACTIVE trial. To note that the occurrence of hypercalcemia is uncommon and very rarely a clinical issue with these agents, even less so with abaloparatide.

On another side, the development of sclerostin antibodies, namely romosozumab, provides a potent stimulus of modeling-based bone formation by recruiting otherwise quiescent lining cells, while inhibiting bone remodeling. This leads to prominent BMD gains over a short period of time at bone spine and hip. A first phase 3 clinical trial has demonstrated antifracture efficacy regarding vertebral and clinical fractures, an effect that was maintained by transitioning to denosumab after one year. No significant safety signals were detected over the 2 years of the study.

Hence in the near future the number of bone-forming agents available for treatment of osteoporosis will increase and diversify. This will allow to reconsider the best strategies to be used as initial and sequential therapy for patients with severe osteoporosis.

PL3 IMPLICATION OF BONE BIOMECHANICS IN DAILY PRACTICE

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The principles of biomechanics dictate that fractures occur when the loads applied to a bone exceed its strength. In daily practice, this suggests that in addition to bone strength, factors related to skeletal loading may influence fracture risk. Moreover, knowledge about bone biomechanics reveals that bone strength, and therefore skeletal fragility, is dependent not only on BMD, but on bone microarchitecture and characteristics of the bone matrix, features which may (or may not) be assessed with technologies available in the clinic. This presentation will first focus on the latest findings regarding the impact of non-skeletal factors on fracture risk, including the contribution of trochanteric soft tissue thickness to hip fracture,

and the contribution of trunk muscle morphology and spinal curvature to vertebral fracture. In addition, findings on the contribution of bone microarchitecture and bone matrix properties to fracture risk will be highlighted. Emphasis will be placed on conceptual and technological advances that may ultimately impact clinical practice and/or the conduct of clinical trials.

PL4 EMERGING TREATMENTS FOR THE MANAGEMENT OF OSTEOARTHRITIS

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Objective: Its inherently slow rate of progression, together with obstacles to outcome measurement in this field, have contributed to slow progress in the development of therapeutic remedies for osteoarthritis, especially disease-modifying interventions. However, the recent reconceptualization of osteoarthritis pathology as a whole-joint disorder, together with the recognition of the existence of distinct subphenotypes, has broadened the range of therapeutic targets. Potentiation of chronic pain by nociceptive mechanisms ranging from central processing to peripheral sensitization has also generated potential treatments ranging from mind-body complementary medicine modalities to the highly targeted nerve growth factor blockade. In addition, greater understanding of how biomechanical dysfunction participates in osteoarthritis pathology, together with technological developments in orthotics, has led to the possibility of innovative assistive devices as treatments for knee osteoarthritis. At the same time, development of a range of pharmaceutical delivery systems now makes targeted therapy feasible, offering potential for enhanced efficacy with reduced systemic toxicity.

Material and Methods: Review of the scientific literature and online sources of information about current clinical trials

Results: Examples of novel products and approaches in development for OA according to their targets are as follows: cartilage - WNT pathway modulator (SM04690), recombinant FGF18, stem cell therapies; aggrecanases inhibitor (AGG-523), BMP-7; subchondral bone – zoledronic acid; inflammation/synovitis – hydroxychloroquine, methotrexate, corticosteroids, TNF inhibitors (etanercept, adalimumab); IL1 inhibitors (ABT-652, gevokizumab); p38MAPK inhibitor and autologous therapies using platelet-rich plasma, proteins; human serum albumin, bone marrow aspirate; peripheral nervous system – NGF blockers (Tanezumab, REGN475, ASP7962); biomechanical - braces, specialized footwear, assistive devices; mind-body therapies – Tai Chi, Yoga. Novel delivery systems in development include microparticles

(PGA, chondroitin), silk-derived, fusion molecules (e.g. with HA) and direct injection (e.g. IA etanercept).

Conclusion: The landscape of pipeline treatments for OA is currently extensive, reflecting the diversity of potential tissue targets as well as technological advances in the formulation of molecular delivery systems and construction of assistive devices.

Disclosures: Dr McAlindon has performed Consulting activities for Samumed, Flexion, Astellas, Pfizer, Regeneron, Sanofi, Seikugaku; and has had NIH funding for studies testing Tai Chi, corticosteroids, Vitamin D

PL5

CAN WE IMPROVE BONE HEALTH THROUGH NUTRITION?

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Osteoporosis constitutes a major public health problem through its association with age-related fractures. It has been estimated that the lifetime risk of these fractures approaches 50% among Caucasian women, and 20% among Caucasian men, from the age of 50 years. Life expectancy is increasing around the globe and the rising number of elderly individuals will enlarge the public health problem posed by osteoporosis. Nutrition plays a key role in the maintenance of bone health throughout the lifecourse. Bone mass increases during childhood and adolescence; is generally stable during the third and fourth decade of life; before beginning to decline thereafter. If we are to remain fracture free throughout life, it is important to: (a) achieve the genetic potential for peak bone mass through appropriate nutrition, physical activity and endocrine development through the first two decades of life; (b) retard bone loss during middle life and early old age; and (c) attenuate bone loss during later life. Key nutritional components throughout the lifecourse include calcium and vitamin D status; other micronutrients such as vitamins B, C, E, magnesium, zinc and polyphenols; macronutrients most notably protein consumption; and overall dietary pattern. These are variably linked to bone density and fracture risk during childhood and adult life. More recently, maternal vitamin D insufficiency during mid and late gestation has been associated with reduced skeletal health in the offspring during mid and late childhood. A recent, large randomised trial of vitamin D supplementation in pregnancy suggested that 1000 IU cholecalciferol administered daily led to vitamin D repletion in over 80% of pregnant women; the intervention led to a highly significant improvement in neonatal bone mass among offspring born during winter months. Nutritional strategies can

therefore be constructed to optimise bone health throughout the lifecourse; utilisation of these policies will impact the rising fracture burden.

PL6

CALCIUM AND VITAMIN D: THE TRUE STORY

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¹Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Boston, MA, United States

Calcium has been the subject of increased investigation in recent years, from the point of view of both efficacy in reducing fracture risk and safety. Evidence indicating that calcium when partnered with vitamin D reduces risk of fracture will be reviewed. Calcium from supplements but not from food sources may increase risk of kidney stones under selected circumstances. The strongest evidence comes from the Women's Health Initiative, a large 7-year calcium supplement versus placebo intervention trial. The safety of calcium with respect to cardiovascular disease risk has been the subject of considerable controversy and investigation in recent years. The evidence will be briefly summarized. Vitamin D supplement sales in many countries have climbed to record highs, whilst the discussion of the amount needed for maximal efficacy and safety follows behind. The IOM based its recommendations on the amount of vitamin D needed to support bone mass and strength. Recent work has also focused on the impact of vitamin D on muscle performance and risk of falling. Falls are a major risk factor for fracture. It now appears that the association of vitamin D with fall risk is U shaped. The optimal range of serum 25-hydroxyvitamin D levels for fall prevention is currently being sought. The lack of standardization of assays for 25-hydroxyvitamin D levels is one of the challenges in defining the optimal range. Finally an important challenge is to identify the segment of the population that stands to benefit from supplementation with calcium and vitamin D.

Disclosures: Investigator-initiated research grant from Pfizer, Inc.

Consulting: Amgen, Pfizer, Opko, Takeda, Nestle, Roche, Tricida

PL7

NEW PERSPECTIVES IN THE TREATMENT OF FRAILTY AND SARCOPENIA

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The main objective of the treatment of frailty and sarcopenia is to maintain function mobility with advancing age in subjects with high risk to develop dependency.

To reach this goal we need to integrate the following steps as mentioned in the P4 medicine

- Be proactive able to diagnosis frailty or sarcopenia at one early stage more likely to respond to a treatment. To develop this aims the Gerontopole has implemented some nurses with specific training to primary care office or into the community.. We need also to **Discover biomarkers** to identify the 55 years + at risk for sarcopenia, frailty and lose of mobility. We have also to **Develop specific functional clinical tool** to follow the trajectory of strength, mobility functions from the beginning, these tools will need to be accessible online by the subjects as well as by the health professional
- We need to **Use precision medicine to better determine the causes** of slow gait speed, lose of strength, weight loss, and fatigue with aging and frailty. We need laso with precision medicine using MRI and biomarkers to better define the exact type of sarcopenia to develop targeted therapy
- **Use environmental approaches**, multi-domain intervention to maintain function with aging and post pone the occurrence of frailty and dependency. Nutrition (including specific AA, Vit D, Omega 3), physical exercise, social activities have to be part of these programs
- **Develop personalized medicine using e-platform** to interact with the subjects, follow functions trajectories, interventions,
- **Discover new potential drugs not only to cure disease but to maintain** function: cognition and muscle: several are presently in development and will be reviewed including myostatin anti-body, testosterone, SARMS, GH, Ghrelin, estrogen, leptin..
- **Use genetic, epigenetic, plus multi-omics analyses** to identify the actionable possibilities that let one optimize subject physical performance or avoid disease

PL8

WHAT DO GENETIC STUDIES BRING TO THE UNDERSTANDING OF OSTEOPOROSIS?

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Osteoporosis and its consequences, fragility fractures, re-fractures and mortality, ask for a considerable attention on health-care services worldwide. The need to identify individuals at high risk of fragility fractures is imposed for the earliest diagnosis and appropriate management. Even though the family history for fragility fractures represents a critical element in the

existing predictive models, gene variants are not still applicable in the routine prediction analysis. However, the incomplete accounting for fracture incidence by bone mineral density (BMD) alone suggests that factors other than BMD are important determinants of fracture risk. Indeed, fragility fractures represent a complex phenotype, that results from a constellation of skeletal and nonskeletal factors, All these factors bring to the conclusion that the assessment of fracture risk should be individualized and the unique profile of an individual could be improved by including the genetic evaluation. The early 1990s witnessed a blossoming in the search of the effect size of candidate gene polymorphisms on fracture risk, but the results obtained were conflicting and quite frustrating. The application of genome-wide association studies (GWAS) arrived late in osteoporosis. Through genome-wide association analysis several genetic variants associated to the risk of fractures have been identified in the past fifteen years, but the effect size of the latter is quite modest. In addition GWAS did not confirm what found before in candidate gene studies, while new gene variants were identified, mainly in the noncoding regions of the genome. A logical step forward would be to develop an individual's genetic risk profile. Genetic analyses if integrated into existing fracture risk assessment tools, as the FRAX risk card, could yield predictive power beyond the commonly used clinical and anthropometric risk factors. Moreover, it is not clear whether genetic differences exist in relation to the morbidity and efficacy of the osteoporosis pharmacotherapy treatments, that is highly variable among individuals. The identification of gene variants segregating with a diverse response to a drug treatment could greatly contribute to the development of a personalized pharmacological therapy. Today, as trials designed to test the efficacy of individualized therapies selected on a genetic risk-based assessment are missing in osteoporosis, the application of clinical management based on genetic tests contrasts with the stringent principle of evidence-based medicine. These important issues will be outlined and discussed during the presentation.

PL9

WHEN IS IT TIME TO STOP OSTEOPOROSIS TREATMENT?

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The principal aim of osteoporosis treatment is to reduce an individual's risk of fracture in a chronic disease characterised by persistently high and, indeed, increasing fracture risk. Osteoporosis is therefore very similar to many other chronic diseases in which exposure to long term risk factors gives rise

to adverse outcomes (e.g. hypercholesterolaemia and myocardial infarction). At its simplest, treatment usually targets at least one of the underlying risk factors with the aim of reversing, at least partially, the risk conferred by that factor. It also follows that in complex, multifactorial diseases, several approaches may be required, simultaneously or consecutively, to reduce the risk most effectively; on the opposite side of the coin, if treatment only addresses one of the several risk factors, then ‘treatment failures’ can be expected despite that particular therapy working optimally. Another common feature is that the effect on the risk factor will reverse fairly rapidly after the discontinuation of therapy, so that long term and continuous treatment is advocated. In contrast, the long term biological effect of bisphosphonates has raised a unique question in osteoporosis; when is it time to stop osteoporosis treatment? This question requires the answers to several other questions to be addressed: What was the risk of fracture in the individual patient that merited treatment in the first place? Can we estimate the current risk? What determines the effect of treatment on fracture risk? Is it a change in bone turnover, mass, structure, matrix quality or a combination of these? What is the speed of offset of these effects and how will this impact on fracture risk when treatment is stopped? Do the benefits of long term treatment outweigh the risks? Is there a “target” for treatment that, if achieved, means that treatment can be stopped? It is clear that we do not have definitive answers to many of these questions; current guidelines on discontinuing bisphosphonates therefore need a critical appraisal and consideration of individual factors in the clinical setting.

PL10

CAN WE REDUCE FALLS AND FRACTURES?

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The reduction of increased fracture risk associated with osteoporosis-related bone fragility implies an influence

on both pathogenetic mechanisms leading to fracture, ie mechanical overload, such as falls, and mechanical incompetence, like osteoporosis and bone fragility. Measures for fracture prevention include the triad - balanced nutrition, with calcium, protein and vitamin D, -weight-bearing or balance improving physical exercise and -pharmacological therapies. The first 2 of the triad may modify both mechanical overload and incompetence, whereas available drugs are limited to mechanical incompetence. Indeed, nutrition, vitamin D and physical activity have been shown to influence both fall and fracture risks. The benefits of resistance training may be amplified by protein supplements. Some studies have reported fall risk reduction in the elderly with Tai Chi programs. The multitask music-based training like Jacques-Dalcroze rhythmic exercises has been shown to reduce gait and balance variability, and to lower falls incidence. A meta-analysis has concluded that falls prevention regimens can reduce injurious falls and fracture risk. A major limitation of fall prevention is the poor long term compliance. Available anti-osteoporosis treatments decrease vertebral fracture risk. Some reduce hip fracture risk in women with osteoporosis. The amino-terminal fragment of PTH teriparatide, the full length molecule, and recently an analog of parathyroid hormone related protein, abaloparatide, are associated with a marked decrease in vertebral and non-vertebral (the latter at least for teriparatide and abaloparatide) fracture risk. The monoclonal antibody against sclerostin romosozumab is likely going to join this group of drugs. With several agents, anti-fracture efficacy can be detected as early as by 6 months of therapy indicating that a treatment should be considered even in the oldest old with a limited life expectancy. The management of those patients and of those with an immediate increased fracture risk should include both falls prevention and bone strength improvement.

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OC1

ABALOPARATIDE-SC DECREASES VERTEBRAL, NONVERTEBRAL, MAJOR OSTEOPOROTIC, AND WRIST FRACTURES IN A SUBSET OF POSTMENOPAUSAL WOMEN AT HIGH RISK OF FRACTURE BY FRAX SCORE

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Objective: Abaloparatide-SC (ABL-SC) is a novel osteoanabolic agent that has the potential to be a treatment for postmenopausal women with osteoporosis. ACTIVE was a phase 3 trial of 2463 postmenopausal women with osteoporosis randomized 1:1:1 to double-blinded ABL-SC 80 µg, placebo (PBO), or open-label teriparatide (TER) 20 µg SC for 18 months. ABL-SC treatment significantly reduced the risk of vertebral and nonvertebral fractures compared to PBO, and reduced the risk of major osteoporotic fractures compared to TER. This post hoc analysis studied the efficacy of ABL-SC in a subset of women enrolled in ACTIVE with an increased risk of fracture at baseline, based on CHMP-recommended risk thresholds for inclusion in a clinical trial.

Material and Methods: Baseline fracture risk was assessed using the FRAX tool. Patients with a baseline 10-years risk of major osteoporotic fracture $\geq 10\%$ or hip fracture $\geq 5\%$ were included in analyses. The proportion of women with one or more incidents of new morphometric vertebral fractures was calculated. Event rates for nonvertebral, major osteoporotic, all clinical, and wrist fractures were estimated using the Kaplan-Meier method.

Results: After 18 months of treatment, ABL-SC treatment resulted in fewer new vertebral fractures compared to PBO

(0.5% vs. 5.6%; $P < 0.0001$) in this high-risk subgroup. ABL-SC compared to PBO also resulted in significantly fewer estimated incidents of nonvertebral, major osteoporotic, and clinical fractures; as well as significantly fewer estimated major osteoporotic and wrist fractures compared to TER (Table). **Conclusions:** A potential limitation of these analyses is that these risk thresholds were defined with respect to trial inclusion rather than as guidance for intervention. However, in this post hoc analysis of a subset of postmenopausal women with osteoporosis enrolled in ACTIVE with increased risk of fracture at baseline as determined by FRAX scores, ABL-SC significantly decreased the risk of all assessed fracture endpoints compared to PBO, and significantly decreased the risk of major osteoporotic and wrist fractures compared to TER.

Table. Fracture efficacy endpoints after 18 months of treatment for women with increased risk of fracture at baseline.

| Fracture Endpoint | PBO | ABL-SC | TER |
|--------------------|--------------|--------------|--------------|
| Vertebral | | | |
| n/N (%) | 23/414 (5.6) | 2/401 (0.5) | 6/430 (1.4) |
| P vs PBO | -- | <0.0001 | 0.0010 |
| Nonvertebral | | | |
| n/N (%) | | 10/459 (2.7) | 18/473 (4.1) |
| P vs PBO | 23/468 (5.8) | 0.0358 | 0.3653 |
| P vs TER | -- | 0.2016 | -- |
| Major Osteoporotic | | | |
| n/N (%) | 24/468 (6.0) | 5/459 (1.3) | 19/473 (4.3) |
| P vs PBO | -- | 0.0007 | 0.3841 |
| P vs TER | -- | 0.0074 | -- |
| Clinical | | | |
| n/N (%) | 33/468 (8.2) | 13/459 (3.5) | 25/473 (5.7) |
| P vs PBO | -- | 0.0055 | 0.2344 |

| | | | |
|----------|--------------|-------------|--------------|
| P vs TER | -- | 0.0883 | -- |
| Wrist | | | |
| n/N (%) | 10.468 (2.6) | 4/459 (1.0) | 13/473 (2.9) |
| P vs PBO | -- | 0.1378 | 0.5863 |
| P vs TER | -- | 0.0444 | -- |

OC2

ABALOPARATIDE-SC SIGNIFICANTLY REDUCES VERTEBRAL AND NONVERTEBRAL FRACTURES AND INCREASES BONE MINERAL DENSITY REGARDLESS OF BASELINE RISK: RESULTS FROM THE ACTIVE PHASE 3 CLINICAL TRIAL

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Objective: Abaloparatide-SC is a novel, selective activator of the PTH 1 receptor signaling pathway with potential as a treatment for postmenopausal women with osteoporosis. In the ACTIVE (Abaloparatide Comparator Trial in Vertebral Endpoints) phase 3 trial, 2463 postmenopausal women with osteoporosis (mean age 69 years; range 49–86 years) were randomized to double-blinded abaloparatide-SC 80 µg or placebo, or open-label teriparatide 20 µg SC for 18 months. During ACTIVE, abaloparatide-SC significantly reduced the risk of vertebral and nonvertebral fractures compared to placebo, and reduced the risk of major osteoporotic fractures compared to teriparatide. Prespecified subgroup analyses were performed to evaluate if fracture risk reduction was consistent across multiple subgroups categorized by baseline risk.

Material and Methods: Risk factor subgroups were defined categorically by BMD T-score of the lumbar spine, total hip and femoral neck (≤ -2.5 vs. > -2.5 and ≤ -3.0 vs. > -3.0); fracture history (yes vs. no); prevalent vertebral fracture (yes vs. no); and age (<65 vs. 65 to <75 vs. ≥ 75 years old) at baseline. Treatment effects in subgroups were assessed by forest plots and statistical tests for interactions using relative risk ratios for new vertebral fractures (Breslow-Day test), hazard ratios for nonvertebral fractures (Cox proportional hazards model), and least-squares mean differences in % change for BMD (ANCOVA model).

Results: Abaloparatide-SC vs. placebo reduced morphometric vertebral fractures 86% ($p < 0.0001$), nonvertebral fractures 43% ($p = 0.049$) and major osteoporotic fractures 70% ($p = 0.0004$), and reduced major osteoporotic fractures

compared to teriparatide by 55% ($p = 0.031$). Consistent fracture reduction was observed in the abaloparatide arm for new morphometric vertebral or nonvertebral fractures without any interactions caused by baseline risk factors. There were no meaningful interactions among any of the baseline risk factors and magnitude of BMD accrual at the lumbar spine, total hip, or femoral neck by abaloparatide-SC.

Conclusions: These data suggest that abaloparatide-SC may protect against fractures across a variety of ages and baseline risks, including prior fracture history. Abaloparatide-SC may therefore be an effective treatment option for a broad population of postmenopausal women with osteoporosis.

OC3

FRACTURE RISK REDUCTION WITH ROMOSUZUMAB: RESULTS OF A PHASE 3 STUDY IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Objective: Romosozumab (Romo) is a monoclonal antibody that binds sclerostin and increases bone formation and decreases bone resorption. Here, we report results of the FRActure study in postmenopausal woMen with osteoporosis (FRAME; NCT01575834).

Methods: This double-blind study of postmenopausal women with osteoporosis (total hip or femoral neck BMD T-score ≤ -2.5) randomized subjects to sc placebo (Pbo) or 210 mg Romo monthly for 12 months (M), followed by sc denosumab (DMab) every 6 months for 12 months in both groups. Coprimary endpoints were subject incidence of new vertebral (vert) fracture (fx) through M 12 and 24.

Results: 7180 women (mean age 71 years, mean total hip BMD T-score -2.5) were enrolled. At M12, Romo reduced new vert fx, with a relative risk reduction (RRR) of 73% (subject incidence of fx: 1.8% Pbo vs. 0.5% Romo; $P < 0.001$). In subjects who received Romo in year 1, vert fx risk reduction persisted through M24 after both groups transitioned to DmAb (2.5% Pbo/DmAb vs. 0.6% Romo/DmAb; RRR 75%; $P < 0.001$). Romo reduced clinical (nonvert plus symptomatic vert) fx risk at M12 (2.5% Pbo vs. 1.6% Romo; RRR 36%; $P = 0.008$). Nonvert fx incidence through M12 was 2.1% for Pbo (lower than expected) vs. 1.6% for Romo (RRR 25%; $P = 0.096$), with a similar risk reduction through M24 (Pbo/DmAb vs. Romo/DmAb RRR 25%; nominal $P = 0.029$, adjusted $P = 0.057$). A preplanned analysis revealed a significant interaction between treatment and geographic region for nonvert fx at M12 ($P = 0.042$). Nonvert fx incidence in Latin America was 1.2% for Pbo vs. 1.5% for Romo, whereas a 42% RRR in nonvert fx was observed in rest-of-world ($P = 0.012$). Compared to Pbo, Romo increased BMD by 12.7 and 5.8% at the lumbar spine and total hip, respectively, at M12 ($P < 0.001$). Adverse events were generally balanced between groups, with injection-site reactions in 2.9% of Pbo and 5.2% of Romo subjects during year 1. One atypical femoral fx and 2 osteonecrosis of the jaw events were positively adjudicated in the Romo group through M24.

Conclusion: Romo 210 mg monthly was well tolerated and reduced vert and clinical fx risk vs. Pbo at M12; vert fx risk reduction persisted in Romo subjects through M24 after both groups transitioned to DmAb. The sequence of Romo followed by DmAb may be a highly effective treatment for postmenopausal women with osteoporosis.

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OC4

ROMOSUZUMAB RAPIDLY REDUCES CLINICAL VERTEBRAL FRACTURE INCIDENCE: RESULTS FROM THE FRAME STUDY

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Objectives: Romosozumab (ROMO) inhibits sclerostin and has a dual effect on bone, increasing formation while decreasing resorption, resulting in significant increases in bone mineral density (BMD) at 6 months (m), which at 12 m reach 13.3% vs. placebo (PBO) at the spine.¹ Using high resolution quantitative computed tomography, BMD increases were observed at both trabecular and cortical compartments of the spine, explaining the significant reductions in radiographic vertebral fracture (Vfx) risk in women with osteoporosis (OP) enrolled in the FRAME trial (NCT01575834). Here, we report the effect of ROMO on clinical (clin) Vfx incidence over 12 m in women in FRAME with back pain.

Materials and Methods: FRAME enrolled 7180 postmenopausal women with OP, mean age 70.9 years (total hip T-score -2.5 to -3.5) and no severe Vfx. Patients received monthly ROMO ($n = 3589$; 210 mg) or PBO ($n = 3591$) for 12 m. At monthly visits, women with back pain consistent with a clin Vfx had a confirmatory spinal X-ray. Clin Vfx risk (ROMO vs. PBO) was calculated by Cox-proportional hazards model.

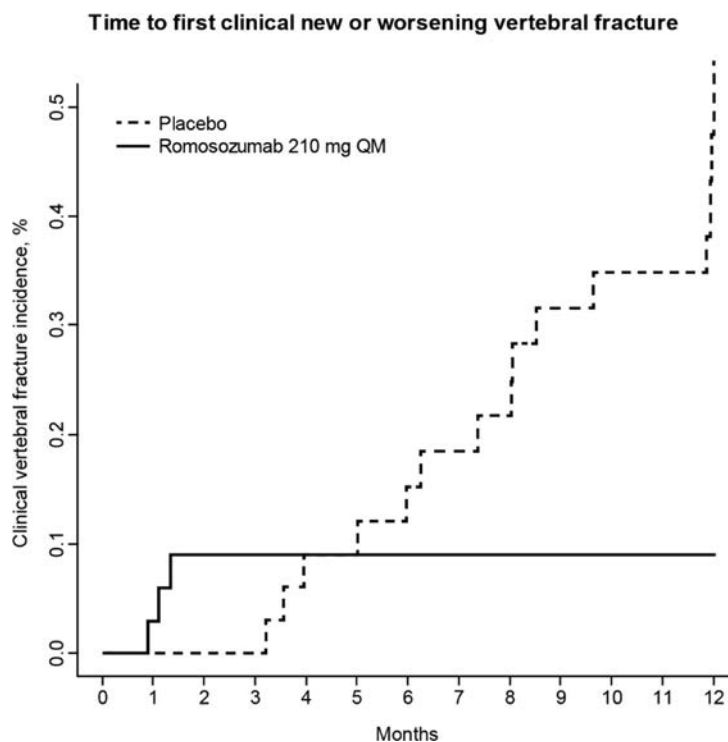
Results: Of 119 women reporting back pain over 12 m, 20 women were diagnosed with a new or worsening Vfx. With ROMO, 3 clin Vfx ($< 0.1\%$; all at < 2 m) were identified vs. 17 (0.5% at 12 m) with PBO (Figure). Clin Vfx risk was 83% lower in the ROMO group vs. PBO at 12 m (hazard ratio 0.17; 95% CI, 0.05–0.58; $p = 0.001$). In women with clin Vfx vs. no clin Vfx, the lumbar spine T-score was numerically lower and the FRAX score higher at baseline; other baseline characteristics were comparable among all women who reported back pain.

Conclusions: ROMO treatment for 12 m was associated with rapid and large reductions in clin VFX risk vs. PBO. In the ROMO group, all clin VFX occurred <2 m; clin VFX risk was ≥ 5 times higher with PBO

vs. ROMO. Monthly study visits in FRAME allowed for timely radiologic confirmation of a suspected clin VFX.

References: 1. Cosman F et al. *N Engl J Med* 2016;375:1532.

Figure



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OC5

EFFECT OF DENOSUMAB COMPARED WITH RISEDRONATE IN GLUCOCORTICOID-TREATED INDIVIDUALS: RESULTS FROM THE 12-MONTHS PRIMARY ANALYSIS OF A RANDOMIZED, DOUBLE-BLIND, ACTIVE-CONTROLLED STUDY

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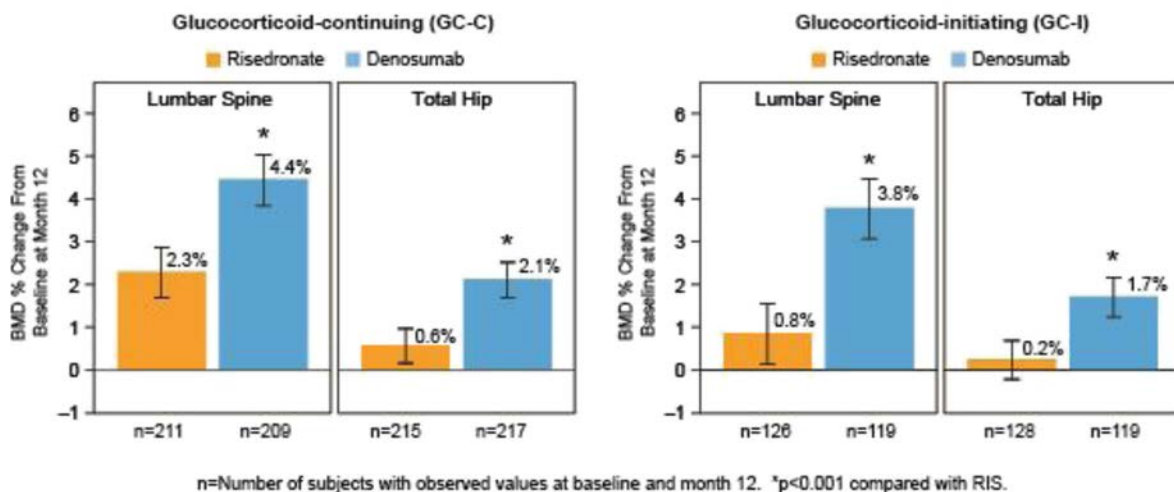
Objective: Assess the safety and efficacy of DMAB vs. RIS in subjects with glucocorticoid-induced osteoporosis (GIOP).

Methods: This ongoing, 24-months, phase 3 study enrolled subjects ≥ 18 years receiving GC (≥ 7.5 mg daily prednisone or equivalent) for ≥ 3 or < 3 months (mos) prior to screening (GC-continuing [GC-C] and -initiating [GC-I], respectively). Subjects < 50 year were required to have prior osteoporotic fracture; GC-C subjects ≥ 50 year were required to have lumbar spine (LS), total hip (TH), or femoral neck bone mineral density (BMD) T-score ≤ -2.0 ; or T-score ≤ -1.0 with prior fracture. Subjects were randomized 1:1 to SC DMAB 60 mg every 6 months or RIS 5 mg daily for 24 months. Primary outcome was percentage change from baseline (% Δ) in LS BMD at 12 months (non-inferiority in GC-C and GC-I). Secondary outcomes included % Δ in LS and TH BMD at 12 months (superiority).

Results: 795 subjects (505 GC-C, 290 GC-I) enrolled, with baseline characteristics balanced between treatment groups (data not shown). Non-inferiority (% Δ in LS BMD at 12 months) and superiority (% Δ in LS and TH BMD at 12 months) with DMAB were shown for the GC-C and GC-I subpopulations (Fig). Incidence of adverse events (AEs) and serious AEs, including serious AEs of infection, and fracture, were similar between treatment groups and consistent with the known safety profile of DMAB.

Conclusion: DMAB increased BMD significantly more than RIS at the spine and hip at 12 months. The overall safety profile was similar between treatments. DMAB is a new potential treatment for patients newly initiating or continuing GC at fracture risk.

Figure. BMD Percentage Change From Baseline at Month 12



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OC6

DISCONTINUATION OF DENOSUMAB AND ASSOCIATED VERTEBRAL FRACTURE INCIDENCE: ANALYSIS FROM FREEDOM AND ITS EXTENSION

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Objective: Describe vertebral fracture (VFX) risk and possible determinants in subjects who discontinued denosumab (DMAb) during FREEDOM (3 years) or Extension (7 years).

Material and Methods: We analysed subjects who received ≥ 2 doses of investigational product (IP; DMAb 60 mg Q6M or placebo [pbo]) and discontinued IP but stayed on study ≥ 7 months after last dose. Subjects who discontinued DMAb from FREEDOM or Extension were analyzed as one group; logistic regression explored covariates related to off-treatment new VFX.

Results: 1001 subjects discontinued DMAb during FREEDOM or Extension, of these 56 (5.6%) sustained new VFX. Upon DMAb discontinuation, new VFX incidence increased relative to the on-treatment period but was within the range of those who discontinued pbo (Table). The same pattern was seen in subjects with prior VFX before treatment, who had higher on- and off-treatment VFX rates than the overall population. Among subjects with off-treatment new VFX, a greater percentage of those who discontinued DMAb than pbo sustained multiple new VFX. Prior VFX before or during treatment was the strongest predictor of off-treatment new VFX, including multiple VFX (odds ratio 2.1–3.4).

Conclusion: DMAb discontinuation is associated with an increase in VFX rate to levels comparable to pbo. Among subjects who sustained new VFX after DMAb cessation, there was a greater incidence of multiple new VFX than in pbo. Subjects with prior VFX are at high risk for off-treatment new VFX and should continue osteoporosis therapy; those who discontinue DMAb should transition to another therapy.

Table. Off-treatment vertebral fracture incidence in subjects who discontinued IP in FREEDOM or its Extension

| | FREEDOM Placebo | FREEDOM + Extension Denosumab |
|---|--------------------|-------------------------------------|
| All subjects | <i>N</i> = 470 | <i>N</i> = 1,001 |
| Off-treatment new VFX, n (%) | 29 (6.25) | 56 (5.6%) |
| Off-treatment multiple new VFX, n (%) [among all subjects] | 10 (2.1%) | 34 (3.4%) |
| Off-treatment multiple new VFX, n (%) [among all subjects with new VFX] | 10 (34.5%) | 34 (60.7%) |
| On-treatment new VFX (per 100 subjects-years) | 7.0 | 1.2 |
| Off-treatment new VFX (per 100 subjects-years) | 8.0 | 7.1 |
| Subjects with prior VFX before treatment (26%) | <i>N</i> = 122 | <i>N</i> = 255 (25%) |
| Off-treatment new VFX, n (%) | 12 (9.8%) | 19 (7.5%) |
| Off-treatment multiple new VFX, n (%) [among all subjects] | 5 (4.1%) | 15 (5.9%) |
| Off-treatment multiple new VFX, n (%) [among all subjects with new VFX] | 5 (41.7%) | 15 (78.9%) |
| On-treatment new VFX (per 100 subjects-years) | 11.6 | 1.9 |
| Off-treatment new VFX (per 100 subjects-years) | 14.4 | 12.1 |

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OC7

A NEW SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS OF LONG-TERM TRIALS OF PHARMACOLOGICAL TREATMENTS IN KNEE OSTEOARTHRITIS

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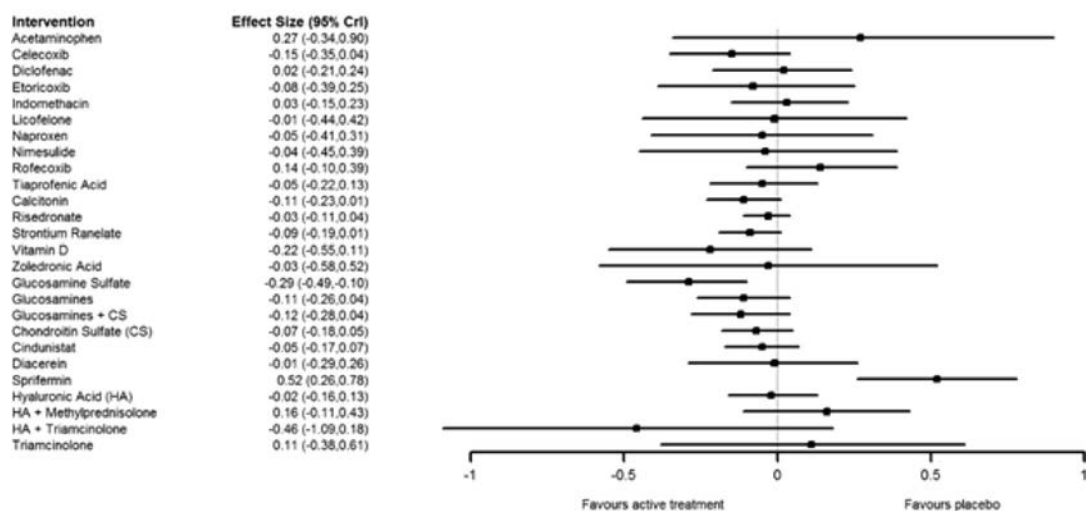
Objective: Osteoarthritis (OA) is a chronic and progressive degenerative disease. Most clinical trials of pharmacological agents for the treatment of OA assess their efficacy over short-term periods. This is the first systematic review and meta-analysis of trials investigating the effects of available medications over long-term treatment courses on symptoms and joint structure changes in knee OA.

Material and Methods: The Cochrane Central Register of Controlled Trials (CENTRAL), PubMed, Embase, Scopus and Web of Science were searched for randomized controlled trials (RCTs) of pharmacological interventions in knee. Reference lists of retrieved articles were also screened for additional trials. Only RCTs with treatment/follow-up of at least 1 year were eligible. The primary outcome was knee OA pain change from baseline to the endpoint (≥ 12 months) on a validated scale. Secondary outcomes were changes in physical function and joint structure expressed as radiologic medial tibiofemoral joint space narrowing (JSN). We performed a random-effects network meta-analysis within a Bayesian framework. Imputation methods for mean changes and variability measures were adopted to include papers with incomplete data.

Results: A total of 5992 articles for RCTs of drug therapy in knee OA were retrieved and 38 RCTs involving 18833 patients met the long-term eligibility criteria. All available pharmacological intervention categories were represented, including acetaminophen, non-steroidal anti-inflammatory drugs (NSAIDs), corticosteroids, bone acting agents, Slow Acting Drugs in OA and putative disease-modifying drugs. Overall, there were 27 interventions including placebo studied for long-term pain control, 13 for physical function and 17 for JSN, with trial duration ranging between 1 and 3 years. There was no evidence of efficacy for most interventions vs. placebo, with the exception of prescription glucosamine sulfate that was significant on pain (Figure) and physical function, with a Glass' Delta Effect Size (ES) of -0.29 [95% credibility interval: -0.49 ; -0.10] and -0.32 [-0.52 , -0.12], respectively. Glucosamine sulfate, chondroitin sulfate and strontium ranelate were the only interventions able to significantly reduce radiologic JSN (ES 0.42 [0.20 ; 0.64], 0.20 [0.08 ; 0.31] and 0.20 [0.06 ; 0.35], respectively).

Conclusions: This network meta-analysis shows no evidence of efficacy in the long-term management (at least 1 year) of knee OA for available medications. The only exception is prescription glucosamine sulfate, that is consistently effective on symptoms and joint structure changes, while chondroitin sulfate and strontium ranelate are effective only on structure. Additional long-term RCTs of available and new medications are needed in OA.

Figure: Estimates of long-term treatments compared with placebo (primary outcome - Pain)



OC8

PHARMACEUTICAL-GRADE CHONDROITIN SULFATE IS AS EFFECTIVE AS CELECOXIB AND SUPERIOR TO PLACEBO IN SYMPTOMATIC KNEE OSTEOARTHRITIS: THE CHONDROITIN VS CELECOXIB VS PLACEBO TRIAL (CONCEPT)

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Background/Purpose: For the assessment of Symptomatic Slow Drugs in Osteoarthritis (SYSADOAs), regulatory Agencies request the assessment of two co-primary endpoints: pain and function. They also recommend the design of three-arm studies including the investigational drug, a placebo and an active comparator.

Objectives: To assess the efficacy and safety of Pharmaceutical-grade Chondroitin Sulfate (800 mg/day) (CS) in the symptomatic management of knee OA in complete accordance with the guideline of the European Medicines Agency

Methods: The CONCEPT study investigated the symptomatic effects of pharmaceutical grade Chondroitin Sulfate (CS) (800 mg/day), Celecoxib (CE) (200 mg/day) and a placebo (PL) in a double-blind, double-dummy Phase III clinical trial.

Results: 640 patients recruited in 5 European countries, with knee osteoarthritis (OA) in accordance with the ACR criteria, were followed for 182 days. In the intention to treat analysis, pain (VAS) was significantly reduced, at D182, in the CS group (-42.6 mm) and in the CE group (-39.5 mm) compared to PL group (-33.3 mm) ($p=0.0008$ for CS and $p=0.0087$ for CE). No differences were observed between CS and CE. The Lequesne index, measuring pain and function, showed similar results with CS (-4.7) and CE (-4.6) being significantly different from PL (-3.7) ($p=0.0231$ for CS and $p=0.0151$ for CE) and no difference between CS and CE.

Similar results were observed for the Minimum Clinically Important Improvement (MCII) and Patient Acceptable Symptoms State (PASS) at D182 for the intention to-treat and per-protocol populations. Safety analyses showed no significant differences between the three groups.

Conclusion: Pharmaceutical grade Chondroitin Sulfate, at the dose of 800 mg/day, reduced pain and improved function to the same extend as Celecoxib and significantly more than placebo, in patients with knee osteoarthritis.

Disclosure: J. Y. Reginster, Servier, Novartis, Negma, Lilly, Wyeth, Amgen, GlaxoSmithKline, Roche, Merckle, Nycomed-Takeda, NPS, IBSA-Genvrier, Theramex, UCB, Asahi Kasei, Endocyte, Radius Health, 5, Merck Sharp and Dohme, Lilly, Rottapharm, IBSA, Genvrier, Novartis, Servier, Roche, GlaxoSmithKline, Merckle, Teijin, Teva, Analis, Theramex, Nycomed, NovoNordisk, Ebewee

Pharma, Zodiac, Danone, Will Pharma, Amgen, 9, Bristol Myers Squibb, Merck Sharp and Dohme, Rottapharm, Teva, Roche, Amgen, Lilly, Novartis, GlaxoSmithKline, Servier, Pfizer, Theramex, Danone, Organon, Therabel, Boehringer, Chiltern, Galapagos, 2;

OC9

DISCOVERY OF A SMALL MOLECULE WNT PATHWAY INHIBITOR (SM04690) AS A POTENTIAL DISEASE MODIFYING TREATMENT FOR KNEE OSTEOARTHRITIS

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Objectives: Wnt signaling affects pathogenesis of osteoarthritis (OA) by regulating stem cell differentiation that results in cartilage thinning and increased subchondral bone. SM04690, a novel, small-molecule Wnt pathway inhibitor was evaluated in vitro to determine its ability to augment chondrogenesis and in a preclinical OA model to prevent cartilage deterioration and improve joint health.

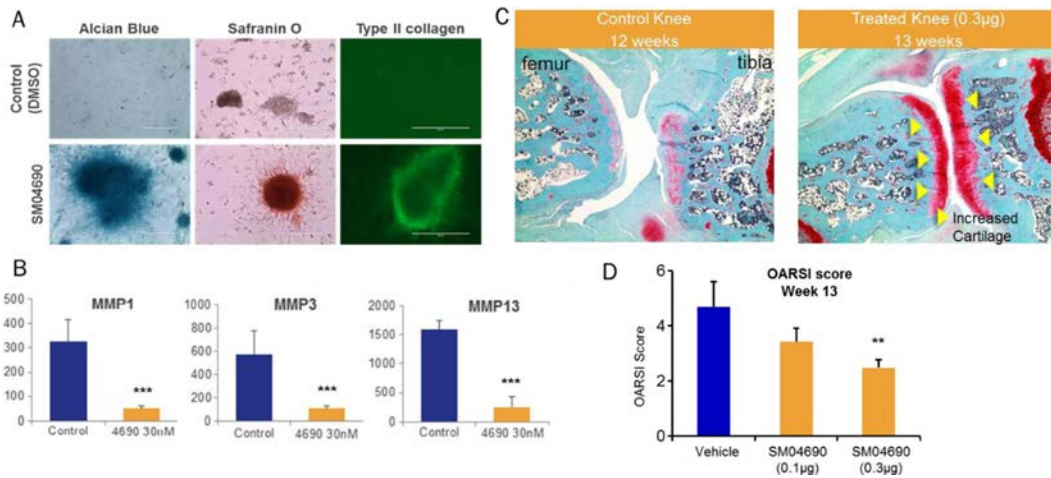
Methods: Wnt pathway inhibition was measured using a cell-based reporter assay. Chondrogenesis was histologically evaluated using differentiation of human mesenchymal stem cells (hMSCs) to chondrocytes. Protease release from chondrocytes and cytokine release from synovial fibroblasts was measured by qRT-PCR and ELISA. Pharmacokinetics were evaluated by intra-articular (IA) injection in rats, followed by analysis of SM04690 concentrations in joints and plasma. Safety evaluations included clinical observation and histopathology. In vivo efficacy was measured in a rodent model of knee OA by histological evaluation, using Osteoarthritis Research Society International (OARSI) score and biomarker measurement.

Results: SM04690 was a potent (EC_{50} @3nM) inhibitor of Wnt signaling, and significantly increased the differentiation of hMSCs (EC_{50} @30nM) into mature and functional chondrocytes (figure 1A). SM04690 inhibited matrix metalloprotease release (figure 1B) from chondrocytes and cytokine release (TNF- α , IL-1 β , IL-5, IL-6, IL-8 and IL-17) from synovial fibroblasts. One IA injection of SM04690 resulted in joint concentrations > EC_{50} for >180 days, with no detectable systemic exposure or toxicity up to >1400 \times the therapeutic dose. This dose also inhibited Wnt signaling in vivo and in the rodent model of knee OA, it increased cartilage thickness (figure 1C), resulting in significantly reduced OARSI scores (** $p < 0.01$; figure 1D) and OA biomarkers compared to vehicle.

Conclusions: In a rodent model of knee OA, an IA injection of the Wnt pathway inhibitor SM04690 induced chondrogenesis, inhibited protease and cytokine production, and

improved cartilage health compared to vehicle, with no detectable exposure in plasma or systemic toxicity. SM04690 has potential as a disease modifying therapy for OA.

Disclosures: Lane serves as an advisor to Samumed, LLC. Deshmukh, Hu, Barroga, KC, and Yazici are employees of Samumed, LLC.



SM04690 induced chondrogenesis and protected cartilage (A) hMSCs treated with either DMSO or SM04690 (30nM) for 21 days and stained for various markers of mature chondrocytes. (B) Gene expression of proteases in chondrocytes treated with TNF α (20 ng/ml)+Oncostatin M (10 ng/ml) and SM04690 (30nM) for 72 h ($n=3$, Mean \pm SD, *** $p < 0.001$). (C) Representative images of medial tibial plateau of the knee joint stained with Safranin O-Fast Green from naïve or vehicle treated or SM04690 (0.3 µg) treated rats 13 weeks after surgery. (D) The medial tibial plateau joint score in the ACLT+pMMx model, based on the OARSI scoring system ($n=12$ rats, Mean \pm SEM, ** $p < 0.01$)

OC10

THE ASSOCIATION OF KNEE OSTEOARTHRITIS AND PREMATURE MORTALITY IN THE COMMUNITY: AN INTERNATIONAL INDIVIDUAL PATIENT LEVEL META-ANALYSIS IN SIX PROSPECTIVE COHORTS

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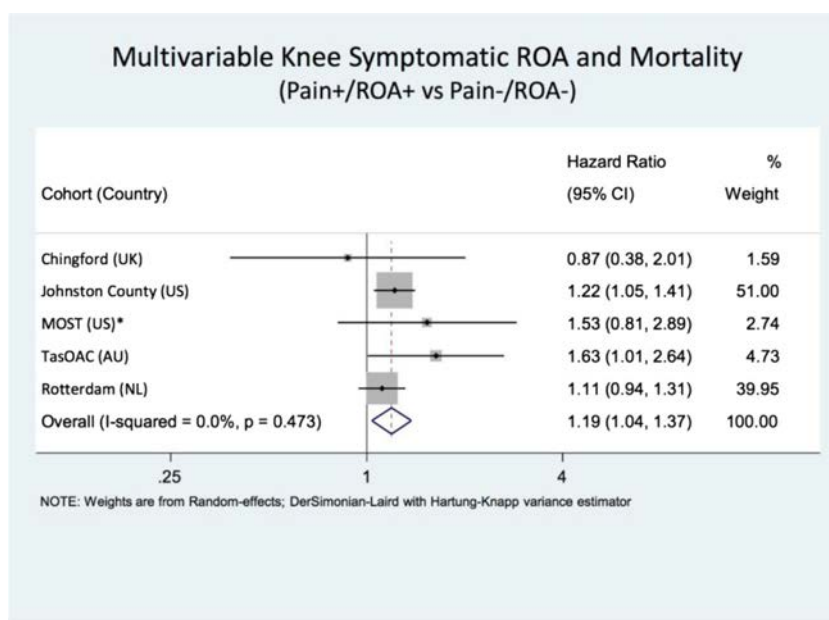
Objective: To combine individual participant data (IPD) from major international population-based cohorts, using harmonised OA data, to assess whether subjects with knee OA have an increased association with premature mortality.

Methods: Five general population and one enhanced risk factor* cohort were identified and had IPD available for analysis: three US (Framingham, Johnston County Osteoarthritis Project and Multicentre Osteoarthritis Study* (MOST)); UK (Chingford); Dutch (Rotterdam Study); and Australian (Tasmanian Older Adult Cohort (TasOAC)). Cohorts were included regardless of whether they had previously published

on OA and mortality. Subjects were divided into four knee OA categories based on the results of an expert consensus study: (1) No OA (ROA-/Pain-); (2) ROA only (ROA+/Pain-); (3) Symptomatic OA [SOA] (ROA-/Pain+); (4) Symptomatic Radiographic OA [SROA] (ROA+/Pain+). Subjects were free from RA, aged 45–80 years old, and had complete data (<10% missingness). The association between OA and time to all-cause mortality was assessed using Cox proportional hazard models giving hazard ratios (HRs) and 95% confidence intervals (95% CI). No OA (ROA-/Pain-) subjects were controls for both the SROA and SOA analyses. Two-stage IPD meta-analysis methods were utilised, with cohorts analysed in separate cox models, and then pooled in the second stage using random effect DerSimonian and Laird estimation with a Hartung-Knapp correction.

Results: There were 253 to 3384 subjects in each cohort, totalling 9889 subjects with a median follow-up of 5.6 to 19.8 years. Prevalence of knee SROA ranged from 4.4% in the youngest cohort to 33.3% in the risk enriched cohort. Subjects with SROA had a significant association with premature mortality in both the unadjusted (HR 1.47 [95% CI 1.07, 2.04]) and age, sex and race adjusted model (HR 1.19 [95% CI 1.04, 1.37]) (fig 1). Subjects with SOA had no significant increased association with mortality in either model.

Conclusion: Subjects with knee SROA showed a significant 19% increased association with premature mortality independent of age, sex and race compared to subjects free from OA. This international study is one of the largest analyses of well-phenotyped knee osteoarthritis and mortality in the general population.



OC11

OSTEOARTHRITIS INCREASES THE RISK OF CARDIOVASCULAR DISEASE: DATA FROM THE OSTEOARTHRITIS INITIATIVE

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Objective: Although osteoarthritis (OA) is a common condition in older adults, the role of OA in increasing cardiovascular disease (CVD) incidence is still debated. The aim of this

study was to investigate the association between OA and the onset of CVD in a large database of American adults.

Material and Methods: The Osteoarthritis Initiative (OAI) dataset, a multi-center, longitudinal, observational study, collected data on community-dwelling adults. Osteoarthritis was defined as the presence of OA of the hand, knee, hip, back/neck or of other sites. CVD was defined as self-reported presence of heart attack, heart failure, stroke and other cerebral atherosclerotic conditions, and peripheral artery disease.

Results: A total 4,265 persons without CVD (mean age = 60.8 years, females = 59.2%) at baseline were analyzed (1,775 with OA vs. 2,490 without). Over a mean of 8.2 years, according to an adjusted Cox's regression analysis for 11

potential baseline confounders, study participants with OA of any joint had a significantly higher risk of developing CVD compared to those without OA (Hazard ratio (HR):=1.27; 95% CI: 1.03–1.56). The presence of hand OA was associated with a higher risk of developing CVD (HR = 1.31; 95% CI: 1.01–1.68) with respect to those who had no OA. Knee, hip and back/neck OA did not, instead, increase the risk of developing CVD. The association between OA and CVD was significant in the women, but not in the men.

Conclusions: OA, in particular, when it affects the hand and is found in women, was associated with a higher risk of developing CVD.

OC12

A RANDOMISED DOUBLE-BLIND PLACE-BOCONTROLLED CROSSOVER TRIAL OF ADALIMUMAB FOR EROSIIVE HAND OSTEOARTHRITIS: THE HUMOR TRIAL

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Objective: To assess the efficacy of adalimumab vs. placebo in patients with erosive hand osteoarthritis (OA).

Material and Methods: This was a randomised double-blind placebo-controlled crossover trial. Patients >50 years old, meeting the ACR criteria for hand OA, with pain >50/100 mm VAS, morning stiffness >30 min, ≥ 1 erosive interphalangeal joint on x-ray with synovitis present on MRI were recruited. Patients with systemic inflammatory arthritis or contraindications to adalimumab were excluded. Patients were randomised to adalimumab (40 mg subcutaneous injections every other week) or identical placebo injections for 12 weeks followed by an 8-weeks washout and then the converse treatment for 12 weeks. Hand pain was assessed using a VAS (0–100 mm) and hand pain, function and stiffness were measured using the Australian/Canadian Hand OA Index (AUSCAN) at baseline, 4, 8 and 12 weeks. MRI-defined synovitis and bone marrow lesions (BMLs) of the index joint were scored according to the OMERACT scoring systems for interphalangeal and thumb base OA at baseline and 12 weeks, blinded to treatment allocation. The primary outcome was change over 12 weeks as assessed by VAS pain. Secondary outcomes included change in AUSCAN pain, function and stiffness at 4, 8 and 12 weeks, change in synovitis and BMLs at 12 weeks and change in VAS pain at 4 and 8 weeks. Analysis was by intention to treat. Treatment effects were calculated using paired t-tests, as each patient served as his or her own control.

Results: 51 patients were recruited and 43 were randomised to either Group 1 ($N=18$, active then placebo) or Group 2 ($N=25$, placebo then active). Mean age was 61 years (SD 8.4), 77% were women, and mean VAS pain was 63.6 (SD 17.7) at baseline indicating highly symptomatic disease. At 12 weeks there was no difference between the groups on the primary outcome measure: mean decrease in VAS pain was 3.0 (SD 17.0) following adalimumab treatment vs. 0.7 (SD 30.0) following placebo (treatment effect: 2.3 (SD 31.0), $P=0.65$). There were small changes in synovitis and BML scores in both groups. No statistically significant differences were found for any of the secondary outcomes or the rate of adverse events.

Conclusions: Adalimumab was no different to placebo for pain, synovitis or BMLs in patients with erosive hand OA

Disclosures: Funded by AbbVie Pty Ltd.

OC13

PREMENOPAUSAL WOMEN WITH EARLY BREAST CANCER TREATED BY OESTRADIOL SUPPRESSION HAVE SEVERELY DETERIORATED BONE MICROSTRUCTURE

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Background: In premenopausal women with early oestrogen-receptor-positive breast cancer, combined ovarian suppression and aromatase inhibition result in a precipitous decline in oestradiol production. The resulting unbalanced and rapid bone remodelling replaces older more mineralised bone with a smaller volume of less fully mineralised new bone. We hypothesised that these changes result in severe trabecular and cortical microstructural deterioration and reduced matrix mineralisation density.

Methods: This cross-sectional study included 27 premenopausal women, mean age 43.3 years (range 30.4 to 53.7) with early breast cancer ('cases') made oestradiol deficient for 17 months (range 6–120) by combined ovarian suppression and aromatase inhibition, 42 healthy age-matched premenopausal controls and 35 healthy postmenopausal controls, mean age 62.6 years (range 60.2 to 65.5). Images of the distal radius and distal tibia were acquired using high-resolution peripheral quantitative computed tomography. Cortical and trabecular microstructure were quantified using the StrAx1.0 algorithm.

Results: Compared with premenopausal controls, cases had 0.75 SD (95% CI 0.21 to 1.29) lower distal radial trabecular

bone volume fraction (bone volume/tissue volume, BV/TV) due to 1.29 SD (0.71 to 1.87) fewer trabeculae. Cortical porosity was 1.25 SD (0.59 to 1.91) higher. Compared with postmenopausal controls 20 years older, cases had comparable or lower trabecular BV/TV and comparable cortical porosity. Matrix mineral density was 1.56 SD (0.90 to 2.22) lower in cases than in premenopausal controls and 2.17 SD (1.50 to 2.84) lower than in postmenopausal controls. Results at the tibia were similar.

Conclusion: The longevity of premenopausal women with early breast cancer treated with endocrine therapy and the severe microstructural deterioration associated with oestradiol depletion provide a compelling rationale to investigate the efficacy of antiresorptive therapy.

Disclosures: ES has received research support and has lectured at national and international meeting symposia funded by Amgen, Allergan, Asahi, Genzyme, and Merck Sharp and Dohme. He is director of the board and shareholder in StraxCorp, is remunerated by StraxCorp as chief medical officer, and is one of the inventors of the StrAx1.0 algorithm. No financial compensation was derived from this work. AGZ is remunerated by StraxCorp as senior image analyst, and is one of the inventors of the StrAx1.0 algorithm. PAF has received honoraria from AstraZeneca. All authors state that they have no other conflicts of interest.

OC14

WOMEN IDENTIFIED AT HIGH RISK BASED ON FRAX HIP FRACTURE PROBABILITY ARE RESPONSIVE TO APPROPRIATE OSTEOPOROSIS MANAGEMENT: ANALYSIS FROM THE SCOOP STUDY OF POPULATION SCREENING

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Objectives: Targeting of treatment in interventional studies to reduce osteoporotic fractures have usually been based on low BMD and/or fracture rather than the absolute risk of fracture, e.g. using FRAX probabilities. The recently completed SCOOP screening study recruited women from UK primary care practices and targeted treatment to those at highest hip fracture risk using FRAX. We wished to examine the impact

of the screening intervention on hip fracture risk according to baseline FRAX hip fracture probability.

Methods: The SCOOP study comprised a two-arm randomised controlled trial in women aged 70 to 85 years comparing a screening programme vs. usual management. In the screening arm, treatment was recommended in women identified to be at high risk of hip fracture by FRAX. Age-dependent intervention thresholds were used ranging from 5.24% in 70–74 year olds to 8.99% hip fracture probability in 85 year olds.

Results: Of 12 483 eligible participants, 6233 women were randomised to screening, with treatment recommended in 898 (14.4%); in these, uptake of medication at 6 months was 78.3%. In the screening arm, the number of incident hip fractures was lower than that in the control arm (218 vs. 164) reflecting a 28% reduction in hip fracture risk (hazard ratio 0.72, 95% CI 0.59 to 0.89, $p=0.002$). As treatment was targeted to those at highest risk, the effect on hip fracture risk increased significantly with baseline FRAX hip fracture probability ($p=0.021$ for interaction); for example at the 10th centile of baseline FRAX hip probability (2.6%), hip fractures were not significantly reduced (HR 0.93, 0.71–1.23) but at the 90th centile (16.6%), there was a 33% reduction (HR 0.67, 0.53–0.84).

Conclusions: Women identified at high fracture risk based on hip fracture probability are responsive to appropriate osteoporosis management. This study demonstrates the feasibility of a community-based screening intervention using the FRAX tool. N.B. The authorship also includes the SCOOP Study Investigators.

OC15

CAN INDIVIDUALISED RISK FEEDBACK PRODUCE LONG-TERM HEALTH BENEFITS? A 10-YEAR FOLLOW-UP OF A 2-YEAR RANDOMISED CONTROLLED TRIAL OF FEEDBACK OF FRACTURE RISK

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Objectives: Feedback of an individual's disease risk is useful for improving health behaviours for a range of diseases but has only been tested in short-term studies. For osteoporosis, any benefits of early life preventive efforts need to persist into older adulthood to be clinically important. This study aimed to determine if beneficial effects of individualised feedback of fracture risk on osteoporosis preventive behaviours and bone

mineral density (BMD) observed in a 2-years randomised controlled trial (RCT), were sustained long-term.

Methods: This 10-years follow-up of a 2-years RCT included 470 women aged 25–44 years who were randomised at baseline to receive the Osteoporosis Prevention and Self-management course (OPSMC) or an information leaflet and given BMD determined feedback of either being or not being at higher risk of fracture in later life (high vs. normal risk groups). BMD of lumbar spine (LS) and femoral neck (FN) was measured by dual-energy X-ray absorptiometry and osteoporosis preventive behaviours by questionnaires.

Results: From 2 to 12 years, the high risk group had a smaller decrease in FN BMD ($\beta=0.023$ (95% CI: 0.005–0.042) g/cm²) but similar LS BMD change as the normal risk group. They also had a more favourable pattern of smoking behaviour change (RR=1.85 (95% CI: 0.70–4.89) for smoking cessation; 0.33 (0.13–0.80) for commenced or persistent smoking) and were more likely to use calcium supplements (RR=1.66 (1.22–2.24)) and vitamin D supplements (RR=1.99 (1.27–3.11)). The OPSMC group had a more favourable pattern of smoking behaviour change compared to the leaflet group (RR=2.27 (0.86–6.01) for smoking cessation; 0.28 (0.10–0.79) for commenced or persistent smoking) but other behaviours and BMD changes were similar.

Conclusions: Feedback of high fracture risk to younger women was associated with long-term improvements in osteoporosis preventive behaviours and attenuated FN BMD loss so could be considered as a strategy to prevent osteoporosis. Benefits could extend to other diseases and a similar approach could be trialled for diseases, such as cardiovascular diseases where early individualised risk assessment is possible.

OC16

MOBILITY RELATED RISK FACTORS PREDICT INCIDENT FRACTURES INDEPENDENTLY OF FRAX: THE OSTEOPOROTIC FRACTURES IN MEN (MROS) STUDY

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Objective: We investigated, across the 3 Osteoporotic Fractures in Men (MrOS) Study cohorts, whether mobility related risk factors (time for 5 chair stands and walking speed) predicted incident fractures independently of FRAX probability.

Methods: We studied older men participating in MrOS Sweden, Hong Kong and USA. Available baseline information included falls history, clinical risk factors for falls and fractures, femoral neck BMD and calculated FRAX probabilities. An extension of Poisson regression was used to investigate the relationship between time for 5 chair stands or walking speed, FRAX probability [major osteoporotic fracture (MOF) with BMD], and incident fracture. All associations were adjusted for age, time since baseline and cohort, and are reported as hazard ratio (HR) per SD difference in predictor.

Results: Information on mobility related risk factors and BMD was available for: 5789 men in USA (mean age 73.5 years); 2883 men in Sweden (mean age 75.4 years); and 1987 men in Hong Kong (mean age 72.4 years). Mean follow-up time ranged from 8.7 to 10.8 years. 4223, 1791 and 1661 men respectively also had FRAX probability. Across all cohorts, increasing time for 5 chair stands was associated with greater risk of incident fracture at any site [HR: 1.17 (95% CI: 1.13, 1.22)], MOF [HR: 1.24 (95% CI: 1.18, 1.30)] and hip fracture [HR: 1.32 (95% CI: 1.23, 1.41)]. Greater walking speed was associated with lower risk of incident fracture [any fracture, HR: 0.90 (95% CI: 0.85, 0.94); MOF, HR: 0.83 (95% CI: 0.78, 0.88); hip fracture, HR: 0.70 (95% CI: 0.64, 0.77)]. These relationships did not materially change when FRAX probability (calculated with femoral neck BMD) or femoral neck BMD alone, was included in the models.

Conclusions: Mobility related markers of falls risk predict incident fractures independently of FRAX probability. Although these findings suggest that such risk factors may usefully add to fracture risk assessment, confirmation that they might be amenable to therapeutic interventions is required.

OC17

IMMINENT RISK OF HIP FRACTURE AFTER RECENT (SENTINEL) FRACTURE – COMPARISON OF SENTINEL FRACTURE SITES (REYKJAVIK STUDY)

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A history of fracture is a strong risk factor for future fractures. The aim of the present study was to determine whether the predictive value of a recent (sentinel) fracture for future hip fracture differed by site of fracture.

The analysis was based on an Icelandic population-based cohort of 18,872 men and women born between 1907 and 1935. Fractures were documented over a total follow-up of 510,265 person-years. An extension of Poisson regression was used to investigate the relationship between the first (sentinel) fracture and subsequent hip fractures. All associations were adjusted for age and time since baseline.

Sentinel hip, clinical vertebral, forearm and humeral fractures were identified in 2074, 1365, 2364 and 1092 individuals, respectively. Subsequent hip fractures arose in 352, 256, 435 and 215 individuals, respectively. The risk of hip fracture within 5 years after the sentinel fracture for a women aged 60 years varied from 6 to 31-fold higher than the risk of a hip fracture in the normal population depending on the site of the sentinel fracture (Table 1).

We conclude that the risk of hip fracture after a sentinel fracture depends in part on the site of the first fracture. The very high risk ratios underline the importance of treating patients as soon as possible after sustaining a major fracture.

The project is supported by Radius Health.

Table 1. Risk ratio between risk of hip fracture 5 year after a sentinel fracture at the sites shown and the risk of hip fracture in the normal population for a woman aged 60 years.

| Sentinel | RR (95% CI) of hip fracture |
|-----------------------------|-----------------------------|
| Clinical vertebral fracture | 31.4 (20.3–48.6) |
| Hip fracture | 13.2 (9.2–19.1) |
| Humeral fracture | 8.1 (4.1–15.8) |
| Distal forearm fracture | 6.1 (3.7–10.1) |

OC18

ABALOPARATIDE-SC FOR POSTMENOPAUSAL OSTEOPOROSIS: ANALYSIS OF THE NUMBER NEEDED TO TREAT COMPARED WITH TERIPARATIDE

Objective: Abaloparatide-SC (ABL-SC) is a novel, investigational, osteoanabolic agent that binds selectively to the RG conformation of the parathyroid type 1 receptor, potentially resulting in an enhanced net anabolic effect with decreased bone resorption. In an 18-months phase 3, double-blind, randomized controlled trial (Abaloparatide Comparator Trial In Vertebral Endpoints; ACTIVE) of postmenopausal women with osteoporosis, ABL-SC significantly reduced the relative risk of vertebral (86%) and the risk of nonvertebral (43%) fractures compared to placebo, and reduced the risk of major osteoporotic fractures compared to teriparatide (55%). Treatment-emergent adverse events were similar across treatment groups. To further evaluate the effectiveness of ABL-SC in ACTIVE, we analyzed the number needed to treat (NNT) to prevent one fracture.

Material And Methods: A total of 2463 postmenopausal women with osteoporosis (mean age 68.8 years) were randomized 1:1:1 to double-blinded ABL-SC 80 µg or placebo, or open-label teriparatide 20 µg SC, for 18 months. NNT to prevent one fracture was calculated for treatment vs. placebo. NNT for ABL-SC was also calculated using higher placebo incidence rates for vertebral fractures from earlier randomized controlled trials (FREEDOM trial: Boonen 2011; FIT trial: Black 1996), assuming the same risk reduction of 86% seen in ACTIVE.

Results: NNT for ABL-SC vs. placebo was 28 for vertebral, 55 for nonvertebral, 37 for clinical, and 34 for major osteoporotic fractures. NNT for teriparatide vs. placebo was higher for each fracture type (Table). NNT for ABL-SC for vertebral fracture was 17 and 8, respectively, using 3-years placebo incidence rates from FREEDOM (7%) and FIT (15%).

Conclusions: Following 18 months of treatment on ACTIVE, the NNT for abaloparatide-SC vs. placebo was lower than that of teriparatide vs. placebo for vertebral, nonvertebral, clinical, and major osteoporotic fractures. These data are useful for evaluating abaloparatide-SC as a potential option for the treatment of osteoporosis in postmenopausal women.

Table. Incidence and number needed to treat after 18 months of treatment on ACTIVE.

| | Incidence (%) | | | NNT | |
|-----------------------|---------------|--------|------|-----------------|------------------|
| | PLB | ABL-SC | TER | ABL-SCvs PLB | TER vs PLB |
| Vertebral | 4.22 | 0.58 | 0.84 | 28 | 30 |
| Nonvertebral | 4.02 | 2.18 | 2.93 | 55 | 95 |
| Clinical | 5.97 | 3.28 | 4.28 | 37 | 59 |
| Major osteoporotic | 4.14 | 1.21 | 2.81 | 34 | 75 |

ABL-SC, abaloparatide for subcutaneous injection; NNT, number needed to treat; PLB, placebo; TER, teriparatide

OC19

A RANDOMIZED, OPEN-LABEL PHASE 2 STUDY OF KRN23, AN INVESTIGATIONAL FULLY HUMAN ANTI-FGF23 MONOCLONAL ANTIBODY, IN CHILDREN WITH X-LINKED HYPOPHOSPHATEMIA (XLH): 64-WEEKS RESULTS

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Objective: To evaluate the safety and efficacy of KRN23 in 52 children with XLH (ages 5–12 years, \leq Tanner 2).

Materials and Methods: Patients (Pts) were randomized to receive KRN23 biweekly (Q2W) or monthly (Q4W) by SC injection. KRN23 dose was titrated (maximum 2 mg/kg) to achieve age-appropriate serum phosphate (Pi) concentrations which were measured Q2W. Efficacy endpoints included change in rickets severity (Thacher Rickets Severity Score [RSS] and Radiographic Global Impression of Change [RGI-C; -3 = severe worsening; 0 = no change; +3 = complete healing], pharmacodynamic parameters, growth, walking ability (6MWT), and patient-reported pain and functional disability (PODCI). The primary analysis was at Week (Wk) 40; extended analysis to Wk64 for the first 36 pts.

Results: Rickets was evident at baseline (BL) (mean RSS 1.8) despite ~7 years of prior oral Pi/active vitamin D therapy. Serum Pi increased in all pts to near normal levels (mean

increase from BL to Wk38 value of 0.33 mmol/L; $p < 0.001$) and was more stable in the Q2W group. No hyperphosphataemia occurred. Mean RSS improved by 61% for the Q2W group, 37% for Q4W, and 50% overall ($p < 0.001$ all groups). At Wk40 mean RGI-C scores of +1.72 for Q2W, +1.41 for Q4W, and +1.56 overall ($p < 0.0001$ all groups) also indicated improvement. Pts with impaired walking and physical function at BL had improvements in the 6MWT and PODCI at Wk40 and sustained through Wk64. Q2W pts with walking impairment at BL achieved a mean increase of 84 m ($p < 0.001$) at Wk40 ($n = 14$), and 97 m ($p < 0.001$) at Wk64 ($n = 7$). Most treatment-related adverse events (AEs) were mild. Transient injection site reactions (33%) were most frequent. One child experienced a serious AE, was hospitalized for fever/muscle pain that resolved, and continues in the trial. No clinically meaningful changes occurred in serum or urine calcium, serum iPTH, or renal sonography.

Conclusion: KRN23 improved serum Pi, rickets, and walking/functional ability in children with XLH, and was generally safe and well tolerated.

Disclosures: TC: grant support, travel Ultragenyx (UGX); EI, AB, AL, WH, WvH: travel+consulting fees UGX; AP: travel, advisory panel UGX; RP: consulting fees UGX+Alexion; MM, AS, JSM: employees of UGX; MW: research grant support, honoraria, + travel UGX+Alexion; Ting Chang, PhD (UGX) provided writing support

OC20

EFFECT OF 10 YEARS OF DENOSUMAB TREATMENT ON BONE HISTOLOGY AND HISTOMORPHOMETRY IN THE FREEDOM EXTENSION STUDY

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Objective: Report bone biopsy data in subjects with 10 years of DMab treatment.

Material and Methods: A subset of subjects with 10 years of DMab exposure in FREEDOM/FREEDOM Extension underwent tetracycline/demeclocycline labeling prior to their bone biopsy visit (6 months after their last DMab dose). Samples were prepared and analyzed as described previously (Reid *JBMR* 2010). Data were summarized using descriptive statistics.

Results: 22 biopsies were evaluable for qualitative histology. All specimens showed normally mineralized lamellar bone; there was no evidence of pathologic findings, including osteomalacia, woven bone, or marrow fibrosis. 21 biopsies were evaluable for histomorphometry. These showed DMAB antiresorptive effects were maintained over time. Indicators associated with bone formation/structure were similar to those at years 2/3 and year 5 of DMAB treatment (Table). The presence of tetracycline labels was reviewed in all biopsies. The percentage of samples with any tetracycline label in trabecular bone steadily increased from 34% in year 2/3, to 43% in year 5, and 77% in year 10 of DMAB treatment; the percentage of samples with any label in cortical bone has remained steady from 57 to 64%, and 55%, respectively. Double tetracycline labeling of trabecular or cortical bone was found in 7 (32%) subjects at year 10.

Conclusion: Bone histology showed normal bone microarchitecture, and histomorphometry was consistent with DMAB mechanism of action. There was no evidence of progression in the degree of low remodeling with long-term exposure to DMAB.

Table. Bone histomorphometry in FREEDOM and its extension

| | FREEDOM year 2/3 | | FREEDOM Extension | |
|---|----------------------------|----------------------------|----------------------------|----------------------------|
| | Placebo N = 45 | Denosumab N = 47 | Year 2 N = 25 | Year 7 N = 22 |
| Denosumab exposure | 0 | 2–3 | 5 | 10 |
| Parameter | Median (Q1, 3) | | | |
| Eroded surface/ bone surface | 1.0 (0.6, 1.9) | 0.2 (0.0, 0.7) | 0.1 (0.0, 0.3) | 0.3 (0.0, 0.9) |
| Osteoid surface (%) | 6.8 (3.6, 10.1) | 0.4 (0.2, 1.2) | 0.1 (0.0, 0.8) | 0.1 (0.0, 0.2) |
| Osteoid width (µm) | 8.7 (6.4, 11.0) | 5.4 (4.4, 7.4) | 3.3 (0.0, 7.4) | 4.2 (0.0, 7.4) |
| Mineral apposition rate (µm/d) | 0.8 (0.7, 0.8) | 0.3 (0.3, 0.5) | 0.4 (0.3, 1.1) | 0.3 (0.3, 0.3) |
| Bone formation rate, volume based (%/year) | 14.6 (8.6, 21.8) | 0.4 (0.2, 0.8) | 2.2 (0.2, 4.7) | 0.3 (0.2, 2.8) |
| Activation frequency (year ⁻¹) | 0.200 (0.120, 0.330) | 0.002 (0.001, 0.004) | 0.031 (0.001, 0.071) | 0.001 (0.001, 0.012) |

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OC21

REDUCTION IN FRATURE RATES WITH DENOSUMAB COMPARED TO ALENDRONATE IN TREATMENT NAÏVE PATIENTS: A PROPENSITY-MATCHED 'REAL WORLD' COHORT AND INSTRUMENTAL VARIABLE ANALYSIS

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Objective: To compare the risk of hip and all osteoporotic fracture/s observed amongst treatment naïve users of subcutaneous denosumab and oral alendronate.

Material and Methods: Data was extracted from primary care computerised records linked to pharmacy dispensation data (www.sidiap.org). All treatment naïve, incident users of Denosumab (at anti-osteoporosis doses) or weekly alendronic acid between October/2010 and end/2014 were eligible. Patients were followed up from first prescription until the earliest of: first fracture, switching, treatment cessation, death, migration, or end of study. Primary and secondary outcomes were hip and all osteoporotic (any but skull/face/digits) fractures respectively. Propensity-score matching 1:10 was used to obtain comparable user groups, and a sensitivity instrumental variable analysis (physician prescription preference) was conducted to measure the impact of unobserved confounding. Fine and Gray models were fitted to estimate relative risks (SHR [95% CI]) according to drug used.

Results: A total of 1,612 denosumab and 27,190 alendronate users were observed (1,611 and 16,025 included in the matched sets) and followed for a median of 1.8 and 2.2 years. Propensity score analyses found a SHR of 0.50 [0.31–0.80] for hip and 0.70 [0.59–0.84]

for all fractures; and instrumental variable analyses SHR 0.64 [0.45–0.92] and 0.71 [0.62–0.83] respectively.

Conclusions: Our data suggest an additional 35 to 50% risk reduction of hip fractures (and a 30% all fracture) associated with the use of denosumab compared to alendronate amongst ‘real world’ users of these drugs. Head-to-head RCTs are needed to confirm these findings.

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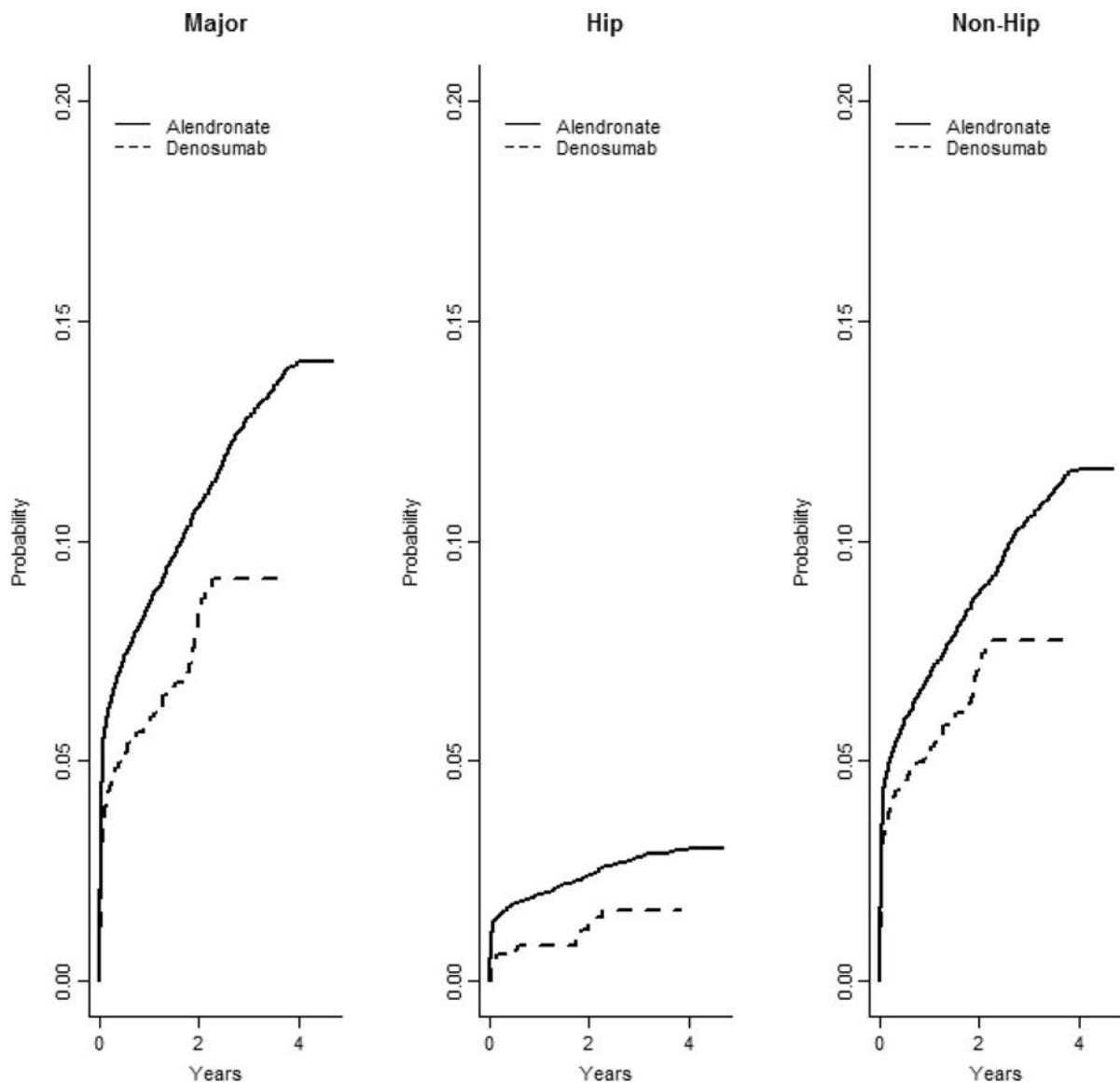


Figure 1. Cumulative incidence of all osteoporotic (left) and hip (right) fracture according to drug use in the propensity-matched cohort.

OC22

A FRACTURE LIAISON SERVICE UTILIZING EMERGENCY DEPARTMENT INFORMATION SYSTEMS TO IDENTIFY PATIENTS WITH FRAGILITY FRACTURE IMPROVED TREATMENT AND RECURRENT FRACTURE RATES AND IS COST EFFECTIVE: A 12 MONTHS ANALYSIS

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Background: Osteoporotic fractures impose significant morbidity, mortality and economic burden (1). Research within our hospital confirmed low rates of identification and secondary prevention for patients discharged from Emergency Department (ED) with a fracture (2). The Fracture Liaison Service (FLS) aimed to identify, review and then manage these patients following their discharge from the ED.

Objectives: To determine the economic benefits of a FLS in a Western Australian hospital.

Methods: Patients over the age of fifty who presented to the Emergency Department after suffering a fracture at Sir Charles Gairdner Hospital (SCGH) were offered an appointment at the FLS. A retrospective control group from SCGH determined the historical fracture risk without an active FLS intervention. Two other hospital sites were used as prospective control cohorts.

Method: A health economic analysis from the payer's perspective (WA Health Department) examined recurrent fracture rates and quality of life (EQ-5D). Bottom-up costing included medication usage, investigations (e.g. BMD testing), GP visits, hospital presentations and admissions and the cost of fracture (weighted basket) determined by either the literature or the AR-DRG 2013/14 prices. The mean incremental cost effectiveness ratios/diagrams were derived from 5000 bootstrap iterations. Cost-effectiveness acceptability curves were generated with societal willingness-to-pay set at \$50,000 (AUD).

Results: This FLS program reduced the rate of re-fractures compared to the retrospective cohort and another tertiary hospital by between 12.3 and 12.8% equating to cost savings of approximately \$1.048–\$1.299 million (AUD) per 1,000 patient-years, by the first 12 months, compared to control cohorts. There was no absolute difference in the QALYs gained

across groups by 12 months. The FLS compared to SCGH retrospective cohort had a mean incremental cost of \$8,721 (95% CI-\$1,218, \$35,044) per 1% reduction in the 12 months recurrent fracture risk. The FLS compared to other sites had a mean incremental cost of \$8,974 (95% CI-\$26,701, \$69,929) per 1% reduction in the 12 months recurrent fracture risk. The FLS compared to SCGH retrospective cohort had a mean incremental cost of \$292 (95% CI-\$3,588, \$3,380) per QALY gained at 12 months. The FLS compared to other sites had a mean incremental cost of -\$261 (95% CI-\$1,521, \$471) per QALY gained at 12 months.

Conclusion: This FLS demonstrated to be effective in reducing rates or recurrent fracture(s) and resulted in significant cost effectiveness and cost-saving.

OC23

A BONE SPECIFIC PERIOSTIN FRAGMENT IS ASSOCIATED WITH INCIDENT FRACTURES RISK IN POSTMENOPAUSAL WOMEN FROM THE GERICO COHORT

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Periostin is a matricellular protein produced in several tissues. Its circulating levels (cPostn) have been associated with bone microstructure and prevalent fractures. However, the association is rather weak, possibly because cPostn assessed by the current commercial assays does not specifically reflect bone metabolism. In this context, we developed a new ELISA for a circulating bone-specific periostin fragment produced by cathepsin K digestion (K-Post, patent filed P1971PC00).

Objective: To investigate the independent association of K-Post with incident low-trauma fractures in the Geneva Retirees Cohort (GERICO).

Material and methods: At baseline we measured cPostn, K-Post, sCTx, femoral neck aBMD by DXA, trabecular (Tb) and cortical (Ct) microstructural parameters at the distal radius and tibia by HRpQCT, in 695 postmenopausal women (mean age 65.0±1.4 years). The association between K-Post and incident fractures was assessed by Cox proportional models and Harrell's C index was used to compare Cox models discrimination.

Results: Over a mean follow-up of 4.7±1.9 years, 66 women sustained a low-trauma clinical fracture. cPostn was not associated with fractures, hazard ratios [HR (95% CI)] per SD: 0.82 (0.64–1.06), *P*=0.123. In contrast, K-Post was significantly higher in the fracture vs. non-fracture group (57.5±36.6 ng/ml vs. 42.5±23.4 ng/ml, *p*<0.001) and associated with fracture risk, [HR (95% CI)] for one SD increase of K-Post: 2.14 (1.54–2.97), *p*<0.001). After adjustment for

aBMD, radius Ct area, BV/TV, sCTX and FRAX (without aBMD), K-Post remained significantly associated with fracture risk HR: 1.79 (1.25–2.56), $p=0.002$. The performance of the prediction models based on the C indices derived from Cox regression models was improved by adding K-Postn (C index for fracture 0.70 for “aBMD+K-Post” compared with 0.59 for “aBMD alone”, $p=0.001$; 0.73 for “FRAX+K-Post” compared with 0.66 for “FRAX alone”, $p=0.005$).

Conclusions: Circulating K-Post predicts incident fractures independently of BMD, Ct and Tb microstructure, bone turnover markers and FRAX in postmenopausal women aged 65+. Hence measurement of a bone-specific periostin fragment resulting from *in vivo* cathepsin K digestion may help to identify subjects at high risk of fracture.

OC24

IMPACT OF SARCOPENIA ON FUNCTIONAL OUTCOMES AMONG OLDER HIP-FRACTURED PATIENTS UNDERGOING IN-HOSPITAL REHABILITATION

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Objective: Sarcopenia is a geriatric syndrome associated with several adverse health outcomes including falls, disability, institutionalization, and mortality. This study was undertaken to evaluate the prevalence of sarcopenia among older hip-fractured patients admitted to in-hospital rehabilitation unit and to evaluate its association with functional outcomes.

>Material and Methods: Hip-fractured 70+ years old patients admitted to in-hospital rehabilitation programs were enrolled in the study. Sarcopenia was assessed using the FNIH criteria. Multivariable linear regression models were used to evaluate the association between the sarcopenia and functional recovery.

Results: 127 patients (mean age of 81.3 ± 4.8 years, 64.6% females) were recruited. Among them, 43 (33.9%) were sarcopenic. After adjusting for potential confounders, sarcopenic subjects showed a significant increased risk of incomplete functional recovery compared with non-sarcopenic subjects (OR 3.07, 95% CI 1.07–8.75). Compared with subjects without sarcopenia, participants with sarcopenia showed lower Barthel index scores at the time of discharge from the rehabilitation unit (58.9 vs. 69.2, respectively; $p < 0.001$), and after 3 months of follow-up (80.5 vs. 90.9, respectively; $p = 0.02$).

Conclusions: These findings support the use of a systematic assessment for sarcopenia among older adults receiving

rehabilitation programs to help develop personalized treatment plans.

OC25

HEALTH OUTCOMES OF SARCOPENIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective: The purpose of this study was to perform a systematic review to assess the short-, middle- and long-term consequences of sarcopenia.

Methods: Prospective studies assessing the consequences of sarcopenia were searched across different electronic databases (MEDLINE, EMBASE, Cochrane Database of Systematic Reviews, ACP Journal Club, DARE and AMED). Only studies that used the definition of the European Working Group on Sarcopenia in Older People to diagnose sarcopenia were included. Study selection and data extraction were performed by two independent reviewers. For outcomes reported by three or more studies, a meta-analysis was performed. The study results are expressed as odds ratios (OR) with 95% CI.

Results: Of the 772 references identified through the database search, 17 were included in this systematic review. The number of participants in the included studies ranged from 99 to 6658, and the duration of follow-up varied from 3 months to 9.8 years. Eleven out of 12 studies assessed the impact of sarcopenia on mortality. The results showed a higher rate of mortality among sarcopenic subjects (pooled OR of 3.596 (95% CI 2.96–4.37)). The effect was higher in people aged 79 years or older compared with younger subjects ($p = 0.02$). Sarcopenia is also associated with functional decline (pooled OR of 6 studies 3.03 (95% CI 1.80–5.12)), a higher rate of falls (2/2 studies found a significant association) and a higher incidence of hospitalizations (1/1 study). The impact of sarcopenia on the incidence of fractures and the length of hospital stay was less clear (only 1/2 studies showed an association for both outcomes).

Conclusion: Sarcopenia is associated with several harmful outcomes, making this geriatric syndrome a real public health burden.

OC26

ECONOMIC BURDEN ASSOCIATED WITH SARCOPENIA: ESTIMATIONS FROM AN ENGLISH COHORT STUDY

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Objective: To estimate the excess economic burden associated with the provision of health and social care to people with sarcopenia.

Methods: We used data from 442 subjects who participated in a follow-up of the Hertfordshire Cohort Study in England during 2011, comprising men and women aged between 71 and 80 years. Individuals were identified as sarcopenic based on recorded maximum hand grip strength according to the FNIH definition (<27 kg for men and <16 kg for women). Costs associated with primary care consultations and visits, outpatient and inpatient secondary care, prescriptions, and formal (paid) as well as informal care for each subject were calculated. To do this, reported use of services was extrapolated to a 1-year period and multiplied by standard unit costs for England. Missing data was addressed by applying multiple and mean imputation techniques. Mean total costs per patient and their corresponding components were compared between groups to estimate excess economic burden associated with sarcopenia.

Results: Prevalence of sarcopenia in the sample was 12% (52

long-term illness (46% vs. 23%) and lower health-related quality of life (0.68 EQ-5D score vs. 0.82) compared to non-sarcopenic subjects. Mean total costs for subjects with sarcopenia was £4,503 (CI £2,961–£6,045), with informal care, inpatient secondary care and formal care being responsible for 39, 22 and 10% of total costs, respectively. For non-sarcopenic subjects, total costs were £1,857 (CI £1,508–£2,206) and their three highest cost categories were informal care (28%), primary care (21%) and formal care (20%). Total excess costs were £2,646 per year per subject, with prescriptions and informal care components reporting statistically significant differences and accounting for 46% of total excess costs.

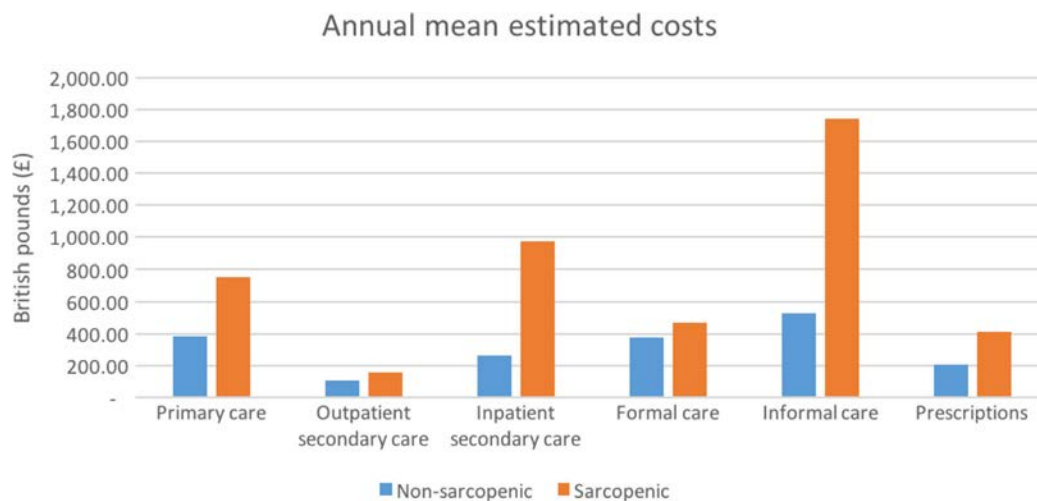
Conclusion: In a sample of 442 elderly subjects from an English cohort, sarcopenia was associated with higher costs in primary and secondary care, prescriptions, formal and informal care, with excess total costs of £2,646 per year and informal care as the largest contributor to this difference.

OC27

SARCOPENIA DOES NOT PREDICT ONE-YEAR MORTALITY AFTER A HIP FRACTURE

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subjects), 56% of which were women compared to a 50/50 gender split in the entire sample. There was no statistically significant difference in age, BMI or number of comorbidities, but sarcopenic subjects were more likely to have a

Introduction: This is a substudy of an ongoing study that aims to identify biological markers (inflammatory/neuromuscular) for the diagnosis of sarcopenia in patients older than 80, hospitalized for the treatment of a hip fracture.

The aim was to explore if sarcopenia is linked with outcomes in this patients.

Methods: Patients admitted to an orthogeriatric unit who gave informed consent for the biomarker's study. Muscle mass was assessed using bioimpedance analysis, Janssen(J) and Masanés(M) reference cutoff-points were used. Strength was assessed with handgrip(Jamar's dynamometer). Assessment included socio-demographic data, cognitive status(Pfeiffer, GDS-Reisberg), functional status(Barthel, Lawton, FAC), nutrition(MNA, BMI), number of falls, medications. After 1 year, by phone-call, mortality, functional status, cognitive status, visits to Emergency Department (ED), hospitalizations, falls and institutionalization were collected.

Results: $N=87$. Mean age: 88.0 ± 4.7 . Women: 82.8%. Sarcopenia prevalence varied from 8.8%(J) to 33.7%(M). One-year-mortality: 16%. Visits-to-ED: 0.7 ± 1.1 . Hospitalizations: 0.2 ± 0.5 . Falls: 1.4 ± 1.6 . No ambulation: 38.1%. 45.7% had at least one visit to the ED, 20.5% one or more hospitalizations. Independent for ADL 14.3%, severe dependency 57.1%. Only 14.3% were independent in more than three IADL. 55% had at least one fall, 15% ≥ 4 falls after discharge. In multivariate analysis, sarcopenia was not predictive of mortality. The only predictive factor of mortality was male gender ($p=0.012$).

Conclusions: Sarcopenia, assessed by international (Janssen) and local (Masanés) cutoff-points, did not predict one-year-mortality in this small sample of patients hospitalized for the surgical treatment of a hip fracture. This should be confirmed with a larger sample. Male gender is a risk factor for one-year-mortality in this population.

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OC28

INTEREST IN 10 CURRENT DEFINITIONS OF FRAILTY TO PREDICT THE INCIDENCE OF FALLS AND DEATHS AMONG ELDERLY NURSING HOME RESIDENTS

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Objective: The aim of this study was to evaluate the extent to which the various operational definitions of frailty predict mortality and falls at 1 year, among nursing home residents.

Methods: We took data from the SENIOR cohort (for Sample of Elderly Nursing home Individuals: an Observational Research) including subjects living in nursing home setting. Among the 662 residents included in this cohort, 584 subjects were monitored during 12 months, for a mortality assessment. Indeed, 78 subjects were lost to follow-up: 20 subjects moved and 58 subjects were living in 2 nursing homes who refused to continue the study for an additional year. The assessment of falls during 1 year of follow-up was performed among 544 subjects (i.e. we did not

obtain the data for 5 nursing homes, which corresponds to 118 subjects). In order to compare the mortality rate and the falls rate between frail subjects and robust subjects, diagnosed according to 10 different operational definitions, logistic regressions, adjusted for age and gender, were performed.

Results: Among subjects included in the analysis, 99 (16.9%) died during the year of follow-up. Only 2 of the 10 operational definitions studied seem to predict the one-year mortality: the Tilburg definition (OR=2.21, 95% CI: 1.41–3.47) and the "Share Frailty Instrument" (OR=1.94, 95% CI: 1.21–3.09). For these 2 definitions, the prevalence of frailty at baseline was 45 and 45.1%, respectively. For the other definitions studied (i.e. Fried definition, Edmonton Frail Scale, Clinical Frailty Scale, Frail Scale Status, Frailty Index, Groningen Frailty Indicator, Sega Gird, Strawbridge questionnaire), the rate of death was not significantly higher among frail than robust subjects. Regarding falls, 192 residents (35.3%) fell during the year of follow-up. Only the Groningen Frailty Indicator is significantly associated with the occurrence of falls at 1 year (OR=1.56, 95% CI: 1.10–2.41).

Conclusion: Within the studied operational definition of frailty, Tilburg's and the « Share Frailty Instrument » seems to be the most predictive of the one-year mortality among nursing home residents and the Groningen Frailty Indicator seems to be the most robust definition to predict the occurrence of falls at 1 year in this population.

OC29

EFFECTS OF 24 MONTHS TREATMENT OF TERIPARATIDE COMPARED WITH RISEDRONATE ON NEW FRACTURES IN POSTMENOPAUSAL WOMEN WITH SEVERE OSTEOPOROSIS: A RANDOMIZED, DOUBLE-DUMMY, CLINICAL TRIAL

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There have been no controlled, head-to-head clinical trials to date that have compared the anti-fracture efficacy of osteoporosis therapies as the primary endpoint.

Objective: To compare the anti-fracture efficacy of teriparatide (TPTD) with risedronate (RIS) in postmenopausal women with severe osteoporosis.

Patients and Methods: 2-years randomized (1:1), double-blind, double-dummy trial. We compared sc daily TPTD (20 µg) with oral weekly RIS (35 mg) in 1,360 women (mean age [SD]: 72.1 [8.7] years) with at least 2 moderate or 1 severe vertebral fracture and low bone mass. Prior use of osteoporosis drugs was allowed. The primary endpoint was the incidence of new vertebral fractures after 2 years assessed by quantitative morphometry. Secondary outcomes were clinical fractures, non-vertebral fractures, other spine fractures endpoints, height loss, back pain, quality of life (EQ-5D) and safety.

Results: Fewer patients had new vertebral fractures in the TPTD group compared to RIS at 2 years (5.4% vs. 12.0%, $p < 0.0001$) (Table), and after 1 year (3.1% vs. 6.0%, $p < 0.05$). Groups did not differ in the change from baseline in height, back pain and quality of life. More patients in the TPTD group had at least 1 report of hypercalcemia (8.8% vs. 0.2%), hyperuricemia (13.0% vs. 3.3%) and hypomagnesemia (5.2% vs. 0.7%) (all $p < 0.001$).

Conclusions: Among postmenopausal women with severe osteoporosis, the risk for new vertebral and clinical fractures was significantly reduced in patients receiving TPTD compared to those receiving RIS.

New Fracture Incidence: Patients (%)

| | TPTD (<i>n</i> = 680) | RIS (<i>n</i> = 680) | Relative Risk or Hazard Ratio (95% CI) vs RIS |
|---|---------------------------|--------------------------|--|
| Vertebral fractures (≥1) ^a | 28 (5.4) | 64 (12.0) | 0.44 (0.29; 0.68) ^b |
| Moderate/severe vertebral fractures (≥1) ^a | 26 (5.0) | 63 (11.8) | 0.42 (0.27; 0.65) ^c |
| Multiple vertebral fractures (≥2) ^a | 2 (0.4) | 12 (2.3) | 0.16 (0.04; 0.74) ^d |
| Clinical fractures ^e | 30 (4.8) | 61 (9.8) | 0.48 (0.32; 0.74) ^f |
| Non-vertebral fragility fractures | 25 (4.0) | 38 (6.1) | 0.66 (0.39; 1.10) ^g |

^aThe incidence of new vertebral fracture was estimated from 516 TPTD and 533 RIS patients who baseline and follow-up spine x-rays

^b $p < 0.0001$ (CMH chi-squared test)

^c $p < 0.001$ (CMH chi-squared test)

^d $p < 0.01$ (CMH chi-squared test)

^eClinical vertebral plus non-vertebral fragility fractures

^f $p < 0.001$ (log-rank test)

^g $p = 0.099$ (log-rank test)

Supported by Lilly

OC30

25-HYDROXYVITAMIN D RESPONSE TO GESTATIONAL CHOLECALCIFEROL SUPPLEMENTATION IS ASSOCIATED WITH COMMON VITAMIN D RELATED GENETIC VARIANTS: FINDINGS FROM THE MAVIDOS TRIAL

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Objectives: Single nucleotide polymorphisms (SNP) in genes related to vitamin D metabolism have been associated with 25-hydroxyvitamin D [25(OH)D] status, but these relationships have not been examined in pregnancy or following antenatal vitamin D supplementation. We assessed whether SNPs in *DHCR7*, *CYP2R1*, *CYP24A1* and *GC* were associated with the response to antenatal vitamin D supplementation.

Methods: MAVIDOS is a randomised double-blind placebo-controlled trial of 1000 IU/day cholecalciferol from 14 weeks gestation until delivery. Anthropometry, serum 25(OH)D (Diasorin Liaison), health and diet were assessed at 14 and 34 weeks gestation. Genotyping of rs12785878 (*DHCR7*), rs10741657 (*CYP2R1*), rs6013897 (*CYP24A1*) and rs2282679 (*GC*) was undertaken by LGC Genomics (Hoddeston, UK) using KASP™ competitive allele-specific PCR. Multiple linear regression was performed using an additive model with the homozygous minor allele as the reference group (beta represents the change in outcome per additional major allele), adjusting for a number of previously identified determinants of 25(OH)D.

Results: 712 women (367 placebo, 345 cholecalciferol) were included (95.8% White ethnicity). Only rs12785878 (*DHCR7*) was associated with baseline 25(OH)D [$\beta = 4.1$ nmol/l (95% CI 2.2, 6.1), $p < 0.001$]. Conversely, rs10741657 (*CYP2R1*) [$\beta = -4.1$ nmol/l (95% CI -7.1, -1.2), $p = 0.006$] and rs2282679 (*GC*) [$\beta = 4.4$ nmol/l (95% CI 1.2, 7.6), $p = 0.007$]

were associated with achieved 25(OH)D after supplementation, but rs12785878 and rs6013897 were not.

Conclusion: Genetic variation in *DHCR7*, which encodes 7-dehydrocholesterol reductase in the cholesterol/vitamin D biosynthesis pathway in the skin appears to modify baseline 25(OH)D, whereas the response to antenatal cholecalciferol supplementation was associated with SNPs in *CYP2R1* and *GC*, which may alter 25-hydroxylase activity and vitamin D binding protein synthesis. Women with more risk alleles may require higher supplement doses to achieve vitamin D repletion in pregnancy.

OC31

FERMENTED DAIRY PRODUCTS CONSUMPTION IS ASSOCIATED WITH ATTENUATED CORTICAL BONE LOSS INDEPENDENTLY OF TOTAL CALCIUM, PROTEIN AND ENERGY INTAKES IN POSTMENOPAUSAL WOMEN

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Objective: Fermented dairy products (FDP), including yogurts and fresh cheese, provide calcium and proteins together with probiotics with possible effects on gut microbiota, all being potentially beneficial on bone. We investigated the influence of FDP and other dairy products (DP) consumption on bone mineral density (BMD) and microstructure changes in a cohort of healthy postmenopausal women.

Methods: DP consumption (classified as milk, FDP and ripened cheeses) and total calcium and protein intakes were assessed at baseline and after 3.0±0.5 years with a food frequency questionnaire (mean of two assessments) in 482 postmenopausal women (baseline mean age±SD 65.0±1.4 years) enrolled in the Geneva Retirees Cohort and not taking antiresorptive drugs. Cortical (Ct) and trabecular (Tb) volumetric (v) BMD and microstructure at the distal radius and tibia were assessed by HR-pQCT (Xtreme CT, Scanco Medical, Bassersdorf, Switzerland), in addition to areal (a) BMD by DXA, at the same time points.

Results: FDP represented 25±15% of total DP servings and 16±10% of total calcium intake. At baseline, FDP consumption was positively associated with total and distal third radius aBMD ($p=0.046$ and $p=0.014$) and tibia Ct vBMD ($p=0.027$). In the longitudinal analysis, FDP consumption was associated with attenuated loss of total hip aBMD ($p=0.050$), of radius total vBMD ($p=0.010$) and Ct vBMD ($p=0.008$), area ($p=0.003$) and thickness ($p=0.003$). There was no difference at spine, tibia and Tb compartments. Similar associations were observed when FDP consumption was adjusted for total energy intakes. Radius Ct vBMD loss remained significantly and negatively associated with

FDP consumption adjusted for total calcium or protein intakes ($p=0.017$ and 0.018 , respectively). No association was observed between other DP categories and changes in BMD and bone microstructure, except for milk consumption which was associated with lower loss of aBMD at the distal radius.

Conclusion: Radius Ct bone loss is attenuated in FDP consumers, not in milk or ripened cheeses consumers, independently of total calcium, protein and energy intakes. Whether influence on the gut microbiota may contribute to this specific protective effect of FDP remains to be investigated.

OC32

PUBLIC HEALTH AND ECONOMIC IMPACT OF VITAMIN D-FORTIFIED DAIRY PRODUCTS FOR FRACTURE PREVENTION IN FRANCE

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Objective: To assess the public health and economic impact of vitamin D-fortified dairy products in the general French population aged over 60 years.

Material and methods: We estimated the lifetime health impacts expressed in number of fractures prevented, life years gained, quality-adjusted life years (QALY) gained of the recommended intake of dairy products in the general French population over 60 years for 1 year (2015). A validated microsimulation model was used to simulate three age cohorts for both women and men (60–69, 70–79 and >80 years). The incremental cost per QALY gained of vitamin D-fortified dairy products compared to the absence of appropriate intake was estimated in different populations, assuming the cost of 2 dairy products per day in base case

Results: The total lifetime number of fractures decreased by 64,932 for the recommended intake of dairy products in the general population over 60 years, of which 46,472 and 18,460 occurred in women and men respectively. In particular, 15,087 and 4,413 hip fractures could be prevented in women and men. Vitamin D-fortified dairy products also resulted in 32,569 QALY and 29,169 life years gained. The cost per QALY gained of appropriate dairy intake was estimated at €58,244 and fall below a threshold of €30,000 per QALY gained in women over 70 years and in men over 80 years.

Conclusion: Vitamin D-fortified dairy products have the potential to substantially reduce the burden of

osteoporotic fractures in France and seem an economically beneficial strategy, especially in the general population aged above 70 years.

Disclosures: The University of Liege has received an unrestricted educational grant from CNIEL (Paris, France).

OC33

THE DETERIORATION OF BONE MICROSTRUCTURE IS ASSOCIATED WITH INCIDENT FRAGILITY FRACTURE: THE OFELY STUDY

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Introduction: Identifying women before the first fracture is challenging; bone mineral density (BMD) is insensitive and the fracture risk assessment (FRAX) tool only estimates 10-years fracture risk. Bone loss produces cortical and trabecular deterioration which compromises bone strength disproportionate to the loss of bone. We therefore hypothesized that measurement of this deterioration will improve fracture prediction.

Methods: In a 10-years prospective study, 562 French postmenopausal women had measurements of femoral neck BMD and FRAX. Distal radial cortical and trabecular deterioration were measured using high resolution peripheral quantitative computed tomography and expressed as a Structural Fragility Score (SFS) using StrAx1.0. Results of the Cox proportional hazards models are presented as relative risks (RR) with 95% confidence intervals (CI).

Results: Of the 130 women having fractures during 10 years, 115 (88.4%) had osteopenia or normal BMD. Neither BMD nor FRAX detected them. The SFS identified 45.8% of the 24 having fractures within 2 years (RR 2.12, 95% CI 1.33–3.39), and 37% of the 115 having fractures within 10 years (RR 2, 95% CI 1.46–2.73; $p < 0.0001$). In over 70 year olds, the SFS identified 84.6% having a fracture within 2 years (RR 2.34, 95% CI 1.73–3.18; $p = 0.0007$) and 60.7% having a fracture within 10 years (RR 1.93, 95% CI 1.38–2.68; $p < 0.001$).

Conclusion: Measuring bone microstructure detects women at risk for fractures undetected by the currently used BMD or FRAX tools.

OC34

CALCIUM INTAKE ASSESSMENT BY CALCIUM CALCULATOR IN AN ITALIAN POPULATION: VALIDATION STUDY

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Objectives:

- To validate the algorithm Calcium Calculator in Italian language using a validated FFQ to assess calcium intake as gold standard.
- To assess dietary calcium intake in a sample of Italian subjects in apparent good health.

Material and Methods: 110 subjects in apparent good health, males and females resident in two areas of central Italy (Florence and Rome) were recruited and two FFQs have been administered: the Calcium Calculator and a FFQ validated to assess dietary calcium intake in the Italian population as a gold standard.

Results: 51 males and 59 females, mean age 45.2 years, mean BMI 23.4, answered the questionnaires. Average daily intake of calcium obtained by administration of Calcium Calculator was 660.94 mg/day (SD \pm 201.09), while the one obtained by administration of the gold standard FFQ was 728.64 mg/day (SD \pm 263.69). The correlation index, assessed by Pearson's value r , has proven to be very good for the whole population $R = 0.87$ ($p < 0.001$) between the Calcium Calculator and FFQ.

Conclusion: Our study confirm that Calcium Calculator is a valid tool to assess calcium intake also in the general population. Moreover, in the studied sample the dietary calcium intake results below the recommended Italian daily intakes.

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OC35

DNA METHYLATION AT THE RXRA PROMOTER AT BIRTH IS ASSOCIATED WITH GESTATIONAL VITAMIN D SUPPLEMENTATION: RESULTS FROM THE MAVIDOS TRIAL

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Background: We aimed to test whether maternal supplementation with vitamin D during pregnancy would lead to altered perinatal DNA methylation at the retinoid-X-receptor-alpha (*RXR*A) gene, which has a key role in the nuclear action of 1,25(OH)₂-vitamin D.

Methods: The Maternal Vitamin D Osteoporosis Study (MAVIDOS) is a randomised, double-blind, placebo-controlled trial of 1000iu/day cholecalciferol vs. matched placebo from 14 weeks gestation until delivery. Umbilical cord tissue was collected at birth and snap frozen in liquid nitrogen. Following storage at -80°C, DNA was extracted, and after bisulphite conversion, pyrosequencing was used to carry out in-depth methylation analysis at 11 CpG sites within the *RXR*A region of interest. Data were normalised and independent t-tests were used to assess the differences in methylation within the *RXR*A promoter between the two treatment groups.

Results: Pyrosequencing data were available for 144 umbilical cords. Statistically significant ($p < 0.05$) differences in methylation at the *RXR*A region of interest were observed between the cholecalciferol supplemented group and placebo group at eight out of eleven CpG sites. Overall, the methylation levels were significantly lower in the umbilical cord tissue from offspring of mothers who had received the vitamin D supplement: for example at *RXR*A CpG -2642, mean difference in methylation was -3.59% between the supplemented and placebo groups ($n = 144$, 95% CI -6.57 to -0.61, $p = 0.019$). We have previously shown, using electrophoretic mobility shift assays (EMSA), that methylation in this region leads to reduced transcription factor binding, thus reduced methylation in this region may potentially be associated with an upregulation of 1, 25(OH)₂-vitamin D signalling.

Conclusion: Our findings support our previous observational results and provide evidence, to our knowledge for the first time, that maternal gestational supplementation with cholecalciferol leads to altered perinatal epigenetic marking. Further work will be required to elucidate whether consistent changes in heterogeneous tissue

composition, or other biological mechanisms, underpin this relationship.

OC36

HIP AND OTHER FRACTURE RISK IN PATIENTS RECEIVING TERIPARATIDE IN REAL-WORLD CLINICAL PRACTICE: POOLED DATA FROM FOUR PROSPECTIVE OBSERVATIONAL STUDIES

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Objectives: The pivotal clinical trial in postmenopausal women with osteoporosis was not conclusive for the effects of teriparatide on hip fractures given the small number of events. Here, we report analyses of hip and other fracture rates in pooled data from the teriparatide observational studies DANCE (USA), EFOS and EXFOS (Europe), and JFOS (Japan).

Materials and Methods: The studies included ambulatory women and men (except in EFOS) with osteoporosis receiving teriparatide 20 µg/day SQ for 18 to 24 months as prescribed during real-world practice. Results for each study, including safety have been reported previously. Here we assessed hip, non-vertebral (NVF), clinical vertebral (CVF), wrist, and clinical fracture rates comparing the teriparatide treatment period 0–6 months (0–6 months; a period during which NVF rates were similar for placebo and teriparatide in phase 3 trials) as a reference vs. 6-months to end of dosing (6 mo-EOD), using a piecewise exponential model for the first occurrence of each fracture type for each patient.

Results: Patients were 91.9% female with mean age of 70.9 years; 8828 had ≥1 assessment on treatment and median time on treatment was 1.57 years. For all types of fracture excepting wrist, rates per 100 patient years were significantly lower from 6 months-EOD vs. the 0–6 months reference period (all $p < .001$; wrist, $p = 0.065$). Rates for the 0–6 months and 6 months-EOD periods, respectively, for hip were 0.88 and 0.39 (56% reduction); for NVF were 4.02 and 2.30 (-43%); for CVF were 2.37 and 0.90 (-62%); for clinical fracture were

6.31 and 3.16 (−50%); and for wrist fracture were 0.88 and 0.59.

Conclusions: In pooled data including 8828 patients from observational studies in Europe, the USA, and Japan, hip fracture rate decreased significantly during the period from 6 months to end of dosing relative to the reference first 6 months of therapy. Non-vertebral, vertebral, and clinical fracture also decreased significantly after 6 months of teriparatide dosing.

OC37

BRIEF HIGH INTENSITY EXERCISE IMPROVES BONE, POSTURE AND FUNCTIONAL RISK FACTORS FOR FALLING IN POSTMENOPAUSAL WOMEN WITH OSTEOPENIA AND OSTEOPOROSIS: THE LIFTMOR TRIAL

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Objective: Animal data has shown that loads inducing large strains and/or rates of strain in bone are required to stimulate a notable adaptive response. High intensity resistance and impact training (HiRIT) can be employed to generate such strains, but have not previously been recommended for individuals with osteoporosis owing to a perceived high risk of fracture. The aim of the LIFTMOR trial was to determine the safety and efficacy of HiRIT to improve parameters of risk for fracture in postmenopausal women with low to very bone mass.

Material and Methods: Women over 60 with osteopenia or osteoporosis (T-score < −1.0 at hip or spine), free of conditions or medications that influence bone and physical function, were randomised to either 8 months of twice-weekly, 30-min, supervised HiRIT (>85% 1 repetition maximum) or a home-based, low intensity exercise program (CON). Testing at baseline and follow-up included anthropometrics, posture, whole body, lumbar spine and proximal femur BMD, proximal femur geometry, and indices of functional performance related to risk of falling (timed up-and-go, functional reach, 5 times sit-to-stand, back and leg strength).

Results: 101 eligible women (65 ± 5 years, 161.8 ± 5.9 cm, 63.1 ± 10.4 kg) were recruited. HiRIT (*n* = 49) improved height (0.2 ± 0.5 cm vs. −0.2 ± 0.5 cm, *p* = 0.004), LS BMD (2.9 ± 2.8% vs. −1.2 ± 2.8%, *p* < 0.001), FN BMD (0.3 ± 2.6% vs. −1.9 ± 2.6%, *p* = 0.004), FN cortical thickness (6.3 ± 16.4% vs. 13.6 ± 16.4%, *p* = 0.014), WB BMC (−1.6 ± 3.2% vs. −2.2 ± 3.2%, *p* < 0.014), and all functional measures (*p* < 0.001), relative to CON (*n* = 52). Compliance was high in both groups (HiRIT, 92 ± 11%; CON 85 ± 24%). Only one adverse event was reported (HiRIT: minor lower back spasm).

Conclusion: Our novel, brief HiRIT programme enhanced bone, posture, and functional performance in postmenopausal

women with low bone mass. Contrary to conventional wisdom, HiRIT is a safe, feasible and efficacious therapy for this demographic at high risk of osteoporotic fracture.

OC38

BALLOON KYPHOPLASTY COMPARED TO PERCUTANEOUS VERTEBROPLASTY: WHAT IS THE EVIDENCE?

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Background: A systematic review evaluating outcomes of balloon kyphoplasty (BK) vs. percutaneous vertebroplasty (VP) for vertebral compression fractures (VCF).

Methods: We searched multiple electronic databases to March 2016 for randomised and quasi-randomised controlled trials comparing BK with VP in adults with VCF. Outcomes included back pain, back disability, quality of life (QoL), new VCF and adverse events (AE). One reviewer extracted data, a second checked accuracy, and 2 reviewers independently rated risk of bias. Mean differences and 95% confidence intervals were calculated using inverse-variance models. Risk ratios of new VCF and AE were calculated using Mantel-Haenszel models.

Results: Seven unique trials (6 RCTs and one quasi-randomised trial) enrolling 969 participants (range of mean ages: 61–76 years, 75% female) met eligibility criteria. All trials had a high risk of bias. No statistically significant difference between treatments in improvement in back disability from baseline at any time point up to 2 years. No statistically significant difference between treatments in QoL improvements. No statistically significant difference in incident radiographic VCFs occurring within 3 months (23.3% vs. 27.4%, RR = 0.85 [0.58, 1.26], *k* = 1 trial), 12 months (28.3% vs. 31.5%, RR = 0.89 [0.66, 1.19], *k* = 2) or 24 months of intervention (49.1% vs. 57.7%, RR = 0.85 [0.66, 1.09], *k* = 1). No significant difference in risk of incident adjacent radiographic vertebral fracture occurring up to 12 [6.0% vs. 7.0%; RR = 0.91 (0.39, 2.15); *n* = 278; *k* = 3], 24 [16.0% vs. 14.0%; RR = 1.14 (0.45, 2.91); *n* = 100; *k* = 1] or 60 months [16.0%

vs. 14.0%; RR = 1.14 (0.45, 2.91); $n = 100$; $k = 1$]. There was no significant difference in risk of incident clinical vertebral fracture at one (4.7% vs. 8.9%; RR = 0.53 [0.24, 1.15]; $k = 1$), or 12 months (16.3% vs. 22.9%; RR = 0.77, 0.53, 1.11, $k = 2$), or at 2 years (18.2% vs. 14.3%, RR = 1.27 [0.48, 3.36], $n = 86$). No increased risk of serious AE at 30 days (26.2% vs. 27.4%, $p = 0.82$) from one study.

Discussion: No differences in back pain or disability, QoL, VCFs or AEs were identified between BK and VP. Major limitations included lack of a sham BK comparison, lack of blinding to treatment assignment and limited AE reporting. Rigorous new trials may resolve remaining areas of uncertainty about relative benefits and harms of BK.

OC39

LONG-TERM PROSPECTIVE COHORT STUDY OF A LOCAL OSTEO-ENHANCEMENT PROCEDURE (LOEP) TO TREAT PROXIMAL FEMURS OF POSTMENOPAUSAL OSTEOPOROTIC WOMEN

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Objective: To evaluate the long-term safety and efficacy of a minimally invasive local osteo-enhancement procedure to treat osteoporotic femurs with a proprietary calcium-based implant.

Material and Methods: 12 postmenopausal women (mean age 72, range 56–89) with osteoporosis of the hip (mean T-score -3.1) underwent a minimally invasive LOEP. A proprietary triphasic calcium sulfate/calcium phosphate implant was injected into the left proximal femur; the right served as the control. Subjects were followed for 5–7 years. Outcomes included medical history review, BMD by DXA, and qualitative assessment by x-ray and CT. Data are reported as mean \pm SD. $N = 12$ at 1 and 2 years; $N = 10$ at 5–7 years (2 patients failed to complete radiological evaluations). 6/12 patients received bisphosphonates during some period of the study. Statistical comparisons used paired T-tests. The US Western Institutional Review Board approved the study; all patients provided written informed consent.

Results: Femoral neck BMD in treated hips was significantly greater than contralateral control hips at each time point: 0.88 ± 0.13 vs. 0.52 ± 0.06 g/cm² ($p < 0.001$) at 1 year; 0.85 ± 0.12 vs. 0.52 ± 0.08 ($p < 0.001$) at 2 years; and 0.83 ± 0.12 vs. 0.53

± 0.04 , ($p < 0.001$) at 5–7 years. Femoral neck BMD in control hips did not change from baseline to 5–7 years ($p = 0.30$). X-ray and CT analyses demonstrated the implant material was completely resorbed in all patients by 5–7 years and replaced with bone that integrated with surrounding trabecular and cortical bone. There were no procedure or device related serious adverse events. Six osteoporosis-related fragility fractures were observed: 2 control hips (27 and 44 months), 1 treated hip (40 months), 2 vertebrae (73 months and unknown), and 1 humerus (35 months).

Conclusions: Proximal femurs of osteoporotic patients treated with a local osteo-enhancement procedure (LOEP) and a proprietary triphasic implant demonstrated substantial and sustained BMD increases which corresponded with integrated bone replacing the implant. These results support the safety and efficacy of LOEP to treat osteoporotic proximal femurs, and provide a strong rationale for additional studies of LOEP to enhance femoral strength in patients at high risk for hip fracture.

OC40

SPINAL LOADING ESTIMATES FROM A DETAILED MUSCULOSKELETAL MODEL OF THE THORACOLUMBAR SPINE EXPLAIN THE HIGH INCIDENCE OF VERTEBRAL FRACTURES AT THE THORACOLUMBAR REGION

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Objective: Vertebral fractures (Vfx) are the most common osteoporosis-related fracture and represent half of the 1.5 million fractures that occur in the US each year. Vfx occur most frequently in the mid-thoracic and thoracolumbar spine regions, but the reasons for this site-specific occurrence of fracture are not understood. We hypothesize that increased spinal loading leads to Vfx. Thus, our study's objective was to describe how vertebral compressive loads and factor-of-risk (FOR) vary along the spine for different activities and varying thoracic kyphosis.

Material and Methods: We used a validated musculoskeletal model of the thoracolumbar spine and ribcage to estimate vertebral loading using OpenSim software¹. Muscle morphology and body size were adjusted to that of older women using previously published data². To determine the influence of spinal curvature on loading, thoracic kyphosis was varied (26°, 50°, and 74°). We simulated 119 different activities of daily living, including standing, opening a window and pushing a shopping cart. Average compressive strength for vertebrae between T6 and L5 was estimated using integral volumetric BMD and vertebral cross-sectional area measured from quantitative computed tomography (QCT) scans in 276

women (aged 40 to 80) from the Framingham Heart Study QCT cohort. FOR at each spinal level was defined as vertebral load/strength, with higher values indicating increased risk of VFX.

Results: The average vertebral strength increased monotonically from the thoracic to lumbar spine (mean \pm SD), from 2240 ± 760 N at T6 to 4492 ± 1353 N at L5. We found that nearly all activities showed a peak in vertebral compressive loading in the thoracolumbar region (T11-L1), with the load then decreasing until the mid-lumbar spine, and then increasing again in the lower lumbar spine. The largest factor-of-risk occurred at T11 for 83% of the activities, with 8% of the activities showed the largest factor-of-risk at T6, and the remaining 9% scattered throughout the spine from T8-L5. Higher thoracic kyphosis accentuated the peak in loading at the thoracolumbar region. The largest contributors to the

muscle force at each vertebral level were the erector spinae and multifidus muscle groups, with all other muscle groups having minimal activation (generally less than 50 N). Notably, activation of the multifidus muscle fascicles in the thoracolumbar region, but not in other spine regions, appears to be the main contributor to the peaks in vertebral compressive loading in the thoracolumbar spine.

Conclusions: In sum, vertebral loading estimates from this realistic thoracolumbar spine model explain, for the first time, the high incidence of VFX at the thoracolumbar region. Further, our model shows that greater thoracic kyphosis leads to slightly increased spinal loads and risk of VFX.

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SE1

HOW CAN WE DEFINE A PATIENT AT IMMINENT RISK OF FRACTURE?

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Over recent decades the risk factors for osteoporotic fracture have been extensively documented. Risk assessment has evolved from a basis in bone mineral density (BMD) to consideration of a range of clinical risk factors partly independent of BMD, with FRAX being the most widely used tool incorporating such approaches. Whilst the risk factors associated with fracture in general are well understood, there is much more limited information on the time course of the risk relationships, and specifically whether a risk factor might render an individual at a particularly high risk of fracture in the immediate future. Recent work has confirmed that an index fragility fracture increases the risk of a new fracture, and that the magnitude of this risk is particularly elevated in the year immediately after the index fracture, before subsequently waning, although in the long term increasing again with time due to ageing. Thus a fracture represents a risk factor for future fracture, which has a marked time dependency. There are several considerations with regard to other risk factors, most notably whether it is biologically plausible that they might modify the risk relationship, or whether they simply represent the measurement of the existing state- for example, measurement of bone mineral density does not change an individual's risk, but simply permits us to quantify it more accurately. In this presentation, I will give an overview of the approach to the definition of the patient at imminent risk of fracture, and consider in more detail the specific case of fracture, before concluding with some practical considerations for clinical practice.

SE2

THE EFFICACY OF CURRENTLY AVAILABLE TREATMENTS IN PATIENTS AT IMMINENT RISK OF FRACTURE

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In clinical study setting, different approaches are used to evaluate the efficacy of treatments in patients who are at increased risk of fracture, including the selection of such patients using specific inclusion criteria, subgroup analysis using risk factors known to further increase fracture risk, or analyses using a continuous variable of fracture probability, such as FRAX.

Differences in clinical study inclusion criteria, as well as baseline disease severity, can result in challenges when evaluating the optimal treatment for patients at increased risk of fracture. Despite stringent inclusion criteria, patients recruited in most recent phase 3 clinical trials could be at relatively low risk of fracture compared with other large osteoporosis treatment studies. Conversely, there are good examples of randomised, double-blind, placebo-controlled studies using simple inclusion criteria, that resulted in baseline characteristics more indicative of a higher risk population which was then reflected in the very high incidence of fracture in the placebo group over the study period. Subgroup analyses have also been used to evaluate the efficacy of treatments in subgroups of patients at increased risk of fracture. Most subgroup analyses from clinical studies have shown at least comparable efficacy in patients at increased risk of fracture compared with the overall population. There are, however, some inherent limitations to subgroup analyses. In most situations, even when results looked different from one subgroup to another one, interaction tests were non-significant. It should therefore be highlighted that primary endpoint

results provide the greatest weight of evidence in clinical studies whereas subgroup analyses, particularly when undertaken post hoc, can provide useful information, but are lower in the hierarchy of evidence grades. Some of the pitfalls of subgroup analyses can be avoided by assessing the efficacy of a treatment as a function of fracture risk, using BMD or FRAX. Further clinical efficacy data supported by health economic assessments are needed so that clinicians, regulatory bodies and payers can identify which treatments are most effective in terms of clinical efficacy, safety and cost for those patients at increased risk of fracture.

SE3

DOES NUTRITION PLAY A ROLE IN THE PREVENTION AND MANAGEMENT OF SARCOPENIA?

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Role of proteins:

Skeletal muscle protein is constantly being synthesized and broken down, with a turnover rate of about 1-2% per day. The rate of skeletal muscle protein synthesis is regulated by two main metabolic stimuli, food intake and physical activity. Food intake, or more specifically protein ingestion, directly elevates muscle protein synthesis rates. The dietary protein derived essential amino acids act as signaling molecules activating anabolic pathways and provide precursors for muscle protein synthesis. Ingestion of a meal-like amount of dietary protein elevates muscle protein synthesis rates for several hours, providing evidence that ‘you are what you just ate’. When food is ingested after a bout of physical activity the post-prandial muscle protein synthetic response is augmented, with higher muscle protein synthesis rates sustained over a more prolonged period of time. In other words, when you ingest protein following a bout of physical activity ‘you become even more of what you just ate’. In contrast, when protein is ingested following a period of inactivity the post-prandial muscle protein synthetic response is blunted, coined anabolic resistance. Therefore, disuse makes you ‘become less of what you just ate’. These concepts play a key role in the prevention and management of sarcopenia.

SE4

ROLE OF CALCIUM, DAIRY PRODUCTS AND VITAMIN D

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Milk may help support bone and muscle health as it is a primary source of calcium and also supplies significant amounts of protein and phosphorus. In the US, due to fortification, milk is also an important source of vitamin D. Mechanistically, milk has been suggested to reduce bone loss and enhance muscle mass by providing high-quality whey protein as a stimulator of the growth factor IGF-1 and muscle protein synthesis. Fall events due to muscle weakness are considered to be the primary risk factor of hip fractures. Thus, milk intake may also reduce hip fracture risk by improving muscle mass. The latter benefit may be enhanced by vitamin D, which has been shown to improve muscle strength and reduce fall risk among seniors with vitamin D deficiency. This presentation will review the role of calcium supplementation, milk consumption, and vitamin D supplementation for the prevention of hip fractures.

Conflict of interest: Speaker invitations / advisory board activities for Pfizer, Sanofi, Diasorin, Roche, Sandoz, and Roche Diagnostics. Investigator initiated research support by DSM Nutritional Products, Besins, and WILD.

SE5

ROLE OF NUTRIENTS OTHER THAN PROTEINS

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Multiple risk factors contribute to the development of sarcopenia. Poor protein intake is an important risk factor. Growing evidences also suggest that other nutrients such as vitamin D, antioxidant, omega 3, or bicarbonate play an important role, both in the prevention and management of sarcopenia. These nutrients are safe, inexpensive, well-tolerated, and may be relevant for long-term strategies to prevent and treat the loss of muscle mass and strength. There is significant evidence of the importance of vitamin D supplementation to improve muscle mass and strength. Large meta-analysis of vitamin D supplementation trials confirms a small but positive effect on muscle strength. Benefits of vitamin D supplementation may be limited to older people with a low vitamin D blood level. Optimal supplementation approach remains an open question. Omega-3 fatty acids are anti-inflammatory agents that may also prevent sarcopenia. Omega-3 fatty acids may also have a direct effect on muscle protein anabolism via mTOR signalling pathway. Despite promising, current supplementation trials report controversial results. Few observational studies and RCT support that bicarbonate may attenuate the age-related loss of muscle performance and mass in the elderly but evidence remains scarce. The age-related inflammation process is supposed to be an important factor in the development of sarcopenia, but no

RCT have currently evaluated the efficacy of antioxidants in the elderly patient suffering from sarcopenia. However, dietary antioxidants are also a promising area of research.

SE6

REGULATORY ASPECTS OF RHEUMATOID ARTHRITIS IN EUROPE IN 2017

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Evaluation in Europe of new treatments for rheumatoid arthritis (RA) is based on guidelines from the EMA entitled “European Agency for the Evaluation of Medicinal Products. Points to consider on clinical investigation of medicinal products other than NSAIDs for treatment of rheumatoid arthritis”. Such guidelines were published in December 2003 and have been used for the evaluation of an increasing number of biologicals targeting first cytokines then cell molecules. More recently this has been extended to small molecules acting on signaling pathways. These trials have enrolled patients with very active disease with high number of swollen joint and high systemic inflammation. Patients are classified as either treatment-naïve, DMARD, mostly methotrexate, inadequate responders (IR), biological treatment mostly a TNF inhibitor, –IR.

Today these guidelines need to be updated. Because of the irreversible destruction linked to active RA, the use of a placebo group is a major ethical issue. Progress on diagnosis and care has limited the actual number of patients with such a high disease activity. In parallel, basic and clinical work has identified a high degree of clinical heterogeneity, as assessed by genetics, environmental risk factors, autoantibody patterns, cytokine expression, clinical course, and response to therapy. New rules are much needed to have the best use of biomarkers in health-related issues. As such, RA is one of the most appropriate conditions for the development of personalized medicine.

Clinical observation has identified for a long time that the degree of response is related to the delay of diagnosis and optimal care. Acting early remains the best way to obtain an optimal control. Although this is common sense, basic research has clearly demonstrated that chronic inflammation induces a fundamental change in RA pathophysiology. The early phase can be identified as immune driven and indeed response to molecules acting of the immune response has a high rate of success when used early. Step by step unfortunately, chronic inflammation induces molecular changes in mesenchymal cells making the disease not anymore immune driven.

A better way to improve the overall result is to improve identification and treatment at the early phase of the disease. The

new guidelines are now focusing on trials in early disease. Clinical questions to be clarified are the definition of early disease: either based on circulating biomarkers or limited to joint pain or obvious joint swelling? To make the best use of treatment options, both targeted and non-targeted biomarkers must be identified and validated. To this aim, new rules are also needed for better interactions between academia and industry under regulatory control.

SE7

ESCEO CONSENSUS ADVICE TO EMA REGARDING THE DRAFT GUIDELINES ON CLINICAL INVESTIGATION OF MEDICINAL PRODUCTS FOR THE TREATMENT OF RA

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ESCEO convened a task force of experts in rheumatoid arthritis (RA) and clinical trial methodology to comment on the new draft ‘Guideline on clinical investigation of medicinal products for the treatment of RA’ released by the European Medicines Agency (EMA). The draft guideline distinguishes early and established RA, and focuses on remission as defined by Disease Activity Score using 28-joint counts (DAS28) <2.6 as primary endpoint, especially in trials of early RA.

The ESCEO group made several suggestions. First, in the absence of a clear definition of early RA, they proposed a working definition for the setting of new drug development: disease duration no more than 1 year, and no previous exposure to disease-modifying antirheumatic drugs. Further, the group considered real remission (as defined by ACR/EULAR criteria) to be a rare event in current treatment trials, and less discriminative than endpoints currently in use. If, as EMA suggests, remission were used as primary endpoint this would lead, leading to loss of power. Thus the group recommended as primary endpoint: either an appropriate improvement in disease activity (by American College of Rheumatology (ACR) or Simplified/Clinical Disease Activity Index (SDAI/CDAI) response criteria) or the achievement of low disease activity (by any score). The achievement of ACR/EULAR remission should be a secondary endpoint. Finally, as compelling evidence shows that the DAS28 does not provide a reliable definition of remission, and is suboptimal to define low disease activity, the group suggested to abandon DAS28 as a measurement instrument for disease activity in RA clinical trials. Proposed alternatives include SDAI, CDAI and the above remission criteria.

SE8

ACTION OF HYALURONIC ACID IN OSTEOARTHRITIS: NEW INSIGHTG. Herrero-Beaumont¹¹Bone and Joint Research Unit, Service of Rheumatology, IIS-Fundación Jiménez Díaz, Autonomous University of Madrid, Madrid, Spain

Hyaluronic acid (HA) is present in many tissues of the body, however it is particularly found in high concentrations within the knee joint where it provides visco-elastic properties to the synovial fluid. During the course of osteoarthritis (OA), not only the concentration of HA within the joint decreases, but also its molecular weight diminishes. Noteworthy, lower ranges of HA molecular weight are correlated to pain. Hence, HA replacement sounds a reasonable therapeutic option that may restore the rheological properties of OA synovial fluid. This is the origin of viscosupplementation.

The intra-articular administration of HA has been introduced in the OA therapeutic armamentarium aiming to reestablish HA concentration and molecular weight distribution in the synovial fluid. But, the short life of HA into the joint has become a major shortcoming of this apparently sounded argument. Therefore, it is not likely a direct rheological mechanism can account for the prolonged effect of intra-articular HA.

In this context, many authors have proposed alternative mechanisms of action of HA, according to its biologic effects. Indeed, HA might alter all the cellular response induced by diverse pathways. The lack of a clear mechanism of action of HA may have contributed to the distrust on mechanistic studies carried out in *in vitro* and animal models, thus becoming a hurdle for the clinical development of these compounds. However, many of the previously published results show that HA decreases inflammatory mediators, matrix turnover and chondrocyte apoptosis as well as increases its own articular synthesis.

The chondroprotective effect of HA could be better understood through its effects on innate immune system at the different joint structures. Since the role of innate immunity in OA joint has turned out relevant toll-like receptor (TLR) blockers, particularly TLR4 and MyD-88, have emerged as attractive candidates of DMOADs. Fragments of HA are highly expressed in the OA joint and can activate joint cells by favoring the synthesis of toll-like receptors (TLR)-2, -4, or both. In contrast, the whole HA molecule is a potent agonist inhibitor of TLR-4 reducing the fragmentation ratio of endogenous HA in OA joint. Therefore, it is plausible that intra-articular injection of HA could act on knee OA controlling the innate immune response.

SE9

RECOMMENDATIONS FOR THE APPROPRIATE USE OF HYALURONIC ACID IN DAILY MANAGEMENT OF OSTEOARTHRITISF. Rannou¹¹Cochin hospital, APHP, University Paris Descartes, Paris, France

This review emphasizes the safety profile of intra-articular hyaluronic acid treatment of knee osteoarthritis, as well as its moderate but real efficacy on symptoms, which is in the same range than other pharmacological modalities used in this indication. Effectiveness of intra-articular hyaluronic acid has also been highlighted based on ‘real-life’ data, together with the clinical benefit of systematic repeated treatment cycles, and the influence of the molecular weight of hyaluronic acid on treatment outcome. These aspects should be particularly helpful to clinicians when making personalized care decisions. This study has been conducted by an international group of experts in the field of osteoarthritis:

Cyrus Cooper, François Rannou, Pascal Richette, Olivier Bruyère, Nasser Al-Daghri, Roy D. Altman, Maria Luisa Brandi, Sabine Collaud Basset, Gabriel Herrero-Beaumont, Alberto Migliore, Karel Pavelka, Daniel Uebelhart, and Jean-Yves Reginster

SE10

ACTIONS OF VITAMIN D ON CARDIOVASCULAR AND IMMUNE FUNCTIONSH. A. Bischoff-Ferrari¹¹Dept. of Geriatrics and Aging Research University Hospital and University of Zurich, Zurich, Switzerland

Early geographical studies suggested blood pressure and immune diseases, such as multiple sclerosis, increase with distance from the equator. Later, these findings were supported by mechanistic studies linking vitamin D to cardiovascular health and immunity by the presence of the VDR in both cells of the cardiovascular system (i.e. cardiomyocytes and smooth muscle cells) and the immune cells (i.e. T and B cells, macrophages). Further, several large cohort studies suggested that individuals with 25-hydroxyvitamin D levels in the deficient range may have an increased risk for incident hypertension, major cardiovascular events, and infections. However, small to moderate sized clinical trials and meta-analyses showed inconsistent findings with a possible signal that only vitamin D deficient individuals may benefit. Notably, large clinical trials with a sufficient dose of vitamin D, ideally tested among individuals at risk of vitamin D deficiency, are missing for blood pressure, any major cardiovascular events and immune function. This presentation will review the potential role of vitamin D in cardiovascular health and immune functions

and provide an outlook on ongoing large clinical trials addressing these endpoints.

Conflict of interest: Speaker invitations / advisory board activities for Pfizer, Sanofi, Diasorin, Roche, Sandoz, and Roche Diagnostics. Investigator initiated research support by DSM Nutritional Products, Besins, and WILD.

SE11 THE ROLE OF CHOLECALCIFEROL ON MALIGNANCY

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The ubiquitous presence of the Vitamin D Receptor (VDR) and the possible production of extra-renal calcitriol driven by the concentration of 25(OH)D, constitute the physiological conditions for the potential extra-skeletal effects of calcitriol. Cancer cells express the VDR and 1 α OHase, responsible for the local conversion of cholecalciferol into the active vitamin D. *In vitro* and in animal models active vitamin D controls cellular proliferation and differentiation of cancer cells inhibiting cancer progression and metastasis. In humans, epidemiological data have shown an increased prevalence of several types of cancer in the northern countries, suggesting an inverse trend with the amount of UV exposure. Many studies have shown an increased prevalence of vitamin D deficiency in individuals with cancer versus controls and an association between low vitamin D status and increased risk of developing various tumors, such as breast, prostate, and colon cancer. Meta-analyses have assessed the association between VDR polymorphisms and cancers, showing that variants of the VDR or higher levels of VDBP were associated with an increased risk for certain types of cancer. Unfortunately nowadays RCTs assessing the role of cholecalciferol supplementation reported no significant cancer risk reduction. A meta-analysis took into account RCTs, prospective cohort studies and nested case-control studies mainly performed in older women, with data on risk of cancer and cancer-related mortality. It was shown that combined calcium and vitamin D supplementation may reduce the risk for all cancers, with a dose-response relationship observed for colon cancer but not for breast and prostate cancer. A Cochrane meta-analysis included a total of 50,623 participants from 18 RCTs trials, which compared the effect of different type of vitamin D supplementation/treatment at any dose or regimen versus placebo on the risk of cancer. No conclusion could be drawn in terms of cancer prevention and there are conflicting results whether vitamin D supplementation reduces cancer-related mortality. In conclusion, although there is a high prevalence of low levels of vitamin D in cancer patients, insufficient evidence exists on the likely reduction of cancer incidence

and mortality by vitamin D. The results of ongoing RCTs will possibly clarify these issues. Supplementation with 25(OH)D actually can not be recommended for this indication.

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SE12 WHY DO WE NEED STANDARDIZATION OF APPENDICULAR LEAN BODY MASS (ALBM) ASSESSMENT

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All proposed definitions of sarcopenia include the measurement of muscle mass but the techniques and threshold values used vary. The literature does not establish consensus on the best techniques for measuring muscle mass or appendicular lean mass. This hampers the objective assessment of sarcopenia. The aim of this work was to review some commonly used methods to assess muscle mass and to reach a consensus on the preferred methodology for research and clinical practice. The work was based on literature reviews performed by members of the European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (ESCEO) working group on frailty and sarcopenia and the World Health Organization (WHO), and face-to-face meetings and discussions to derive recommendations. Accuracy, precision, cost, availability and ease of use determine which technique is optimal for clinical practice and/or research. During the presentation, these critical characteristics will be reviewed for the assessment of muscle mass by dual x-ray absorptiometry, bioelectrical impedance, and several other techniques. Furthermore, based on these characteristics, several recommendations will be made with regard to preferred techniques and the need for standardization.

SE13 HOW CAN WE ACHIEVE STANDARDIZATION OF APPENDICULAR LEAN BODY MASS (ALBM) ASSESSMENT?

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ALBM is measured by whole body DXA, which uses the 3 compartment soft tissue composition model to differentiate bone mineral mass (BMC), fat mass and lean body mass. In the appendicular skeleton lean mass is very similar but not identical to muscle mass because other contributors of lean

mass such as internal organs do not exist in the arms and legs. Appendicular skeletal muscle mass (ASMM) is one of constituents of the operational definition of sarcopenia (after normalization to the square of body height). The difference between ALBM and ASMM is the contribution of water to ALBM.

Another issue of the ALBM measurement is the standardization across DXA manufacturers as similar to BMD, scanners are calibrated differently. Finally, in longitudinal studies scanner stability is an important component of the mid- and long-term precision of an ALBM measurement. In the field of osteodensitometry we are acquainted with the use of phantoms to tackle the issues, however, appropriate phantoms that cover the physiological ALBM range in humans are still lacking. Recent recommendations of the International Society of Clinical Densitometry state that no total-body phantom is

available that can be used as absolute reference standard for soft-tissue composition. Cross calibration of the same DXA make and model can be performed with an appropriate phantom but no phantom has been identified to remove systematic differences in soft tissue composition across manufacturers when compared to *in vivo* results.

Existing and future options for standardization of lean will be discussed in this contribution. *In vivo* based scanner cross calibration equations in analogy of the universal standardization equations for BMD have been published. Another route to eliminate or to reduce calibration based differences among scanners is the use of T-scores, but common reference populations are required. Finally, better reference materials must be developed for phantoms in order to represent the range of data observed *in vivo*. Ideally these phantoms should also be able to address the impact of varying water content on ALBM.

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WHO1

OPERATIONALIZATION OF THE CONCEPT OF INTRINSIC CAPACITY IN CLINICAL PRACTICE, GERIATRIC MEDICINE AND WITHIN THE WHO ICOPE (INTEGRATED CARE FOR OLDER PEOPLE) STRATEGY

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This paper explores key issues relating to the clinical application of “intrinsic capacity”, a relatively new concept that describes people’s health as a composite of all the physical and mental capacities on which an individual can draw, not only in old age, but across their lives. We suggest measurements of intrinsic capacity that may be relevant to clinical practice and that might be used to predict and prevent care dependence and detect important changes and transitions in functioning. These measures should be of value to health professionals in clinical practice and to policy makers when designing public health strategies intended to enable the maintenance of functional ability into older age.

Health professionals in clinical settings need to be able to understand and detect changes in Intrinsic Capacity as early as possible if they are to deliver effective interventions to prevent/ slow/stop/reverse negative trajectories. In order to identify relevant measures, this analysis provides an

operational characterisation of intrinsic capacity that might be adopted in clinical practice and related research including:

- Development of an operational definition of intrinsic capacity to be used at a community level, and in primary health care and other clinical settings;
- A review of clinically objective measures of IC
- Assessment of the predictive ability of IC measures for adverse health clinical outcomes, most importantly significant loss of IC leading to care dependency in older age
- A proposal for development of a validated IC Risk Assessment and screening tool that might be included in an intervention guide

The paper will:

1. Draw on discussions undertaken within the recent WHO/ IAGG/ frailty meeting, to discuss the feasibility of the application of this concept in the field of geriatric medicine.
2. Recommend clinical metrics for the IC construct
3. Present a comprehensive review on psychometric properties of clinical and diagnostic measures of the construct of IC: : source of information, diagnosis, measurement type, time to administer and score the measure (in minutes), method of administration, administered by (specialist or non-specialist), educational bias, validated population, cultural bias, settings (clinical/community), prevalence (%), sensitivity(%), specificity (%), PPV (%), NPV(%), acceptability (service users), criterion validity(adverse outcomes predicted by the measurement), responsiveness(ability to detect the change over time),cross-cultural validation(high, middle, and low income countries), and cost of the measurement.
4. Test these measures for responsiveness in analysis of secondary data sets

5. Recommend how the concept of frailty fits in the concept of IC proposed for use in clinical practice

WHO2

SCREENING FOR DECLINES IN INTRINSIC CAPACITY IN OLDER PEOPLE: A PERSONALIZED APPROACH TO PROMOTE HEALTHY AGEING

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In the recent World Report on Ageing and Health, the World Health Organization has presented the concept of "intrinsic capacity" as the composite of all the physical and mental capacities of an individual. Such concept nests the potentialities for revolutionizing the traditional models of care, bypassing several obsolete paradigms of traditional medicine. Intrinsic capacity is indeed designed as a comprehensive marker of the physiological global functioning of the individual, a parameter that might be measured and monitored over time even in the absence of a specific clinical phenotype. The construction of normative values for intrinsic capacity will allow the possibility to promptly identify individuals presenting abnormal age-related physiological trajectories. This will allow the activation of services for the validation of the alerts and the eventual implementation of preventive strategies before the onset of clinically manifest conditions. For supporting such theoretical framework, it is necessary to develop an assessment tool for intrinsic capacity that should meet the following criteria: 1) comprehensiveness (i.e., capturing multiple domains of the individual's physiological status), 2) easiness of administration (i.e., non-intrusiveness and economically sustainable adoption), 3) independence from environmental factors (i.e., suitable for global application and not affected by socio-economic and cultural diversities), 4) objectiveness (i.e., capable to determine the activation of proactive models of care), 5) longitudinal dimension (i.e., supportive of monitoring over time), and 6) predictive of negative outcomes (in particular, loss of functional ability and dependency). In this presentation, the background work conducted to identify the health domains that more than others should be included in the operationalization of the intrinsic capacity concept is presented and discussed.

WHO3

ROLE OF NUTRITION AND PHYSICAL EXERCISE IN MAINTAINING INTRINSIC CAPACITY

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Ageing is a long process, which begins before birth and continues throughout life. The functional capacity of the

biological systems (e.g. muscular strength, cardiovascular performance, respiratory capacity etc.) increases during the first years of life, reaches its peak in early adulthood and naturally declines thereafter. Health and activity in older age are resulting from the living circumstances of - and actions taken by individuals during their whole life span. Fighting against the causes and risks of disability and dependency, which can happen throughout the whole life process and more particularly during the second part of life, needs to become a core focus of adult public health actions. It is well known that people are able to influence how they age by adopting healthier life styles and by adapting to age-associated changes. If most of the health problems of older age are linked to chronic conditions, particularly non-communicable diseases, many of these can be prevented or delayed by healthy behaviours. Indeed, even in very advanced years, physical activity and good nutrition can have powerful benefits on health and well-being. The recent ICOPE recommendations clearly state that multimodal exercise (progressive resistance training or generic strength, balance, and other exercise components) should be recommended for older people with musculoskeletal impairment. However, if diet of good quality is recommended, the public health impact of nutritional or food supplementation is rather limited.

WHO4

CLOSING THE EVIDENCE TO PRACTICE GAP: WHO ICOPE GUIDELINE RECOMMENDATIONS

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With increasing age, numerous underlying physiological changes occur, and the risk of chronic disease and care dependency in older people increases. By the age of 60 years, the major burdens of disability and death arise from age-related losses in hearing, seeing and moving, and associated conditions such as dementia, heart disease, stroke, chronic respiratory disorders, diabetes, and osteoarthritis. These are not just problems for higher-income countries. In fact, the burden associated with these conditions in older people is generally far higher in low- and middle-income countries.

Population ageing will dramatically increase the proportion and number of people needing long-term care in countries at all levels of development. This will occur at the same time as the proportion of younger people who might be available to provide care will fall, and the societal role of women, who have until now been the main care providers, is changing. Therefore, an approach to prevent and reverse functional decline and care dependency in older age is critical to improve public health responses to population ageing and is urgently needed.

Following the World Report on Ageing and Health (2015) and Global Strategy and Plan of Actions on Ageing and Health (2016), WHO will for the first time launch a guideline for dealing with the many, often concurrent impairments strongly linked to intrinsic capacity of older people. The main purpose of the guidelines is to assist countries with the scale up of interventions to prevent care dependency in older age by early identification of declining physical and mental capacities. This new guideline is intended for use by non-specialist health

professionals, such as doctors, nurses, and health workers working in primary care settings where specialists are few and far between. These guidelines include guidance on evidence-based interventions to manage common impairments in older age, namely mobility, cognition, mood, vision and hearing, and well as important geriatric syndromes such as urinary incontinence and risk of falls. This presentation will introduce evidence, recommendations and rationale behind WHO ICOPE guidelines.

World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2017): Meet-the-Experts Abstracts

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MTE1

DIABETES AND BONE

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Diabetes and osteoporosis are two of the most common chronic disorders which prevalence increases worldwide, eventually affecting hundreds of millions of people. Type 2 diabetes is increasingly recognized as an independent risk factor for fractures. The risk of fragility fractures is even higher among the leaner patients with type 1 diabetes, whose long-standing disease is associated with an up to five fold higher hip fracture risk. The relative contribution of decreased bone strength, in particular bone “quality”, and increased incidence of injurious falls, to the higher fracture risk among diabetics remains unknown.

From a clinical standpoint, there are many challenges. Both aBMD and FRAX underestimate fracture prediction in diabetic patients, particularly with type 2, and the addition of TBS brings only a marginal improvement to this evaluation. Commonly used bone turnover markers are often not elevated in diabetes and the prognostic value of more specific markers, such as pentosidine, has not been systematically evaluated. Hence new clinical tools and adjusted algorithms will be necessary. This task will be even more complicated to achieve that the numerous treatments of diabetes have differential effects on bone homeostasis and fracture risk and will therefore have to be integrated as well in this evaluation. An even more challenging task concerns the pharmacological treatment of bone fragility in diabetes. Indeed, there is currently no study that has evaluated any of the osteoporosis drugs effects on bone strength and fracture outcomes in this context.

MTE2

WHAT CAN WE EXPECT FROM BIOMARKERS IN OSTEOARTHRITIS?

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Osteoarthritis (OA) is a chronic disease affecting every tissue of diarthrodial joints, however major structural alterations are present in articular cartilage, subchondral bone and synovium. Partial or complete cartilage disintegration is a key factor for understanding the pathogenesis of OA along with subchondral bone alterations. Changes occurring in the subchondral bone include increased turnover of the subchondral plate and sclerosis. Nevertheless, additional findings are observed in either distant or close areas to the osteochondral region, such as the formation of osteophytes and bone marrow lesions that occur in late stages of OA. Although there is little information regarding initial phases, it seems that subchondral bone osteoporosis can be present, particularly in osteoporotic patients. In turn, synovium is frequently affected by inflammatory changes producing additional pain and function limitation during advanced phases of the disease.

An imbalance in cartilage synthesis and degradation is central to the development of OA. Therefore, products of cartilage metabolism have been explored as potential candidate biomarkers for OA. Since type II collagen is the most abundant protein of the cartilage matrix, many of its epitopes have been described as potential OA biomarkers. Biomarkers resulting from subchondral bone remodeling are also under investigation to evaluate clinical outcomes of patients affected of OA. Recent advances in the development of assays, reflecting changes in both synthesis and

degradation products of main molecules of either cartilage or subchondral bone possesses great potential to make a prompt diagnosis and more accurate monitoring of therapies. However, while several techniques and imaging modalities are capable of screening and measuring cartilage width and subchondral bone structure, soluble biomarkers are less sensitive and specific. Furthermore, there is a lack of precise information about the role of biomarkers in monitoring early changes in OA joint tissues. Nonetheless, in conjunction with imaging techniques or alone, these indicators may still have a potential value in the management of OA.

MTE3

BONE FRAGILITY DURING GROWTH, YOUNG ADULTHOOD AND BEFORE MENOPAUSE

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Bone fragility at any age is a function of the peak bone material strength and structural strength achieved during growth, and the loss of bone mass and microstructural deterioration accompanying advancing age after cessation of longitudinal growth. Growth during the neonatal period, infancy, adolescence and puberty is heterogeneous. The appendicular skeleton grows faster than the axial skeleton before puberty while the axial skeleton grows faster than the appendicular skeleton during puberty. Long bones like the radius grow faster at the distal than proximal growth plate, while growth is faster at the proximal than distal growth plate of the tibia. Boys have a longer duration of pre- and intra-pubertal growth than girls. There are also racial differences in timing of puberty. These differing patterns of regional growth have important implications. Diseases during growth produce effects that depend on the maturational stage of a region as well as the severity and duration of the disease. Prior puberty, disease may afflict appendicular more than axial growth, while delayed puberty may produce more abnormalities in bone morphology and bone fragility of the axial skeletal. The most common fragility fracture in children and young adults is the distal radial fracture. The distal radial metaphysis grows rapidly and determines most of the length of the radius. Metaphyseal trabecular emerging from the periphery of the growth plate coalesce to form the cortex. When growth is rapid, lengthening of the radius outpaces trabecular ‘corticalisation’ resulting in cortical porosity predisposing to these fractures. Delayed puberty

results in protracted growth due to failure of epiphyseal closure. There is a reduction in endocortical bone formation and failed corticalisation of trabeculae resulting in girls having a wider appendicular bones with thinner and more porous cortices. Delayed puberty may also predispose the continued axial growth predisposing to scoliosis and reduced trabecular thickening. (Vertebrae are like two metaphyses without a diaphysis separating them.) Many diseases of growth and young adulthood like anorexia nervosa and malabsorption syndromes interfere with the development of the macro- and microstructure of bone. Subtle abnormalities in structure such as reduced bone size, cortical thinning or porosity with little, if any, reduction in bone mass, may predispose to stress fractures in young adults. Understanding bone fragility requires the study of skeletal growth during the first 20 years of life, and changes occurring throughout young adulthood as well as during advancing age.

MTE4

RARE BONE DISEASE: APPROACHES TO CLASSIFICATION

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Rare diseases are defined as those with a prevalence of less than 1:2000 within Europe. There are over 400 rare diseases of the bone in addition to a number of rare diseases in other systems with clinically significant musculoskeletal features. The advent of whole exome and genome sequencing has improved our understanding of the genetic causes and mechanisms of rare disease, informing the development of potential biomarkers and therapeutic targets. While the majority of rare bone diseases are diagnosed in children, a number may present in adulthood. The timely identification and confirmation of diagnosis of these patients amongst the those with common metabolic bone diseases remains a challenge for general clinician. A number of classification systems based on clinical, radiological, molecular, including genetic, characteristics are now available. During this session we will work through the different strategies used to define and classify more the prevalent rare diseases that can affect the bone, in order to improve the ability to diagnose patients with rare bone diseases. This session will be focused on rare bone diseases that can present with increased bone fragility, bone pain and/or increase bone density.

MTE5**GLUCOCORTICOID INDUCED OSTEOPOROSIS**J. D. Adachi¹¹Department of Medicine, St. Joseph's Hospital, McMaster University, Hamilton, Ontario, Canada

Glucocorticoid-induced osteoporosis is the most commonly recognized secondary cause of osteoporosis. Unlike postmenopausal osteoporosis, bone loss is rapid upon initiation of glucocorticoid therapy. Vertebral fractures occur early, with non-vertebral fractures becoming a greater problem with longer duration of use. Higher doses and longer duration of use are associated with greater risk for fracture. As in primary osteoporosis the greatest risk for fracturing is seen in those who have had prior fractures, are older and have the lowest BMD.

The pathogenesis of glucocorticoid-induced osteoporosis is thought to result from direct effects of glucocorticoids on bone cells and indirect effects mediated by altered calcium handling by the kidneys and the gut, reduced production of gonadal hormones and detrimental effects on the neuromuscular system, which may increase the risk of falls.

Glucocorticoids modify the biology of all three major bone cells, osteoblasts, osteoclasts and osteocytes. Pluripotent mesenchymal stromal cells may be shifted towards the adipocytic pathway at the cost of the osteoblastic pathway when exposed to glucocorticoids. Not only are there fewer osteoblasts being produced, but glucocorticoids inhibit osteoblast function and promote osteoblast and osteocyte apoptosis leading to a shorter life span of bone-forming and mechanosensing cells. Mechanisms involved are decreased osteoblastic production of bone anabolic factors IGF-1 and TGF β , interference with the Wnt signaling pathway with upregulation of Wnt inhibitors such as Dkk-1 and sclerostin and alterations of the bone matrix composition by altered production of type I collagen and overproduction of inhibitors of matrix mineralization. Some of these pro-apoptotic effects of glucocorticoids may be prevented by PTH and by bisphosphonates. The effect of glucocorticoids on osteoclasts involves osteoblast-mediated actions. Glucocorticoids increase the ratio of RANKL to OPG produced by osteoblasts. This translates into increased osteoclastogenesis.

Fracture risk assessment tools may help identify those who might benefit from pharmacologic therapy. Recently adjustments have been made to FRAX to account for low (<2.5 mg prednisone) and high (>7.5 mg prednisone) glucocorticoid use and major and hip fracture risk.

Indications for bone-protective therapy in postmenopausal women and men ≥ 50 years on glucocorticoid therapy include: age ≥ 70 years, previous fragility fracture or incident fragility fracture during glucocorticoid therapy, high doses of glucocorticoids, depending on daily dose and presence or absence of other clinical risk factors or a BMD T-score ≤ -1.5 .

In general, patients should be encouraged to get adequate amounts of calcium through their diet. Vitamin D status should be maintained using supplements if necessary. Exercise should be encouraged to maintain muscle mass and function and to prevent falls.

There are number of pharmacologic therapies that are of benefit including etidronate, alendronate, risedronate, zoledronic acid and teriparatide. Most of the evidence is based on favourable changes in BMD, however vertebral fracture reduction data is available, predominantly in postmenopausal women. The evidence for treatment is less certain in premenopausal women and younger men. Therapy may be appropriate in some cases, particularly in patients treated with high doses of glucocorticoids and in those with a previous history of fracture.

MTE6**CONNECTED DEVICES IN MUSCULOSKELETAL HEALTH**O. Bruyère¹¹University of Liège, Liège, Belgium

Connected health is the collective term for telecare, telehealth, telemedicine, mHealth, digital health and eHealth services. Connected health involves the convergence of, health technology, digital, media and mobile telecommunications and is increasingly seen as an integral part of the solution to many of the challenges facing the health sector. In musculoskeletal disorders, including a variety of conditions, such as, osteoarthritis, osteoporosis, sarcopenia, total hip and knee replacements, and low back pain, connected health could be of potential interest. For example, assistive devices to improve the human-environment interface and to restore or enhance an individual's capacity to function in his or her environment are highly appreciated. Other connected tools, such as simple activity trackers, are of primary interest both for the researchers and for the clinicians but have also some potential impact on the patient's self-management. Currently, this type of applied research and rehabilitation technology aims to enhance mobility, communication, cognition, and environmental control of subjects with musculoskeletal disorders.

MTE7**HOW TO APPRAISE SKELETAL RARE DISEASES**M. L. Brandi¹¹University of Florence, Florence, Italy

Genetic disorders involving the skeletal system arise through disturbances in the complex processes of skeletal development. Almost 400 different forms of such skeletal abnormalities have been identified so far. Because of their diverse signs and symptoms, these rare disorders pose a diagnostic challenge even to seasoned specialists, let alone to the average healthcare professional. The IOF Working Group on Skeletal Rare Diseases recently published a comprehensive taxonomy of the known rare metabolic skeletal diseases. It is hoped that, together with the taxonomy, the new online resource will also help facilitate research to improve understanding of the pathology of these diseases. The ultimate goal is to develop common diagnostic and therapeutic pathways that benefit rare skeletal disease patients worldwide. In recent years, the description of the clinical phenotypes and radiographic features of several genetic bone disorders was paralleled by the discovery of key molecular pathways involved in the regulation of bone and mineral metabolism. Including this information in the description and classification of rare skeletal diseases may improve the recognition and management of affected patients. Genetic disorders of bone and their adult expression is becoming an important area of clinical investigation for the bone doctor. Such approach can provide bone specialists the background for the diagnostic evaluation of biochemical alterations in individual patients and can contribute to their better understanding of the etiology of the disease. To date, the diagnosis of rare skeletal diseases is based on clinical phenotype and radiographic features. A classification system based on measurement of bone mineral density (BMD) or assessment of skeletal fragility is not feasible because in the majority of these disorders, systematic evaluation of BMD by DXA has not yet been performed, and the long-term incidence of fracture is unknown. Classification of “local” or “systemic” disorders is also not feasible, because in apparently localized disorders, a systemic alteration in bone metabolism can be present (e.g., tumoral calcinosis) or maybe have not yet been assessed. For the majority of these disorders, biochemical features are not available, which underlines the need for a better metabolic characterization. Determination of biomarkers related to mineral metabolism as well as systematic assessment of BMD and quality of bone by improved diagnostic tools is, therefore, needed. However, these investigations are not disease-specific and are not commonly employed, unless patients are evaluated in referral centers by bone specialists with expertise in rare skeletal disorders. In selected cases, bone biopsy and *in vitro* assays can help to further refine the metabolic diagnosis. Many of the bone marker tests, not available at the time of the first description of these diseases, are now

routinely used, encouraging the biochemical/metabolic characterization of disorders potentially characterized by metabolic fingerprints. The metabolic framing of a rare skeletal disease is of paramount importance for therapeutics and can guide the clinician in the choice of the most appropriate pharmacological intervention. Indeed, the characterization of a rare bone disease for the bone-forming or bone-resorbing phenotype will lead to different therapeutic approaches (e.g., anabolics or antiresorptives). In this respect, an example is hypophosphatasia, the only rare bone disease, due to a specific metabolic enzymatic alteration, for which a targeted therapy (asfotase alpha) has recently been developed and for which an antiresorptive therapy is contraindicated. However, other rare genetic metabolic bone disorders are often treated with the available antiosteoporotic agents which are given without being included in their approved indications (off-label prescription). In such cases, knowledge of the bone metabolic and structural profile can help in choosing the most suitable therapy for a given clinical case.

MTE8**ASSESSMENT OF FRAILTY AND SARCOPENIA IN DAILY PRACTICE**S. Maggi¹¹CNR Aging Branch-IN, Padua, Italy

Frailty is a clinical state of increased vulnerability to stressors, leading to negative health outcomes (disability, hospitalization, institutionalization, mortality). Frailty, in the somatic domain, is characterized by weight loss, muscle weakness, low walking speed, low physical activity, and exhaustion (three or more of these criteria define “frailty” according to Fried’s definition¹). Several instruments have been developed for its assessment, all capable of predicting adverse health outcomes, but capturing different population at risk, due to the heterogeneous nature of the frailty syndrome and of the different outcomes investigated. In the geriatric literature, physical disability has been considered the primary outcome of interest for the frailty syndrome, therefore physical performance measures have been the main instruments used in the assessment. In particular, gait speed and the Short Physical Performance Battery (SPPB) have been extensively used in clinical practice and proved to be associated to disability, institutionalization, mortality, and health status in the broadest sense²). Sarcopenia is a syndrome characterized by progressive and generalized loss of skeletal muscle mass and function (strength or performance)³. It is clear that frailty and sarcopenia show a significant overlapping. For the assessment of sarcopenia in clinical practice, we cannot consider some popular body imaging techniques (e.g. MRI, CT), while DXA may be considered the current

reference technique for assessing muscle mass and body composition⁴. The strengths and weaknesses of ultrasonography, BIA, anthropometric parameters, and biochemical markers will also be presented.

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Dr. Maggi has received consultancy/lecture fees from GSK, Takeda, and Sigma Tau.

MTE9

MANAGEMENT OF OSTEOPOROSIS IN MALES

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One in three osteoporotic fractures occur in men and the consequences of a fracture in men tend to be more severe than in women. Still, only a small minority of men with high risk of fracture are detected and treated. Although there are gender differences in the pathophysiology of osteoporosis, such as in the pattern of bone loss, similarities predominate, which is also the case for clinical risk

factors. It seems appropriate to consider treatment for men and women with a similar fracture risk. Idiopathic osteoporosis in younger men results generally from genetically determined deficient build-up of peak bone mass, without increased turnover and bone loss. In most clinical settings, compared to postmenopausal women a larger proportion of men diagnosed with osteoporosis have secondary osteoporosis, a consequence of underdiagnosed primary osteoporosis. As to senile osteoporosis, compared to women there is a shift towards 5 to 10 years older age for similar risk of major osteoporotic fractures. The initial evaluation of men with osteoporosis should aim at detecting secondary causes, assessing lifestyle-related factors, and estimating fracture probability for which use of FRAX[®] is an option. This evaluation is the basis for individualized treatment recommendations. Besides calcium and vitamin D supplementation, drugs approved for treatment of osteoporosis in men include the anti-resorptive bisphosphonates alendronate, residronate and zoledronic acid, the anti-resorptive drug denosumab, the bone-forming agent teriparatide, and (not in the US) strontium ranelate with mild opposite effects on resorption and formation. Although the evidence level for efficacy and safety of these drugs in men is generally rather limited, available data indicate that treatment effects in men are very similar to what has been observed in the treatment of postmenopausal osteoporosis. Denosumab is also approved for treatment in men receiving androgen deprivation therapy for non-metastatic prostate cancer; bisphosphonates and teriparatide are also available to clinicians for treatment of glucocorticoid-induced osteoporosis in men. Testosterone treatment may be indicated in men with documented symptomatic hypogonadism, but osteoporosis is neither a sufficient nor a specific indication for testosterone treatment. The place of the promising bone anabolic compounds abaloparatide and romosozumab remains to be established.

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OCs1

BONE MINERAL DENSITY AT PATIENTS OF EARLY ONSET RHEUMATOID ARTHRITIS

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Objective: Rheumatoid arthritis (RA) is a chronic inflammatory and destructive joint disease that affects 0.5–1% of the world's population and commonly leads to significant disability and consequent impairment of quality of life. Osteoporosis is an early and common feature in RA and occurs during the course of the disease as extra articular manifestation of rheumatoid arthritis which may result in increased risk of fractures, morbidity and mortality. In this study we evaluated bone mineral density changes in patients with early onset rheumatoid arthritis.

Material and methods: We investigated 30 patients with early onset rheumatoid arthritis in Private Clinic "Rheuma". Bone mineral density of these patients measured at lumbar spine and hip by using dual energy x-ray absorptiometry scan (DXA-Stratos800). Demographic and clinical data were collected like age, gender, BMI, menstrual status, disease duration, erythrocyte sedimentation rate, vitamin D level, total calcium level, phosphorous, clinical disease activity index and seropositivity for rheumatoid arthritis was measured.

Results: A total of 30 patients fulfilling inclusion criteria were registered. Among the total number 21 patients or 70% were female, with mean age of patients 50.95 ± 7.87 years. Nine patients or 30% were male, with mean age 42.01 ± 11.01 years. Twelve or 40% had low bone mineral density. Low bone mineral density was found higher in female patients with 21 (70%) as compared to male patients 9 (30%), whereas higher low bone mineral density was found in 15 (71.4%) female patients that were in post-menopause stage.

Conclusion: Low BMD was found in patients at earlier stage of the rheumatoid arthritis with seropositivity, age and menopausal status as significant risk factors.

OCs2

ASSOCIATION BETWEEN GENETIC FACTORS OF OSTEOPOROSIS AND FRAX® CALCULATED TEN-YEAR FRACTURE PROBABILITY

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Osteoporosis (OP) is a common disorder with reduced BMD and increased susceptibility to fracture. As much as 80% of BMD variation is determined by genetics. Screening of genetics factors of predisposition to OP may enable early identification of risk groups to perform preventive measures. Another approach for OP fractures risk calculation is to use fracture risk assessment tool.

Aim: To reveal possible association between allelic variants of OP susceptibility genes and OP probability, calculated from FRAX®.

Materials: A group of 42 Belarusian women with OP, average age 60.5 (56.3; 64.8) years, BMI 26.6 (24.4; 28.0) were genotyped for *COL1A1 Sp1* (rs1800012), *COL1A2 A/G* (rs42517), *VDR ApaI* (rs7975232) and *VDR TaqI* (rs731236) polymorphisms using RT-PCR analysis. Association between genotyping data and FRAX 10-year probability of major fracture (MF) or FRAX 10-year probability of hip fracture (HF) was assessed using χ^2 test for single polymorphism analysis

and linear regression analysis for haplotype testing. The differences were considered significant at $P < 0.05$.

Results: The data shows that for the bearers of homozygous *C/C*-genotype *VDR ApaI* the median of MF and HF is 2.5 times and 3.5 times higher, respectively, compared to bearers of *A/A*-genotype ($P = 0.01$ in both cases). We found also statistically significant association of global haplotype distribution with HF ($\chi^2 = 16.5$, $df = 7$, Global $P = 0.01$), corresponding that this FRAX parameter strongly correlates with analyzed gene variants. Analysis of possible allelic combinations of rs42517, rs7975232 and rs731236 revealed that the most frequent haplotype was wild-type *A-A-C* (total frequency 42.4%, MF median - 4.1 points). For the carriers of *G-C-C* haplotype (8.3%), MF median was 5.1 points higher compared to reference haplotype (95% CI: 0.7–9.5, $P = 0.02$). Meanwhile, for the carriers of *G-C-T*-allelic combination, constructed from risk alleles (9.1%), there was a tendency for MF median increase by 4.2 points compared to reference haplotype (95% CI: -0.1–8.5, $P = 0.058$). We also revealed that HF median was 3.4 points higher for the carriers of *G-C-C* haplotype compared to reference haplotype (95% CI: 0.8–6.1, $P = 0.02$).

Conclusion: Our findings suggest that analyzed genetic markers may be associated with FRAX-calculated probability of fractures.

OCs3

IN-OFFICE PROTEOMIC PLATFORM FOR BONE MARKER MEASUREMENT

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Objectives: Current trends towards theranostics and provision of personalized diagnostic therapy tailored to an individual has emphasized the need for inexpensive point-of-care and in-office devices, capable of performing rapid analysis, with small volumes of sample, minimum number of assay steps, and no need for highly skilled personnel for routine checkup and patient screening. In this work, we report a microfluidic proteomic platform that can easily be translated into an in-office biomarker diagnostic tool to be used by clinicians. This platform integrates microfluidic technology with electrochemical sensing to measure serum levels of different biomarkers with comparable accuracy with the current state-of-the-art, electrochemiluminescence (ECLIA) and ELISA, but in shorter time and probably cheaper.

Material and Methods: Microfabricated Au electrodes encased in a microfluidic chamber were functionalized to immobilize the antibodies, which can selectively capture the

corresponding antigen. The magnitude of the response current varied linearly with the concentration of the relative biomarker, and thus was used to quantify the concentration of the relative biomarker in serum samples.

Results: We demonstrated the implementation, feasibility and specificity of this platform (Osteokit), the first in its kind, in assaying serum levels of bone turnover markers using osteocalcin (Oc) and C-terminal telopeptide of type 1 collagen (CTX). The detection limit of osteocalcin was 1.94 ng/mL, whereas that of CTX was 2.77 pg/mL. Our results also showed the sensitivity of Osteokit to be comparable with ECLIA when human serum samples were used. According to the results, the coefficients of variation for the ECLIA and Osteokit were calculated to be 4.6% and 3.7% for Oc, and 6.4% and 7.7% for CTX. The high correlation between our sensor results and that of ECLIA was also reported (Figure 1).

Conclusion: Our results show that Osteokit could some day be used as an alternative for ELISA/ECLIA, especially in the developing countries and rural areas. The device may also be used to monitor the osteoporosis treatment more efficiently and probably help identify high turnover patients in an earlier phase.

OCs4

BODY MASS INDEX, VITAMIN D DEFICIENCY AND PHYSICAL ACTIVITY IN OSTEOPOROSIS

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Introduction: Skeletal disease of bone thinning and compromised bone strength, osteoporosis, continues to be a major public health issue in the aging population. Building and maintaining bone mass requires a combination of nutrients and physical activity. Body mass index (BMI) as a predictor of fracture risk. Risk factors are numerous and there is no single cause of the disorder. Exercise prescription also includes a window of opportunity to improve bone strength.

Aim: To determine the influence of sport, BMI and vitamin D deficiency on bone mineral density in patients diagnosed with osteoporosis.

Materials and methods: The study included a group of 548 patients, 30 to 65 years of age, diagnosed with osteoporosis and osteopenia and treated at the Clinical Center University of Sarajevo, over 12 months period. The study was designed as

prospective. For each patient we provided personal history and diagnostic procedure: bone mineral density (BMD) at lumbar spine and proximal femur, weight and body mass (BMI) presence as risk factors for osteoporosis, physical activity and D vitamin deficiency.

Results: Low BMD is an independent predictor of hip and spinal column risk fracture or other fractures. BMD depends on the mineral value and vitamin D deficient. Weight and body mass (BMI) associated with low bone mineral density affects the bone structure and results in bone degradation. Risk factors for the prediction of osteoporosis and fractures have been less thoroughly studied in younger patients. In patients who are still actively involved in sports activities osteoporosis occurs in only 9% of cases. However, in patients who do not participate in sports activities osteoporosis occurs in 55% of cases and in those who are moderately involved in sports activities osteoporosis occurs in 36% of cases.

Conclusion: We evaluated the association between the weight and BMI. Active sports, maintenance of body weight, varied diet, sufficient intake of vitamin D, and sun exposure can increase bone density and prevent fractures. One of the best ways to strengthen your bones and prevent osteoporosis is by getting regular exercise.

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OCs5

COMPARATIVE STUDY OF FRAX® SCORE IN ECUADORIAN POPULATION

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Introduction: Osteoporosis is a systemic skeletal disease characterized by a decrease in bone mineral density with alterations in bone microarchitecture and an increased risk of fracture. The World Health Organization asserts that it is a major public health problem and increases morbidity and mortality in elderly patients. The FRAX® score is a tool that estimates the risk of fracture at 10 years. It was adapted to the Ecuadorian population in 2009.

Purpose: To identify the risk of fracture in the Ecuadorian population using the FRAX® Ecuador calculator and compare the results with FRAX® Colombia, Brazil and the United States (Hispanics).

Methods: This is a retrospective study that included an Ecuadorian population between 40-90 years old, who underwent bone densitometry between 2013-2015, and whose risk of fracture was assessed with FRAX® Ecuador,

Colombia, Brazil and the United States (Hispanics). The DXA values considered were: Osteopenia: T Score -1.0 -2.5 and Osteoporosis: T Score ≥ 2.5 .

Results: We analyzed 837 patients with a mean age of 61.54 [SD 10.90] (40-90). The predominant gender was female with 87.6% (733) versus 12.4% (104) male. The mean age of menopause was 45.69 [SD 5.4]. The diagnoses according to bone densitometry were: 20.3% (170) normal, 30.5% (255) osteopenia and 49.2% (412) osteoporosis. The risk of major osteoporotic fracture in the population using FRAX® Ecuador was 1.4% (3-13%) and hip 0.4% (0-9.3%). For FRAX Colombia: 4.8% (7-29%) for major osteoporotic fracture and 1.1% (0-17%) for hip fracture. With FRAX® Brazil, 3.20% (1.2-25) was obtained for major osteoporotic fracture and 2.08% (0-16%) for hip. Finally, FRAX® USA (Hispanic) had a risk of 2.01% (0-17%) for major osteoporotic fracture and 1.81% (2-12%) for hip fracture (Image 1).

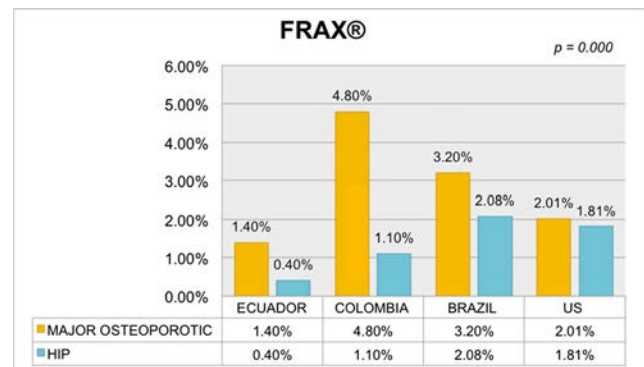


Image 1. Risk of fracture by FRAX® score in Ecuadorian population.

Conclusions: The risk of fracture for the Ecuadorian population according to the FRAX® Ecuador calculator was 1.4% for major osteoporotic fracture and 0.4% for hip fracture. Surprisingly, this population presents a low risk of fracture using the calculator of this country, in comparison to the scores obtained using the FRAX® of Colombia, Brazil and the United States (Hispanic). This may indicate that the risk of fracture may be underestimated with FRAX® Ecuador, although more specific studies are needed.

Keywords: Ecuador, epidemiology, FRAX calculator, osteopenia, osteoporosis

OCs6

DEVELOPMENT AND VALIDATION OF ANTHROPOMETRIC PREDICTION MODEL FOR ESTIMATION OF MUSCLE MASS IN THE ELDERLY

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Objective: Age- related muscle loss, named sarcopenia, has been linked to functional declines and an increased risk of complications. The aim of this study was to identify predictors of low skeletal muscle mass in older adults toward development of a practical clinical assessment tool for use by clinicians to identify subjects requiring dual-energy X-ray absorptiometry (DXA) screening for muscle mass in Iranian older people.

Materials and methods: Data were available for 2000 people aged ≥ 60 years who participated in the second stage of Bushehr Elderly Health (BEH) program, a population-based prospective cohort study, in a southern province of Iran. The participants were randomly assigned to two groups; a model-development group and a validation group.

Appendicular skeletal mass (ASM) was measured by DXA, as the dependent variable. To estimate predictive model, multiple linear regression analysis, anthropometric measures contains; weight, height, limb circumferences (upper arm, forearm, thigh and calf), waist, hip and neck circumferences, age, sex, body mass index (BMI), hand grip strength were used as independent variables. ASM_{DXA} was used as criterion measurement. Agreement was verified by intra-class correlation coefficient (ICC) and by the Bland-Altman technique.

Results: Prediction models were established using the data from model -development group. A five- variable model was developed as follows: $ASM = 9.29 - 0.18 \times \text{age} - 4.68 \times \text{sex} + 0.09 \times (\text{hand- grip strength}) + 0.22 \times \text{calf circumference} + 0.196 \times \text{BMI}$ (where adjusted $R^2 = 0.79$, $P < 0.0001$). The high agreement (ICC = 0.85) observed between ASM estimated by equation and DXA. This model performed well in the validation group.

Conclusions: The simple anthropometric prediction model developed in this study showed useful and good practical tool in clinical evaluation to estimate muscle mass and thus sarcopenia in elderly people

OCs7

IMPORTANCE OF THE JOURNAL AND WEBSITE BONE HEALTH FOR PATIENTS WITH OSTEOPOROSIS AND OTHER MUSCULOSKELETAL DISEASES

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Objectives: One of the crucial points in diagnosing and appropriately treating patients with osteoporosis (OP) and other musculoskeletal diseases such as osteoarthritis is the patient's knowledge about the disease. Different sources of information for the patients (e.g., websites and journals) can be helpful for managing these diseases. Since 2013, a biannual, bilingual (Latvian, Russian) journal and website *Bone Health* (www.kauluveseliba.lv) is available for patients in Latvia. There is information about OP and other musculoskeletal disease risk factors, diagnosis, treatment and prophylaxis options.

Material and methods: Questionnaires with 14 questions about the journal and website *Bone Health* were given to different respondents (rsp.). Demographic data and rsp. opinion about the informational content, design, and usefulness of the journal and website *Bone Health* were analysed.

Results: Totally 81 questionnaires was filled in (90% women, the median age of rsp. was 48 years. [IQR 77–19]). Almost a third (30%, $n = 24$) of the rsp. had OP or other musculoskeletal disease. In most of the cases (47%) rsp. had found out about the journal *Bone Health* from general practice and other specialists (e.g., endocrinologists and rheumatologists), 19% had found out about it from their family members or friends, 23% – from different sources (patient associations, World Osteoporosis day events, etc.). A small part of rsp. had used the journal's website (21%). 69% of the rsp. liked the journal's design, 20% liked it very much, and only 5% did not like it. Most of the rsp. (97%) mentioned that the informational content of the journal was useful, important, and essential. All the rsp. would recommend *Bone Health* to their relatives or friends.

Conclusion: Electronic media and classical communication tools such as journal and website *Bone Health* are useful and informative in the patients' view and can help manage patients with OP and other musculoskeletal diseases.

OCs8

TBS, VFA AND HANDGRIP IN A GROUP OF POSTMENOPAUSAL WOMEN WITH VERTEBRAL FRACTURE

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Objective: To evaluate the results of VFA, TBS and handgrip test measurement in postmenopausal women.

Material and Methods: The study was conducted in a group of 36 women aged 49–95 years. All patients had been tested with the use of VFA, TBS (Hologic Horizon) and for handgrip strength (Baseline SN 04201183). Vertebral fractures assessed by VFA were classified according to the Genant scale. Statistical analysis of the results was performed by Statistica 12.

Results: VFA results showed presence of fractures in 17 women (40% of the group). Most fractures were located in vertebra T7, Th12, T6 and Th8 (15; 13; 12; 10). Analysis of TBS in the research group showed significant abnormalities of bone microarchitecture. The average TBS result was 1197, with only 2 patients having the proper TBS score (>1350). The results showed no statistically significant correlation between the TBS, BMD, VFA and the number of fractures in patients. Analysis of the muscle strength test showed that average score of the handgrip was 23.9 kg. Results showed a correlation between handgrip and the value of TBS, however it was not statistically significant ($R = 0.44$). The study demonstrated a statistical significant dependence between the number of vertebral fractures (identified by VFA) and the result handgrip test ($p < 0.05$). Another statistically significant correlation ($R = 0.79$, $p < 0.001$) between the number of fractures, and decrease of growth recorded in patients.

Conclusions: There is a correlation between the number of fractures (noticed by VFA) the handgrip results and the decrease in growth. TBS results in the group of patients with vertebral fractures are generally low.

OCs9

DISCRIMINATIVE POWER OR ROMANIAN VERSION OF SARQOL QUESTIONNAIRE: PRELIMINARY RESULTS

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Introduction: SarQol (Sarcopenia Quality of Life) is the first disease-specific questionnaire for sarcopenia and has been developed and validated, initially in French language followed a year later in English. Recently we provided a translated and

culturally adapted version of the original SarQol questionnaire in Romanian language.

Objective: This study addressed the need to evaluate the discriminative power of the Romanian SarQol questionnaire.

Material and Methods: The sample size included 46 volunteers of both sexes, 65 years old or above who completed the Romanian SarQol questionnaire. To assess muscle strength we used a hand dynamometer; the Cut off values suggested by EWGSOP were used: a muscle strength <20 kg for women and <30 kg for men assessed.

Results: Mean age was 71.71 years \pm 9.02. Gender distribution: 36 female volunteers (78%) and 10 male volunteers (22%). Among subjects with positive Handgrip Test ($n = 23$), mean SarQol scores were significantly lower compared with individuals ($n = 23$) with Handgrip test below the mentioned cut-off values (60.2 ± 20.2 vs. 81.2 ± 14.2 , $p = 0.0002$).

Conclusion: In our study, subjects with a positive Handgrip Test reported a reduced global quality of life compared to those with a negative Handgrip Test. We found also a good, positive, statistically significant correlation between SarQol Mean scores and hand grip strength.

OCs10

IN PATIENT CARE FOR DIABETIC AND NON-DIABETIC PATIENTS WITH OSTEOPOROTIC HIP FRACTURES IN A FRACTURE LIAISON SERVICE AT AN ASIAN HOSPITAL: BRINGING THE BURDEN INTO THE SPOTLIGHT

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Introduction: Osteoporosis as well as Diabetes are increasing exponentially in Asia. Whether and how the burden of hospital care and problems after admission for osteoporotic hip fractures differ between diabetics and non-diabetics has not been explored in SE Asian populations.

Method: Retrospective review of patients admitted with new osteoporotic hip fractures and recruited into a FLS at Singapore's largest hospital.

Results: The study population included 150 non-diabetics and 88 diabetics. Chinese constituted 87.4%, Malays 6.7% and Indians 3.8%. 81.5% were women. Mean age was 74 years (10.3). On Univariate analysis, mean ((SD) time to operation (TTO) in days was significantly more in diabetics compared to non-diabetics; 4 (3) vs. 3.1 (3.3); $p = 0.002$. Length of Hospital Stay (LOHS) in days significantly differed between diabetics and non-diabetics; (mean (SD) 14.3 (7.7) vs. 12.6 (10.8) respectively; $p = 0.006$). Major post-operative complications were more in diabetics (19.3% vs. 8.7%; $p = 0.023$). Non-diabetics were more likely to be discharged to their homes (55.3% vs. 42%) compared

to diabetics who were more likely to get discharged to nursing homes or step-down facilities ($p=0.037$). There were no in-hospital deaths in either group. After adjusting for age and gender, patients with one or more co-morbidities at admission had a delay in time to operation by 1.66 days (CI 0.8–2.51; $p<0.001$) compared to those who had none. Logistic regression showed that the odds of developing post-operative complications was 2.15 times (0.98–4.74) higher in diabetics compared to non-diabetics ($p=0.055$). Both diabetic and non-diabetic patients with one or more other co-morbidities at admission had on average 3 days longer LOHS and those who developed a post-operative complication had 9 days longer LOHS than those who did not ($p=0.014$ and $p<0.001$ respectively). Linear regression analysis adjusted for age, gender, co-morbidities and post-operative complications showed that LOHS was longer in diabetics by 1.16 days compared to non-diabetics (1.01–1.34; $p=0.036$).

Conclusion: The burden of hospital care for patients with hip fractures is large. Though both non-diabetics and diabetics with other comorbidities present at the time of admission had more delays to operation and longer hospital stays, the burden appears to be even more in diabetics compared to non-diabetics with the former more likely to have post-operative complications and ultimately needing longer inpatient care.

OCs11

BALLOON KYPHOPLASTY COMPARED TO PERCUTANEOUS VERTEBROPLASTY: WHAT IS THE EVIDENCE?

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Background: A systematic review evaluating outcomes of balloon kyphoplasty (BK) vs. percutaneous vertebroplasty (VP) for vertebral compression fractures (VCF).

Methods: We searched multiple electronic databases to March 2016 for randomised and quasi-randomised controlled trials comparing BK with VP in adults with VCF. Outcomes included back pain, back disability, quality of life (QoL), new VCF and adverse events (AE). One reviewer extracted data, a second checked accuracy, and 2 reviewers independently rated risk of bias. Mean differences and 95% confidence intervals were calculated using inverse-variance models. Risk ratios of new VCF and AE were calculated using Mantel-Haenszel models.

Results: Seven unique trials (6 RCTs and one quasi-randomised trial) enrolling 969 participants (range of mean ages: 61–76 years, 75% female) met eligibility criteria. All trials had a high risk of bias. No statistically significant difference between treatments in improvement in back disability from baseline at any time point up to 2 years. No statistically significant difference between treatments in QoL improvements. No statistically significant difference in incident radiographic VCFs occurring within 3 months (23.3% vs. 27.4%, RR=0.85 [0.58, 1.26], k=1 trial), 12 months (28.3% vs. 31.5%, RR=0.89 [0.66, 1.19], k=2) or 24 months of intervention (49.1% vs. 57.7%, RR=0.85[0.66, 1.09], k=1). No significant difference in risk of incident adjacent radiographic vertebral fracture occurring up to 12 [6.0% vs. 7.0%; RR=0.91 (0.39, 2.15); n=278; k=3], 24 [16.0% vs. 14.0%; RR=1.14 (0.45, 2.91); n=100; k=1] or 60 months [16.0% vs. 14.0%; RR=1.14 (0.45, 2.91); n=100; k=1]. There was no significant difference in risk of incident clinical vertebral fracture at one (4.7% vs. 8.9%; RR=0.53 [0.24, 1.15]; k=1), or 12 months (16.3% vs. 22.9%; RR=0.77, 0.53, 1.11, k=2), or at 2 years (18.2% vs. 14.3%, RR=1.27 [0.48, 3.36], n=86). No increased risk of serious AE at 30 days (26.2% vs. 27.4%, $p=0.82$) from one study.

Discussion: No differences in back pain or disability, QoL, VCFs or AEs were identified between BK and VP. Major limitations included lack of a sham BK comparison, lack of blinding to treatment assignment and limited AE reporting. Rigorous new trials may resolve remaining areas of uncertainty about relative benefits and harms of BK.

World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2017): Non-sponsored Symposia Abstracts

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NS1

MEDIEVAL EVIDENCE: RECONSTRUCTING SOCIAL STATUS FROM BRITISH MEDIEVAL SKELETONS

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Current research into human bone health primarily relies on clinical and animal model experimental data. However, it is becoming increasingly clear that biological anthropologists who examine human skeletal remains from archaeological contexts can contribute perspectives on bone quality from specific historical lifestyle categories. Skeletal remains that derive from the European Medieval period offer a unique opportunity to investigate the effect of socioeconomic status (SES) stratification on skeletal health.

The aim of this talk is to review and summarise three key lines of evidence for the negative effect of low SES in British Medieval peasant skeletons: 1) childhood physiological stress events retained in dental enamel in the form of linear enamel hypoplasia (LEH) will be explored against longevity data, 2) products of cortical bone remodeling recorded using histomorphometry of the femur will be investigated in the context of SES-specific physical labour and diet, and 3) a direct correlation between LEH and femoral bone histomorphometry data per individual will be sought to test how and if the adult human skeleton accounts for childhood ill health. Each of the research questions will be addressed in a comparative framework with higher SES data from skeletons that encompassed richer and healthier Medieval noblemen. Statistically significant results in all three cases demonstrate that the skeletons of peasants experienced more frequent events of physiological stress disruption in childhood, developed adult bone of lower density, and had shortened longevity when compared to high

SES individuals. These findings provide support for the effect of SES on human skeletal health in the past.

NS2

CONTEMPORARY EVIDENCE: SOCIAL GRADIENT OF OSTEOPOROSIS

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With few exceptions, an inverse relationship exists between social disadvantage and chronic disease: osteoporosis appears to be no exception. The burgeoning evidence-base regarding a social gradient of osteoporosis suggests that disparities in bone quality and fracture risk are observed across many heterogeneous, and interconnected, parameters of social disadvantage, and also across the life-course. These disparities are not fully explained by clinical or lifestyle risk factors.

Whilst the underlying mechanism(s) for that social gradient remain unknown, it may be underpinned by biological mechanisms related to cumulative stressors and responses to those stressors across the life-course. Here, we also present a conceptual model, based on (i) the challenge posed by social disadvantage to individuals achieving allostasis, and (ii) the 'three-hit theory' of the allostatic load model, whereby genetic predisposition provides the first 'hit' to allostasis, the early life environment provides the second, and later life environment provides the third. This model suggests that, in addition to the direct biological effects exerted on bone by clinical and lifestyle factors, the recognised socially patterned risk factors for osteoporosis may also act on the pathway to disease onset via epigenetic mechanisms that transduce the psychosocial environment and increase the risk of osteoporosis and fracture.

NS3**EPIGENETIC EVIDENCE: CHRONIC STRESS, INFLAMMATORY RESPONSE AND OSTEOPOROSIS RISK**J. A. Riancho¹¹Department of Medicine. Hospital U M Valdecilla, University of Cantabria, IDIVAL, Santander, Spain

Epigenetic mechanisms can modulate gene activity in a stable manner, independently of changes in DNA sequence, and can be transmitted through cell divisions. Among them, DNA methylation has been widely explored. Cytosines which are followed by a guanine can be methylated by a family of DNA methyltransferases. The degree of methylation in promoter and other regulatory genomic regions influences gene transcription. Different from the genome, the epigenome is cell- and tissue-specific and varies along lifetime with environmental and other factors. Thus, epigenetics help to explain, in part, the interaction between genetic and acquired factors that underlies the pathogenesis of many common disorders, such as osteoporosis.

A wide variety of studies, from experimental animal models to epidemiological human studies, have shown that socio-economic status is associated with specific patterns of DNA methylation. The factors driving the association may be multiple and include nutrition and other lifestyle habits, environmental exposures, and psychological factors. Specifically, early life adverse nutritional and psychological experiences have long-term effects in the methylation patterns of genes involved in stress and inflammatory responses, such as glucocorticoids and cytokines. These factors are known to modulate the activity of bone cells and tend to induce an uncoupling between bone resorption and bone formation. Therefore, it can be speculated that epigenetic changes may be implicated in the association between socio-economic status and osteoporosis.

NS4**INNOVATIONS IN APPROACH TO ABSOLUTE RISK ASSESSMENT**C. Cooper^{1,2}¹Musculoskeletal epidemiology. Botnar Research Centre. Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences. University of Oxford, Oxford, United Kingdom, ²University of Oxford, Oxford, United Kingdom

The most widely available tool for the calculation of the 10 year probability of hip and major osteoporotic fractures, using readily assessed clinical risk factors and bone mineral density, is provided by FRAX. The widespread uptake and availability of FRAX during a time of transition since its launch in 2008, has resulted in its inclusion in many guidelines. In a systematic review incorporating 435 citations from which 231 were of sufficient quality to bring together in an IOF Report, 120

guidelines incorporated the FRAX algorithm. 38 of these provided no clear statement on how fracture probability is derived were to be used for clinical decision making. Two broad approaches were used to develop intervention thresholds with FRAX; the first was to determine a fixed threshold probability that could be applied to men and women irrespective of age; the second approach was to use age dependent thresholds where fracture probability at which treatment was recommended, was age-specific. Two guidelines utilised a combination of fixed and age dependent thresholds; fixed probability thresholds that ranged from 4 to 20% for a major fracture and 1.3–5% for hip fracture. Age dependent intervention thresholds, first developed by the National Osteoporosis Guideline Group (NOGG) are based on the rationale that if a woman with a prior fragility fracture is eligible for treatment, then at any given age a man or woman with the same fracture probability (in the absence of a previous fracture) should also be eligible. Under current NOGG guidelines, inequalities in access to therapy arise especially at older ages (>70 years) depending on the presence or absence of previous fracture. An alternative threshold has therefore been proposed, which uses a hybrid model to reduce this disparity. The use of FRAX (fixed or age dependent thresholds) as the gateway to assessment identifies individuals at higher risk more effectively than the use of BMD alone, or the use of individual clinical risk factors alone. However, the setting of intervention thresholds continues to be country specific.

NS5**CURRENT OSTEOPOROSIS TREATMENTS AND GUIDELINES FOR THEIR DELIVERY IN THE UNITED STATES**M. McClung¹¹Oregon Osteoporosis Center, Portland, OR, United States

Eight drugs are currently approved in the United States for the treatment of osteoporosis. Five of these drugs into additional agents are also approved for the prevention of osteoporosis. The original National Osteoporosis Foundation (NOF) guidelines that became available in 1998 recommended pharmacological treatment for all postmenopausal women with T score values of –2.0 or less or, for those with any of several risk factors, with a T-score of –1.5 or lower. Many professional societies adopted more conservative guidelines, resulting in confusion among physicians and patients about who should be treated.

Recognizing that the cost effectiveness and the benefit: risk relationship of osteoporosis treatment could be optimized by targeting therapy at high-risk patients, updated in NOF guidelines became available soon after the availability of the FRAX assessment tool in 2008. Based upon a combination of cost effectiveness and clinical considerations, treatment was recommended in postmenopausal women and men with a personal history of hip or vertebral fracture, a T-score of –2.5 or less, or a combination

of low bone mass (T-score between -1 and -2.5) and a 10-year probability of hip fracture of at least 3% or any major fracture of at least 20% as calculated by the FRAX Fracture Risk Assessment Tool. Subsequently major professional societies, including, as of 2015, the American Academy of family physicians, have endorsed these new guidelines. Fracture risk assessment (FRAX) has also been incorporated into treatment guidelines for glucocorticoid induced osteoporosis by the American College of rheumatology. In 2011, the US Preventive Services Task Force is included fracture risk assessment into guidelines for bone density testing, recommending screening for osteoporosis in women aged 65 years or older and in younger women whose (major) fracture risk is equal to or greater than that of a 65-year-old white woman who has no additional risk factors (9.3%). The availability of risk assessment tools, in particular franks, has significantly changed the US national recommendations for osteoporosis therapy. Importantly, there is strong consensus among professional societies about the current guidelines. Treatment is now preferentially targeted to patients at high fracture risk and is most often avoided in women at low risk. Unfortunately, many primary care physicians are not aware of these guidelines and many insurance companies do not reimburse for osteoporosis drugs in patients who meet these criteria for treatment but who do not have BMD values consistent with osteoporosis. These factors contribute to the large treatment gap known to exist in the United States.

NS6

TREATMENT BASED ON FRACTURE RISK – HEALTH ECONOMIC IMPLICATIONS

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Treatment efficacy, assessed in randomised controlled studies, is usually expressed as a single overall value – the average relative risk reduction observed over the treatment period between treatment and placebo or other comparator. In many studies, sub-group analyses then examine the relative risk reduction in pre-specified or, sometimes, post hoc identified sub-groups based on a single risk factor (e.g. T-score < -2.5). Such approaches can give misleading results and also decrease the power of the analyses. The availability of fracture risk tools, such as FRAX (<http://www.shef.ac.uk/FRAX>), where fracture risk is expressed as a continuous variable allows the examination of potential interactions between treatment and baseline fracture risk, thus avoiding sub-group analysis.

In a 3-year prospective, randomized, placebo-controlled trial of oral clodronate in women aged 75 years or more, greater clinical osteoporotic fracture reduction was seen at higher fracture probabilities. Similar findings of greater efficacy at higher

probabilities, though without significant interactions, have been reported in analyses of the phase III studies of bazedoxifene and denosumab. In contrast, other studies, including those of raloxifene, strontium ranelate, teriparatide and abaloparatide, have not shown this trend with apparently similar efficacy across a range of fracture probabilities (but still with greater absolute risk reductions in those at higher risk).

The knowledge that the efficacy of treatment may interact with baseline fracture risk has important implications for health economics. The use of a greater relative risk reduction in those at highest risk of fracture will result in a more favourable cost-effectiveness analysis than the use of the overall average effect. In contrast, a lower relative efficacy in those at highest risk may also be observed and should be taken into account.

NS7

IMMUNOSENESCENCE AND IMPACT OF EXERCISE ON CELLULAR MARKERS

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Introduction: Aging affects negatively the immune system, defined as immunosenescence, which increases the susceptibility to infections, autoimmune diseases and cancer. Physical exercise may prevent or slow down immunosenescence without significant side effects.

Purpose: The aim of this review was to appraise the existing evidence regarding the impact of exercise on surface markers of cellular immunosenescence in either young and old humans or animals.

Methods: - 2 databases (PubMed, Web of Science) were screened for relevant articles.

- Methodological quality assessment was performed.

Results: 28 articles (humans and animals) were found. Among them, there were 10 randomized control trials with moderate to good quality. An acute bout of exercise induces increases in senescent, naïve, memory CD4+ and CD8+ T-lymphocytes; and significantly elevates apoptotic lymphocytes in peripheral blood. Long-term exercise produces increased levels of T-lymphocytes expressing CD28+ in both young and elderly subjects. Few studies found an increase in natural killer (NK) cell cytotoxic activity following a period of training.

Conclusion: Exercise has considerable effects on the expression of surface markers of immune cells. An acute bout of exercise induces the mobilization of memory, naive, and senescent T-lymphocytes into the peripheral blood compartment and promotes lymphocyte apoptosis. Long-term exercise has a tendency to promote NK cell activity and T-lymphocytes expressing CD28. Physical exercise might be used as a safe mode to improve the immune system, but direct scientific evidence for its ability to counter immunosenescence needs further investigation.

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NS8

CHRONIC LOW-GRADE INFLAMMATION AND EFFECTS OF EXERCISE

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Background: Ageing is associated with reduced muscle mass, muscle performance and increased inflammatory profile. Also changes in body composition and lower physical function are noticed. Physical exercise is one of the most effective means to attenuate characteristics of ageing.

Methods: A systematic review was performed to provide the most recent literature on changes in muscle strength, body composition, physical functioning and inflammation in older adults after an exercise intervention. To confirm the findings in the latest literature, we analysed the effect of three different exercise modalities on IL-6 in 113 older adults (71 ± 5 years) participating in the Senior's Project Intensive Training (SPRINT, an ongoing exercise intervention study).

Results: 34 articles were included in the review— 4 involving frail, 24 healthy and 5 older adults with a specific disease. Articles reported many exercise types: resistance training, aerobic training, combined resistance training and aerobic training and others. In frail older adults, moderate-to-large beneficial effects were obtained in inflammation, muscle strength and physical functioning. None of the articles compared different exercise types, making an exercise recommendation for frail older persons difficult. In healthy older adults, effects of resistance training (most frequently investigated) on inflammation or muscle strength can be influenced by the exercise modalities. Muscle strength seemed the most frequently used outcome measure, with moderate-to-large effects obtained

regardless the exercise intervention studied. Similar effects were found in patients with specific diseases.

For the SPRINT study, all exercise interventions were well tolerated by the participants. 3 months intensive strength training induced a significant decrease ($p=0.027$) in circulating IL-6 in male only.

Conclusion: Exercise has moderate-to-large effects on muscle strength, body composition, physical functioning and inflammation in older adults. Future studies should focus on the influence of specific exercise modalities and target the frail population. Our study confirmed the findings in the most recent literature regarding the effects of exercise intervention on chronic low-grade inflammation in older adults.

None of the authors have any conflicts of interest to declare in relation to his abstract.

NS9

ANTI-INFLAMMATORY EFFECTS OF RESISTANCE TRAINING: DOSE-RESPONSE RELATIONSHIP

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Background: Ageing is associated with an increase in circulating pro-inflammatory mediators, corresponding to a chronic low-grade inflammatory profile. Contracting skeletal muscle is reported to secrete myokines which counteracts this low-grade inflammation. Little is known about the effects of resistance training (RT) on circulating cytokines, also dose-response relationships remain unclear. This study investigated the impact of RT at different external loads on circulating inflammatory mediators in young and older community-dwelling persons.

Method: 36 young (22 ± 2 years) healthy subjects were randomized to 9 weeks 3x/week supervised RT at either HI_{max} ($n=12$, 1 × 10-12 repetitions at 80% 1RM), LO ($n=12$, 1 × 10-12 repetitions at 40% 1RM), or LO_{max} ($n=12$, 1 × 10-12 repetitions at 40% 1RM preceded by 60 repetitions at 20-25% 1RM). In addition, 56 community-dwelling older (68 ± 5 years) volunteers were randomized to 12 weeks of supervised RT (3x/week) at either high-resistance (HIGH, 2 × 10-15 repetitions at 80% 1RM), low-resistance (LOW, 1 × 80-100 repetitions at 20% 1RM), or mixed low-resistance

(LOW+, 1 × 60 repetitions at 20% 1RM followed by 1 × 10-20 repetitions at 40% 1RM). Serum was collected at baseline and after intervention for cytokines determination.

Results: IL-8 increased and IL-6 decreased significantly after training in the young, but no significant time*group interaction was found. When analyzed separately, IL-8 increased significantly in HI_{max} and LO_{max} and IL-6 decreased significantly in LO_{max} and LO training groups. In the HI_{max} group sTNFR1 and IL-1RA increased significantly, but remained unchanged in LO_{max} and LO groups. For the older cohort, 12 weeks of RT induced an overall significant increase of sTNFR1 and IL-8. In addition, we found in males of the HIGH group a significant increase in IL-8 and IL-1ra.

Conclusions: RT has anti-inflammatory effects already at young age and the effects on the different inflammatory mediators depends on the magnitude of the external load. 12 weeks of supervised RT in older persons induced an overall significant increase of circulating IL-8 and sTNFR1, independently from the external load applied. However, training at HIGH external load also increased anti-inflammatory IL-1ra in male participants, which might be beneficial in combating low-grade inflammation.

None of the authors have any conflicts of interest to declare in relation to this abstract.

NS10

INTRODUCTION AND MISSION STATEMENT OF THE INTERNATIONAL CONSORTIUM

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Objectives: To develop a consensus on how to improve the management of patients with FD/MAS and prioritize areas for research

Methods: Annual international workshops were held over 3 days involving patients, clinicians and researchers. Each day had a combination of formal presentations and facilitated discussions that focused on clinical pathways and research.

Results: Two workshops have been held (Oxford, UK 2015 and Lyon, France 2016). The first meeting's patient workshop days highlighted the variability patients experience in getting a diagnosis, the knowledge of general clinical staff and understanding long-term outcomes. The second meeting's patient workshop day was focused around patient groups from different countries and how they could support and learn from each other. The research workshop prioritized collaborations that improved understanding of the contemporary natural history of FD/MAS and highlighted the current research within each unit. The clinical workshop outlined the key issues around diagnostics, assessment of severity, treatment and monitoring of patients.

Conclusions: In spite of advances in understanding the genetic and molecular underpinnings of FD/MAS, clinical management remains a challenge. From the workshops, a consensus was reached to create an international, multi-stakeholder partnership to advance research and clinical care in FD/MAS. We invite other stakeholders to join the consortium.

NS11

PATHOPHYSIOLOGY OF SKELETAL AND EXTRASKELETAL MANIFESTATIONS OF FD/MAS

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Objective: To review the pathophysiology of the skeletal and extraskeletal manifestations of Fibrous Dysplasia/McCune Albright Syndrome (FD/MAS).

Methods: Addressing the cellular and molecular basis of clinical manifestations of FD/MAS.

Results: FD/MAS is a rare genetic, non-inheritable disorder due to a somatic mutation of the GNAS1-gene leading to activation of the stimulatory α -subunit of the G protein Gs, and associated constitutive activation of cAMP-mediated signalling in cells variably derived from endoderm, ectoderm or mesoderm. The mutation occurs postzygotically, resulting in a somatic mosaic state and a wide spectrum of clinical expression ranging from the completely asymptomatic patient with an incidentally discovered radiological lesion, to the patient with extensive crippling skeletal disease. Skeletal manifestations of FD result from dysfunction of cells of the osteogenic lineage, with normal bone being replaced by disorganised fibrous tissue and poorly mineralized woven bone in a single bone (monostotic FD) or in several bones (polyostotic FD) leading to disturbed microarchitecture, poor bone quality and significant morbidity due to pain, which may be severe and intractable, deformities which may be crippling, and increased fracture risk. The exact mechanism of FD-related pain remains elusive although there is some evidence for its association with increased bone turnover. Overexpression of RANK-L and IL-6 increases the number and activity of osteoclasts in and around FD lesions, and the resulting acidic bone microenvironment may directly stimulate nociceptive sensory neuron receptors, which are also potentially stimulated by mechanical stress and periosteal expansion of a lesion. Osteomalacia due to renal phosphate wasting and low levels of 1,25(OH)2D3 due to overexpression of FGF-23 also plays a role. Extraskeletal manifestations of FD are due to increased cyclic AMP signalling in mutated endocrine cells variably leading to precocious puberty, growth hormone excess, hyperthyroidism, neonatal hypercortisolism and FGF-23-mediated renal phosphate

wasting. Mutations in skin cells result in characteristic hyperpigmented café-au-lait patches.

Conclusion: Better understanding of the complex cellular and molecular pathophysiology of FD has paved the way to the development of novel therapeutic agents in the management of this ubiquitous disorder.

NS12

CONSENSUS CLINICAL CARE PATHWAY

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Objectives: To develop standard of care guidelines for diagnosis and management of FD/MAS based on the best available evidence and expert opinion.

To identify, measure and improve outcomes for children and adults with FD/MAS.

Methods: Using a modified Delphi approach, a core stakeholder group developed a list of key statements around the clinical care of children and adults with FD/MAS to include definitions, diagnosis, staging, treatment and monitoring. The core stakeholder group then identified experts within their countries and other countries who were sent the key statements to comment on. Their responses were then reviewed and a final pathway agreed by the group.

Results: Definitions for monostotic FD, polyostotic FD, McCune Albright and Mazabraud's syndrome are agreed. The need for a thorough evaluation to exclude polyostotic and endocrine involvement are highlighted as well as the role of genetic testing in mono-ostotic lesions. The staging of skeletal and endocrine symptoms, signs, laboratory testing and imaging are defined as well as the need to capture quality of life measures. Specific recommendations for cranio-facial and orthopaedic staging are described. Treatment and monitoring recommendations include general lifestyle, bone pain, hypophosphataemia, other endocrine disorders, other organ systems, orthopaedic and cranio-facial involvement.

Conclusions: This clinical care pathway is aimed at standardizing care for patients with FD/MAS across centres and empowering patients to understand the types of care they should be receiving. Widespread adoption of the pathway will allow comparison of outcomes between centres and identify sub-groups of patients for future clinical studies.

NS13

THERAPEUTIC OPTIONS IN FIBROUS DYSPLASIA-MCCUNE-ALBRIGHT SYNDROME

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The indications of treatment of fibrous dysplasia of bone - McCune-Albright syndrome (FDMAS) are guided by the evaluation of bone pain, fracture risk and bone and endocrine measurements. The treatment must be started as soon as possible. Therapies of FDMAS include analgesics, bisphosphonates, surgery and the management of endocrine complications. In the common situation where analgesics do not suffice to reduce bone pain, intravenous bisphosphonates can be used. In open studies, pamidronate, olpadronate and zoledronic acid have been shown to reduce bone pain significantly. In general, after 2 years of semestrial infusions, the treatment is progressively tapered and can be stopped or continued on demand if bone pain resumes. Oral alendronate could not reduce bone pain in a randomized trial conducted in patients with moderate bone pain over 2 years. The results of a randomized trial testing risedronate compared with placebo are expected soon. A trial testing an antiIL6 (tocilizumab) is ongoing. Osteotomies and intra-medullary rods can be used preventively. This preventive treatment should be used early in children at risk for hip deformity and high fracture risk. In adults, they can also be used whenever deemed necessary. These surgical techniques are also used after fracture. Optic nerve decompression has to be used very cautiously for this is a high risk procedure. In those patients with precocious puberty, the use of anti-aromatases such as letrozole is recommended to preserve the growth. Growth hormone hypersecretion and hyperthyroidism are also to be treated, both in children and adults. The long term therapies depend on a careful monitoring of clinical symptoms, bone metabolism measurements, fracture risk and endocrine abnormalities. Of note, many patients with non severe forms (often monostotic forms) do not need any specific therapies.

NS14

THE ROLE OF CALCIUM IN BONE GROWTH AND PRESERVATION

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Approximately 99% of calcium in the body is found in bone, where it serves a key structural role as a component of hydroxyapatite. Calcium absorption occurs by several mechanisms: active transport, the dominant mechanism at low calcium intakes (<500 mg/d), passive diffusion that is proportional to the gut luminal concentration of calcium, and to a lesser degree, by osmotic gradient. Many factors influence calcium absorption efficiency including age, the circulating 25-hydroxyvitamin D level, vitamin D receptor genotype, season, and diet composition. Dietary fiber and oxalates decrease calcium absorption and protein (aromatic amino acids) and glucose, increase it. Caffeine and sodium

increase calcium excretion as does dietary protein (secondary to the increase in absorption). Because diets vary around the globe, the requirement for calcium is also expected to vary. Calcium supports bone growth in children. The bone accretion rate is maximal during adolescence when it exceeds 400 mg per day. Calcium plays a role in preserving bone mass in adults. In postmenopausal women, calcium supplementation had little impact on the rapid bone loss that occurs in the first 5 years after menopause, but reduced bone loss thereafter. The impact on rates of bone loss was related to the starting calcium intake levels of the participants. Specifically, women in the US with usual calcium intakes <400 mg/d responded favorably to supplementation with 500 mg of calcium per day whereas women with higher intakes had a blunted response. In many parts of the world calcium intakes are suspected to be low. This concern prompted the IOF to undertake the project of assembling available information on calcium intakes from food in different regions and countries around the globe. Awareness is an essential step in the process of change.

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NS15

EVIDENCE TO SUPPORT A GLOBAL MAP OF DIETARY CALCIUM INTAKE BY COUNTRY AND SUBGROUP

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Objectives: Globally, there is concern that low calcium intake across the population is adversely affecting bone health. To better understand the current status of dietary calcium intake around the world, the International Osteoporosis Foundation commissioned a systematic review of the evidence for average dietary calcium intake by country.

Materials and Methods: We searched Pubmed, Embase, CAB Abstracts, CINAHL, Global Health, and 8 other databases for studies reporting national average dietary calcium intake in adults. We prioritized larger population surveys conducted since 2000 but included older or smaller studies, convenience samples, or subpopulations, as necessary. We excluded studies of children, institutionalized adults, those with comorbidities, and pregnant or lactating women. We extracted mean or median (and range or SD) dietary calcium intake for the total sample and subgroups by age, sex, and socioeconomic factors (e.g., wealth, urban vs. rural).

Results: We have screened 17,137 abstracts and retrieved about 350 articles. To date, we have data for 62 countries, mostly from Europe, South and Southeast Asia, Africa,

Latin America, and the Middle East. From national data, mean dietary calcium intake ranged from 288 mg (Nigeria) to 1151 mg (Netherlands). The 5 lowest estimates of mean dietary calcium intake (<350 mg/d) are from India, Thailand (women), Nigeria, South Korea, and Malawi. Nine countries had mean intake >1000 mg/d (from Europe or Canada). Within countries, men's intake tended to be higher. No clear pattern of mean intake by age is evident. In 3 countries, intake was higher in urban than rural dwellers.

Conclusions: Dietary calcium intake varies widely across the globe, with lowest intakes in Asia, Africa, and lower income countries and highest intakes in Europe and higher income countries. Average intake is usually higher among men than women. Data from this systematic review will support an interactive, global map of average dietary calcium intake.

Disclosures: None

NS16

THE SKELETAL CONSEQUENCES OF INADEQUATE CALCIUM INTAKE

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Calcium is an essential nutrient for skeletal development and maintenance. The evidence for nutrients and food that predicted peak bone mass is strongest for calcium, mixed for vitamin D and dairy, and weak to nonexistent for most other components of the diet. Together with weight-bearing exercise around the time of puberty, an adequate calcium intake is essential to achieve optimal peak bone mass in girls and boys. It seems logical that other phases of rapid bone remodeling, including pregnancy, lactation, infancy, menopause and ageing, are also periods where calcium interventions would have most benefit, however differences in calcium absorption at different life stages also need to be considered. For example, calcium absorption efficiency ranges from 80% in infancy, 40% in the teens, to as low as ~5% in the elderly.

Calcium supplementation has been shown to increase bone accrual during puberty, but not during young adulthood, except in the humerus, nor are lactation-associated or postmenopausal bone loss prevented by calcium. In athletes, higher low fat dairy intakes are associated with a lower risk of stress fractures, as is treatment with calcium and vitamin D in naval recruits. The response of postmenopausal women to calcium supplements is mixed. However, a recent meta-analysis showed calcium and vitamin D produced significant 15% and 30% reductions in total and hip fractures, respectively. Thus, calcium plus vitamin D is a useful intervention for reducing fractures in both community-dwelling and institutionalized middle-aged to older adults.

Concerns have been raised about possible adverse effects of calcium supplements on increasing cardiovascular disease,

including myocardial infarction. Wherever possible it is recommended that dietary calcium is the best source of calcium. Three serves of calcium-containing foods daily provides an adequate calcium intake in most people. In longitudinal cohort studies, higher dietary calcium intakes have been associated with lower fracture rates, and other beneficial health outcomes, including reduced risks for cardiovascular disease, stroke and all cause mortality. Increasing dietary calcium intakes throughout the lifespan in individuals from countries with inadequate calcium intakes is likely to be an important strategy for improving bone health globally.

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NS17

CLINICAL AND BIOCHEMICAL PHENOTYPE OF OSTEOSARCOPENIA

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Osteosarcopenia is a new skeletal muscle disease characterized by the interaction of low appendicular muscle mass and bone mineral density associated with aging. The body composition of subjects with Osteosarcopenia presents lower appendicular muscle mass, bone mineral density, body mass index and total fat index compared to subject with osteoporosis or sarcopenia only, but differences occurs between the genders. The clinical manifestations of osteosarcopenia are characterized by weakness, low walking speed, and loss of mobility, disability and frailty. Studies on biochemical characteristics of osteosarcopenia are still scarce; however, recent finding have demonstrated that subjects with osteosarcopenia have lower levels of testosterone, vitamin D and hemoglobin than subjects with osteoporosis or sarcopenia. To date, the diagnosis of osteosarcopenia is not fully established, and significant variations of clinical and physical phenotype are observed among the combinations of different concepts of Sarcopenia with osteopenia/osteoporosis. In this presentation we will show some recent data from SARCOS study - an epidemiological study of Sarcopenia and Osteoporosis in older adults with Cardiovascular Diseases, and review studies on clinical manifestations and biochemical characteristics in the different conceptualizations of ostosarcopenia. We will also discuss a practical guideline for the diagnosis of Osteosarcopenia.

NS18

DXA USE IN DIAGNOSIS AND MONITORING OF OSTEOSARCOPENIA

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Dual energy X-ray absorptiometry (DXA) is a low-radiation, relatively inexpensive and widely available methodology that is commonly utilized in the diagnosis and monitoring of osteoporosis treatment. As DXA can measure bone, fat and fat-free (i.e. “lean”) mass it is often also used in studies of sarcopenia. Consequently, current consensus approaches to identify sarcopenia include an appendicular (i.e., arm plus leg) DXA measured lean mass assessment. The necessity of high-quality DXA acquisition, analysis and interpretation in osteoporosis care is often underappreciated; as a result substantial errors are common in clinical practice that may negatively impact patient care. Similar rigorous attention to detail in DXA performance for sarcopenia diagnosis is essential. Moreover, it is also important to recognize that DXA-measured lean mass is not a direct measure of muscle mass, rather it is a surrogate that is largely the measurement of water. It seems plausible that algorithms might be developed thereby allowing DXA lean mass measurements to more closely mimic gold standard muscle mass measurement approaches such as MRI. Clinical DXA examples and pitfalls relating to osteoporosis and sarcopenia will be presented. Additionally, the current and future utility of DXA to assist in improved identification of those at risk for fragility fracture will be considered.

NS19

THERAPEUTIC INTERVENTIONS FOR OSTEOSARCOPENIA

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Osteosarcopenia has been coined to describe frailer individuals at higher risk of falls, fractures and poor outcomes, including higher prevalence of disability and mortality. Physical inactivity, low serum levels of vitamin D, hypogonadism (in men), and poor nutrition accelerate the progression of osteosarcopenia. Based on a real case, we will review preventive measures and therapeutic interventions that can benefit osteosarcopenic patients while concurrently targeting muscle and bone. Based on care pathways, we will review evidence-based practical therapeutic interventions for this condition that can improve older adult care. This will include the review of the effect of nutritional supplements on muscle and bone, appropriate prescription of physical activity to improve muscle and bone mass, and current (i.e. vitamin D) and upcoming non-pharmacological (i.e. whole body vibration) and pharmacological interventions for this condition (i.e. myostatin antibodies).

NS20

MUSCLE WEAKNESS AND FATIGUE: DOES THE TYPE OF CONTRACTION MATTER?L. De Dobbeleer^{1,2}, I. Beyer^{1,2}, I. Bautmans^{1,2}¹Gerontology department; Frailty in Ageing research department, Vrije Universiteit Brussel, Brussels, Belgium,²Geriatrics Department, Brussels, Belgium

Objectives: The FR (Fatigue Resistance) test – the time during which grip strength drops to 50% of its maximum during sustained contraction – is an objective evaluation validated by the measurements of dynamic contraction with the Martin Vigorimeter (MV). However, the Jamar Dynamometer (JD), a device measuring static grip strength, often used to measure grip strength. It remains unclear whether muscle fatigue is similar when FR is measured with both devices.

Methods: 141 community-dwelling people (81♀ and 60♂; aged 53±23 years, age range 19–91 years) were tested for FR with both devices. Agonist (flexor muscles of the fingers) and antagonist (extensor muscles of the fingers) muscle activity of the dominant arm was simultaneously recorded by surface electromyography and analysed at the start (T100= maximal force) and when force declined to 75% (T75) and 50% (T50) of its maximum.

Results: FR was significantly longer when measured with MV compared to JD (respectively 68±35 sec and 37±20 sec, $p<0.001$), when splitting into 3 age-groups we found similar significant differences. At T100, T75 and T50, antagonist muscle co-activation was significantly higher during sustained dynamic (MV, respectively 51±29% at T100, 39±25% at T75 and 35±22% at T50) compared to sustained static (JD, respectively 9±4% at T100, 8±3% at T75 and 7±3% at T50, all $p<0.001$) contraction. In contrast, the agonist muscle activation level remained significantly higher during the static (JD 94±22% at T75 and 76±23% at T50) compared to the dynamic (MV, 86±27% at T75 and 65±24% at T50, all $p<0.001$) contraction.

Conclusion: The results suggest that the FR test when using the MV (dynamic contraction) induces a more prominent muscle exhaustion than when using the JD (static contraction), suggesting that the MV might be more suitable for measuring muscle FR.

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NS21

CAN EXERCISE COUNTER MUSCLE ACTIVATION DEFICITS?P. Arnold^{1,2}, I. Bautmans^{1,2}¹Stichting Opleidingen Musculoskeletale Therapie (SOMT), Amersfoort, Netherlands, ²Gerontology (GERO) and Frailty in Ageing (FRIA) Research Department, Vrije Universiteit Brussel, Brussels, Belgium

Background and objective: Age-related muscle weakness is only partially related to muscle atrophy, due to neuromuscular changes, including reduced voluntary muscle activation (i.e. the capacity to fully activate a muscle during a maximal voluntary contraction (MVC)) and antagonist muscle co-activation. Important strength gains (up to >50%) have been reported, already after a relatively short period (i.e. 6–9 weeks) of strengthening exercise, even in very old persons. Neuromuscular adaptations most probably are involved in these rapid changes. Literature is inconsistent about the respective contribution of these mechanisms in exercise-induced strength gains at higher age.

Methods: We systematically reviewed the literature for studies reporting effects of resistance training programs on voluntary muscle activation and antagonist muscle co-activation in elderly persons.

Results: Seventeen relevant studies were identified, 4 investigated voluntary muscle activation, 8 antagonist muscle co-activation and 5 studies investigated both. Meta-analysis showed an exercise-induced improvement in voluntary activation in plantar flexors (weighted mean difference (WMD) +8.8%, $p<0.001$), and knee extensors (WMD +1.8%, $p<0.001$), with greater gains in activation capacity obtained in subjects with lower voluntary activation level prior to the onset of training. We found no significant overall effect of strength training on antagonist co-activation during ankle plantar flexion (WMD +0.6%, $p=0.686$) or knee extension (WMD -1.1%, $p=0.699$ for the RCT's and -1.8%, $p=0.516$ for the non-controlled trials).

Conclusion: Based on our results we can conclude that there is evidence for exercise-induced increase in voluntary activation related to strength gains in the lower extremities in elderly persons. The results for exercise-induced effects on antagonist co-activation are inconsistent and more research is necessary to determine its contribution to strength gains following resistance training in elderly persons. More insight in these mechanisms, as well as the strong dose–response relationship in training programs, will support the clinical decision making in prescribing exercise interventions to counter muscle weakness and related physical dependency in elderly persons.

None of the authors have any conflicts of interest to declare in relation to his abstract

NS22

STRENGTH GAIN AND FUNCTIONAL BENEFITS OF RESISTANCE TRAINING: DOSE–RESPONSE RELATIONSHIPE. Van Roie¹, C. Delecluse¹, W. Coudyzer², I. Bautmans³¹KU Leuven, Department of Kinesiology, Physical Activity, Sports and Health Research Group, Leuven, Belgium, ²KU Leuven, Department of Morphology and Medical Imaging, Radiology Section, Leuven, Belgium, ³Vrije Universiteit

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Objective: Resistance exercise (RE) is the most effective approach to counteract age-related declines in muscle mass and strength. International guidelines have recommended to perform RE at relatively high loads (60%-80% of the one repetition maximum (1RM)). Recently, the question has arisen whether muscle strength and mass gains would also be achievable with lighter loads. Studies comparing different RE regimens often failed to control for total training volume and degree of fatigue. The objective of the current study is to compare the effects of high- and low-load RE, matched for training volume and degree of fatigue, on muscle mass, strength and functional performance in older adults.

Material and methods: Fifty-six older adults (♂ 26, ♀ 30, age = 68 ± 5 yrs) were randomly assigned to 12 weeks of leg press and leg extension training at either HIGH load ($2 \times 10-15$ repetitions at 80% of 1RM), LOW load ($1 \times 80-100$ repetitions at 20% of 1RM), or LOW+ load (1×60 repetitions at 20% of 1RM, followed by $1 \times 10-20$ repetitions at 40% of 1RM). All protocols ended with volitional fatigue. Outcome measures included leg press and leg extension 1RM, mid-thigh muscle volume (CT-scan), knee extensor static peak torque (PTstat) and dynamic peak torque at different speeds (PTdyn 60°s^{-1} , PTdyn 180°s^{-1} , PTdyn 240°s^{-1}) and several functional performance tests.

Results: HIGH and LOW+ resulted in greater gains in 1RM than LOW ($p < 0.05$). Similar gains were found between groups in muscle volume, PTstat, PTdyn 60°s^{-1} , PTdyn 180°s^{-1} and functional performance. HIGH tended to improve PTdyn 240°s^{-1} more than LOW or LOW+ ($p = 0.064$).

Conclusions: High- and low-load RE ending with volitional fatigue may be similarly effective for hypertrophy, strength gains and functional performance in older adults. Differences that did occur were very specific to the trained movement. The study points out that it is time to re-think the high-load RE philosophy that has gone unchallenged for decades, especially in older adults.

None of the authors have any conflicts of interest to declare in relation to this abstract.

NS23

IMPORTANCE OF PATIENT-CENTRED OUTCOMES (PCOS) IN THE ASSESSMENT OF CHRONIC DISORDERS

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The measurement of patient reported outcomes complements and enhances clinical outcome evaluations, and is crucial for

the understanding of the burden of a chronic disease, and to foster patient-centred care. If used, PROs should be built as early as possible into the clinical trial protocols, and should be explicitly stated as an objective. The development of a PRO includes aspects of cultural and scientific validation, as the PRO must be able to discern clinically meaningful changes and events: a clear hypothesis and construct of interest are needed for the development of these tools. Health related QoLs are also extensively used in health technology assessment to support the determination of therapeutic value of an intervention. The increase of burden of chronic disease, and the population ageing, are likely to drive an increase of their use, and attention to the variability due to patient-related factors (relevance of the instrument may change with age, sex...). Before developing a new instrument, the relevance sensitivity and specificity of existing instruments should be considered. Most of the work at the EMA so far has been in relation to cancer (a Concept paper on revision of the old guidance on health related QoL is currently being drafted). A compendium is being developed with FDA to collect existing validated instruments (<http://www.fda.gov/drugs/developmentapprovalprocess/developmentresources/ucm459231.htm>). For sarcopenia, a co-primary endpoint of a function based and a PRO outcome has been advised in most development plan proposals which have been the subject of a Scientific Advice request to EMA.

NS24

ASSESSMENT OF QUALITY OF LIFE IN SARCOPENIA: WHAT CAN WE LEARN FROM OSTEOPOROSIS ?

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Osteoporotic fracture risk is multifactorial, but is largely determined by the balance between bone strength and the propensity to fall. Fractures are associated with marked morbidity, altered quality of life, and increased mortality. Disability, decreased capacity of activity of daily living (ADL), limitations of social interactions and need of health care are compromising quality of life (QOL). The alterations of QOL after fragility fracture are dependent on age (older patients are less resilient), gender, type of fracture (recovery after a forearm fracture is higher and faster, and more likely to be complete than after a hip fracture) and on number and severity of comorbidities. Several instruments capable of quantifying QOL in relation with prevalent fractures are validated, but few can detect changes related to incident fractures. Sarcopenia and osteoporosis are sharing similar epidemiology, risk factors and pathogenetic mechanisms.

Furthermore, consequences of sarcopenia and osteoporotic fractures may also be similar, including disability, decrease in ADL, altered social interactions, admission in nursing homes, hospitalisation and death. Instruments able to appreciate QOL in sarcopenia should not only estimate the relationship with prevalent sarcopenia but also be able to detect changes of QOL related to worsening or improvement of muscle mass and function. Reduction of fracture risk and reversal of sarcopenia should result into an improvement in quantifiable quality of life.

NS25

SARQOL: A VALIDATED TOOL FOR THE ASSESSMENT OF QUALITY OF LIFE IN SARCOPIENIA

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Background: Health related quality of life (HRQoL) is defined by the World Health Organization (WHO) as individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. Until now, the consequences of sarcopenia on quality of life have been poorly investigated and poorly understood. Evaluating the impact of sarcopenia on individuals' HRQoL with a disease-specific tool is important to better detect effects of treatment and observe longitudinal changes of quality of life in subjects suffering from sarcopenia.

Development of the SarQoL® : With this in mind, the SarQoL® (for Sarcopenia and Quality of Life), a quality of life questionnaire specific to sarcopenia, has recently been developed and validated on a Belgian cohort of sarcopenic subjects (Beaudart et al. *Age and Ageing* 2015; Beaudart et al. *Journal of Cachexia, Sarcopenia and Muscle* 2016). The development of the tool has been performed following rigorous steps articulated in the following four stages: (i) item generation—based on literature review, sarcopenic subjects' opinion, experts' opinion, and focus groups; (ii) item reduction—based on sarcopenic subjects' and experts' preferences; (iii) questionnaire generation—developed during an experts meeting; and (iv) pre-test of the questionnaire—based on sarcopenic subjects' opinion. A total of 43 sarcopenic subjects and 12 experts were involved in the development of the questionnaire. The final version of the SarQoL® is composed of 55 items translated into 22 questions rated on a 4-point Likert scale. This self-administrated questionnaire is scored on 100 points. A higher score reflects a higher quality of life. Items are organized into seven domains: domain 1 'Physical and Mental Health' with 8

items; domain 2 'Locomotion' with 9 items; domain 3 'Body Composition' with 3 items; domain 4 'Functionality' with 14 items; domain 5 'Activities of daily living' with 15 items, domain 6 'Leisure activities' with 2 items, and, at last, domain 7 'Fears' with 4 items. It takes approximately 10 min for patients to fill in the questionnaire.

Validation of the SarQoL®: The SarQoL® has been validated on 296 subjects (median age of 73.3 years) among whom 43 were diagnosed sarcopenic according to the criteria of the European Working Group on Sarcopenia in Older People. After adjustment for potential confounding factors, the total score and the scores of the different dimensions of the SarQoL® questionnaire were significantly lower for sarcopenic than for non-sarcopenic subjects (respectively 54.7 (45.9–66.3) and 67.8 (57.3–79.0); OR 0.93 (95%CI 0.90–0.96)). Regarding internal consistency, the Cronbach's alpha coefficient was 0.87, indicating a good internal consistency. The SarQoL® questionnaire data showed good correlation with some domains of the Short-Form 36 (SF-36), with the EuroQoL 5-dimension (EQ-5D) questionnaires and with the mobility test. Our hypotheses regarding convergent and divergent validity were therefore checked. An excellent agreement between the test and the retest was also found with an ICC of 0.91 (95% CI 0.82–0.95). At last, neither floor nor ceiling effects were detected.

Translations of the SarQoL®: The SarQoL® has initially been developed in French. However, since the first publication related to this tool, the SarQoL® questionnaire has already been translated into 10 languages: English, Dutch, German, Spanish, Italian, Greek, Romanian, Ukrainian, Hungarian and Polish. Only the English version and the Romanian version have already been fully validated in a population of sarcopenic subjects and results indicate psychometric properties very close to those of the French version (Beaudart et al. *Age and Ageing* 2016, Gasparik et al. 2016. *Submitted*).

Discussion: A valid, consistent and reliable quality of life questionnaire specific to sarcopenia is now available and can be used with confidence to better assess the burden associated with sarcopenia. It could also be used as a treatment outcome indicator in research. All translated versions of this tool are available on the website www.sarqol.org. A smartphone app is also available (app "SarQoL") for practical use. The questionnaire still needs to be validated regarding its sensitivity to change.

NS26

BIOLOGIC THERAPIES AND BONE LOSS IN AN AUTOIMMUNE DISEASE MODEL

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Rheumatoid Arthritis (RA) is a common systemic autoimmune disease of unknown cause, characterized by a chronic, symmetric and progressive inflammatory polyarthritis. Although considered primarily a disease of the joints, many extra-articular manifestations can develop during its clinical course. One of the most deleterious effects induced by the chronic inflammation of RA is bone loss. The persistent synovial inflammation induces the body allocation of a large amount of energy to the activated immune system leaving RA patients with debilitating signs and symptoms characterized by anorexia, malnutrition, muscle wasting, cachexia and depression. These sick elements associated to pain and deformities lead to a decreased functional capacity enhancing bone loss. Three forms of skeletal development can be seen in RA patients: periarticular bone loss, marginal bone erosions and generalized osteoporosis. All forms of osteoporosis are mediated by an imbalance in bone remodeling in favor of reabsorption. Bone loss in RA may start even in a preclinical phase and may be linked to anti-citrullinated antibodies (ACPAs) production. The cytokines interplay during the RA inflammatory process involving mainly TNF, IL-1, IL-6 and IL-17 can largely activate osteoclasts via RANKL, promoting bone reabsorption and a progressive impairment of the skeleton structure. TNF is also a potent inducer of the protein Dkk-1 which inhibits the Wnt stimulus on osteoblasts reducing the decoy receptor osteoprotegerin. During the last fifteen years, the better knowledge of the cytokine network involved in RA, allowed the development of potent inhibitors of the inflammatory process classified as biological DMARDs. These new drugs are very effective in the inhibition of inflammation but there are only few studies regarding their role in bone protection. We made a literature search to show the evidence of the principal biologic therapies and bone loss in Rheumatoid Arthritis, focusing on their effects on bone mineral density, bone turnover markers and fragility fractures. Treatment with biologic drugs is associated to decrease in bone loss. Studies with anti-TNF blocking agents show preservation or increase in spine and hip BMD and also a better profile of bone markers. Most of these studies were performed with infliximab. Only three epidemiological studies analyzed the effect on fractures after anti-TNF blocking agent's treatment. IL-6 blocking agents also showed improvement in localized bone loss not seen with anti-TNF agents. There are a few studies with rituximab and abatacept. Although several studies reported favorable actions of biologic therapies on bone protection, there are still unmet needs for studies regarding their actions on the risk of bone fractures.

NS27

QUANTIFICATION AND IMPACT OF SECONDARY OSTEOARTHRITIS USING HR-PQCT IN ANTI-CITRULLINATED PROTEIN ANTIBODY RHEUMATOID ARTHRITIS PATIENTS

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Objective: To search for evidence of secondary osteoarthritis (OA) in patients with rheumatoid arthritis (RA) in a cross-sectional and longitudinal setting, and to relate osteophyte formation to functional outcome.

Methods: Anti-citrullinated protein antibody (ACPA)-positive RA patients underwent high-resolution peripheral quantitative computed tomography of the hand. Cross-sectional and longitudinal measurements were performed. The number and size (volume) of osteophytes as well as bone erosions were documented. The relationship of osteophytes to bone erosions and to demographic and disease-specific data was evaluated by multiple logistic regression models.

Results: A total of 202 ACPA-positive RA patients were enrolled in the cross-sectional part of the study, and a total of 77 ACPA-positive RA patients were enrolled in the longitudinal analysis (interval of 1.5 years between baseline and follow-up assessment). The mean \pm SD number of osteophytes per patient was 1.3 ± 2.3 , and the mean \pm SD osteophyte volume per patient was 2.6 ± 4.9 mm³. The total number of erosions was significantly correlated with the total number of osteophytes ($P < 0.001$), and the total volume of erosions was significantly correlated with the total volume of osteophytes ($P < 0.001$). Moreover, the number of osteophytes was related to age ($P < 0.001$) and disease duration ($P = 0.001$), while the volume of osteophytes was related to age ($P = 0.001$), disease duration ($P < 0.001$), and function as measured by the Health Assessment Questionnaire ($P = 0.013$). Multivariate regression analyses showed an independent association between osteophytes and erosions. In the longitudinal analysis, the mean number ($P = 0.033$) and volume ($P < 0.001$) of osteophytes increased significantly in RA patients during their disease course.

Conclusion: Age, disease duration, and bone erosions are associated with

osteophytes, indicating development of secondary OA in patients with RA.

NS28

BONE IMPAIRMENT ASSESSED BY HR-pQCT IN JUVENILE-ONSET SYSTEMIC LUPUS ERYTHEMATOSUS

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High-resolution peripheral quantitative computed tomography (HR-pQCT) analysis of female juvenile-onset systemic lupus erythematosus (JoSLE) patients revealed trabecular/cortical bone damage and reduced bone strength primarily at the distal radius compared to healthy controls. We demonstrated for the first time that JoSLE patients with vertebral fracture (VF) present trabecular impairment at the distal radius.

Introduction: This study investigated the volumetric bone mineral density (vBMD), microarchitecture, and biomechanical features at the distal radius and tibia using HR-pQCT and laboratory bone markers in JoSLE patients compared to controls to determine whether this method discriminates JoSLE patients with or without VF.

Methods: We compared 56 female JoSLE patients to age- and Tanner-matched healthy controls. HR-pQCT was performed at the distal radius and tibia. Serum levels of the amino-terminal pro-peptide of type I collagen, the C-terminal telopeptide of type I collagen, intact parathormone, sclerostin, and 25-hydroxyvitamin D (25OHD) were evaluated. VFs were analyzed using VFA-dual-energy X-ray absorptiometry (DXA) (Genant's method).

Results: Reduced density and strength parameters and microarchitecture alterations of cortical and trabecular bones were observed in JoSLE patients compared to controls, primarily at the distal radius ($p < 0.05$). Patients with VF exhibited a significant decrease in trabecular bone parameters solely at the distal radius (Total.BMD, $p = 0.034$; Trabecular.BMD [Tb.BMD], $p = 0.034$; bone volume (BV)/trabecular volume (TV), $p = 0.034$; apparent modulus, $p = 0.039$) and higher scores for disease damage (Systemic Lupus International Collaborating Clinics/American College of Rheumatology Damage Index (SLICC/ACR-DI), $p = 0.002$). Bone metabolism markers were similar in all groups. Logistic regression analysis of parameters that were significant in univariate analysis revealed that Tb.BMD (OR 0.98, 95% CI 0.95–0.99, $p = 0.039$) and SLICC/ACR-DI (OR 7.37, 95% CI 1.75–30.97, $p = 0.006$) were independent risk factors for VF.

Conclusion: In conclusion, this study is the first demonstration of bone microstructure and strength deficits in JoSLE

patients, particularly at the distal radius. Our results demonstrated that VF was associated with trabecular radius alteration and emphasized the potential detrimental effect of disease damage on this condition.

NS29

CHRONIC INFLAMMATION AND BONE STRUCTURE. THE POTENTIAL PROTECTIVE ROLE OF BIOLOGIC AGENTS IN THE TREATMENT OF CHRONIC ARTHRITIDES

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Bone loss in chronic arthritides occurs as the results of several factors including cytokines produced by chronic synovitis, impaired mobility, low vitamin D levels and chronic administration of supraphysiological doses of glucocorticoids. (figure 1)

Rheumatoid arthritis (RA) and spondyloarthritis (SpA) are diseases in which inflammation can lead to significant changes in bone homeostasis. SpA is a unifying term that encompasses psoriatic arthritis (PsA), ankylosing spondylitis (AS), reactive arthritis and inflammatory bowel disease-associated arthritis. Activated cytokines network enhances osteoclastic activity and impaired osteoblastic maturation to some extent too. The production of local and systemic cytokines mainly M-CSF, TNF alpha, IL-17, IL-1 and IL-6 stimulates the recruitment of osteoclast precursors and regulates osteoclast formation and function. The activation of the receptor activator of nuclear factor kappa B (RANK) on the early osteoclast precursor membrane by RANK ligand (RANKL) allows the commitment of the cell to the mature osteoclast. RANKL is the key molecule involved in the control of the osteoclast differentiation. TNF alpha is a potent stimulator of DKK-1, an inhibitor of the Wnt signal on osteoblast. (1,2)

For all these reasons, agents that block cytokines should theoretically preserve and improve bone integrity in patients with chronic arthritides.

Targets of several biologic agents prescribed in patients with RA to control the disease are depicted in figure 2. Several clinical trials analysed these potential effects in patients with Ra and SpA showing potentially the protective effect on bone metabolism. (table 1 and 2)

To date there are two published studies using adalimumab, one etanercept, eleven infliximab, six tocilizumab, one adalimumab – MTX, one etanercept – infliximab –MTX, two rituximab and three denosumab . Most of them showed increase in bone mineral density in spine and stabilized in hip and most of them showed decreases in bone turnover markers.

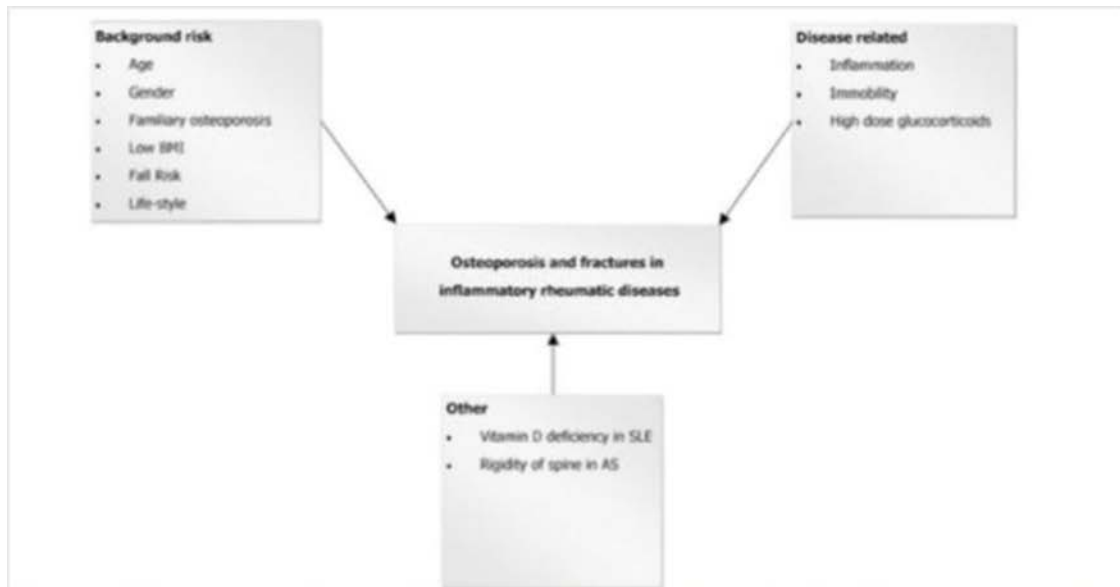


Fig 1 Risk factors for osteoporosis and fractures in inflammatory rheumatic diseases. AS ankylosing spondylitis, BMI body mass index, SLE systemic lupus erythematosus [5]; with permission of W.F. Lems

Fig 2 Cytokine network and biological treatment blockade

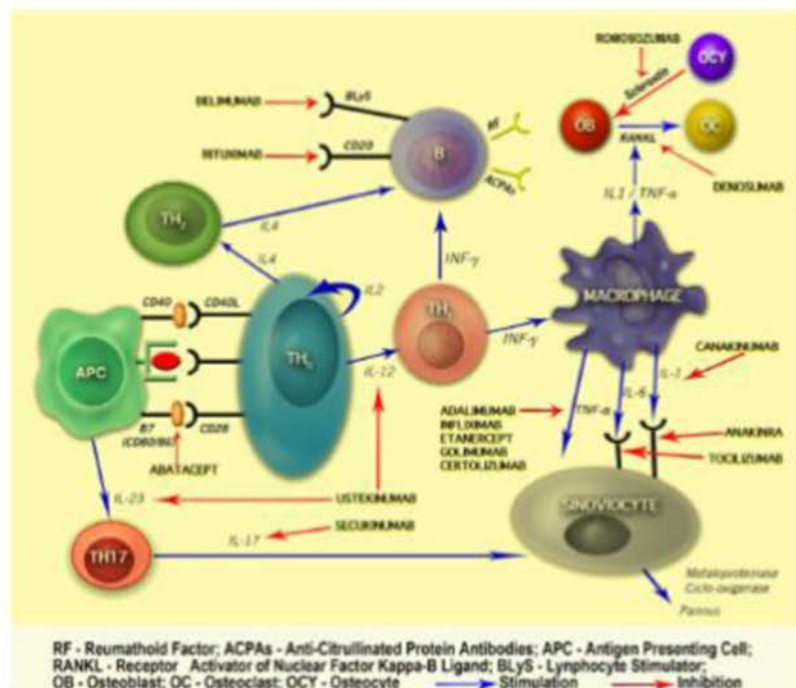


Table 2 Inhibition of structural damage progression on imaging by biologics in SpA and RA

| Drug | Target | RA | PsA* | AS** |
|--------------------------------------|---------------------|--------|------|--------|
| <i>Currently in clinical use</i> | | | | |
| etanercept | TNF | + | + | ND |
| infliximab | TNF | + | + | ND |
| adalimumab | TNF | + | + | ND |
| certolizumab pegol | TNF | + | + | + [83] |
| golimumab | TNF | + | + | ND |
| abatacept | T cell activation | + | + | ND |
| tocilizumab | IL-6R ^O | + | ND | ND |
| rituximab | B cell | + | ND | ND |
| ustekinumab | IL-12/IL-23 | ND | + | + |
| secukinumab | IL-17A | ND | + | + [84] |
| <i>Currently under investigation</i> | | | | |
| sirukumab | IL-6 | + [85] | ND | ND |
| sarilumab | IL-6 | + | ND | ND |
| ixekizumab | IL-17A | ND | + | ND |
| brodalumab | IL-17R ^O | ND | ND | ND |

+ indicates inhibition of structural damage progression either by MRI or plain radiographs

- indicates no effect on inhibition of structural damage progression on imaging

ND no imaging data available

*Peripheral arthritis in PsA

**Axial arthritis in AS

^O R denotes "Receptor"

Table 1 Randomized arthritis studies reporting the effects of biologic therapy on bone mass and on biological markers of bone turnover

| Biological agent | Type study | Sample size | Follow-up | BMD | Block bone mass | Bone formation markers | Bone resorption markers | Reference |
|--|-------------|--|--|--|-----------------|---------------------------------|---------------------------------|-----------|
| Adalimumab | Prospective | 104 | 4 years | Spine and hip BMD ↑ (after 4 years) | ↓ MCP | — | — | [71] |
| Adalimumab | Prospective | 30 | 1 year | Spine/hip stabilized | — | — | — | [87] |
| Etanercept | Prospective | 30 | 4 months | — | — | ↑ BALP/OPG stable | ↓ DPD ↓ RANKL/NTX ↑ osteocalcin | [87] |
| Infliximab | Prospective | 102 | 1 year | Spine/hip stabilized | ↓ MCP | — | ↓ CTX-1/RANKL | [88] |
| Infliximab | Prospective | 52 | 2 years | ↑ Spine/hip stabilized | ↓ MCP | — | — | [89] |
| Infliximab | Prospective | 36 | 1 year | Non-significant ↑ Spine/hip | — | — | — | [75] |
| Infliximab | open cohort | 90 | 1 year | Spine/hip stabilized | — | OC no change | CTX no change | [74] |
| Infliximab | Prospective | 342 (16 groups) (16 groups) | 1 year | Non-significant ↑ Spine/hip (No difference among groups) | — | — | — | [76] |
| Infliximab | Prospective | 36 | 1 year | — | — | ↓ OC | ↓ NTX ↓ DPD | [84] |
| Infliximab | Prospective | 48 | 1 year | Spine/hip stabilized | — | ↑ PDS/CTX-1 ↓ PDP/CTP | — | [83] |
| Infliximab | Prospective | 48 | 4 weeks | — | — | ↓ OC | — | [89] |
| Infliximab | Prospective | 26 | 1 year | ↑ Spine/hip | — | ↓ OC | ↓ Osteocalcin | [85] |
| Infliximab | open label | 17 | 4 months | — | — | Stable BALP | ↓ NTX ↓ DPD | [96] |
| Infliximab | Prospective | 45 (Infliximab) 45 (Control) | 4 months | — | — | ↓ OPG | ↓ RANKL | [88] |
| Tocilizumab | Prospective | 484 | 4 months | — | — | ↑ PDP (4 weeks) | ↓ CTX-1/CTP | [91] |
| Tocilizumab | Control | 20 | — | — | ↓ Large systems | — | — | [96] |
| Tocilizumab | Prospective | 302 | 1 year | — | — | ↓ Erosions (high risk patients) | — | [97] |
| Tocilizumab | Prospective | 209 | 4 months | — | — | — | ↓ CTX-1, CTX-1/OC | [99] |
| Tocilizumab | Non-random | 10 | — | — | — | ↑ OPG/osteocalcin | — | [100] |
| Tocilizumab | Prospective | 22 | 2 months | — | — | — | ↓ DMG | [101] |
| Abatacept + MTX | Randomized | 24 (ADA + MTX) 24 (MTX) | 52 weeks | — | — | MCP stabilized (for ADA Group) | — | [70] |
| Azathioprine + TNF inhibitors/ tocilizumab | Prospective | 92 | Anti-TNF 0-2 years/ Anti-TNF inhibitors 2-10 years | ↓ Bone loss/osteoporosis for men and premenopausal women | — | — | — | [75] |
| Etanercept/ Infliximab/ MTX | Prospective | 11 (Etanercept) 11 (Infliximab) 11 (MTX) | 4 months | Non-significant ↑ Spine/hip (TNF group) | — | ↑ OC | ↓ DPD/OC | [72] |
| Etanercept | — | — | 4 months | — | — | — | — | [113] |

Table 1 (continued)

| Biological agent | Type study | Sample size | Follow-up | BMD | Block bone mass | Bone formation markers | Bone resorption markers | Reference |
|------------------|-------------|--------------------------------|-----------|-----|-----------------|------------------------|-------------------------|-----------|
| Etanercept | Prospective | 43 (Etanercept) 43 (Control) | 1 year | — | — | ↓ MCP/osteocalcin | — | [114] |
| Etanercept | Prospective | 143 (Etanercept) 143 (Control) | 1 year | — | ↑ Spine/hip | — | ↓ PDP | [117] |
| Etanercept | Prospective | 143 (Etanercept) 143 (Control) | 1 year | — | — | — | ↓ DPD | [102] |
| Etanercept | Prospective | 13 | 15 months | — | — | — | ↓ RANKL | [103] |
| Etanercept | Prospective | 28 | 16 weeks | — | — | — | ↓ RANKL | [104] |

OC osteocalcin, BALP bone alkaline phosphatase, PDP N-terminal propeptide of type I procollagen, CTX-1 C-terminal cross-linking tripeptide of type I collagen, NTX N-terminal cross-linking tripeptide of type I collagen, MCP C-terminal cross-linking tripeptide of type I collagen generated by matrix metalloproteinases, DPD deoxyribose, OPG osteoprotegerin, RANKL receptor activator of nuclear factor- κ B ligand, DMG Dehydrogenase

NS30
TREATMENT EVIDENCES BEYOND 5 YEARS

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One fracture owing to osteoporosis occurs every 3 seconds around the world, with the hallmark fractures at the spine and hip leading to substantial mortality, morbidity, and huge societal costs worldwide. (1–2). Progress continues to be made in the development of therapeutics for fracture prevention. Bisphosphonates are now available orally and intravenously, often as inexpensive generics, and remain the most widely used interventions for osteoporosis. The major safety concern associated with the use of bisphosphonates and Denosumab is the development of femoral shaft stress fractures and osteonecrosis

of the jaw (ONJ) (3–4). Approval of bisphosphonates in the United States was based on studies of 3 or 4 yr duration. Some of these studies have been extended, with two alendronate cohorts followed up for 10 yr (5) The FLEX study attempted to address this question for alendronate. BMD at the hip was maintained in women taking alendronate for 5 years who continued at the original dose (10 mg per day) or at half that dose, whereas BMD at the hip tended to return to baseline levels over the second quinquennium in women randomized to receive placebo. Total numbers of nonvertebral fractures were similar in all groups, but post hoc analyses indicated that, in those with femoral neck T-scores < -2.5, continuation of alendronate reduced nonvertebral fractures by 50%. (6) Clinical vertebral fractures were also reduced by ~50% in the group receiving alendronate. (5), similar data have now been presented for zoledronate use up to 9 year. (7), although the number of participants in that study makes conclusions regarding fracture incidence unreliable. Similar to alendronate, hip BMD seems

to peak with zoledronate use between 4 and 5 years, even though bone loss in those individuals who discontinued treatment at 6 years was <1% in the following 3 years (7). Analysis of fracture data between year 3 and year 6 for zoledronate use suggests a partial loss of vertebral fracture efficacy associated with drug discontinuation, particularly in women whose femoral neck T-score remained <−2.5.(8). The extension of the Risedronate Vertebral Efficacy with Risedronate Therapy-NA study was a 1-yr follow-up of subjects who completed 3 yr of blinded therapy with Risedronate 5 mg daily or placebo and then stopped their study medications (but continued calcium and vitamin D). In the year off treatment, BMD decreased in the former Risedronate users (but remained higher than baseline and higher than in the former placebo subjects) and bone turnover markers increased (and were no different from the former placebo subjects); despite the apparent resolution of treatment effect on these intermediate markers, the risk of new vertebral fractures was reduced by 46% in the former Risedronate users compared with the former placebo subjects (9). The Vertebral Efficacy with Risedronate Therapy North America (VERT-NA) and VERT-multi-national (VERT-MN) studies demonstrated that the relative risk reduction (RRR) with Risedronate versus placebo decreased over time (VERT-NA: 65% for first year to 41% for years 0–3; VERT-MN: 61% for first year to 49% for years 0–3). (10). On the basis of these findings, the practice of initiating bisphosphonate therapy for a period of 3–5 years and reassessing BMD at this time to determine whether continued drug administration is necessary has evolved. A hip T-score <−2.5 is regarded as an indication for continued treatment. In the case of alendronate, continuation at half the standard dose (that is 70 mg every 2 weeks) is adequate. In those individuals for whom a drug holiday is appropriate, a duration of 1–2 years is usual for alendronate (although one study has suggested offset of this drug within 12 months(11), whereas 6–12 months is appropriate for risedronate, as offset of the effects of this drug on bone turnover are rapid. (9) LEARNING OBJECTIVES: analyze the effect of most frequently used therapies in the management of osteoporosis under long-term treatment.

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NS31

TREATMENT FAILURE

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Osteoporosis is a major health problem worldwide and is a common musculoskeletal disease characterized by decreased bone mineral density, micro-architectural deterioration of bone and increased risk of fragility fractures. Low bone mineral density is considered the most important determinant of fracture risk and markers of bone turnover are biochemical products that reflect the metabolic activity of bone and are another determinant of the risk of fracture. High bone turnover is associated with a greater rate of bone loss. The goals of osteoporosis treatment are to prevent fractures and to stabilize or increase bone mineral density. The most important goal of any management strategy is the prevention of fracture, but despite the availability of efficacious treatments for osteoporosis, low treatment initiation rates and low adherence among patients limits the benefits. However despite being adherent to bisphosphonate treatment for 1 year, a small proportion of women experienced a fracture in the subsequent year and

remains at high risk of fracture. Antiresorptive drugs are effective in the majority of patients, but one reason of failure is because treatment is offered too late in the natural history. Since antiresorptive drugs reduce but do not eliminate fracture risk, a single fracture during treatment should not be considered failure, as the risk of a new fracture decreases significantly during the treatment. Impaired vitality, falls, low levels of 25 hydroxyvitamin D and prevalent fractures are independent predictors of incident fracture among postmenopausal women on osteoporosis treatment. A working group of the Committee of Scientific Advisors of the International Osteoporosis Foundation proposed a set of criteria for defining inadequate clinical treatment response, that include the occurrence during osteoporosis treatment of two or more incident fractures, when serial measurements of bone remodeling markers are not suppressed by antiresorptive therapy and where bone mineral density continues to decrease. The same working group suggested that although these patients may have some benefits with their medication, the occurrence of any of these criteria may indicate a need to consider a change in the treatment. A weaker antiresorptive is reasonably replaced by a more potent drug of the same class, an oral drug is reasonably replaceable by an injected drug, a strong antiresorptive is reasonably replaceable by an anabolic agent.

NS32

BONE IMAGING AND BIOCHEMICAL MONITORING ON LONG-TERM TREATED PATIENTS

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Bone health assessment is a key step for monitoring patients under treatment or during drug-free periods. A comprehensive approach shall include imaginological and biochemical methods, on a time-frame history of clinical interventions adopted. This brief communication addresses treatment failure assessment on long-term treated patients. On the biochemical scenario, the antiresorptive bone marker Collagen Type 1 Telopeptide (CTX-1) is effective and precise enough to detect changes over 30–40% from baseline. This bone marker is useful to compose a background of drug effects and/or withdrawal. Long-term pharmacological treatment is associated to CTX-1 suppression and drug-free periods, also known as drug-holidays, might lead to a rise on CTX-1, depending on pharmacodynamics of the drug in use. For bisphosphonates, it is expected a sustained suppression from 1 to 3 years after drug withdrawal. For denosumab the rise on CTX-1 is expected to be faster. Imaging is another tool used as intermediate surrogate of fracture risk (i.e. DXA) or final endpoint outcome (i.e. vertebral fractures). The Clinician

should know how to interpret, not only T-scores, but also identify DXA landmarks of good and poor quality exams. Basic parameters for DXA evaluation comprise: bone area, bone edge definition, vertebrae exclusion, proximal femoral optimal positioning, placement of regions of interest, sites valid for diagnosis and monitoring and the meaning of least significant changes (LSC). We will exemplify and discuss each feature described before in order to empower clinical decision based on DXA monitoring. Vertebral fracture identification is also a major endpoint and there are international standards developed to allow a precise morphological follow-up according to Genant tables. There are also imaging landmarks that can be used to identify early changes that may lead to an atypical femur fracture. At the present time, this evaluation can be performed by X-Ray, DXA, MRI and CT. We will show examples of each method and feature mentioned previously. More recently, the trabecular bone score (TBS), an indicator of bone quality, was incorporated into clinical practice guidelines all over the world. More than a diagnostic tool, it can be used to assess changes not captured by regular densitometry. At the end of the activity, the audience shall be enabled on how to deal with these resources on follow-up patients under different long-term pharmacological interventions.

NS33

WHAT HAPPEN AFTER STOPPING DENOSUMAB

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Review of the scientific evidence and clinical management strategy of the individual patient. Denosumab, a fully human IgG2 anti-RANK ligand antibody, quickly and substantially inhibits bone remodeling. Its use in postmenopausal women with osteoporosis is associated with substantial (about 70%) reduction in the risk of vertebral fracture. In women with osteoporosis, hip fracture risk is reduced by 40% and non-vertebral fracture risk by 20%, and efficacy may be sustained with long-term therapy. Discontinuing therapy results in a rapid rebound in bone turnover markers, and a consequent rapid bone loss. The important clinical question raised here is whether this situation has clinical relevance apart from a waning of the treatment benefit. Is the patient exposed to excess fracture risk?

Four recent papers have described several patients in whom denosumab treatment was stopped and who then experienced vertebral fractures. Can we identify patients at risk of rebound fractures? Shall we treat every patient with an antiresorptive drug?

In this symposium we plan to give potential strategies to follow after denosumab discontinuation.

NS34

LIFE-COURSE EPIDEMIOLOGY: DEVELOPMENTAL ORIGINS OF HEALTH AND DISEASE

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In recent years, osteoporosis preventive efforts have begun to concentrate on a life-course approach to reducing the risk of fracture and development of the disease. Rather than focus on treatment efforts in older age, it is now recognised that perhaps more valuable outcomes are yielded if we are to target preventative efforts at younger populations, prior to the onset of osteoporosis. The Developmental Origins of Health and Disease hypothesis states that insults in utero may alter offspring disease risk via ‘foetal programming’. In response to adversity, the developing foetus may make predictive biological adaptations, which may have no short-term gain but are predicted to confer a long-term survival advantage. However, in reality, when these predictions are incorrect for post-natal life, such adaptations may result in an increased disease risk. Thus, in the context of osteoporosis, it is plausible within this paradigm that maternal exposures during pregnancy may alter the future trajectory of offspring bone mineralisation. In turn, if the obtainment of peak bone mass is compromised, this may increase the risk of osteoporosis and subsequent fracture. Indeed, a growing body of evidence now suggests a potential link between environmental and nutritional exposures in utero which may be associated with an increased risk of fracture and osteoporosis in older age. Research to date has yielded conflicting results. A number of maternal exposures have been examined in association with offspring bone health, such as maternal vitamin D, other nutritional exposures and lifestyle behaviours. This session will present some of the observational and clinical trial evidence to date and postulate some potential future avenues of investigation in this field.

NS35

ANIMAL MODELS: ADVERSE CONDITIONS IN UTERO AND BONE

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NB: this session is to be presented by Professor Gustavo Duque (Director of the Australian Institute for Musculoskeletal Science, The University of Melbourne, Australia) on behalf of T Romano, who is unable to attend.

The fetal origins of adult disease hypothesis was first suggested in the late 1980’s, where low birth weight was linked to adverse cardiovascular health in adulthood. Additionally, epidemiologic studies have reported that low birth weight humans have bone mineral content (BMC), density (BMD) and bone strength deficits, highlighting the effects an adverse intrauterine environment can have on adult bone phenotypes. Experimentally, in a rat model of uteroplacental insufficiency, both male and female rats born small have slowed growth throughout life with shorter adult femur length. Importantly, deficits in trabecular and cortical BMC, periosteal circumference, endosteal circumference, cortical thickness and bone bending strength were also present in these offspring at age 6 and 12 months. Using this phenotype, the effects of a constant and cyclic mode of calcium supplementation, from early adolescence on adult bone was also examined. Additionally, detrimental changes occur to maternal skeletal physiology during pregnancy when the mother suffers from uteroplacental insufficiency.

Recently, novel investigations have focused on (i) transgenerational transmission of bone deficits across subsequent generations, (ii) the possible deleterious effects of maternal stress on maternal and offspring bone health, and (iii) the effects of high fat diet and exercise on bone health and paternal line transmission of programmed bone deficits, amongst other areas of enquiry. This talk will present the evidence-base from animal models related to this novel area of bone research. Determining a potential mechanism and interventions that can rescue these skeletal deficits are of major public health relevance, as we may then be able to reduce the incidence of skeletal diseases such as osteoporosis and fracture risk in adults who were born small.

NS36

PUBLIC HEALTH: HEALTH LITERACY, ROLE MODELLING AND OSTEOPOROSIS PREVENTION

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Osteoporosis prevention guidelines highlight the necessity for lifestyle prevention across all ages, including particular emphasis on building peak bone mass in early life. For this reason, parents play an important role in influencing offspring bone health, both in utero and as the child grows. For parents to make decisions for their child to increase bone deposition and role model health behaviours which support bone health, they must have the ability to find, understand and implement guidelines for promoting bone health in children. This requires adequate ‘health literacy’, a term which refers to the skills and abilities individuals require to manage their health. There is evidence to suggest that parents with poorer literacy skills, or suboptimal functional health literacy (basic literacy

and numeracy skills applied to health situations) struggle to perform basic health-related tasks for their children. The importance of understanding the impact of a wide range of parental health literacy abilities on child bone health is imperative if we are to boost public health efforts to prevent osteoporosis. This session will present the evidence-base regarding maternal health literacy, knowledge and role modelling of osteoporosis prevention behaviours on influencing the same behaviours in children.

NS37

SKELETAL DETERMINANTS OF FRACTURE RISK - CAN WE DO BETTER?

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The measurement of areal bone mineral density (BMD), by dual x-ray absorptiometry, forms the cornerstone of the clinical assessment of bone strength. Many studies suggest that BMD can capture about 70-80% of bone strength, reflecting the close relationship between bone mass, size and structure. Changes in both mass and structure ensue from changes in bone remodelling rates and balances between bone resorption and formation, but to date biochemical markers of bone turnover have proven of limited utility in fracture prediction. However, the ability to more accurately measure bone geometry and bone material properties may have the potential to enhance the clinical utility of bone strength assessment and improve risk stratification within the population.

Clinical methods for characterizing bone geometry and microarchitecture include quantitative CT, high-resolution peripheral quantitative CT and high-resolution MRI, all of which can be used to derive estimates of skeletal strength using approaches such as finite element analysis. The recognition that age-related bone loss is predominantly cortical in origin has led to a recent focus on the changes in cortical structure arising from endocortical and intracortical remodelling. Structural analyses and finite element modelling have also been developed for DXA images at the hip, which have been traditionally used for more macrostructural analyses such as hip axis length, neck-shaft angle etc. While such approaches undoubtedly shed light on the impact of structure on fracture risk, and the more detailed imaging can describe the effects of aging and treatments on bone structure, the added value to be gained for fracture risk prediction above and beyond BMD at the individual level remains to be established. In contrast, there is a reasonable body of evidence that non-invasive assessment of trabecular structure can improve risk stratification at the individual level though the clinical impact in terms of

reclassifying between low and high risk remains to be determined. Furthermore, recent techniques such as minimally invasive assessments of bone material properties by micro-indentation also show promise.

The role of improved and more detailed imaging and minimally invasive techniques will continue to develop and may contribute to more personalised fracture risk assessments, if they can be easily applied in clinical settings. In the meantime, BMD continues to serve well as a readily accessible skeletal assessment of fracture risk.

NS38

ROLE OF CORTICAL POROSITY IN FRACTURE RISK AND POTENTIAL IMPLICATION FOR CLINICAL PRACTICE.

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The aim of the prevention and treatment of bone fragility is to avert the first and all subsequent fractures. This requires (i) identification of women at imminent, and longer term, risk for fracture, (ii) ensuring the treatment targets the pathogenesis and microstructural basis of the bone fragility, and (iii) ensuring compliance and effectiveness of treatment by documenting benefits achieved in bone microstructure, material composition and so, bone strength.

Bone fragility is the result of unbalanced remodelling in adulthood. For reasons that are not well understood, less bone is deposited than resorbed during each remodelling transaction carried out by each basic multicellular unit (BMU). This imbalance appears in midlife and worsens after menopause. The rate of remodelling also increases in women so that more bone matrix is remodelled and lost from bone's three internal surfaces – the intracortical surface of Haversian canals, the endocortical surface lining the medullary canal and the trabecular surfaces. Trabeculae perforate rather than thinning after menopause, their numbers decrease and their separation increases. Unbalanced remodelling upon Haversian canals enlarge them. Those traversing cortex adjacent to the medullary canal coalesce fragmenting the cortex, making it porous. Replacement of more mineralized, older bone with younger, less mineralized bone, reduces matrix mineral density. Trabecular remodelling slows as trabeculae are lost but cortical remodelling and cortical microstructural deterioration accelerates as more porosity provides more intracortical surface area for more remodelling to be initiated upon. More remodelling deteriorates an ever decreasing cortical matrix volume. Most bone lost is cortical because 80% of bone is cortical. Antiresorptives slow remodelling and slow progression of fragility, they do not reverse it or even stabilize it. The increase in bone mineral density (BMD) misleadingly suggests

otherwise, but this increase in BMD is largely the result of more complete mineralization of the ever decreasing bone matrix volume.

Restoration of material and structural strength requires anabolic therapy and newer agents are becoming available. The use of anabolic agents as first line therapy, or in combination with antiresorptive agents or followed by antiresorptive agents requires further investigation.

NS39

TRABECULAR BONE SCORE: UTILITY IN CLINICAL PRACTICE

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Trabecular bone score (TBS) is a proprietary software program that performs bone texture analysis on lumbar spine DXA images, thereby providing a surrogate assessment of bone microarchitecture. Low TBS values are associated with increased fragility fracture risk in postmenopausal women and men age 40+ independent of bone mineral density. As a result, TBS values may change the FRAX-calculated estimate of future fracture risk and thereby provide additional insight into fracture risk. Thus, when used in concert with the FRAX tool, TBS results may be useful in clinical decision making when determining whether or not to initiate pharmacologic treatment to reduce fracture risk. While not yet part of clinical care guidelines, data indicate that TBS results may be particularly useful in fracture risk prediction for patients with diabetes mellitus or those requiring glucocorticoid therapy. TBS changes in response to pharmacologic treatment are less robust than those observed in BMD. Thus there is currently inadequate evidence to support use of TBS in the monitoring of osteoporosis treatment. In conclusion, TBS information can benefit clinicians when making decisions to initiate or withhold pharmacologic therapy, but not yet to alter therapy of patients receiving osteoporosis treatment. Additionally, TBS data should not be used alone, but rather combined with FRAX to enhance fracture risk estimation.

NS40

OSTEOPOROSIS MANAGEMENT IN SERBIA

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Osteoporosis (OP) is a systemic skeletal disease characterized by low bone mass and microarchitectural deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility to fracture. Bone mineral density (BMD), assessed

by dual-energy X-ray absorptiometry (DXA) remains the gold standard for the diagnosis of osteoporosis.

The incidence of osteoporosis in Serbia is similar to other Balcan and south european countries. According to 2002 Serbia population registry there were 1.684.289 persons older than 60 years. The appreciation is that among them there are around 550.000 persons with OP and that every year 35000–55000 osteoporotic fractures happen. The most common are vertebral, femoral neck and distal radius fractures.

Densitometry era in Serbia started in eighties of last century with instalation of gadolinium DPA densitometer in Novi Sad. The first DXA densitometer has been installed in Institute Niska Banja in Niska Banja in the year 1992. From these years the interest for osteoporosis in both medical professionals and patients significantly increased. Curently there are approximately 40 DXA devices around Serbia. The geographical distribution is not so favorable, taking into consideration that half of DXA densitometers are situated in Belgrade. It has to be stated that the situation is significantly improving in last 10 years due to increased numbers of DXA and ultrasound densitometers around Serbia and increased number of anti osteoporotic drugs approved in Serbia. Moreover, Serbian Ministry of Health bought several densitometers and established a special Council dedicated to osteoporosis management.

Interesting enough is who among health professional is referring patients to have DXA examination: 65% of patients are referred by rheumatologist, 14,3% by general practice doctors, 5,6% of patients came to have DXA by their own initiative, 4% were referred by physical medicine doctors, 2,3% by orthopedic surgeons and 2,9% by gynecologists.

26 800 DXA examinations in year 2009 were performed (the data are from government health institutions), last two years this number is tripled. Among all performed DXA assessments 35% of patients had osteoporosis, 45% of them had osteopenia and only 20% of findings were within normal values. This is in favor of good education of persons referring to DXA examination and following of guidelines for diagnosis of osteoporosis.

Regarding osteoporosis treatment only generics are completely reimbursed by government health insurance. Among these drugs alendronate and ibandronate are most frequently prescribed. Special conditions for the reimbursement are required for reimbursement of original ibandronate IV preparation: in order to get IV ibandronate patient has to have proven gastrointestinal contraidication for oral treatment by bisphosphonates. For teriparatide the requirement is patient to have previous osteoporotic vertebral fracture.

Both healt professionals and patients avereness is significantly improved by constant acitivity of Serbia Rheumatology association, Serbia Osteoporosis Society and individual efforts of many health professionals who in last 15 years had a lot of media performances. A lot of scientific and professional

gatherings were dedicated to osteoporosis diagnostics and treatment, among them IOF endorsed densitometry course. In conclusion it can be said that the situation regarding both diagnostic and treatment of osteoporosis in Serbia significantly improved, but still there are a lot of unmet needs – to increase the number of DXA densitometers with adequate geographic distribution and to accomplish the complete coverage of all anti osteoporotic drugs by governmental and private health insurances.

NS41

OSTEOPOROSIS MANAGEMENT IN THE BALKAN COUNTRIES: OSTEOPOROSIS DIAGNOSIS AND MANAGEMENT IN TURKEY

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Objectives: Turkey has an aging population and the projected number of hip fractures is rising. There is a significant burden on resource utilization during the acute and rehabilitation phases due to fracture. Treatment strategies, preventive strategies and patient compliance need to be addressed.

Methods: Major osteoporosis treatments (bisphosphonates, denosumab, teriparatide, etc.) are reimbursed by the Turkey's national payer, Social Security Institution (SSI); by certain criteria. DXA evaluation is standard for osteoporosis diagnosis and treatment planning as well as yearly follow-up. T-score < (-2.5) at 65 years, T-score < (-3) before age 65 or any fracture combined with T-score < (-1) or secondary osteoporosis is reimbursed. Teriparatide, has the most limited patient access due to cumulative reimbursement restrictions of patient profile and prescriber profile (restricted to endocrinologists only). All other treatments can be initiated by internists, PMRs, rheumatologists, orthopaedic surgeons, gynaecologists, and endocrinologists.

Results: The Turkey-specific patient pathway for osteoporosis and market research show that 57% of patients initially visit PMRs and orthopaedic surgeons for diagnosis and treatment. Bisphosphonates are the first-line treatment for postmenopausal osteoporosis. In 2016; a total of 2 445 930 patients were treated by prescription. Most patients used oral Ibandronate, 879 730 used Alendronate, 199 017 used Zoledronic acid, 60 334 used Risedronate, 51 572 used Denosumab. Orthopaedic surgeons prefer Zoledronic acid IV following hip fracture, because of evidence-based efficacy, patent preference, easy use and easy follow-up. There is a treatment gap for females age < 65 with high risk but T-score > (-2.5)SD.

Conclusion: In Turkey a study revealed high rates of persistence and compliance however, adherence was significantly improved with a monthly vs weekly bisphosphonate regimen, which was preferred by patients due to easy use.

Effectively integrated Fracture Liaison Services primarily observed by PMRs, close follow-up of osteoporosis patients and preventive strategies for patients at high risk, would lead to better management, fracture avoidance, and cost efficiency in the Turkish healthcare system.

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NS42

ACCESS, UTILISATION AND COSTS OF HEALTH SERVICES AMONG ROMANIAN OSTEOPOROSIS PATIENTS

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The objective of this report is to present the particular prospects and hazards of a Romanian osteoporosis patient, by synthesising the epidemiology of osteoporosis, the economical burden and especially: the current management issues of the silent disease in Romania.

Epidemiological data and health economic aspects were summarised based on available literature and registers, while pharmaceutical data was obtained from a company specialised in information and technology services.

The report presents data and estimated trends in the epidemiology of fractures, direct and indirect costs, treatment guidelines, and gaps, prescribing practices (pharmaceutical products, levels of reimbursement, qualified prescribers /specialties) and how these circumstances may affect a fragile patient.

NS43

STRATEGY FOR THE TREATMENT OF OSTEOPOROSIS IN GREECE: THE ELEECOST PARADIGM

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Osteoporosis is a chronic disease with a significant economic burden mainly through the complications of fractures. The

IOF estimated that the total costs resulting from the osteoporotic fractures were at €680 million in 2010 for Greece, which is expected to increase to € 814 million in 2025.

The proper management of osteoporosis and its associated fractures is essential for maintaining the quality of life for patients. The decision to determine who receive treatment requires clinical evaluation of individual's fracture risk profile. A plethora of clinical risk factors have been identified that are associated with an increase in fracture risk. Thus, the physicians should choose the most suitable treatment for patient based on medical history.

So as to confront this very common disease we have to develop a mutual and effective strategy. The ELECOST, a web-based platform, is under the auspices of Hellenic Osteoporosis Foundation. It is an educational tool for the management of osteoporosis and it aims to develop a Panhellenic electronic network of osteoporosis clinics with a shared diagnostic and therapeutic protocol. This platform is not only a way of keeping electronic records of osteoporotic patients but it also a useful and efficient tool for the management of osteoporotic patients. It evaluates and assesses an abundance of clinical risk factors for fracture, thus providing accurate information to clinicians in order to facilitate them in deciding the appropriate therapeutic approach towards each patient. The ELECOST abides with the diagnostic and therapeutic protocols as well as the guidelines for treatment of osteoporosis in Greece as issued by the National Organization for Medicines. Until now, ELECOST has approximately 500 users (clinicians) and 12.000 patients' medical records.

Nevertheless, we have to underline that none program do not replace good clinical judgment by the health care practitioner.

NS44

OSTEOPOROSIS DIAGNOSIS AND MANAGEMENT IN BOSNIA AND HERZEGOVINA

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Different health system in Balkan countries provides different method of treatment for Osteoporosis and Osteoporotic fracture. In the first epidemiological study on Vitamin D in Bosnia and Herzegovina there was 82% OD subject with Vitamin D deficiency/insufficiency. The use of adequate supplements in these countries is also controversial. The prevalence of postmenopausal osteoporosis in Romania is 11.5% and burden will increase by 17% by 2025 according to data published by IOF. In Greece, in 2010 approximately 86,000 new fragility fractures were registered in people aged 50+ with osteoporosis and burden will increase by 2015 according to IOF data and based on country specific reports. The risk factors for

Osteoporosis vary from country to country. The smoking, alcohol consumption, nutrition, sedentary life, comorbidities is predominant risk factor in these population. The Poor adherence and compliance is below 40% in certain Balkan countries. According to WHO, the average life expectancy in Bosnia and Herzegovina is 76, 66 years (women 79, 01 years, men 74,23 years), that is similar to Europe (77, 29 years). It is estimated that 540.000 women are postmenopausal with 162.000 women suffering from osteoporosis. A 14, 3% of population is ≥ 65 years that is similar to Europe (14, 8%). Concerning the risk factors, the 44, 1% of Bosnian population smoke (male 56, 3%, female 31, 6%) alcohol consume 28, 8%, 21, 2% is obese and 24, 6% is physically active. There is also low consumption of fruit and vegetable and 66% of adults add a salt to meals. The prevalence of muscular/skeletal disorders is 434, 1/10.000 in 2015. A burden of these factors in Bosnia and Herzegovina is in a slight increase.

Reference: Institute za Javno Zdravstvo FB&H, Zdravstveno stanje stanovništva i zdravstvena zaštita u Federaciji Bosne i Hercegovine 2015, Sarajevo June 2016.

NS45

CURRENT STATUS OF OSTEOPOROSIS IN TURKEY

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Osteoporosis has physical, financial, and psychosocial effects on individuals and the community because of increased fracture risk. It is necessary to diagnose the condition early to prevent fractures, and the current approach is based on the measurement of bone mineral density. But fracture probability differs markedly in different regions of the world. In MEDOS study Bone mineral density is important parameter but fracture risk is related other factors. FRAX tools were developed to calculate the 10 year probability of major osteoporotic fracture and hip fracture. A FRAX model for Turkey has been available since 2008. This was a population-based survey of 26.424 residents of Turkey in 12 regions. At the age of 50 years, the remaining lifetime probability of a hip fracture was 3.5% in men and 14.6% in women. In this study the prevalence of osteoporosis at the femoral neck was 7.5% and 33.3% in men and women, respectively, aged 50 years or more. And also it has been estimated that more than 24,000 hip fractures occurred in women and men aged 50 years or more in 2010, 73% of which were in women. The majority of hip fractures in women occurred after the age of 75 years. FRAX- based intervention thresholds in men and women from Turkey was also determined in another study. The age-specific upper and lower assessment thresholds for recommending the measurement of bone mineral density in the assessment of fracture probability was determined. According this study 22.2% of female population aged 50 years or more had fracture

probability that exceed the intervention threshold. 8.6% of women aged 50 years or more would be eligible for treatment because the prior fragility fracture. Although Turkey is still among the countries with low hip fracture rates in Europe, the incidence has increased markedly after the MEDOS study.

NS46

PREVENTION OF OSTEOPOROTIC FRACTURES IN TURKEY: SIMILARITIES AND DIFFERENCES WITH EUROPE

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Osteoporosis is a major public health problem, affecting predominantly postmenopausal women worldwide. The main clinical consequence of the disease is bone fractures, associated with morbidity and even mortality. The FRAX has been developed to detect patients at increased risk of fracture in Europe. It based on simple questions assessing bone mineral density (BMD)-independent risk factors provides 10-year probability of experiencing major osteoporotic fractures or specifically hip fracture. It is validated and analyzed in European postmenopausal women undergoing baseline and follow-up DXA scans. For Turkey, FRAX-based intervention thresholds were also studied in a sample of the Turkish population. The probability of hip fracture and the prevalence of osteoporosis in Turkey were reported in the FRACTURK study.

In the prevention of the fractures, the public workshops are conducted by experienced team from The Turkish Osteoporosis Society. The lectures aim to teach a wide range of pharmacological and non-pharmacological interventions including dietary modification, weight bearing, and balance restoring and muscle-strengthening exercises in order to prevent fractures. The prevention of second fracture is also as important as first fracture. The International Osteoporosis Foundation (IOF) has developed a global campaign ('Capture the fracture™') for the prevention of a second fracture. Similar to this campaign, a coordinated, multidisciplinary fracture liaison service has launched to educate and prevent the new fractures in the patients who had hip fractures.

NS47

MALE OSTEOPOROSIS: TURKISH DATA

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In recent years increasing attention is being paid to osteoporosis (OP) in males in Turkey. Although growing body of evidence indicates of medical, economic and social impacts of male OP, currently only minority of men with high risk of fracture are detected and treated appropriately.

The findings in several studies showed that Turkish men who are at risk of OP do not have sufficient knowledge about OP and its consequences. Despite the higher educational level of the men, it was detected that the level of the OP susceptibility was lower than women.

Quality of Life: The effect of BMD on quality of life in men with OP was evaluated and according to QUALEFFO and SF-36 scores, OP was found to reduce the quality of life. Quality of life was influenced by numerous variables such as smoking, bone fracture and inadequate daily Ca intake have negative effects on quality of life in the case group. The results point out that osteoporotic men should be evaluated multidimensionally and different approaches are needed to improve their quality of life.

Fracture risk: While the clinical diagnosis of OP is based on BMD T-scores, the use of clinical risk factors may help identify men at high risk of fracture to select for BMD testing. A study estimating current and future hip fracture risks and the prevalence of OP in Turkey showed that hip fracture incidence in the community-based survey was similar to that in the hospital survey. At the age of 50 years, the remaining lifetime probability of a hip fracture was 3.5% in men and the prevalence of OP at the femoral neck was 7.5% in men aged 50 years or more. To determine FRAX-based intervention thresholds in men from Turkey and determine its population impact another study was performed showing that the number of men aged 50 years or more eligible for treatment was 3.1%.

Causes: Male OP is typically classified into two different categories as primary and secondary OP. And OP that can be linked to or explained by causes other than aging is generally classified as secondary male OP. Smoking and smokeless tobacco use are two recognized risk factors for low BMD and OP. According to some researchers it may be claimed that smokeless tobacco use is a very strong risk factor for low BMD value compared to cigarette smoking. A study aiming to investigate the increased risk for OP due to closed environment and sedentary lifestyle of prisoners showed that, BMD values of the detainees were lower than those of the control group and there was a negative correlation between BMD values and duration in prison. Based on a case report about bilateral non-traumatic hip fractures in a heavy smoker COPD patient on inhaled steroids, writers stated that, history of COPD with corticosteroid use may be used as a diagnostic tool to identify patients having OP. Another study was conducted to evaluate the BMD and vit D levels in patients with silica exposure. The results demonstrated that subjects with silica exposure had diminished BMD and Vit D levels. Examination of the relationship between serum vit D level and disease activity in male patients with ankylosing spondylitis showed an inverse relationship between serum vit D levels and disease activity in male AS patients and it was concluded that serum vit D levels should also be taken into

account while developing a treatment plan. A study was performed to investigate the relationship between vertebral fractures and spondylosis and BMD in men older than 60 years. Lumbar BMD increases with spinal degenerative changes, but the increase in BMD can not prevent sub clinic vertebral fractures. The writers concluded that, especially, in the men who have intensive spinal degenerative changes, the measurement of lumbar BMD is not enough for determining the fracture risk. Measurement of femoral BMD and evaluation of clinic risk factors are more important for determining the fracture risk. Multiple sclerosis is an important of the cause of secondary OP and there's limited data in Turkey about the affect of MS on male OP. A recent study showed that, femoral BMD, femoral T scores, femoral Z scores were lower in MS patients. There weren't any significant correlation between sex hormon binding globulin levels, Expanded Disability Status Scale, BMD scores and biomarkers (CTX and osteocalcin) and other biochemical variables; but p values were close to the significant value. BMD scores were lower in patient group than in control group and it was concluded that, OP should be managed as part of MS patients' treatment protocols.

Diagnosis: The number of males with OP is not currently known, which is mainly due to the infrequency of screening and controversies in BMD testing standards in men. The concordance in diagnosis of OP based on the WHO classification of BMD measurements of hip and spine in 649 men aged ≥ 50 years was evaluated and the results showed that, in 4 of every 10 male patients aged ≥ 50 years tested by DXA, T score discordance between spine and total hip measurement sites was present. Clinicians should keep in their mind that T score discordance is a prevalent finding and can be related to various physiological and pathological patient factors as well as the performance or analysis of DXA itself. Regarding the correlation between femur geometric and the anthropometric measurements, neck shaft angle and femur shaft width were the geometric parameters found to be significantly higher in the hip fractured male patients. A study revealed that 18.8% of Turkish adult men had a BMD with T scores of ≤ -2.5 SD and serum IGF-1 levels were lower in individuals with decreased BMD compared to men with normal BMD. There was a significant positive correlation between IGF-1 and lumbar spine BMD.

Treatment: If a secondary cause of OP is identified, it should be treated. As an example, potential offending agents (eg, glucocorticoids, alcohol, tobacco, etc.) should be eliminated whenever possible. The treatment of OP in men consists of lifestyle measures (weight bearing exercises, adequate Ca and vit D) and drug or hormonal therapy. Men seem to respond to available medical therapies in the same way that women respond so that, for the most part (notable exceptions being male hypogonadism), the approach to treating men and women with OP is quite similar.

NS48

PRESENTATION OF AN EPIDEMIOLOGICAL STUDY NAMED TUR-BOR-OS

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Although osteoporosis (OP) remains a major public health problem due to its association with fragility fractures, the people with a high risk of fractures may not perceive their risk. Understanding the osteoporotic risk factors is an essential step in receiving appropriate care and safe and effective treatments. It is well known that there is a wide geographic variation in rates of fractures between as well as within countries. We performed a population-based, epidemiological study named TUR-BOR-OS which provided data on the risk factors for skeletal status.

Men and women aged ≥ 50 years were recruited from population registers. Those who took part had an interviewer-administered questionnaire regarding the perception of personal risk of osteoporosis and fractures. We also evaluated previous fractures, family history of fracture, smoking, alcohol consumption, use of glucocorticoids, and secondary causes of osteoporosis. Weight and height of the participants were measured.

In total, 1317 people (780 women and 537 men) completed the questionnaire. The questionnaire was applied by the medical faculty students to increase the awareness of osteoporosis among them. Mean age was 62.9 ± 9.7 . Among them 136 (10.3%) previous osteoporotic fractures and 122 (9.3%) maternal history of fracture were reported. Women had significantly more previous fractures ($p < 0.05$). Only 416 (31.6%) participants had DXA measurement prior to the enrolment and 250 (19.0%) had OP diagnosis. As a risk factor, smoking (24.1%), alcohol (5.1%), use of glucocorticoids (5.9%), DM (24.1%), rheumatic diseases (10.9%) and thyroid dysfunction (8.9%) were identified.

In this symposium, the data of TUR-BOR-OS study will be compared with the results of all previous studies on OP that have been performed in Turkey. The analysis and the comparison of all data will be taken into consideration by The Turkish Osteoporosis Society to implement national osteoporosis prevention health programs.

NS49

FATTY ACIDS AND BONE BIOLOGY: AN OVERVIEW

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Lipids are regulatory molecules important in bone health. There is increasing data that free fatty acids (FFAs), cholesterol, phospholipids and several endogenous metabolites (prostaglandins, oxysterols) act on bone cell survival and function, bone

mineralization and critical signaling pathways. Several specific lipids derived from membrane phospholipids (e.g. sphingosine 1 phosphate, fatty acid amides, lysophosphatidic acid) have emerged as important mediators in bone physiology. Lipid mediators are released into the extracellular environment and transmit signal to target cells through their interaction with specific receptors e.g. G protein coupled receptors (GPCRs).

There is a direct effect of FFA on bone cells. Fatty acids are incorporated into either triglycerides as a source of energy or into phospholipids in membranes. Membrane phospholipids modulate cell functions of membrane fluidity and permeability as well as intracellular signaling pathways. FFAs may influence the bone formation/resorption balance by affecting survival and functions of bone cells as well as modulating different signaling pathways such as MAPK, ERK, JNK and p38 MAPK. FFAs may also alter activation/expression of nuclear transcription factors such as PPAR γ , Runx2, NF- κ B, NFATc and can act as modifiers of Wnt proteins.

Two phospholipids are potent mediators in the osteoblast-osteoclast signaling network: Sphingosine 1 phosphate and Lysophosphatidic acid. Different fatty acid amides modulate bone mass and remodeling as well. These amides include the two endocannabinoids: anandamide (AEA) and 2-arachidonoyl-glycerol (2-AG). Both are derived from arachidonic acid released from breakdown of membrane phospholipids. In vivo, endocannabinoids are likely synthesized by bone cells and act locally, before being quickly degraded. This local action is through specific GPCRs. Activation of the CB2 receptor can increase bone mass or promote bone loss. These amides also include N-oleoyl-L-serine which has been shown to have activity in vivo.

NS50

FATTY ACYL AMIDES AS NOVEL THERAPEUTICS FOR THE TREATMENT OF OSTEOPOROSIS

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The super-family of lipids includes several families of naturally occurring compounds. Among them, fatty acyl amides (FAAs) have been recently identified in bone tissue, and shown to regulate bone remodeling and mass. Of these, only the skeletal effects of *N*-oleoyl serine (OS) administration have been studied in vivo. OS increases bone mass in normal and osteoporotic mice by a dual action consisting of stimulating osteoblast proliferation and bone formation as well as inhibiting bone resorption

by enhancing osteoclast apoptosis. The results to be presented in this presentation will describe the synthesis of novel synthetic analogs for OS, which is expected to be rapidly hydrolyzed by amidases in the circulation. The in vitro and in vivo skeletal effects of these novel compounds will be described in normal and osteoporotic mice, as well as in a mouse model for Prader-Willi syndrome, a rare genetic disorder characterized by decreased bone mineral density, increased fracture risk secondary to osteoporosis, and short stature.

NS51

CANNABIDIOL ENHANCES FRACTURE HEALING BY TARGETING COLLAGEN CROSSLINKING

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Cannabinoid ligands regulate bone mass, but skeletal effects of cannabis (marijuana and hashish) are still controversial. Phyto-cannabis contains over a hundred chemical entities with different biological activities. The major constituents of cannabis, Δ^9 -tetrahydrocannabinol (THC) and cannabidiol (CBD) have been characterized for a wide range of activities in human and animal studies. THC is by far the main psychoactive ingredient of cannabis, whereas CBD has no psychoactivity, and is primarily anti-inflammatory. Here we will discuss the potential actions of CBD on the skeleton, with particular emphasis on fracture healing.

Bone fractures are highly prevalent, involving prolonged immobilization and discomfort. In a recent study, we reported that CBD enhanced the biomechanical properties of the healing callus in a rat femoral fracture model. This effect was not shared by THC alone, and the combined administration of THC with CBD was not superior to CBD alone.

We will describe the mode of action of CBD during bone formation and propose potential therapeutic applications for CBD. We will then discuss these findings in the context of more recent clinical reports on the skeletal adverse effects of recreational cannabis smoking.

NS52

SARCOPENIA IN COMMUNITY DWELLING SUBJECTS: THE SARCOPHAGE STUDY

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Background: The SarcoPhAge project (for Sarcopenia and Physical impairments with advancing Age) is an ongoing longitudinal study following community-dwelling elderly

subjects with the objective to assess some health and functional consequences of sarcopenia.

Methods: A total of 534 community-dwelling subjects aged 65 years or older have been enrolled in this study. Subjects were recruited in different departments (e.g. osteoporotic centre, geriatric centre, rheumatic centre, rehabilitation centre) from an outpatient clinic in Liège, Belgium, but also by means of press advertisement. A complete diagnosis of sarcopenia has been performed for all subjects according to the algorithm developed by the European Working Group on Sarcopenia in Older People (EWGSOP) at inclusion and once a year every following year. Muscle mass was measured by Dual Energy x-ray absorptiometry, muscle strength was measured by grip strength and physical performance was measured with the Short Physical Performance Battery (SPPB). A research assistant was in charge of meeting the participants once a year during a 1-hour clinical visit during which a large number of sociodemographic, anamnestic and clinic data were collected.

Results: Among the 534 subjects (60.5% of women, mean age of 73.5 ± 6.16 years) enrolled in the study, 73 have been diagnosed sarcopenic, which represented a prevalence of 13.7% (11.8% in men, 14.9% in women). After adjustment for age and sex, sarcopenic subjects recruited at baseline presented a significant lower body mass index, lower calf, wrist, waist and arm circumferences, used more drugs, presented more comorbidities, were at higher risk of falls (Tinetti test, Timed Up and Go test), had a worse nutritional status (Mini Nutritional Assessment), had a worse physical health-related quality of life (SF-36) and were more dependent in some activities of daily living (Katz scale and Lawton scale).

After two years, only 336 subjects came for the follow-up evaluation (T2 evaluation), which represents 62.9% of the total sample. Reasons for the 198 subjects for not coming back are as follow: 20 died, 59 presented a physical incapacity (e.g. institutionalisation, mobility impairment, serious comorbidities, etc.), 12 were lost to follow-up, and unfortunately, 107 refused to pursue the study. Only 33 of the 73 sarcopenic subjects diagnosed at baseline were seen at T2 evaluation. This is partly due to a significantly higher incidence of deaths among the sarcopenic (9.59%) subjects compared to non-sarcopenic (2.82%) with a crude OR of 3.65 (IC95 % 1.41–9.49) and an adjusted OR (on age, number of comorbidities and number of drugs) of 4.00 (IC95 % 1.51–10.6). Moreover, 9 sarcopenic subjects (12.3%) announced, during the two years of follow up, being physically unable to pursue the study. Between inclusion and T2, a significantly higher incidence of hospitalisation has also been observed for sarcopenic subjects (52.9%) compared with non-sarcopenic ones (29.0%) ($p=0.004$) with a crude OR of

2.75 (IC 95% 1.34–5.63) and an adjusted OR (same adjustments than those used for the analysis of deaths) of 2.61 (IC95% 1.18–5.76). No differences between groups regarding the incidence of falls ($p=0.63$), fractures ($p=0.34$), physical decline (reported as decline of gait speed ($p=0.34$), of the SPPB test ($p=0.63$) and of the chair rising test ($p=0.63$)) have been reported.

Conclusion: The SarcoPhAge study reported a prevalence of sarcopenia of 13.7% in community-dwelling subjects aged 65 years or older. Sarcopenia seems to be prospectively significantly associated with a higher risk of death and hospitalisation after two years of follow-up which highlights the public health burden of sarcopenia. Several operational definitions of sarcopenia and several diagnosis thresholds could be applied in this study. Therefore, further analyses would be helpful to identify the sarcopenia diagnosis criterion or criteria that could be the most predictive of hard clinical outcomes.

NS53

SARCOPENIA IN NURSING HOME RESIDENTS: THE SENIOR COHORT

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Objective: The aim of this study is to assess the relationship between sarcopenia and a large number of indicators related to physical and muscular performance as well as quality of life in the SENIOR cohort.

Methods: The SENIOR (Sample of Elderly Nursing home Individuals: an Observational Research) cohort including nursing home residents. Subjects are volunteer, oriented and able to walk (walking assistance allowed) nursing home residents in Belgium. A large number of demographic and clinical characteristics, including physical and muscular performance, were collected from each patient. All of them received a diagnosis of sarcopenia based on the definition proposed by the EWGSOP.

Results: In total, 662 subjects are included in this analysis. The mean age of the sample is 83.2 ± 8.99 years, and 484 (73.1%) are women. In this population of nursing home residents, the prevalence of sarcopenia was 38.1%. As expected, some clinical and demographic characteristics differ between subjects with sarcopenia and those without sarcopenia. Indeed, sarcopenic subjects are older (85.6 ± 7.48 years) than healthy subjects (81.9 ± 9.51 years; $p < .0001$), they have a lower BMI (23.8 ± 5.15 vs. 27.2

$\pm 5.43 \text{ kg/m}^2$; $p < .0001$) and a worse MMSE (23.4 ± 4.85 vs. 24.5 ± 4.26 ; $p = .002$). Sarcopenic subjects more often come from nursing home providing care (35.4%) than non-sarcopenic subjects (25.6%; $p = .02$). They also use more often walking assistance (62.1% vs. 52.1%; $p = .009$). Compared to non-sarcopenic subjects, sarcopenic ones have a lower level of physical activity ($p = .002$), a lower score at the Tinetti test ($p < .0001$), "Timed Up and Go" ($p = .04$), "SPPB" ($p < .0001$), gait speed ($p < .0001$) and grip strength ($p < .0001$). Isometric muscle strength is also lower among sarcopenic subjects than among non-sarcopenic subjects for knee flexors ($p = .004$) and extensor ($p = .004$), ankle flexors ($p = .003$) and extensors ($p = .01$), hip abductors ($p = .03$), elbow flexor ($p < .0001$), and extensors ($p = .002$). Appendicular lean mass divided per height square is also lower among sarcopenic subjects ($p < .0001$). Finally, nutritional status is poorer among sarcopenic subjects ($p = .04$), as well as the quality of life linked to "emotional role", "functional role" and "change in health" (respectively $p = .02$, $p = .02$ and $p = .04$).

Conclusion: Sarcopenia among nursing home residents, seems to be associated with several clinical indicators suggesting a higher level of disability and an increased propensity to develop major clinical consequences. Follow-up data of the SENIOR cohort will be helpful in confirming these findings, establishing cause-effect relationships and identifying the most predictive indicators for adverse outcomes in nursing homes.

NS54

NUTRITIONAL NEEDS IN SARCOGENIC PATIENTS: A STUDY USING INDIRECT CALORIMETRY

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There is a significant decline in food and energy intake with increasing age, accounting for an average fall of about 25% between the ages of 40 and 70 years. Declining food intake contributes to weight loss with aggravation of sarcopenia, which is defined as the loss of muscle mass and muscle function. Many factors influence decline of muscle mass and muscle strength, such as nutritional diet. Assessing the energy need in different care settings and in the different patients' conditions is challenging. Indirect calorimetry is the most accurate method to assess rest energy expenditure, and thus the energy need. The aims of this study are to assess the energy need of patients with sarcopenia. Seventy-nine patients (mean age 85.6 years) have been prospectively enrolled. Sarcopenia has been defined according to the European Working Group criteria. Muscle mass has been measured by Bio-impedance analysis (BIA), muscle strength by handgrip strength, and physical performance by Short Physical Performance Battery. Nutritional assessment has been performed by the Mini Nutritional Assessment and biological data. Resting energy expenditure has been measured using indirect calorimetry. Three months, 6 months, and one year after hospital discharge, deaths, readmission, falls and institutionalization are being studied.

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P101

THE EFFECT OF BONE-SEEKING ELEMENTS PRESENT IN BONE ON DUAL-ENERGY X-RAY ABSORPTIOMETRY AND QUANTITATIVE ULTRASOUND-MEASUREMENTS: A PHANTOM STUDY

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Objectives: To use trabecular bone-mimicking phantoms to investigate the effect of bone seeking elements such as strontium, lead and aluminum on bone mineral density (BMD) as determined by dual-energy x-ray absorptiometry (DXA), and quantitative ultrasound index (QUI) as derived by quantitative ultrasound (QUS) systems.

Materials and Methods: Seven strontium-substituted trabecular bone-mimicking phantoms with Sr/(Sr+Ca) mole ratios ranging from 0 to 2% mol/mol were constructed using the method previously developed by our research group [1]. Similarly, four lead-doped and four aluminum-doped phantoms were constructed with the respective analyte concentrations ranging from 50 to 200 µg/g. In addition, a 0 µg/g phantom was constructed for the baseline measurements of lead and aluminum. The volumetric mineral density of all phantoms was kept constant at 200 mg/cm³. The phantoms were quantified for their BMD and QUI by a Hologic Horizon® DXA device and a Hologic Sahara® QUS device, respectively.

Results: A strong positive correlation was observed between BMD determined by DXA and mole ratio of strontium ($r=0.993$ and $p<0.001$). In the cases of lead and aluminum, negative correlations were observed between measured BMD

and the analyte concentrations ($r=-0.347$, $p=0.016$, and $r=-0.549$, $p<0.001$, for lead and aluminum, respectively). However, the deviation of BMD observed from clinically relevant concentration of lead and aluminum, which is under 100 µg/g was within 1% of the coefficient of variation of BMD intrinsic to DXA. No statistically significant correlation between QUI and analyte concentrations was observed for all three elements.

Conclusions: The results of this study suggest that, strontium induces artificial elevation of BMD measured by DXA as previously documented [2], but it does not influence QUI determinations. The use of QUS in conjunction with DXA can potentially aid with BMD monitoring of patients who are taking strontium or has a history of strontium intake. Furthermore, clinically relevant levels of bone lead and aluminum do not induce detectable deviation in measurements of BMD or QUI, making both modalities useful in assessing patients with elevated bone lead or aluminum levels.

References:

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- [2] Liao J et al. Bone 2010;47:882

P102

HIP AND EYE INVOLVEMENT IN ANKYLOSING SPONDYLITIS

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Background: Ankylosing spondylitis (AS) is a chronic systemic inflammatory disease that primarily affects axial skeleton, but with an important involvement of peripheral joints and extra-skeleton disorders. Hip involvement in AS is a common and disabling condition and in contrast to the classical

changes of AS in the spine, inflammation in the hip does not lead to formation of new bone, but results in an erosive disease. Acute anterior uveitis is a common manifestation of AS, that can occur onset or in the course of the disease, and can lead to serious visual complications.

Objectives: To evaluate radiological hip abnormalities and to establish a correlation with acute anterior uveitis.

Methods: This study group included 36 male patients with define AS, with 45,5 years mean age (range 23-68) and mean disease duration of 17,4 years. All patients were assessed for hip involvement by performing an X-ray radiography and ophthalmological exam for anterior uveitis. Typical clinical findings included regional pain, muscle atrophy, flexion contractures and limitation of motion on hip joint. Anterior uveitis is easily to diagnose by red and painful eye, photophobia and blurred vision.

Results: The radiographic findings was concentric space narrowing (38,8%), osteophytosis (27,7%), protrusion acetabuli (13,8%), 11,1% was normal and 8,3% had hip ankylosing and needed total hip replacement. Radiographic and clinical signs of hip involvement showed significant positive correlation. Coxitis tend to begin early in disease course, average age of hip involvement was 36 years. From the 36 patients, 9 (25%) had one or more acute anterior uveitis episodes in the course of disease. From them, 3 (33,3%) needed total hip replacement, 4 (44,4%) had protrusion acetabuli and the remaining 2 (22,2%) had a normal hip joint.

Conclusions: Patients with early AS onset had higher frequencies of hip involvement and also had a greater need for total hip replacement, as compared with patients with adult-onset AS. We consider that hip involvement in AS patients should be assessed routinely in both young and adult AS patients. The study demonstrates an association between coxitis and anterior unilateral and recurrent uveitis. Uveitis and coxitis require simultaneous rheumatology and ophthalmology approach, being associated with unfavorable evolution of AS.

P103

LONG-TERM EFFECTS OF INTRAVENOUS PAMIDRONATE IN PAGET'S DISEASE OF BONE

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Objective: To evaluate the effect of intravenously administered pamidronate in patients with Paget's disease of bone.

Background: Paget's disease of bone (PDB), also known as osteitis deformans since 1877. PDB has been regarded as the second most frequent metabolic bone disorder in many publications. The prevalence of PDB in Poland is low. This bone remodeling disorder is leading to changes

in the architecture and overall appearance of the bone. The disorder may be monostotic or polyostotic and affect any bone in the body, but never the entire skeleton. PDB is classically identified in the skull, thoracolumbar spine, pelvis as well as long bones of the lower extremity. Interactions between environmental and genetic factors are considered essential to the development of Paget's disease. Mutations in the coding region of sequestosome-1 (SQSTM1), which encodes the p62 protein are linked to Paget's disease. Chronic measles (MV) infection has been suggested the environmental factor induce Paget's disease. It is a well-characterized metabolic disorder of bone due to rapid bone remodeling and turnover that results in bony overgrowth at single or multiple skeletal sites and presents as radiographical and biochemical markers alterations. Bisphosphonates are now considered as the standard treatment for active Paget's disease that subsequently normalizes alkaline phosphatase and PTH levels, and pain relief.

Material and methods: The nonrandomized retrospective study was conducted. Thirty-six patients with diagnosed PDB were included in this study. Indications for therapy included extensive disease, pagetic deformities, neurologic complications, and pagetic pain. Patients were treated with long-term pamidronate from 2008 to 2015. The study group consisted of 17 males and 19 females in average age 60,3 years (men - 60,6 years and women 58,2 years). The average follow-up was 4,27 years. Alkaline phosphatase, PHT, Calcium, Phosphorus, and 25OH D3 were tested. The therapy was administered when alkaline phosphatase or PTH increase or when pain deteriorated. The pamidronate was administered intravenously at a dose 1 mg/kg of body mass. Vitamin D was supplemented if required.

Results: The mean serum alkaline phosphatase level was 259,77 U/L (maximum 2606) before therapy and 152,19 U/L after treatment, a decrease of 58,58% (P<0.01). Calcium and Phosphorus levels were within the norm range (Ca 8,87 mg/dL; Ph 3,31 mg/dL) but 25 OH D3 was usually low 24,4 j.m. (3,8-52). Laboratory findings usually normalized after pamidronate administration. Local orthopedic deformities due to PDB (hip osteoarthritis 3 cases, tibial deformities in 2 cases), spinal stenosis 2 cases required conservative or surgical treatment. Pamidronate was well tolerated. A "flu-like" syndrome after the infusion was infrequently reported. Patients reported significant pain relief after pamidronate administration.

Conclusions: PDB in Poland is relatively rare. This disorder is frequently referred to orthopedic department specialized in metabolic bone diseases due to laboratory findings or orthopedic deformity. The intravenous administration of pamidronate in a dose of 1 mg/kg of the body mass in patients with Paget's disease of bone, was efficient in remissions of symptoms like pagetic pain and decrease of serum alkaline phosphatase level.

P104**EPIDEMIOLOGY OF VITAMIN D SUPPLY IN GERMANY: ASSESSMENT ON 1343 UNSELECTED PATIENTS**J. D. Ringe¹, P. Farahmand¹¹West German Osteoporosis Center (WOZ) at Klinikum Leverkusen, University of Cologne, Cologne, Germany

Vitamin D insufficiency is increasingly recognized as an important risk factor in the pathogenesis of falls and osteoporotic fractures. Aim of this trial was to get information about the vitamin D supply from a representative cohort of females and males in the average German population. 266 GPs cooperated with our center in this study by taking blood samples from their daily ambulant patients regardless of the actual reason for consultation. In these blood samples Vitamin D (25-OH-D), parathyroid hormone, calcium, phosphate, alk. phosphatase, gamma-GT and creatinine were measured in one central laboratory. Furthermore the patients filled in a questionnaire (age, sex, previous falls or fractures, skin type, Vitamin D-supplementation, acute or chronic diseases, medications). The trial was performed between Feb. 26th and May 25th. Laboratory and personal data became available from 1343 patients (615 men and 728 women). The age distribution ranged from 20 to 99 years, the average age of the whole cohort was 57.6 years (men 58.2, women 57.2). The mean 25-OH-D-value for the whole cohort was 16.2 ng/ml (range: 6.0 to 66.8, median 14,1 ng/ml). 16% of the patients had 25-OH-D-values below 8 ng/ml (=20 nmol/l), 37% below 12 ng/ml (=30 nmol/l) and 94% showed values below 32 ng/ml (=80 nmol). Parathyroid hormone levels were in 29% of cases in the upper tertile of normal, while 16% were above the upper normal limit of 65 pg/ml. Since 25-OH-D values above 80 nmol/l are regarded as optimal for bone and muscle and general health this means that we found in this particular population a high prevalence of moderate to severe Vitamin D-insufficiency the latter together with secondary hyperparathyroidism.

P105**MANAGEMENT OF PAEDIATRIC VERTEBRAL HAEMANGIOMAS PRESENTING WITH MYELOPATHY WITH MINIMUM 2-YEAR FOLLOW UP**P. K. Singh¹, P. S. Chandra¹, S. S. Kale¹, B. S. Sharma¹, A. K. Mahapatra², D. R. Sawarker¹¹Neurosurgery, All India Institute of Medical Sciences, New Delhi, India, ²Neurosurgery, All India Institute of Medical Sciences, New Delhi, New Delhi, India

Introduction: Pediatric vertebral haemangiomas (VH) are exceedingly rare benign and highly vascular tumours of spine. Purpose of study was to evaluate the long term outcome of

patients with vertebral haemangioma presenting with myelopathy treated surgically.

Materials and method: Six patients (Mean age 14.17 years, range: 12- 17 years, 3 females and 3 males) treated by laminectomy, laminectomy + alcohol embolization, laminectomy + alcohol embolization + bone cement injection and laminectomy + alcohol embolization + instrumentation from 2010 to 2014 with minimum 2 years follow up were included. Clinical/Neurological outcome was assessed using American Spinal Injury Association (ASIA) scale. Demographical, clinical, radiological, operative details and postoperative events were retrieved from hospital records. Only one patient underwent only laminectomy was operated outside with procedure abandoned due to bleeding. That patient was followed up here

Result: Myelopathy was present in all patients. The pre-operative ASIA score was A in 5 and C in 1 patient. All had pan vertebral body VH with severe cord compression in thoracic region on imaging study. Immediate embolization was achieved in all patients in which alcohol was injected, which made laminectomy and soft tissue hemangioma removal relatively easy. Post-surgery, at mean follow up of 41.33 months (range 25 to 69 months) all patients showed improvement in power. ASIA score was E all patients at last follow up.

Conclusion: Present study is largest series of pediatric symptomatic VH with more than 2-year follow up. Over all outcome was good with decompressive surgery.

P106**PREDICTIVE FACTORS FOR RESPONSE TO ULTRASOUND-GUIDED INTRA-ARTICULAR GLUCOCORTICOIDS IN KNEE OSTEOARTHRITIS**S. Slimani¹, A. Aissoug², S. Aouidane¹, H. Bounecer¹, M. M. Makhloufi¹, A. Ladjouz-Rezig³¹Department of Medicine, University of Batna, Batna, Algeria, ²Private practice, Batna, Algeria, ³Rheumatology Department, Benaknoun Hospital, Algiers University Medicine Faculty, Algiers, Algeria

Aim: To investigate predictive factors for good outcome of ultrasound intra-articular glucocorticoids in knee osteoarthritis (OA).

Methods: We conducted a prospective monocenter cohort study including 116 patients with knee OA, after failure to standard treatments, with pain > 4 (numerical rating scale NRS 0-10). Patients received an ultrasound-guided injection of 40 mg triamcinolone acetonide in their most painful knee. We exhaustively collected demographic and clinical data at inclusion, as well as lab, radiographs and ultrasound parameters of the included knees. WOMAC score was calculated at inclusion and after 4 weeks. Responders were defined as patients with at least 40% improvement of their WOMAC score.

Univariate analysis was performed in order to select possible predictive factors, and stepwise multiple logistic regression analyses were conducted to identify predictors of response.

Results: Among the 116 patients, 101 were females. Median age was 64 years (40-85) and mean duration of the disease was 14.1 ± 14.8 years. Mean BMI was 29.9 ± 3.8 kg/m². Mean NRS of pain was 8.4 ± 1.2 and mean WOMAC was 73.3 ± 11.8 at inclusion. 70.0% of the knees were grade 3 or 4 of Kellgren-Lawrence. 98% of knees expressed ultrasound synovial effusion and/or hypertrophy at inclusion. After 4 weeks, 61.2% of patients were responders. Regression analysis showed that patients with a BMI <30 kg/m² (OR=0.38, 95%CI 0.16-0.89) and an ESR <20 mm (OR=0.27, 95%CI 0.08-0.90) were more likely to respond to ultrasound-guided glucocorticoids injection. Having both predictive factors of good response increases the response rate to 73.5%, whereas having no predictive factor decreases the response rate to 25.0%.

Conclusion. Our study is the largest study evaluating predictive factors of response for intra-articular glucocorticoids injections in knee OA. Also, it is the first study of predictive factors for ultrasound-guided injections. Patients with high BMIs and high ESR seem less likely to respond to intra-articular injections.

P107

OSTEOARTHRITIS AS A CAUSE OF ACUTE ARTICULAR SYNDROME

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Introduction: Since 2008 in Saint-Petersburg Scientific Research Institute of Emergency Care n.a. I.I. Dzanelidze introduced a program for the treatment of patients with acute articular syndrome (AAS). Osteoarthritis is a common cause of significant pain syndrome requiring hospitalization of the patient for urgent reasons. At the same time, a large number of patients with AAS are delivered with an unknown nosological diagnosis, during the diagnostic process is verified as osteoarthritis.

Purpose: The purpose of the study was the research of osteoarthritis as the cause of AAS.

Material and methods: There were patients with AAS, directed to hospital inpatient treatment, the final diagnosis of which was recognized as osteoarthritis. In the 2008-2012 years total 377 patients were surveyed (51, 64, 106, 78 and 78, respectively).

Results: The proportion of patients with osteoarthritis in relation to the total number of patients with AAS was determined. Comparing by age, gender of patients, the incoming diagnosis, the presence of previously verified diagnosis of

osteoarthritis, the availability of outpatient consultations rheumatologist or hospital treatment for osteoarthritis in history was performed. Application prior to admission nonsteroidal anti-inflammatory drugs and SYSADOA treatment was estimated. Comparing of patients according to severity of pain, functional disability of joints, number of painful joints, signs of synovitis, duration of the pain syndrome before treatment was conducted. The severity of the changes in laboratory parameters, their dynamics in the course of treatment, duration of hospitalization in different subgroups of patients was estimated.

Conclusion: Osteoarthritis is one of the leading causes of hospitalization of patients with acute articular syndrome. It is necessary to develop optimal algorithms for diagnosis and treatment of osteoarthritis in AAS.

P108

ACUTE ARTICULAR SYNDROME: DEVELOPMENT AND IMPLEMENTATION OF A SYSTEM OF DIAGNOSIS AND TREATMENT

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Introduction: Acute articular syndrome (AAS) is a heterogeneous group of diseases, common to which is the articular apparatus involvement into the pathological process. Most rheumatology hospitals provide only the planned hospitalization of patients, however, the problem of hospitalization and medical care for patients with AAS had not previously been solved.

Purpose: Since 2008 in Saint-Petersburg Scientific Research Institute of Emergency Care named after I.I. Dzanelidze was developed and implemented a program of management of AAS patients. The purpose of this program is to create opportunities of hospitalization for emergency indications patients with a preliminary AAS diagnosis.

Materials and methods: The performance of this project at the 7/24 on duty multidisciplinary emergency medicine hospital allows to use all diagnostic capabilities of the emergency department, to ensure the consultation of different medical specialists.

During the development phase, carried out the coordination with the city Bureau of emergency medical services and Chief rheumatologist about the possibility of sending patients with a diagnosis of AAS, not with the specific nosological diagnosis. This approach provides a purposeful direction for these patients from outpatient centers and ambulances directly to the Institute of Emergency Care with a goal to their concentration in the multispecialty hospital for differential diagnostics procedures with simultaneous beginning of symptomatic and pathogenetic therapy.

Results: The main principles of differential diagnostics of AAS and groups of nosological forms were presented. Recommendations on optimizing the algorithm of examination of patients were revealed. Initial symptomatic therapy aimed at the speedy relief of pain, which improves the compliance of patients. Subsequently assigned pathogenetic therapy will be more likely to be effective because the patient had previously noted the effectiveness of symptomatic therapy. The main groups of medications and key features of their destination were considered. The stages of pathogenetic therapy, the most commonly occurring drug interactions and side effects were reflected. We summarized the 1658 rheumatic patients treatment experience in our Institute from a cohort of AAS patients. The distribution features of the patients with recurrence of articular syndrome in previously verified diagnosis and newly diagnosed disease requiring clarification of nosological forms were presented.

Conclusion: Successful experience of creation and confirmed the effectiveness of the system of providing medical care for AAS patients allow us to recommend its widespread introduction.

P109

RELATION BETWEEN CHOLINESTERASE INHIBITORS USE AND PISA SYNDROME

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Background: Few cases of Pisa syndrome (PS) or pleurothotonus have been reported in the literature. This syndrome is an acquired, persistent truncal dystonia which appears to be potentially reversible. It is characterized by an involuntary side flexion (on the right hand side or on the left) of the body and head and associated with a backward axial rotation, so that the person seems to be leaning like the leaning tower of Pisa. There are two types of dystonia. Some patients develop clinical features of *acute* dystonia whereas others develop *delayed* dystonia. Patients are not aware of their dystonia. This syndrome was first described as a rare side effect of long-term classic neuroleptics medications. Pisa syndrome reported after Cholinesterase Inhibitors (*CHEIs*) use is uncommon.

Methods: We describe 27 patients worldwide with probable AD who presented PS with *CHEIs* use including 10 cases in France. Then we analysed the differences and the similarities between our findings and others, reported in fifteen articles (PubMed). Measurements and results: Description of individual case narratives of PS patients on *CHEIs* during a period of thirteen years. PS is now attributed to a rare side effect of the three *CHEIs* medications available (donepezil, rivastigmine and galantamine) whatever the dosage or the pharmaceutical form used (oral or transdermal form).

Conclusion: This persistent truncal dystonia appears to be potentially reversible with *CHEIs* discontinuation as reported in the literature. The connection between *CHEIs* treatment and PS may be considered as likely because dystonia stopped with *CHEIs* discontinuation in most cases, which suggests that *CHEIs* alone can induce reversible PS in Alzheimer's disease patients. The frequency of this rare side effect should increase in the future with the growing number of polypharmacy old Alzheimer's patients. In order to the improve quality of care, systematic efforts to increase clinicians' awareness and reporting all adverse events with *CHEIs* use should become the rule.

Reference: D. Huvent-Grelle et al, Relation between Pisa Syndrome and Cholinesterase inhibitors use for elderly Alzheimer's disease patients, JAGS 2014;62:2450

P110

VERTEBRAL FRAGILITY FRACTURES: FREQUENCY OF LOCALIZATION

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Vertebral deformities represent the most frequent and feared complication of osteoporosis together with the femur fracture they are associated to an increase of the morbidity, disability and of mortality. The evaluation of such deformities is assign from many years to the Genant semiquantitative method which establishes three degrees of reduction of vertebral height. Nowadays such deformities unfortunately are not always accurately described in the radiological report and so the patients delay the therapeutical approach. The aim of our study is to evaluate the prevalence of vertebral fractures from fragility in relation to the age, the sex and the eventual correlation of the mentioned fractures with the densitometric and BMI value in a 1062 subjects (average age 67.72 years old ± 10.62 SD), 987 of them females and 75 males, which have arrived for the first time to our observation and have not been put under therapy for osteoporosis. From the data obtained by our sample it is clear that are meanly interested vertebra T7, T8, T11 and T12. In the males the vertebra more frequently interested of fracture results to be the T5 while in the females the T7. With the coming of age the most interested vertebra are the T11 and T12. The presents of osteoporosis at femur neck level is correlated with a major probability of vertebral fracture at T10, T11, T12, L1, L2 and L3, while the presents of osteoporosis at ward level is correlated in a significantly way with a major prevalence of vertebra fractures at T4, T6, T10,

T11, T12, L1, L2, L3 and L4. Obesity at general has a negative influence over the health of the spine and in particular the obesity of 1st degree in a significantly way in the deformation of the T11 and T12. At the moment we can affirm that the osteoporosis is underdiagnosed and undertreated and so it remains the real obstacle to pass in order to reduce the sanitary cost and, most important, to protect the health of the skeleton.

P111

EFFECTS OF A 24 MONTHS TREATMENT WITH DENOSUMAB IN A GROUP OF PEOPLE SUFFERING FROM OSTEOPOROSIS: OUR EXPERIENCE

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Osteoporosis is a systemic disease of the skeleton characterized by a reduced bone mass and by an alteration of the bone micro architecture, both factors are determinant of an increase of the fracture risk. The fractures constitute the most relevant clinical event and they affect with much frequency the wrist, vertebra and femur. The aim of our study has been that of evaluating the effects of denosumab on 148 patients affected by osteoporosis. The subjects enrolled on this study have been examined with DXA L1-L4 and femur districts, calculation of the fracture risk through FRAX algorithm and questionnaires to evaluate the occurring of fractures at the beginning of the treatment (t0) and after 24 months of therapy (t1). To compare the results registered before and after 24 months of treatment have been used chi square and the Wilcoxon signed rank test. After 24 months of therapy with denosumab the patients have shown a significant recovery of mineral bone density on the spine ($p < 0.001$) and on the femur ($p < 0.001$) in terms of t-score, z-score and BMD with a considerable reduction of the fractures risk of the hip ($p < 0.01$) through the calculation of the FRAX algorithm, while such calculation regarding the reduction of the fracture risk apart from the hip fracture, even though there was a positive trend it did not reach a significant statistical difference ($p = 0.076$). From the data obtained by our experience, we can see that the drug used resulted in great relevance effects over patients affected by osteoporosis and in general it was well tolerated and produced a significant improvement of the adherence levels. In this way from what we have studied we can affirm that denosumab drug represents an important progress on the osteoporosis treatment.

P113

PHILOS PLATE IN THE TREATMENT OF OSTEOPOROTIC PROXIMAL HUMERUS FRACTURE

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Introduction: The “Philos plate” is an alternative for the treatment of osteoporotic proximal humerus fractures. Proximal humerus fracture is the third most common osteoporotic fracture in our area. 70% of cases affect women with osteoporosis.

Objective: To evaluate clinical and radiographic short-medium term results of the Philos plate, in the treatment of osteoporotic proximal humerus fracture in 3 and 4 fragments.

Materials and Methods: A retrospective study was performed in our hospital, on 44 patients undergoing Philos plate from 2010-2012. The indications for surgical intervention were osteoporotic proximal humerus fracture in 3 and 4 fragments. Patient-oriented outcomes were obtained using the Constant Score postoperatively at 3, 6, 12, 24 months. In addition, functional ranges of motion were measured in forward elevation and internal and external rotation. Preoperative and postoperative Visual Analog Scale (VAS) were recorded.

Results: The mean patient age was 78,6 years (range, 51-85 years). The mean follow-up was 4,3 years (range, 6 months- 6 years). 85% of the patients were women. 59% were right shoulders and 41% left shoulders. The average preoperative pain score was 7, with a range from 5 to 9. Preoperative Constant score averaged 21,9, with a range from 16 to 29. Postoperatively, all scores improved with a mean pain score noted at 1, range 0 to 6; mean Constant 40,5, with a range 23 to 55; Mean Abduction was 70, forward elevation was 80 degrees, external rotation of 41 degrees. Internal rotation 43 degrees. 25 patients were satisfied with the functional results of surgery while 13 were somewhat dissatisfied and 6 were dissatisfied. The overall incidence of complications was 12 cases, 2 cases of infection, 4 cases of avascular necrosis, 6 cases of non-union.

Conclusions: Philos plate is a therapeutic option for the treatment of proximal humerus fracture, providing good pain relief, but their long-term functional results are not entirely satisfactory than expected, design improvements are necessary in order to achieve better results.

P114

THE NCB (NON-CONTACT BRIDGING) PERIPROSTHETIC FEMUR SYSTEM FOR THE TREATMENT OF OSTEOPOROTIC PERIPROTESIC

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Introduction and Objectives: Despite the success of total hip prosthesis is inevitable in many cases the appearance intra- and postoperative complications. These complications include: vascular lesions, peripheral nerve injuries, osteoporotic periprosthetic fractures and leg discrepancy. Osteoporotic periprosthetic fracture after a total hip arthroplasty is a common complication due to the increase in hip replacements and the advanced age of the population. Is more common in women with bone comorbidities (osteolysis, osteoporosis) and metabolic diseases (rheumatoid arthritis, corticosteroids, Paget...), after a low-energy trauma or even without it. For the classification of these fractures is used the Vancouver classification, which divides them into types A, B and C.

Material and Methods: A retrospective study was performed at the HUMS on 20 patients undergoing. The NCB plate system plate for the treatment osteoporotic periprosthetic hip fractures, from 2014 to 2015. We analyzed the indications and the complications in the use of this system.

Results: The mean patient age was 76,3. 16 patients were women. In all cases occurred after fall from their own height. 12 cases were classified as B1 Vancouver classification, 6 as B2 and 2 as B3. In cases classified as B1 they were treated by open reduction and osteosynthesis with the NCB plate system plate. In cases classified as B2 and B3 the NCB plate system plate was associated to the implantation of cemented long stem. The patients were allowed to start walking with partial weight bearing at six weeks after surgery. There were no complications of the surgical wound. At 12 months after surgery in all cases seen radiographic bone healing. 12 patients refer no subjective sensation of pain and almost rejoined his normally activities. 8 patients had to limit considerably its activity.

Conclusions: Osteoporotic periprosthetic hip fractures incidence is increasing in our health area. For the prevention of this pathology, it is important to educate doctors and patients, monitoring and treating osteoporosis, advising the patient regarding risk activities and caring intra-operative surgical technique.

P115

MICROSTRUCTURAL ANALYSIS OF SUBCHONDRAL BONE IN KNEE OSTEOARTHRITIS

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Aims: Subchondral bone changes seem to contribute to the progression of knee osteoarthritis (OA). This study aimed to analyse subchondral bone microstructure in specimens of late-stage knee OA in respect to articular cartilage damage, meniscus integrity and knee joint alignment.

Methods: 30 proximal tibiae of 30 patients (20 female and 10 male) with late-stage OA that were retrieved during total knee arthroplasty (TKA) were scanned using a high-resolution Micro-Computed Tomography (μ CT). The scans were semi-automatically segmented into five regions of interest (ROIs). The ROIs were then further analysed using a commercially available software. The degree of articular cartilage damage was assessed semi-quantitatively by magnetic resonance imaging (MRI) before surgery.

Results: The mean bone fraction volume in the medial compartment was significantly higher compared to the mean bone fraction volume in the lateral compartment ($62,07 \pm 12,53$ vs. $52,57 \pm 13,33$). The differences were statistically significant ($p=0,007$). The submeniscal mean bone fraction volume in the medial compartment was statistically significantly higher compared to submeniscal mean bone fraction volume in the lateral compartment ($56,76 \pm 12,8$ vs. $47,36 \pm 14,97$; $p=0,015$). There was a significantly lower bone fraction volume in the medial submeniscal subchondral bone compared to the subchondral bone fraction volume from the medial tibial plateau compartment ($p=0,041$). There was a significant difference in the lateral submeniscal subchondral bone fraction volume compared to the subchondral bone fraction volume from the lateral tibial plateau compartment ($p=0,024$). The bone fraction volume in all weight bearing locations (medial meniscus, medial tibial plateau, lateral meniscus, lateral tibial plateau) was significantly higher compared to the non weight-bearing reference point below the ACL ($p=0,000$). In intact menisci, there was a significantly lower subchondral bone fraction volume compared to subluxated or luxated meniscus in the medial ($p=0,020$) and lateral compartment ($p=0,005$). Varus alignment had a significantly higher subchondral bone fraction volume in the medial compartment than valgus, whereas valgus alignment had a significantly higher subchondral bone fraction volume in the lateral compartment ($p=0,011$).

Conclusion: The results of this study show significant differences of subchondral bone microstructural parameters in respect to cartilage damage, meniscus' structural integrity and knee joint alignment. Therefore, subchondral microstructural bone changes seem to be a secondary process in the late-stage OA of knee caused by mechanical changes.

P116

HEPCIDIN INHIBITION ON THE EFFECT OF OSTEOGENESIS IN ZEBRAFISH

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Iron overload, as a risk factor for osteoporosis, can result in the up-regulation of *Hepcidin*, and *Hepcidin* knockout mice display defects in their bone microarchitecture. However, the molecular and genetic mechanisms underlying *Hepcidin* deficiency-derived bone loss remain unclear. Here, we show that *hepcidin* knockdown in zebrafish using morpholinos leads to iron overload. Furthermore, a mineralization delay is observed in osteoblast cells in *hepcidin* morphants, and these defects could be partially restored with microinjection of *hepcidin* mRNA. Quantitative real-time PCR analyses revealed the osteoblast-specific genes *alp*, *runx2a*, *runx2b*, and *sp7* in morphants are downregulated. Furthermore, we confirmed qRT-PCR results by *in situ* hybridization and found downregulated genes related to osteoblast function in *hepcidin* morphants. Most importantly, we revealed that *hepcidin* was capable of removing whole-body iron which facilitated larval recovery from the reductions in bone formation and osteogenesis induced by iron overload. Iron overload, as a risk factor for osteoporosis, can result in the up-regulation of *Hepcidin*, and *Hepcidin* knockout mice display defects in their bone microarchitecture. However, the molecular and genetic mechanisms underlying *Hepcidin* deficiency-derived bone loss remain unclear. Here, we show that *hepcidin* knockdown in zebrafish using morpholinos leads to iron overload. Furthermore, a mineralization delay is observed in osteoblast cells in *hepcidin* morphants, and these defects could be partially restored with microinjection of *hepcidin* mRNA. Quantitative real-time PCR analyses revealed the osteoblast-specific genes *alp*, *runx2a*, *runx2b*, and *sp7* in morphants are downregulated. Furthermore, we confirmed qRT-PCR results by *in situ* hybridization and found downregulated genes related to osteoblast function in *hepcidin* morphants. Most importantly, we revealed that *hepcidin* was capable of removing whole-body iron which facilitated larval recovery from the reductions in bone formation and osteogenesis induced by iron overload.

P117

THREE-DIMENSIONAL CT-BASED STUDY OF THE VOLUME OF BONE DESTRUCTION IN LONG-TERM TOTAL HIP ARTHROPLASTIES

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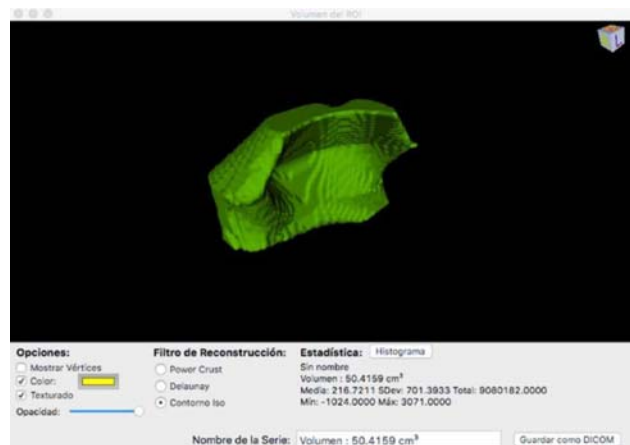
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Objectives: To study the severity of long-term periprosthetic bone destruction in Total Hip Replacements (THR), calculate the volume of lytic lesions using CT studies and three-dimensional reconstruction techniques and compare this method with the MRI-based diagnosis.

Material and Methods: We selected 15 THR with long-term periprosthetic osteolysis which had been previously studied with X-ray and MRI. We conducted a CT high-quality study using an artifact reduction software. Based on it, bone density loss was analyzed and the volume of lytic lesions was calculated, using a specific free-access medical imaging program. Also, the results were compared with MRI findings to check the sensitivity and specificity of the method.

Results: Osteolysis was detected in all cases. CT detected 27 lesions (1.8 per case) with an average volume of 7.21 cm³ per lesion and 12.98 cm³ per case. Osteolysis affected a total of 35 pelvic areas (2.33 per case). Assuming MRI as gold standard, CT had a sensitivity and specificity of 81% and 84% respectively.

Conclusions: Three-dimensional techniques based on CT studies allow us to analyze, in an accurately and reproducibly way, the presence and volume of osteolytic lesions in THR. Such lesions are very prevalent and can have a disturbing volume. The advanced analysis we have performed give us information about the location and magnitude of the lysis and helps us to plan the proper treatment. Thanks to that method, we can know the amount of bone deficit, the need for biological treatment or the quantity of bone grafting necessary in the operation room.



P118

PREVALENCE OF UPPER GASTROINTESTINAL BLEEDING RISK FACTORS IN THE OSTEOARTHRITIS PATIENTSS. H. Kim¹, J. M. Yun¹, D. W. Shin¹¹Department of Family Medicine, Seoul National University Hospital, Seoul, Republic of Korea

Background: As upper gastrointestinal bleeding (UGIB) is a high-risk condition with high morbidity and mortality, the increasing trend of NSAIDs-induced UGIB has led to research focusing on arthritis patients, who are potential long-term consumers of these predisposing drugs. We aimed to assess the prevalence of possible risk factors of UGIB and their age-group specific trend among osteoarthritis patients and general population.

Methods: We utilized data from the National Health Insurance Service that included claims data and results of the national health check-up program. Comorbid conditions (peptic ulcer, diabetes, liver disease, and chronic renal failure), concomitant drugs (aspirin, clopidogrel, cilostazol, NSAIDs, steroid, anticoagulants, and SSRI), personal habits (smoking, alcohol consumption, and sedentary lifestyle) and *Helicobacter pylori* infection were considered as possible UGIB risk factors.

Results: A total of 93,855 osteoarthritis patients out of 801,926 general population aged 20 and above were included. The prevalence of individual and concurrent multiple risk factors became higher as the age increased. The prevalence of each comorbid condition and concomitant drug were higher in osteoarthritis patients than the general population. 60.98% of osteoarthritis patients and 27.84% of the general population had at least one or more risk factors of UGIB. The prevalence of individual and concurrent multiple risk factors in younger age groups were also substantial. Furthermore, when personal habits and *H. pylori* infection were included, the prevalence of concurrent multiple risk factors increased greatly even in younger age groups.

Conclusion: The prevalence of various UGIB risk factors was higher in osteoarthritis patients. Physicians who care the osteoarthritis patients should consider individualized risk assessment regardless of age when prescribing drugs that predisposes to UGIB. Additionally, subjects with high risk should control modifiable UGIB risk factors such as *H. pylori* infection.

P119

THE ASSOCIATION BETWEEN THE PRESENCE OF HEPATIC STEATOSIS AND DECLINE OF BONE MINERAL DENSITYJ. M. Yun¹, S. H. Kim¹, D. W. Shin¹¹Department of Family Medicine, Seoul National University Hospital, Seoul, Republic of Korea

Background: In some previous studies, subjects with metabolic syndrome were more likely to have osteoporosis. Also, osteoporotic fractures were more frequent in patients with metabolic syndrome. Since non-alcoholic fatty liver disease (NAFLD) is considered as the hepatic manifestation of the metabolic syndrome, we performed this study to assess the association between the presence of hepatic steatosis and subsequent decline of BMD.

Methods: We conducted a study of 2637 Korean people (mean age, 54.8±8.3; no. of men=427), who had undergone health checkup in a 3rd degree hospital at least twice from 2006 to 2013. The baseline hepatic steatosis was evaluated with ultrasonography. The decline of mineral density was defined as the difference between baseline and subsequent BMD, divided by the time interval. We performed multivariate regression by gender adjusting baseline characteristics including age, BMD, bone mineral density, waist circumflex.

Results: The mean decline per year was 0.004±0.023 with hepatic steatosis and -0.001±0.022 without steatosis. In multivariate regression, the presence of hepatic steatosis assessed by ultrasonography was not associated significantly with BMD change in both men and women. In men, the p-values were 0.57 for L1, 0.56 for L2, 0.38 for L3, 0.57 for L4 and 0.95 for mean BMD for L-spine, respectively. In women, the p-values were 0.74 for L1, 0.64 for L2, 0.91 for L3, 0.18 for L4 and 0.49 for mean BMD for L-spine, respectively.

Conclusion: There was no significant association between the presence of hepatic steatosis and BMD change. Although previous study in Korea indicated significant association between NAFLD and low bone mass, the result was obtained from analysis without considering waist circumflex. Further well designed studies are essential for clarifying the association between NAFLD and low BMD.

P120

AN AUDIT OF TREATMENT FOLLOWING A LOW TRAUMA WRIST FRACTURE PRESENTING TO THE ACCIDENT AND EMERGENCY DEPARTMENT AT A PRIVATE HOSPITAL IN MALAYSIA FROM 2011 TO 2015S. S. Yeap¹, M. A. Nur-Syabeela², V. Thirunavukkarasu², S. Thambiah², S. Intan-Nureslyna², Z. S. Siti-Yazmin², P. Balan¹, F. L. Hew¹, S. P. Chan¹¹Subang Jaya Medical Centre, Subang Jaya, Malaysia,²Faculty of Medicine and Health Sciences, University Putra Malaysia, Selangor, Malaysia

Objective: To look at whether there was a treatment gap in patients with low trauma wrist fractures presenting to an Accident and Emergency Department (AandED) at a tertiary private hospital in Malaysia.

Material and Methods: The records of patients over the age of 50 attending AandED from 2011-2015 with a diagnosis of Colles'/wrist fracture were obtained. Information was extracted for those with a low trauma fracture. Data was analysed using IBM SPSS Statistics version 22.0 for Windows.

Results: 191 patients presented with a wrist fracture for the years 2011-2015. 58 of these were due to accidents, which left 133 (69.9%) low trauma wrist fractures for analysis. The median age of the patients was 58 years (IQR 14). 86 (64.7%) were female, 89 (66.9%) were Chinese. 5 patients had a previous low trauma fracture, but only 2 had treatment. Following the low trauma wrist fracture, only 16/133 (12.0%) were given treatment. Of those given treatment, 6/16 (37.5%) were given calcium/vitamin D/activated vitamin D only and 10/16 (62.5%) were given active osteoporotic treatment. For those given treatment, the median duration of prescribed treatment was 1 month. There was no significant difference in demographic factors, medical history or osteoporosis risk factors between wrist fracture patients who were treated and not treated with osteoporosis medication.

Conclusions: Currently, treatment for osteoporosis following low trauma wrist fractures in Malaysia is inadequate with only 12% receiving some treatment, and in those who are treated, the median duration of treatment was only 1 month.

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SECONDARY BONE SIZE DEFICIT IN PATIENTS WITH EHLERS-DANLOS SYNDROME

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Background: Ehlers-Danlos syndrome (EDS) comprises a group of inherited connective tissue disorders, caused by various defects in the biosynthesis or secretion of fibrillar collagens. As collagen represents a major constituent of the bone matrix as well as of tendons and muscle, bone strength in EDS patients might be impaired both via direct and indirect pathways. Although decreased muscle strength, decreased areal bone mineral density (BMD) and increased fracture risk have been reported, no studies have investigated volumetric bone parameters in these patients.

Objective: We aimed to compare volumetric BMD (vBMD) and cortical bone geometry in patients with EDS hypermobility type (EDS-HT) and age- and sex-matched controls.

Material and Methods: 42 female EDS-HT patients (mean age 40.0±10.8 years) and 42 controls were included in a cross-sectional study. vBMD and bone geometry at the tibia (4% and 66% region) as well as lower leg muscle cross-sectional area (CSA, 66% region) were measured using pQCT.

Results: Although EDS-HT patients did not differ from controls with regard to trabecular or cortical vBMD, they presented with about 6.3% smaller trabecular bone area (p=0.014), 8.9% smaller cortical bone area (p=0.005), 6.6% smaller cortical thickness (p=0.021), and albeit non-significant, 2.9% smaller periosteal circumference (p=0.101). As a result, strength-strain index was 9.8% lower in EDS-HT patients as compared to controls (p=0.039). Furthermore, EDS-HT was associated with a 10.8% decreased muscle CSA (p=0.004) without differences in muscle density. Bone/muscle CSA ratio was within the normal range and did not differ between groups.

Conclusions: EDS-HT patients present with both a trabecular and cortical tibial bone size deficit as compared to controls, which might contribute to their increased fracture risk. As indicated by the decreased muscle CSA and normal bone/muscle CSA ratio, this bone size deficit is probably secondary to decreased mechanical loading in these patients with known muscle dysfunction.

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WHY A SIX-WEEK COURSE OF PHYSIOTHERAPY ON PATELLOFEMORAL PAIN SYNDROME HAS A SIGNIFICANT EFFECT ON PAIN AND FUNCTION BUT NOT ON STRENGTH AND FLEXIBILITY? A FOCUS GROUP STUDY

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Objectives: The purpose of this focus group study was to establish North-West Wales (NWW) physiotherapy treatment of Patellofemoral Pain Syndrome and report the barriers that stopped physiotherapists from increasing strength and flexibility and the contradictions of physiotherapists' beliefs regarding their practice.

Methods: The investigation was based on specific and priori designed questions. Two focus groups were conducted, where physiotherapists discussed the results of a feasibility study conducted in their department which showed that physiotherapy treatment had a significant effect on pain and function but not on strength and flexibility. The Ritchie and Spencer (1994) method of qualitative data analysis was selected because This framework analysis is particularly appropriate when a study has clear aims at the outset.

Results: 11 hypotheses were discussed whilst 13 evidence statements were reported by the merger of the answers to the hypotheses. A level of consensus was described using the moderator's notes. Patellofemoral Pain Syndrome physiotherapy works; not through strength and flexibility but through pain and function improvement. According to the physiotherapists, the main reason for not achieving strength and flexibility improvement was there was not enough time to physically increase those components. In addition, the available literature is based on athletic patients with PFPS, while patients who are referred in the NHS clinic of NWW district hospital are largely non-athletic. These patients do not comply with the prescribed exercises, thus, physiotherapists only prescribe simple and functional exercises. These exercises improve pain and function however, this practice often only has a short-term effect and most of those patients have to return after a few months for more physiotherapy.

Conclusions: The specific exercises for patients with Patellofemoral Pain are not effective because they are not used by NWW physiotherapists. Group classes and better education on the importance of specific exercises and self-managing should be researched whilst the long-term effect of these treatment components should also be assessed.

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Reference: Ritchie, J. and Spencer, L. (1994). Qualitative data analysis for applied policy research. *Analysing Qualitative Data*. London, UK: Routledge.

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MALE OSTEOPOROSIS: CLINICAL HIGHLIGHT, REMARKABLE DETAILS

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Introduction: Two decades ago osteoporosis had gender distinction. It was considered as a women's disease. Now borders of a gender, set previously, are diminishing, pointing to the newly emerged medical direction called male osteoporosis. Year of 2014 is announced as the year of male osteoporosis by IOF. There are many unanswered questions though: What are the risk factors of male osteoporosis? How the principles of basic therapy are chosen?

Objectives: To evaluate BMD in osteoporotic Georgian male population and analyse antiosteoporotic treatment outcome

Materials and Methods: Since 2007, 970 Georgian male with diagnosis of OP are under regular medical supervision. Age groups are as follows: 279 men under 45 years, 460 men 46-60 years, 191 men 79 years and above. The diagnosis of osteoporosis was made by T-Scores using DXA method on Hologic 1000 System.

Table 1. Clinical form of osteoporosis in male population.

| Number of Patients | Osteoporosis and osteoarthritis | | Thyroid Disease induced OP | | Osteoporosis related to Secondary Hypogonadism | | Osteoporosis and Arteriosclerosis | |
|--------------------|---------------------------------|-----------------|----------------------------|-----------------|--|-----------------|-----------------------------------|-----------------|
| | % | Absolute number | % | Absolute number | % | Absolute number | % | Absolute number |
| N=970 | 19% | 184,3 | 20% | 194 | 24% | 232,8 | 37% | 358,9 |

All patients received antiosteoporotic treatment denosumab subcutaneous injection once in every 6 months, with calcium supplement - 1500mg elemental calcium and Vit D 800 IU. DXA was used for the evaluation efficacy of treatment once yearly in 3 years. BMD basic values are shown in Table 2. Table 2. BMD value assessed in different clinical manifestations of OP (M±).

| Clinical Forms | L ₂ -L ₄ | Neck | Total | Forearm | P |
|--|--------------------------------|------------|-----------|-----------|--------|
| Osteoporosis and osteoarthritis | -2,7±1,1 | -1,69±1,18 | -2,1±0,91 | -2,2±0,90 | <0,01 |
| Thyroid Disease induced OP | -2,7±1,4 | -2,6±0,18 | -2,1±0,4 | -2,5±0,18 | <0,01 |
| Osteoporosis related to Secondary Hypogonadism | -2,6±0,95 | -2,3±1,2 | -2,4±0,65 | -3,0±1,0 | <0,01 |
| Osteoporosis and Arteriosclerosis | -2,8±0,155 | -2,7±0,08 | -3,2±0,8 | -2,6±0,15 | <0,001 |

Results:

1. The research has shown that male osteoporosis is most prevalent in population with coronal arteriosclerosis that possibly corresponds with recent hypothesis of simultaneous occurrence of the pathological mechanisms - atherosclerosis and osteoporosis.
2. Based on results of our study, denosumab has the best safety index among other antiosteoporotic agents. therapy with denosumab showed no side effects or complications.
3. The lowest BMD values and highest T-score deviations were observed in males with atherosclerosis (p<0,001).
4. Therapeutic efficacy of denosumab in males with osteoporosis have exceeded 80%.
5. Based on 3-year experience of using denosumab, male population showed better results on denosumab compared to bisphosphonate treatment. As denosumab mechanism is related to particular pharmacological target, its efficacy can be explained with a speculation that males accumulate more BMD in comparison to women and lesser bone is lost in men than in women population .
6. The pursuit of pharmacologic agent against male osteoporosis is still in progress.

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PTH CHANGE OVER TIME AND MORTALITY: A LONGITUDINAL STUDY OF ELDERLY WOMEN

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Objective: Age-related increases in PTH have been reported previously but whether these changes are associated with negative health-outcomes has not been satisfactorily investigated in elderly women. In this study, we describe the change in PTH over time and its association to mortality in 75-year-old women (OPRA cohort).

Material and Methods: 1044 women aged 75 attended at baseline and were followed for up to 15 years with reassessment at ages 80 (n=715) and 85 (n=382). Data on PTH, 25OHD, calcium, phosphate and kidney function (eGFR) was collected. The presented analyses use 646 women who attended both investigations at ages 75y and 80y. Comorbidities were only available at age 80. The relationship between PTH and mortality over 15 years was investigated using Cox proportional hazards models.

Results: Between ages 75 and 85, half of the women had stable or decreased PTH levels (51%; n=169). Amongst those whose PTH increased (n=164), the majority (64%; n=105) remained within normal range despite increases of up to 50% above baseline values. These women had lower 25OHD (74 vs. 83, p=0.001) compared to women with normal levels. eGFR, phosphate and calcium were unchanged. Increases of more than 50% (36%; n=59) resulted in PTH levels above normal range (mean 9.5±6.0 pmol/L) leading to a pronounced decline in eGFR (42 ±12 vs. 54±14 mL/min/1.73m², p<0.001) compared to women with up to 50% PTH increases. 25OHD, phosphate, calcium and BMI remained more or less unaltered. At age 75, elevated PTH was associated with greater risk of dying (HR=1.4 [1.1-1.8], p=0.007) over a 15-year-period. The association was attenuated however when adjusted for eGFR, 25OHD, smoking and phosphate (p=0.082).

Conclusion: The majority of women maintained normal PTH levels over 10 years and even increases up to 50% still resulted in PTH levels within the normal range. Elevated PTH was not independently associated with mortality but rather reflects impaired health as indicated by lower 25OHD and eGFR. Outcome in a patient presenting with elevated PTH is closely related to vitamin D status, kidney function and comorbidities.

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FACTORS ASSOCIATED WITH KNEE PAIN WITH DIFFERENT GRADES OF KNEE OSTEOARTHRITIS

AMONG KOREAN ADULTS AGED 50 YEARS OR MORE

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Background: Discordance between knee pain and radiologic osteoarthritis is well known. This study was to investigate factors associated with knee pain with different grades of knee osteoarthritis among Korean adults aged 50 years or more.

Methods: Total 5,978 Korean aged 50 years or more who underwent the radiographs of the knees were analyzed from Korean National Nutrition and Health Examination Survey conducted in 2010-11. Radiographs of the knees were scored for osteoarthritis using the Kellgren-Lawrence scale. Multivariate logistic regression analysis adjusting for sociodemographic factors, lifestyle factors, comorbidity and health status was used for analysis.

Results: The prevalence of knee pain was higher in female compared to that of male (P<0.001), and increased as increasing severity of radiologic knee osteoarthritis. Female was associated with increased risk of knee pain in all of Kellgren-Lawrence degrees. In most of Kellgren-Lawrence degrees, depression was associated with increased risk of knee pain, and those with high school diploma or higher were associated with decreased risk of knee pain. A few factors (age, body mass index, and no alcohol drinking) were also associated with increased risk of knee pain for particular grades of radiographic knee osteoarthritis.

Conclusions: Knee pain increased as increasing severity of radiologic knee osteoarthritis. Although there were differences of risk factors associated with knee pain with different grades of knee osteoarthritis, female, depression were associated with increased of knee pain, and those with high school diploma or higher were associated with decreased risk of knee pain in most of Kellgren-Lawrence degrees.

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DEMYELINATING DISEASES AFTER ANTITNF TREATMENT IN RHEUMATIC DISEASES: OUR CLINICAL EXPERIENCE ABOUT THIS RARE SIDE EFFECT

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Background: The onset of demyelinating diseases due to antiTNF α therapy in rheumatic diseases is an uncommon side effect. Currently, the evidence-based data are available from case reports or case series which try to understand the possible cause-effect association. According to "BIOBADASER" (Spanish Register of Adverse Events of Biologic Therapy in

Rheumatic Diseases), the incidence of demyelinating diseases in Spain is 0.05 cases 1000 person-year with antiTNF α (studies performed with etanercept, adalimumab, infliximab) compared to 0.02-0.04 in general population. We report our clinical experience about four clinical cases.

Patients and Methods: We expose four patients whom developed neurologic symptoms compatible with demyelinating disease over the course of a year with antiTNF α therapy.

| | Diagnosis | antiTNF α | Neurologic features And diagnosis | Evolution of neurologic features after antiTNF withdrawal | Current treatment |
|--------|------------------------|------------------|---|---|------------------------------|
| Case 1 | Ankylosing Spondylitis | Golimumab | Demyelinating cervical myelitis. Demyelinating brain lesions. | Clinical Persistence | NSAIDs Glatiramer acetate |
| Case 2 | Psoriatic Arthritis | Infliximab | Demyelinating polyradiculopathy (Guillain-Barré syndrome) | Clinical Remission | Ustekinumab |
| Case 3 | Rheumatoid Arthritis | Adalimumab | Axonal Motor-sensitive Demyelinating Polineuropathy | Clinical Remission | Rituximab |
| Case 4 | Rheumatoid Arthritis | Adalimumab | Distal axonal demyelinating polineuropathy | Clinical Remission | Rituximab |

Results: The three patients who developed peripheral nervous system affection, responded successfully to medication withdrawal, regarding to the improvement of neurologic features, even clinical remission. Although a switch of the therapeutic target was necessary in order to manage the baseline inflammatory disease. On the other hand, the patient who suffered from central nervous system disease did not improve after antiTNF discontinuation, so to establish a specific treatment was required. In all the four cases studied, we observed that neurologic features were developed due to monoclonal antibodies, not to soluble TNF receptor.

Discussion: So far, the association between demyelinating diseases onset and antiTNF α therapy remains unclear. It is still unknown if these drugs are able to cause these pathologies, reveal a previous unidentified latent disease or conversely, there is not any causal link. However, in most cases, an improvement in neurologic symptoms and signs is detected once the drug is removed. This fact, prompt us to consider that a cause-effect relationship is plausible. In view of the above, some recommendations should be made: it is mandatory to discontinue the antiTNF α treatment if any neurologic symptoms or signs appear and, the use of these drugs must be avoided in patients (and first-degree relatives) with medical history of demyelinating disease.

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FACTORS ASSOCIATED WITH THE ACCURACY OF SELF-REPORTED OSTEOPOROSIS IN THE COMMUNITY

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Objective: We examined the agreement between self-reported osteoporosis and bone mineral density (BMD) results through dual-energy x-ray absorptiometry (DXA) using data from a national representative sample taken from the U.S. communities.

Methods: Six-year data from the continuous National Health and Nutrition Examination Survey (NHANES) 2005-2006, 2007-2008, and 2009-2010 were merged. Participants included adults 50 years of age or older whose data appeared in both questionnaire and medical examination data files. Self-reported osteoporosis was defined by an affirmative response to a question in the osteoporosis questionnaire then compared with BMD-defined osteoporosis, defined by BMD values taken from the examination data.

Results: Agreement between self-reported osteoporosis and DXA results were low. Kappa was only 0.24 (95%CI=0.21-0.27), and sensitivity and positive predictive value were 28.0% and 40.8%, respectively. When stratified by gender or age group, agreement remained poor.

Conclusion: Self-report of osteoporosis would not be suitable for accurate prevalence estimates for osteoporosis regardless of gender or age group.

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HEALTH BENEFITS AND CONSEQUENCES OF THE EASTERN ORTHODOX FASTING IN MONKS OF MOUNT ATHOS: A CROSS-SECTIONAL STUDY

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Objectives: Greek Orthodox fasting (OF) is a diet dictated by the Orthodox religion and involves 180-200 days of fasting per year. The aim of this cross-sectional study was to examine,

for the first time, the characteristics and effects of anthropometry, cardio-metabolic markers and calcium homeostasis as it is practiced by Athonian monks (AM).

Materials and Methods: Body composition (bioelectrical impedance analysis) and levels of occupational physical activity (light, moderate, intense) were evaluated in 70 monks (age: 38.8±9.7 years). Energy intake was measured for two separate days of Athonian fasting: a non-restrictive day (NRD) during a weekend of Nativity Fast, and a restrictive day (RD) weekday during Great Lent. For a subsample of the cohort (50 monks, age=38.7±10.6 years) biochemical blood analyses were conducted.

Results: The daily energy intake of the 70 AM was very low during both RD and NRD (1265.9±84.5 vs. 1660±81 kcal, $p<.001$). A statistically significant difference between energy intakes in RD and NRD was observed: carbohydrates (159.6±21.8 vs. 294.3±23.4 g, $p<.0001$) and saturated fat (12.7±0.0 vs. 16.4±0.0 g, $p<.0001$) were lower, whereas protein (89.2±1.3 vs. 72.35±1.3 g, $p<.0001$) was higher during RD. Body weight (74.3±12.9 kg) and body mass index (23.8±4.1 kg/m²) of the cohort were independent of age and level of physical activity. An optimal profile for lipid and glucose parameters (total cholesterol: 183.4±41.7 mg/dl, LDL: 120.6±37.6 mg/dl, triglycerides: 72.2±31.3 mg/dl, HDL: 48.5±14.2 mg/dl, fasting glucose 84.4±10.1 mg/dl and HOMA-IR 1.02±0.40) was found. Profound hypovitaminosis D (8.8±6.2 ng/ml), high PTH: 115.5±48.0 pg/ml with normal serum calcium levels (8.9±3.2 mg/dl) was observed.

Conclusions: Unaffected by variation in lifestyle factors, the results of this unique study offers clear evidence for health benefits of the strict Athonian fasting through optimal lipid and glucose homeostasis. In the context of a health-promoting diet among the general population, further evaluation of advantages and disadvantages of this highly restrictive variant of Mediterranean diet is warranted.

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CORRELATION BETWEEN BONE AND GLUCIDE METABOLISM DEPENDING ON THE NUTRITIONAL STATUS IN DIABETIC PATIENTS

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Background: Diabetes mellitus and low-trauma fractures are major causes of morbidity and mortality worldwide. The objective is to evaluate the relationship between nutritional status, dairy calcium intake, serum levels of vitamin

D, glycemic control and the onset of osteoporosis and/or bone fractures predisposition in T1DM and T2DM patients.

Methods: The sample consists of 1151 patients (350 men and 799 women) divided into three groups: 400 patients with T1DM of which 19 with osteoporosis (age 42,39±13.66 yo; BMI 23,88±3,28), 401 patients with T2DM of which 64 with osteoporosis (age 62.01±13.21 yo; BMI 30,25±8,83), 350 non-diabetic patients with osteoporosis (NDP) (age 64.59±10.45 yo; BMI 25,64±4,17). In all subjects nutritional status, anthropometric, metabolic and glycemic control parameters, BMD (as T-score) at the lumbar spine (LS-BMD), femoral neck (FN-BMD) and total femur (Ftot-BMD) were measured. Prevalence of bone fracture between the different groups were determined.

Results: Low vitamin D levels were found in both T1DM (16.38±2.74 ng/mL) and T2DM (15.04±9.35 ng/mL) as well as low daily calcium intake (634.84±159.97 mg/day and 649.43±189.86 mg/day, respectively). About 89% of T1DM and 37,5% of T2DM had T-score≥-2,5; T1DM had also a FN-BMD (T-score: -2.373±0.68 vs. -1.91±0.72; $p=0.016$) and Ftot-BMD (T-score: -2.368±0.79 vs. -1.60±0.96; $p=0.003$) significantly lower than T2DM and a LS-BMD significantly lower compared to NDP (T-score: -2.26±0.79 vs. -2.91±0.86). Instead, T2DM had a LS-BMD, FN-BMD and Ftot-BMD significantly higher than those of NDP ($p=0.0001$, $p=0.004$, $p=0.007$). We did not find a positive correlation between BMD and HBA1c. 1% of T1DM, 3.2% of T2DM and 14.8% of NDP had vertebral fractures; 22.7%, 9.2% and 14% had non-vertebral fractures. T2DM had 38% reduction in risk of non-vertebral fractures (OR 0.62, 95% CI=0.39-0.98) compared with controls; instead, T1DM had an increased risk of non-vertebral fractures (OR 1.81, 95% CI 1.24-2.66).

Conclusions: We confirm that T1D had an increased risk of fractures. Calcium intake and vitamin D resulted insufficient in all groups. HBA1c did not affect BMD or risk of fractures in all groups.

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TREATMENT OF OSTEOPOROSIS BY IBANDRONATE IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction: Scientists often discuss about similarity between the pathogenesis of rheumatoid arthritis and osteoporosis. It was established that factors that show the degree of

disease (CRP, ESR test) are associated with the degree of osteoporosis; moreover, it is discussed as prognostic indicator of BMD in the course of RA. Can osteoporosis be an immune disorder of the bone connective tissue? It was used ibandronate.

Materials and Methods: 45 RA female patient of 21-50 age group (BMD L1-L4 <2.5 SD). Patients were using ibandronate in intermissive regime -150 mg per month during 1 year, with combined medication CaD3 Nycomed forte. In control group 20 patients were examined with low mineral density indicators, that indicators, that they used only CaD3 Nycomed forte (used 1 tablet per day 0). In all cases the diagnosis of rheumatoid arthritis was made by ARA - 1987 year diagnostic criteria. All patients were using medications, 50 patients - methotrexate; 15 - delagili; 56 - glucocorticosteroids (oral); 60 patients - NSAID. BMD was measured by DXA (Hologic Q-1000). BMD dynamics of indicators in RA patients after 1 year of treatment by ibandronate.

| Indicators | I group n = 45 | II group n = 20 |
|------------------|--------------------|--------------------|
| Before treatment | -2.70 ± 0.15 | -2.20 ± 0.11 |
| After treatment | -2.01 ± 0.16 | -2.71 ± 0.19 |
| Belief | t = -2.94 p < 0.01 | t = 1.57 p > 0.05 |

Results:

- 1) The antiresorptive effect of ibandronate is shown on BMD indicators, in blacks - 6,8%.
- 2) Usage of ibandronate drug showed no side effect at all.
- 3) With antiresorptive effect of ibandronate, it was followed by decrease of back pain (vertebral ache) and other areas of skeleton.

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RELATIONSHIP BETWEEN NICOTINAMIDE PHOSPHORIBOSYLTRANSFERASE SERUM LEVEL AND LABORATORY MARKERS OF INFLAMMATION IN OSTEOARTHRITIS PATIENTS

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Purpose: To study relationship between serum levels of nicotinamide phosphoribosyltransferase and laboratory markers of inflammation in patients with osteoarthritis (OA).

Methods: We determined nicotinamide phosphoribosyltransferase (visfatin) level in sera of 80 patients with primary OA by indirect enzyme-linked immunosorbent assay (RaiBiotech, cat № EIA-VIS-1). We divided the patients into two groups: the

first group (n=23) included patients with elevated nicotinamide phosphoribosyltransferase levels (more than 5.9 ng/mL), the second group (n=57) consisted of patients with normal visfatin level (less than 5.9 ng/ml). Also were determined the levels of high-sensitivity C-reactive protein (CRP, Biomerica, Cat. № 7033) and ESR in each of the two groups.

Results: Patients with elevated levels of nicotinamide phosphoribosyltransferase had the following laboratory parameters (M+m): ESR - 20,4±1,08 mm/h, CRP - 12,43±1,3 mg/l. The second group had following data: ESR 14,8±0,66 mm/h, CRP 6,2±0,62 mg/l. Thus, patients with elevated levels of nicotinamide phosphoribosyltransferase had significantly higher concentrations of ESR and CRP (p<0,001).

Conclusions: Thus we revealed relationship between serum nicotinamide phosphoribosyltransferase level and laboratory markers of inflammation in OA. These data indirectly confirm hypothesis of nicotinamide phosphoribosyltransferase's pro-inflammatory properties.

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THE RELATIONSHIP OF NEUTROPHIL-TO-LYMPHOCYTE RATIO AND MORTALITY IN TROPICAL DIABETIC HAND SYNDROME

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Introduction: The neutrophil-to-lymphocyte ratio (NLR) is an accessible laboratory parameter said to be predictive of mortality. Tropical diabetic hand syndrome (TDHS) comprises upper extremity infections affecting patients with insulin resistance in an equatorial climate.

Objectives: In this retrospective cohort study, we reviewed NLR among TDHS patients and its association with mortality during admission and after discharge.

Methods: Twenty-five hands from 25 consecutive patient referrals were enrolled from January 1, 2014 to December 31, 2015. Complete blood count upon admission and survival status after orthopaedic management were collected and tabulated in a spreadsheet. Receiver operating characteristic (ROC) curve were used to assess the utility of NLR in predicting mortality.

Results: Majority of the patients were males (76%) with a mean age of 50. The right side was affected most (56%). The mean neutrophil count was 78.36 and 13.96 for lymphocytes. NLR interquartile range was 8.10 with Q1 (<3.43), Q2 (3.44-9.33), Q3 (9.34-12.43) and Q4 (>2.43). In-hospital mortality was 52%, mortality in 6 months at 58%, and in 12 months at 100%. ROC value for admission

mortalities was 0.939, mortality six months after discharge at 0.989, and in twelve months at 0.988, with findings statistically significant ($p < 0.05$). Area under the curve for all three specified times describe NLR as an excellent diagnostic tool. **Conclusion:** Patients with increased NLR have higher incidence of in-hospital mortality. Within one year, all TDHS patients expired. TDHS mortality can be attributed to NLR.

P133

PREPUBERTAL IMPACT OF PROTEIN INTAKE AND PHYSICAL ACTIVITY ON WEIGHT BEARING PEAK BONE MASS AND STRENGTH IN HEALTHY MALES

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Context: Peak bone mass (PBM) and strength are important determinants of fragility fracture risk in later life. During growth bone is responsive to changes in nutrition and physical activity (PA), particularly when occurring before pubertal maturation.

Objective: In prepubertal healthy boys, protein intake (Prot-Int) enhances the impact of PA on weight-bearing bone. We hypothesized that the synergism between Prot-Int and PA on proximal femur as recorded at mean age of 7.4 years would track until PBM.

Methods: 124 boys were followed from 7.4 to 15.2 and 22.6 years. At 7.4 years they were dichotomized according to the median of both PA and Prot-Int.

Results: In boys with PA > Median (310 vs. 169 kcal.d⁻¹), higher vs. low Prot-Int (57.7 vs. 38.0 g.d⁻¹) was associated with +9.8% greater femoral neck (FN) BMC ($P = 0.027$) at 7.4 years. At 15.2 and 22.6 years, this difference was maintained: FN BMC: +12.7% ($P = 0.012$) and +11.3% ($P = 0.016$), respectively. With PA > Median, in Prot-Int > vs. <Median, differences in FN BMC Z-scores were +0.60, +0.70 and +0.68 at 7.4, 15.2 and 22.6 years, respectively, and also associated with greater FN width. Micro-finite element analysis of the distal tibia at 15.2 and 22.6 years indicated that in the two groups with PA > Median, CSA, stiffness and failure load were greater in Prot-Int > vs. <Median.

Conclusions: This study demonstrates the crucial influence of Prot-Int on the response to enhanced PA and the importance of prepubertal years for modifying, by environmental factors, the bone growth trajectory and, thereby, for achieving higher PBM and greater strength in healthy male subjects.

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A STUDY ON THE PREVALENCE OF PATHOLOGIES OF THE CERVICAL SPINE IN PATIENTS WITH ESSENTIAL HYPERTENSION

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Objective: Installation of the prevalence of osteochondrosis in the development of essential hypertension.

Design and Method: The diagnosis of hypertension was made based on the criteria recommended by the European (2003) and Russian (2004) societies of cardiology. The presence and severity dorsopathy on the background of osteochondrosis according to generally accepted clinical and radiological criteria. From the study were excluded patients with severe and malignant hypertension, severe cardiac insufficiency, myocardial infarction or stroke in the last 3 months. Results were examined 121 patients with essential hypertension

Results: It was found that in 81 (66.9%) patients with essential hypertension, we observed changes in the spine. The authors analyzed the most frequent clinical and radiological symptoms of cervical degenerative disc disease with this combination of pathological processes. In the study of the cervical spine most commonly detected signs of uncovertebral arthrosis 9.09% (11 people), and also abnormal mobility in one or more intervertebral segments -6.6% (8 people), straightening of the lordosis, scoliosis, uneven decrease in height of intervertebral discs - 19 (15.7%), spondyloarthrosis - 27,2% (33 people). Disc protrusion C6-C7-14 people (11.5%). In most patients, it is dominated by the degree of cervical osteoarthritis by Zekera.

Conclusions: In the examined group of patients with essential hypertension in middle-aged and elderly people the frequency of concomitant dorsopathies (osteoarthritis) of the cervical spine was 66.9%, this figure indicates the possible relationship of these pathologies, and may help in the treatment of people with hypertension not amenable to medical therapy.

P135

BMD CHANGE AFTER IBANDRONATE TREATMENT IN OSTEOPENIC POSTMENOPAUSAL WOMEN

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Background: Ibandronate is effective in the treatment of postmenopausal women with osteoporosis. But there were few data about ibandronate treatment in Korea. We evaluated the effect of ibandronate therapy on bone mass and compared the effectivity on BMD in 1-year treatment group. The

aim of the study is to assess the effect of 1-year treatment with ibandronate on BMD in postmenopausal women with osteopenia or osteoporosis.

Methods: BMD was assessed in 118 postmenopausal women with osteopenia or osteoporosis from March 2007 to January 2011, 42 patients who were treated with 2.5 mg/day of ibandronate were enrolled to study. BMD of lumbar spine (L2-L4) and femur were assessed by DXA at baseline, 12 months after treatment.

Results: The annual BMD of the lumbar spine showed a 9.11% increase, while also positive changes were noted in the proximal femur as a 1.89% increase. The BMD changes were 11% (L: lumbar spine) and 1.1% (F: femur) for the T-scores <-4.0, 6.3% (L) and 0.9% (F) for the T-scores -3.0~-4.0, and 3.8% (L) and 0.5% (F) for the T-scores >-3.0, respectively.

Conclusion: This study suggests that ibandronate treatment in postmenopausal women with osteopenia or osteoporosis is effective in terms of improving BMD.

P136

THOMAS SPLINT WITH PEARSON ATTACHMENT VS. PILLOW FOR PRE-OPERATIVE PAIN CONTROLLED IN PATIENTS WITH FRACTURE OF PROXIMAL FEMUR: A RANDOMIZED CONTROLLED STUDY

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Introduction: Pre-operative pain management using skin traction in patients with proximal femoral fractures has not recommended due to lacking of its efficacy. This might be explained by inadequate immobilization. Thomas splint with Pearson attachment has been used for stabilizing in proximal femur fracture. However, there are no such studies evaluate its efficacy for pre-operative pain management.

Objective: To compare the efficacy of the Thomas splint with pillow in pre-operative pain management.

Methods: This was a randomized controlled study including sixty patients with proximal femur fracture admitted at Songklanagarind Hospital. They were randomized into two groups using block of four techniques; group I - Thomas splint and group II - Pillows. The primary outcome was the verbal numerical rating scale score (VNRS) which was assessed for pain severity by independent assessors at various time points; immediately, 15 minutes, one hour and then every 8 hours until the patients underwent the operation. Secondary outcomes included amount of pain rescue medication, operative time, blood loss and complications were recorded. Repeated measure analysis (GEE) was used to compare the primary outcome.

Results: There were sixty patients included in this study; 30 patients in each groups. Patient characteristics were not

significant different between each groups. Both Pillow and Thomas splint can effectively be used for pre-operative pain control in first 96 hours. However, morphine consumption at 72 and 96 hours were significantly higher in the Thomas splint group than pillow group. In addition, higher rate of major complication in pillow group. Because Thomas splint allowed better physical mobility which is a major comparative advantage of Thomas splint than pillow.

Discussion and Conclusion: Both Thomas splint and pillow are equally effective for pre-op operative pain control, but Thomas splint with Pearson attachment good alternative immobilization option in patients with proximal femoral fracture and can significantly reduce the risk of major immobilization-related complications than pillow.

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FALL RISK AND RELATED FACTORS IN KNEE OSTEOARTHRITIS

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Objective: To determine the fall risk in patients with knee osteoarthritis (KOA) with an objective computerized technique and to evaluate the potential risk factors for falls in these patients.

Material and Methods: Patients with KOA and controls, were included in this cross-sectional study. Gender, age, and body mass index (BMI) were recorded. Pain was evaluated with a visual analog scale (VAS). The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) was used to assess the patients and the Falls Efficacy Scale International (FES-I) was used for the evaluation of fall efficacy. Knee radiographs were recorded with the Kellgren-Lawrence grading scale. Fall risk analysis was performed by using the Tetrax Interactive Balance System, which is a computerized posturography device.

Results: One hundred patients with KOA and 30 controls were included. The age, gender, and BMI scores were similar between the groups. FES-I scores were significantly higher in the cases than in the controls ($p < 0.000$). Using a computerized system, significantly higher fall risk results ($p < 0.000$) and significantly low, moderate, and high fall risk distribution were recorded in the cases than in the controls ($p < 0.000$). Fall risk was significantly related to age, pain, and the WOMAC scores of the patients.

Conclusion: Using an objective technique, our study demonstrated a higher fall risk in patients with KOA than in healthy individuals. This higher risk was shown even in

the early radiographic phases of the disease related to age, pain, and dysfunction. An understanding of factors on postural control seems to be critical in successful fall prevention in these patients.

P138

COMPARISON OF BIOCOMPATIBILITY OF ELASTOMERIC POLYMER AND PMMA BONE CEMENT DURING CURING PHASE

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Introduction: Percutaneous vertebroplasty (PVP) usually involves percutaneous injection of polymethylmethacrylate (PMMA) cement into the vertebral bodies. PMMA cements have some limitations including aseptic loosening, high exothermic reaction and unstable viscosity. Many efforts have been made to develop better and safer biomaterials for PVP. Silicones have been used in numerous personal cares, pharmaceutical and medical device applications, including long term implants. VK100 (BONWRx) is a silicone based elastomeric polymer, and represents a promising alternative for PVP surgery. The risk of toxic methyl methacrylate (MMA) monomer release during the curing phase of PMMA polymerization has been long-term overlooked. The current conclusion that PMMA is non-toxic might be inappropriate because the results generated from standard biocompatibility tests that only employ to cured materials. The purpose of this study was to compare the cytocompatibility of VK100 and PMMA during the curing phase of polymerization.

Discussion and Conclusion: We compared the in vitro cell toxicity of silicone and PMMA cement during and after the curing phase of polymerization. We found that the cell toxicity caused by toxic MMA was considerably underestimated using cured cements (ASTM F813-07 standard). The cell toxicity mainly occurred during the curing phase of PMMA polymerization due to the accumulation of toxic MMA released. Silicone has been used in many applications because of their stability, low surface tension, and lack of toxicity. We believe that silicone, a silicone product, represents a better and safer material for PVP surgery. Data from the use of silicone in 82 PVP patients shows good clinical outcomes including ODI and VAS improvement with 1-year follow up. Our data further demonstrated that silicone is biocompatible during and after the curing phase of polymerization.

P139

ASSOCIATIONS BETWEEN PERIPHERAL AND CENTRAL SKELETAL SITES ASSESSED BY PQCT AND DXA IN A SHEEP MODEL OF OSTEOPOROSIS INDUCED BY OVARECTOMY AND GLUCOCORTICOIDS

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Objectives: To investigate the relationship between measurements obtained by peripheral quantitative computed tomography (pQCT) of the tibia and bone density assessed by dual energy X-ray absorptiometry (DXA) of the femur and lumbar spine using aged ovariectomised (OVX) sheep.

Methods: Twenty-eight merino ewes were randomly allocated into four groups: control, ovariectomised (OVX), and two OVX groups receiving glucocorticoids (400 mg, Vetacortyl[®]), one group once monthly for 5 months (OVXG 5M) and the other for 2 months followed by no treatment for 3 months (OVXG 2M). Bone mineral density (BMD) of lumbar spine and femur was measured by DXA, while total, cortical/subcortical and trabecular volumetric BMD (vBMD) of proximal tibia was measured by pQCT.

Results: At 5 months, bone mineral density was reduced by 7, 28 and 12.7% ($P < 0.001$) in the lumbar spine and by 10.6, 21.0 and 6.4% ($P < 0.05$) in the femur for the OVX, OVXG 5M, and OVXG 2M groups, respectively, when compared with controls. OVX, OVXG 5M, and OVXG 2M had lower total BMD of the proximal tibia (8.3, 27 and 13%, $p \leq 0.0001$), when compared with controls. Cortical vBMD increased by 6% in the OVX and reduced by 8.2 and 9.3% in the OVXG 5M and OVXG 2M, respectively. Trabecular vBMD of the tibia increased by 6% in the OVXG 2M and reduced by 20 and 30% ($P < 0.0001$) in the OVX and OVXG 5M, respectively. Significant correlations were found between femur and spine BMD, and tibia vBMD ($r = 0.82$ $p \leq 0.05$ and $r = 0.71$ $p \leq 0.001$, respectively). Femur and spine BMD were significantly correlated with tibial cortical/subcortical vBMD ($r = 0.5$, $p \leq 0.05$ and $r = 0.51$, $p \leq 0.05$) but not with trabecular vBMD ($r = 0.44$, $p = 0.075$ and $r = -0.36$, $p = 0.152$).

Conclusions: The data suggest that bone density of the proximal tibia measured by pQCT reflects BMD of the lumbar spine and femur, the location of clinically important fractures that occur in postmenopausal osteoporosis.

Acknowledgments: This project was funded via the bilateral agreement between New Zealand Ministry of Business, Innovation and Employment and Agency for Science, Technology and Research in Singapore.

P140**NEW ENTITY “NECROTIZING SWEET’S SYNDROME” PRESENTING AS NECROTIZING FASCIITIS WITH A GOOD RESPONSE TO IMMUNE SUPPRESSANT TREATMENT**Y.-H. Kim¹, H.-S. Kim¹, H.-R. Kim²¹The Soonchunhyang University Seoul Hospital, Seoul, Republic of Korea, ²Konkook University Hospital, Seoul, Republic of Korea

Sweet’s syndrome (SS) is characterized by fever, neutrophilia, diffuse dermal neutrophilic infiltrate without infection and painful, erythematous papules or plaques on the extremities, face, and neck. Treatment with systemic corticosteroids results in a swift and dramatic improvement in both dermatosis-related symptoms and skin lesions. Although SS and necrotizing fasciitis (NF) are different diseases, a new variant of necrotizing Sweet’s syndrome that mimics NF has been reported in immunocompromised patients.

Necrotizing SS is a new variant of neutrophilic dermatoses characterized by the rapid onset of edematous, erythematous, and warm cutaneous necrotic lesions with deep tissue neutrophilic infiltration in the absence of an infection. It can occur as the first manifestation of human immunodeficiency virus (HIV) infection, dermatomyositis, Behçet’s disease, inflammatory bowel disease, hematological malignancies, solid tumors, and medications such as GCSF. Its etiology remains unclear, but it is postulated that it can be mediated by a hypersensitivity reaction in which cytokines may be involved, followed by the infiltration of neutrophils, as in traditional SS. The main treatment for necrotizing SS is a systemic corticosteroid, similar to other types of SS. Because the clinical features of necrotizing SS and NF are similar, necrotizing SS is likely to be misdiagnosed as NF. For this reason, incorrect diagnosis can lead to a vicious cycle of mistreatment, leading to debridement, expansion of the disease, and further debridement. Therefore, early and correct diagnosis is important for managing necrotizing SS. As in our case, a precise assessment of recent infliximab treatment, prompt histopathologic evaluation from a biopsy of the necrotic lesion, and exclusion of infection are essential for a correct diagnosis. In addition, a multidisciplinary approach including clinicians, surgical teams, and pathologists could be crucial for sharing opinions about the existence of unusual neutrophilic dermatoses.

P141**EVALUATION OF A NEW 1,25(OH)₂ VITAMIN D ELISA ASSAY IN A ROUTINE LC-MS LABORATORY**N. Heureux¹¹DIAsource Immunoassays, Louvain-la-Neuve, Belgium

Objective: To evaluate a new 1,25(OH)₂ Vitamin D ELISA assay by comparison with a validated 2D ID-UPLC-MS/MS method.

Material and Methods: The ELISA assay evaluated here is a quantitative immunoassay for in vitro determination of the concentration of 1,25(OH)₂ Vitamin D in serum. It was compared against an extensively validated 2D ID-UPLC-MS/MS method[#] able to measure picomolar concentrations of both 1,25(OH)₂ Vitamin D₃ and D₂ in human serum. The comparison was performed on 80 serum samples originating from the routine testing of the VUMC laboratory (VU University Medical Center, Amsterdam, The Netherlands).

Results: A linear regression was used to establish the correlation between both methods. A slope of 0.92, an intercept of 2.6 pg/mL and a correlation coefficient R of 0.87 were obtained. The exclusion of an isolated high concentration sample provided slightly different values ($Y=0.98X - 0.6$ pg/mL, $R=0.85$).

Conclusion: The new 1,25(OH)₂ Vitamin D ELISA assay proved to be correctly calibrated as evidenced by the regression slope close to 1.0 and the little intercept value. The sample to sample correlation between both methods was acceptable for a routine use of the assay.

Reference: [#]Dirks NF et al. J Steroid Biochem Mol Biol 2015 Dec 10. pii: S0960-0760(15)30149-7.

P142**EFFECT OF BODY SURFACE, BODY SITE AND SUNSCREEN APPLICATION ON PRODUCTION OF VITAMIN D AND 25-HYDROXYVITAMIN D AFTER A SINGLE NARROWBAND UVB EXPOSURE**F. Libon¹, J. Courtois², C. Le Goff², P. Lukas², N. Fabregat-Cabello², L. Seidel³, E. Cavalier², J.-Y. Reginster⁴, A. F. Nikkels¹¹Dermatology, University of Liège, Liège, Belgium, ²Clinical Chemistry, University of Liège, CHU de Liège, Liège, Belgium, ³Bio-Statistics, University of Liège, CHU, Liège, Belgium, ⁴Public Health, Epidemiology and Health Economics, University of Liège, CHU, Liège, Belgium

Objective: To study the effect of body surface, body site and sunscreen application on production of vitamin D (cholecalciferol) and 25(OH)D (calcidiol) after nb-UVB exposure.

Methods: Four groups of 15 volunteers were exposed to a single 0,8 MED on 9% (head and hands), 23% (head, hands and arms), 50% (head, hands, arms and limbs) and 96% (total body) of the body surface. Vitamin D and 25(OH)D were measured before and at days 1, 2 and 5 post-exposure. The same procedure was repeated with a 50+ sunscreen (Figures 1 and 2).

Results: Vitamin D and calcidiol AUC values in groups 1 to 4 increased according to the body surface exposed (3,90, 7,00, 14,9 and 30,0 ng/ml, 91,9, 94,8, 107 and 126 ng/ml, respectively). Using sunscreen the values were: 0,67, 0,82, 3,62 and 2,24 ng/ml (vitamin D) and 79,8, 84,8, 98,7 and 113 ng/ml(calcidiol). Specific body part analysis revealed that head

and hands produced significantly more vitamin D compared to other body parts.

Conclusion: Vitamin D and calcidiol production increases with exposed surface, significantly reduced by sunscreens. Anatomical sites differ in their vitamin D production capacities.

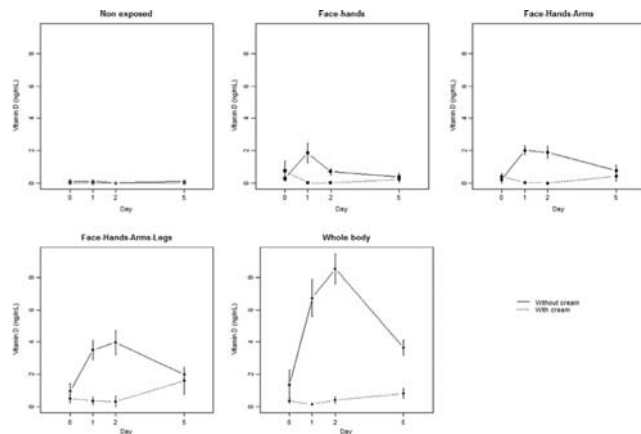


Figure 1. Mean and SD of vitamin D (ng/ml) of every study group with and without sunscreen.

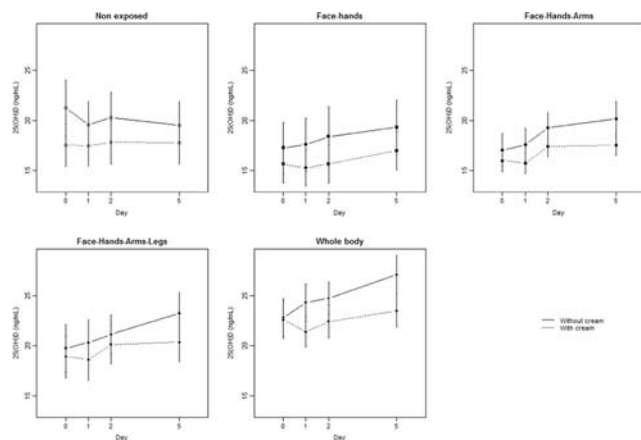


Figure 2. Mean and SD of 25(OH)D (ng/ml) of every study group with and without sunscreen.

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ORTHOPAEDIC VIRTUAL FRACTURE CLINIC: SOMETHING TO BOAST ABOUT?

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Objective: To assess whether the introduction of an orthopaedic consultant-led Virtual Fracture Clinic (VFC) will improve the adherence to the BOAST 7 guidelines which recommends

that newly diagnosed fractures in the ED are seen in fracture clinic within 72 hours.

Material and Methods: Data was audited against section 1 of the BOAST 7 guidelines, which states that “following acute traumatic orthopaedic injury, patients should be seen in a new fracture clinic within 72 hours of presentation with the injury. This includes referrals from emergency departments, minor injury units and general practice.”

Results: Initial audit revealed that 9.78% of patients from AandE met the target audit standard of 100% adherence to the BOAST 7 guidelines. The average time from diagnosis to clinic was 9.78 days. Change was implemented by means of a consultant-led VFC and new referral pathway. This allowed for screening of referrals and expedition of urgent cases. This re-audit allowed for 88% of patients to be virtually reviewed with 72 hours and 27.17% of patients to be discharged to the GP due to inappropriate referral.

Conclusion: The use of a consultant-led VFC and a clearly outlined referral pathway has resulted in a significant improvement in the adherence to the BOAST 7 guidelines and the quality of referrals to fracture clinics. This has enhanced clinical time management, prioritisation, quality of care and most importantly patient safety. It has highlighted that the use of VFC is a safe and efficient way of ensuring orthopaedics patients have appropriate follow up.

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BODY MASS INDEX, VITAMIN D DEFICIENCY AND PHYSICAL ACTIVITY IN OSTEOPOROSIS

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Introduction: Skeletal disease of bone thinning and compromised bone strength, osteoporosis, continues to be a major public health issue in the aging population. Building and maintaining bone mass requires a combination of nutrients and physical activity. Body mass index (BMI) as a predictor of fracture risk. Risk factors are numerous and there is no single cause of the disorder. Exercise prescription also includes a window of opportunity to improve bone strength.

Aim: To determine the influence of sport, BMI and vitamin D deficiency on bone mineral density in patients diagnosed with osteoporosis.

Materials and methods: The study included a group of 548 patients, 30 to 65 years of age, diagnosed with osteoporosis and osteopenia and treated at the Clinical Center University of Sarajevo, over 12 months period. The study was designed as prospective. For each patient we provided personal history and diagnostic procedure: bone mineral density (BMD) at lumbar spine and proximal femur, weight and body mass (BMI) presence as risk factors for osteoporosis, physical activity and D vitamin deficiency.

Results: Low BMD is an independent predictor of hip and spinal column risk fracture or other fractures. BMD depends on the mineral value and vitamin D deficient. Weight and body mass (BMI) associated with low bone mineral density affects the bone structure and results in bone degradation. Risk factors for the prediction of osteoporosis and fractures have been less thoroughly studied in younger patients. In patients who are still actively involved in sports activities osteoporosis occurs in only 9% of cases. However, in patients who do not participate in sports activities osteoporosis occurs in 55% of cases and in those who are moderately involved in sports activities osteoporosis occurs in 36% of cases.

Conclusion: We evaluated the association between the weight and BMI. Active sports, maintenance of body weight, varied diet, sufficient intake of vitamin D, and sun exposure can increase bone density and prevent fractures. One of the best ways to strengthen your bones and prevent osteoporosis is by getting regular exercise.

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P145

THE ADDED VALUE OF TRABECULAR BONE SCORE (TBS) TO CONVENTIONAL BONE DENSITOMETRY IN MANAGEMENT OF POSTMENOPAUSAL OSTEOPOROSIS

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Background: Osteoporosis is known as a major public health problem mostly affecting postmenopausal women and aging individuals of both sexes. Trabecular bone score as a measure of bone microarchitecture has been newly added to the osteoporotic and fracture risk assessment process. However, the evaluation of TBS and its association with fracture risk assessment in Iranian population has not been performed. Here we assessed the bone micro-architecture of postmenopausal Iranian women using TBS method and compared it to the TBS data of other regions to find out the potential differences.

We also calculated the TBS adjusted FRAX and compared it to the aBMD adjusted FRAX in order to find how TBS could affect the fracture risk assessment of our population.

Patients and Methods: In a cross-sectional study, a number of 486 postmenopausal women with osteoporosis screening indication were recruited from rheumatology clinic of two different university centers and were referred to densitometry ward in order to undergo aBMD and TBS evaluation. The simultaneous BMD and TBS were performed and TBS adjusted FRAX in addition to BMD adjusted FRAX was calculated, accordingly.

Results: In total, 174 osteoporotic, 222 osteopenic and 90 normal postmenopausal Iranian women were evaluated in this study. The mean TBS was 1.336 (± 0.113), ranging from 0.949 to 1.601. According to TBS results, 48 postmenopausal women with degraded, 204 postmenopausal women with partially degraded and 234 postmenopausal women with normal bone micro-architecture were evaluated in this study. A significant correlation was seen between L1–L4 TBS and spine L1–L4 aBMD ($r=0.508$, $P<0.001$). The correlation of TBS and femoral neck aBMD was also statistically significant ($r=0.464$, $P<0.001$). In addition, a significant negative correlation was observed between TBS and the age of study population ($r=-0.412$, $P<0.001$). In order to evaluate the effect of TBS on fragility fracture risk and to decide who may mostly benefit from pharmaceutical treatment, FRAX algorithm was calculated for osteopenic women once with and once without TBS adjustment. Since osteoporotic patients are indicated for pharmaceutical treatment regardless of their fragility fracture risk, FRAX was not calculated for this group. In addition, normal individual are not indicated for pharmaceutical treatment. As a result, FRAX was not assessed for this group either. Based on aBMD adjusted FRAX, no osteopenic woman of our cohort had major osteoporotic fracture risk of higher than 20% and pharmaceutical treatment was not indicated, accordingly. Considering hip fracture risk, 12 (2.4%) osteopenic postmenopausal women of our study showed hip fracture risk of more than 3%. Given the NOF guideline, pharmaceutical osteoporotic treatment is indicated for this group. 24% of osteoporotic patients in this study had normal TBS, which is a valuable guidance for choosing the best treatment strategy. On the other hand near half of osteopenic patients showed abnormal TBS.

Conclusion: A significant correlation was observed between TBS and aBMD values of Iranian postmenopausal women of our study. In addition, adding TBS to the FRAX algorithm and BMD results may change the therapeutic threshold in osteopenic patients, and guide the type of therapy in osteoporotic patients respectively.

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THE IMPACT OF BODY MASS INDEX ON QUALITY OF LIFE AFTER LIGAMENOTPLASTY OF THE ANTERIOR CRUCIATE LIGAMENT OF KNEE

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Introduction: Requirements which are set represent into young athletes cause injury of ligament and meniscal system of knee. In the last few years the number of reported cases of completed reconstruction of the anterior cruciate ligament of knee have doubled. Purpose: Purpose of this study is to show if there are some significant difference in quality of life between persons with different values of body mass index (BMI) after anterior cruciate ligament reconstruction.

Material and methods: The study involved 510 patients who underwent reconstruction of the anterior cruciate ligament at the Department of Orthopaedic Surgery and Traumatology, Clinical Center of Vojvodina in Novi Sad in the period from March 2013 to December 2015. It is calculated BMI for each patient account to established formula and results were presented on based indices which are set by WHO. The life quality of these patients was determined by KOOS questionnaire.

Results: Injury of anterior cruciate ligament are basically more often in men population. In our study, 413 patients were male and 97 patients were female. The age average of patients was 27 years old. The average value of BMI was 24,65 with the biggest part of normal nourished patients. It is determined low but significant difference in quality of life of patients with different values of BMI. If BMI is higher than total score of the KOOS questionnaire is lower, the words the quality of life is worse.

Conclusion: The life of persons with higher value of BMI (BMI > 24,9 kg/m²) after anterior cruciate ligament reconstruction is not as good as life of persons with normal BMI (18,5-24,9 kg/m²).

P147

IMPROVING THE QUALITY OF TRAUMA AND ORTHOPAEDIC OPERATION NOTES: IMPLEMENTING CHANGE WITH THE USE OF A PROFORMA

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Objective: To assess the adherence of orthopaedic operation notes to the Royal College of Surgeons (RCOS) guidelines and to evaluate the quality of post-operative instructions.

Material and Methods: Data was audited against the RCOS guidelines (date, patient demographics, operating surgeon(s), consultant responsible, indication for surgery, operation performed, operative findings, serial numbers of prosthetics used, closure/sutures used, intra-operative complications, post-operative complications, surgeons signature). The quality of post-operative instructions was compared to eight criteria deemed clinically important by members of the multi-disciplinary team (bloods, antibiotics, weight bearing status, length of weight bearing status, VTE prophylaxis, post-operative X-rays, removal of sutures/clips and follow up).

Results: 50% of the mandatory RCOS guidelines and 0% of the recommended post-operative instructions met the target audit standard of 100% adherence. Change was implemented through team education and the use of a new proforma incorporating all mandatory and recommended criteria. All mandatory RCOS criteria were then met with 100% adherence apart from consultant responsible (95.7%). All criteria for recommended post-operative instructions were met with 100% adherence with the exception of weight-bearing status (69.6%).

Conclusion: The use of a new and more detailed orthopaedic operation note proforma has resulted in significant improvement in adherence to the RCOS guidelines and the quality of post-operative instructions. This led to the maximisation of post-operative care patients receive from members of the multi-disciplinary team. Most importantly, this small change has had a big impact on optimising patient safety, preventing unnecessary prolonged length of stay in hospital and reducing the risk of medico-legal action to the trust.

P148

PREVALENCE OF OSTEOPOROSIS IN THE ALBANIAN POPULATION AND MAIN RISK FACTORS

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Background: Our study aims to assess the Albanian bone status and the prevention of osteoporosis. In 2010, 22 million females and 5.5 million men were evaluated to have osteoporosis in the EU; and 3.5 million new fragility fractures were maintained, including 620,000 hip fractures, 520,000 vertebral fractures, 560,000 forearm fractures and 1,800,000 other fractures. Preceding and incident fractures also reported for 1,180,000 quality-adjusted life years lost throughout 2010. The expenditures are supposed to amplify by 25% in 2025.

Methods: A total of 6954 chronological individuals of both genders were monitored, gathering medical data through the FRAX™ questionnaire, and evaluating heel bone rigidity by

quantitative ultrasonography (QUS). The 12-year hazard for hip and major osteoporotic fractures was analyzed considering individual or family history of fragility fracture, smoking, alcohol misuse, rheumatoid arthritis, extended steroids postulation. Supplementary risk factors were assessed, counting premature menopause, reduced sunlight revelation, low nutritional calcium ingestion, physical inactivity, amount of pregnancies, months of lactation, tobacco cigarettes smoked per year, precise sources of minor osteoporosis. In the course of a correlation survey, the power of every feature on the expansion of osteoporosis was examined.

Results: 16% of females undergo from osteoporosis, as observed by QUS T-score. The estimation of FRAX™ established the weight of the previously known risk aspects. The correlation survey disclosed the implication of some supplementary factors, for instance hyperthyroidism, nephrolithiasis, Crohn disease, ulcerative colitis prior to age 50.

Conclusions: The elevated prevalence of minor osteoporosis in the Albanian population obviously shows the significance of further risk features not yet incorporated in the FRAX™ algorithm, for which preventive measures should be taken into account. Screening campaigns may allocate both early diagnosis and admission to treatment.

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THE ROLE OF REHABILITATION MEDICINE IN MANAGEMENT OF PAIN AND DISABILITY IN AN ELDERLY PATIENT WITH KNEE OSTEOARTHRITIS AND COMPLICATED CO-MORBIDITIES

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Background: Pain and disability are debilitating effects of knee osteoarthritis. Guidelines in pain management focus on NSAIDs, with their use restricted by cardiovascular, gastrointestinal, and renal comorbidities. Given such comorbidities, how then do we manage pain and disability?

Objectives: To quantify and manage pain and disability by pharmacologic and non-pharmacologic means, focusing on rehabilitation and outcome measures.

Methods: The participant is a 72-year-old Filipino female with knee osteoarthritis, Kellgren-Lawrence 3, with upper gastrointestinal bleeding from chronic NSAID use, chronic kidney disease from diabetic nephropathy, and diabetes mellitus. Intervention occurred for 3 weeks: weak opioids (tramadol/paracetamol) in the first week, adding physical therapy (superficial heat, transcutaneous electrical nerve stimulation, and phonophoresis with indomethacin on both knees) in the second week, and maximizing rehabilitation (joint mobilization; stretching, strengthening, and

balance exercises; functional training; joint conservation techniques in occupational therapy; biomechanical interventions such as using a quad cane and lateral insole wedges) in the third week.

Results: Pain was quantified using the visual analog scale. Pain pre-intervention and after pharmacologic management in the first week was 10/10, decreasing to 6/10 in the second week with rehabilitation using modalities, further going down to 4/10 in the third week with maximal rehabilitation. Disability was quantified using the Knee Injury and Osteoarthritis Outcome Score, with improvement in all 5 domains post-intervention: pain, other symptoms, disability in activities of daily living, disability in sports and recreation, and quality of life. Outcome measures also included OARSI-recommended performance-based tests: 30-second chair stand test (pre-intervention:6.5 repetitions, post-intervention:13 repetitions), 40-meter fast-paced walk test (pre-intervention:30 seconds, post-intervention:26 seconds), stair-climb test (pre-intervention:28.76 seconds, post-intervention:25 seconds), timed up and go test (pre-intervention:14.91 seconds, post-intervention:10.44 seconds), and 6-minute walk test (pre-intervention:430 meters, post-intervention:475 meters). Qualitatively, before intervention, pain led her to stop working as a seamstress and confined her at home, leading to feelings of isolation and loneliness. Post-intervention, she resumed work, started going out again, and reported feeling less lonely.

Conclusions: In this elderly patient, the challenge was to manage pain and disability beyond traditional NSAID use. Rehabilitation medicine improved her quality of life.

P150

BONE MARROW LESION IN ADVANCED OSTEOARTHRITIS OF THE KNEES. CORRELATION STUDY BETWEEN HISTOPATHOLOGICAL FINDINGS AND STRUCTURAL DAMAGE.

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Purpose: To correlate histopathology of a bone marrow lesion (BML) pattern with severity and structural damage in osteoarthritic knees.

Materials and Methods: Twenty consecutive patients (age range, 59–66 years; mean, 65 years) referred for total knee replacements were examined with sagittal short inversion time inversion-recovery (STIR) and T1- and T2-weighted MRI one week prior to surgery before surgery. Different structural abnormalities on MRI were compared with those on histologic maps.

Results: The histopathology of BML in cases of OA revealed that (6) biopsies of cases showing bone marrow

fibrosis (30%), (4) of them grade 1 (20%) and (2) of them grade 2 (10%).

(18) biopsies showing cyst (90%), (9) biopsies showing abnormal trabeculae (45%), (2) of them with grade 1 (10%), (4) of them grade 2 (20%) and (3) of them grade 3 (15%). (5) Biopsies showing lymphocyte (25%), (40%) of them had ++CD3, while (60%) of them had ++CD20. (5) Biopsies showing fatty marrow (25%), (9) biopsies showing haemosiderotic marrow (45%), (6) biopsies showing blood vessels (30%), (5) of them with grade 2 (25%) and (1) with grade 3 (5%). The MRI findings of OA patients had been revealed that there was (6) patients with BML of grade 1 (30%), (10) patients of grade 2 (50%) and (4) patients of grade 3 (20%).

Conclusion:

- BML has a strong correlation with radiographic severity measurements of osteoarthritis of the knee and pain.
- In patients with knee osteoarthritis, BML in bone underneath cartilage markedly increase risk for structural progression in the knee.
- Hyperemia and hematopoietic marrow were possible reasons for appearance of BML as high signal-intensity on STIR images.
- BMLs are a cornerstone in progression of osteoarthritis.

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DETECTION OF SERUM LEVEL CHANGES OF MATRIX METALLOPROTEINASE-13 AND INTERLEUKIN-1 BETA DURING REMISSION AND FLARE-UPS OF PRIMARY OSTEOARTHRITIS OF THE KNEES

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Introduction: The diagnosis of osteoarthritis is currently based on radiographic criteria (e.g., joint space width) and clinical symptoms (e.g., pain and loss of function). The evaluation of new disease-modifying osteoarthritis drugs (DMOADs) is performed on the same basis, since the regulatory bodies currently require evidence for an impact on radiographic joint space narrowing (JSN) and an impact on symptoms. However, the limitations of radiography have led to research into alternative parameters for monitoring osteoarthritis that could serve as biomarkers in drug development.

Aim: To detect the serum level of MMP-13 and IL-1 β in OA of the knee during remission and exacerbation and if these biomarkers can be validated as gold biomarkers in assessing OA progression and drug development in OA.

Methods: This study was performed on 60 patients with knee OA, 18 males (30%) and 42 females (70%), all diagnosed as osteoarthritis of one or both knees. Their ages ranged from (40

-65) years. The duration of their disease ranged from one to 15 years. The control groups were 8 males (32%) and 17 females (68%). Their ages ranged from (40-65) years. We excluded: 1. Significant conditions of the spine, hips, or feet that affect the ability to walk. 2. Significant medical conditions that affect the ability to walk and function. 3. Inflammatory arthritis, such as rheumatoid or gouty arthritis. 4. Degenerative arthritis secondary to other conditions, such as hemochromatosis, Wilson's disease, or ochronosis. 5. Current significant soft tissue rheumatism such as fibromyalgia, or trochanteric bursitis. 6. Significant trauma and surgery (including arthroscopy) or intra-articular corticosteroid injection to the index knee within 6 months of enrollment. The patients were allowed to continue on the medications that they have proinflammatory cytokines (IL-1 β) and degradative enzymes (MMP-13) are measured

Results: Patients who had 3 flare-ups showed the statistically significantly highest mean IL-1 β and MMP-13 level. There was no statistically significant difference between patients with no flare-up, 1 flare-up and 2 flare-ups; all showed statistically significantly lower mean levels. Control group showed the statistically significantly lowest mean IL-1 β level. There was a statistically significant positive (direct) correlation between IL-1 β , disease duration, KL, VAS, stiffness score, pain score, functional score, WOMAC and KOFUS. An increase in all these variables is associated with an increase in IL-1 β and MMP-13.

Conclusion: There is a potential role for IL-1 β and MMP-13 biomarkers in assessing the development in osteoarthritis. IL-1 β and MMP-13 were founded to be correlated positively in patients with knee OA this correlation sounded right as the expression of MMP-13 depends on the level of IL-1 β . Although all medications groups failed to lower the level of IL-1 β and MMP-13, yet there was a numerical difference in favor of diacerein and NSAID. Patients on both diacerein and NSAID had the lowest rate of flare ups. It is recommended that the early measurement of biomarkers may detect cases to progress and thus stronger treatment may be given for these groups.

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CHARACTERIZATION OF MOLECULAR PROFILE OF SARCOPENIA IN OSTEOPOROTIC AND OSTEOARTHRITIC PATIENTS

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Background: Sarcopenia has emerged as an important risk factor for osteoporosis. Indeed, it might decrease bone

strength by reducing mechanical loading to the skeleton. Reduction of mechanical stimulation could result from decreased maximal force that weaker muscles produce and/or less time that the skeleton is loaded due to relative immobility, and thus bone formation is reduced. Aim of this study is to identify the possible molecular pathways involved in pathogenesis of sarcopenia. In particular, we performed morphological and immunohistochemical studies to investigate the expression of BMP2, BMP4, BMP7, Myostatin and vitamin D receptor (VDR) and their relationship with the activity of muscle CD44 + stem cells.

Methods: We obtained muscle biopsies from 30 female patients underwent total hip arthroplasty for osteoarthritis (OA) (mean age 71.6±10.3) and 30 age matched female patients with osteoporotic fragility fracture of the femoral neck (OP). Thanks to immunohistochemistry, transmission electron microscopy and immunogold labeling we investigated the role of BMP-2/4/7, VDR, myostatin and CD44+ satellite muscle cells.

Results: Morphometric investigations allowed us to demonstrate the delay in the onset of Sarcopenia in OA patients. As concern immunohistochemistry, we found that BMPs and nuclear VDR were more expressed in OA patients than OP ones. In OA patients muscle loss rate was replaced by adipose tissue (18.32%), in OP muscle atrophic fibers were substituted by adipose (8.27%) and connective tissue (6.68%). The morphometric analysis in OA patients showed 38.00% of atrophic fibers (17.90% type I and 20.10% type II). In OP group, we observed more than 50.00% of atrophic fibers with prevalence of type II fibers (21.10% type I and 39.20% type II). Moreover we found that OA muscle biopsies there were a significantly higher number of BMP-2-positive fibers (62.79±6.205) as compared with muscle of OP patients (13.92±3.343). Finally, results showed a significantly different rate of CD44+ cells in OA as compared with OP. Noteworthy, our data showed an age dependent decrease of nuclear expression of VDR in OP patients but not in OA. As concern myostatin, we note a strongly association between their expression and degenerative phenomena observed in biopsies of OP patients.

Conclusion: The identification of the molecular profile of sarcopenia can provide the rational for new therapies. In particular, our data allowed us to propose the use of human recombinant BMPs, VIT. D3 supplementation and the anti-myostatin molecules as drugs capable to prevent or treat sarcopenia of OP patients.

P153

E SURVEY OF PREVALENCE OF OSTEOPOROSIS IN ALZHEIMER'S DISEASE PATIENTS

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Objectives: To evaluate the prevalence of osteoporosis in the Alzheimer's disease patients.

Methods: 128 patients with Alzheimer's disease were included in this study. The patients were diagnosed with Alzheimer's disease using Korean-Mini Mental Status Examination (K-MMSE) and checked bone mineral density using single-energy (SE) quantitative computed tomography (QCT) in 2010. To define abnormality in terms of QCT of the spine, a bone mineral density (BMD) spine below 80 mg/cm³ is indicative of osteoporosis and BMD between 80 and 120 mg/cm³ is indicative osteopenia.

Results: The prevalence of osteoporosis in the control group is 29.73%. The prevalence of osteoporosis in the Alzheimer's disease patients is 96.87%. The prevalence of osteopenia in the Alzheimer's disease patients is 3.12%. The prevalence of severe osteoporosis fracture in the Alzheimer's disease patients is 32.03%.

Conclusion: The prevalence of osteoporosis in Alzheimer's disease patients is higher than in the control group.

P154

SOME PATHOPHYSIOLOGICAL ASPECTS OF PAIN SYNDROME IN OSTEOARTHRITIS

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The influence of inflammatory cytokines on cartilage and subchondral bone is considered to be important in the pathogenesis of OA. Nicotinamide phosphoribosyltransferase (Nampt) is one of the newly identified proinflammatory factors [1]. It is known that Nampt is also a potential target for the nerve growth factor (NGF), which may influence on pain severity.

Objective: To study the relationship between dynamics of pain and Nampt's level in patients with OA.

Materials and methods: We studied 80 patients with primary OA in accordance with the ACR criteria. To assess the level of pain in patients OA we used functional WOMAC index and visual analogue scale (VAS). Hypocaloric diet and a health-promoting physical activity were recommended for all patients for weight loss. Only 18 patients (23%) were able to reduce body weight by 5 kg or more for 3 months.

Results: To study the effect of weight loss on the clinical manifestations of OA, patients were divided into two groups. The first group achieved weight loss by 5 kg or more (18

persons). The second group was formed of patients who had body mass reduction less than 5 kg and patients without weight loss (62 persons). We noted that body weight reduction more than 5 kg led to significant reduction in severity of OA's clinical manifestations (decreasing of pain level (VAS) at rest and during walking, total WOMAC score), and normalization of laboratory markers (high-sensitivity C-reactive protein).

Conclusion: In our study we revealed relationship between decreasing body weight, Nampt level and severity of the pain syndrome in OA. These data indirectly confirms the hypothesis that Nampt may influence on NGF-dependent pain in OA.

Reference: 1. Polyakova Y et al. *Osteoporos Int* 2016; 27(Supp.1):82.

P155

NICOTINAMIDE PHOSPHORIBOSYLTRANSFERASE AS FACTORS PREDISPOSING TO OSTEOARTHRITIS AND METABOLIC SYNDROME PROGRESSION

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Objective: To study the effect of reducing body weight more than 5 kg on the clinical manifestations of OA, markers of carbohydrate, lipid metabolism and nicotinamide phosphoribosyltransferase (visfatin) serum levels in patients with OA.

Materials and methods: We observed 110 people: 80 patients with OA and 30 healthy individuals (control group) with body mass index (BMI) of 25 to 35 kg/m², aged 18 to 79 years. Visfatin level in serum was determined by indirect solid phase ELISA test (RaiBiotech, cat № EIA - VIS -1).

Results: Hypocaloric diet low in animal fats and a health-promoting physical activity was recommended for all patients. The first group consisted of patients who were able to reduce body weight by 5 kg or more (18 pers.). The second group was formed of patients having reduced weight by less than 5 kg and patients who did not reduce body weight (62 pers.). We revealed statistically significant decreasing of visfatin concentration in 1st group (4,33±0,39 before treatment and 2,40±0,23 ng/ml after treatment). The dynamics of visfatin in 2nd group was not statistically significant. In the 1st group we noted reduction in the severity of clinical manifestation, visfatin, glucose, lipid profile, C-reactive protein (CRP) levels. Weight loss also led to the normalization of metabolic disorders. In 2nd group we observed tendency to normalization of all parameters, but significant difference was only found for CRP, severity of pain at rest and during walking according to VAS scale and WOMAC total score.

Conclusion: OA patients with weight loss of more than 5 kg had more obvious pain relief, significant improvement of

carbohydrate and lipid metabolism than patients in control group. These data indirectly indicate that obesity may be an important risk factor for OA progression. We also hypothesize that visfatin may be an important factor of OA progression.

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MANDIBULAR ALVEOLAR BONE CHANGES: EFFECTIVE OSTEOPOROTIC FRACTURE RISK PREDICTOR

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Introduction: Osteoporosis is closely related to fragile fracture and consequently excess mortality rate more than 20% in the first year of fracture. Early prediction of osteoporotic fracture risk can prevent this devastating consequence. This prospective study showed that Postmenopausal osteoporotic women having sparse mandibular trabecular pattern, low mandibular alveolar bone mass with dental radiography had statistically significant lower trabecular bone score (TBS) which is predictive of future osteoporotic fracture.

Purpose: The purpose of the study was to explore the possibility of using mandibular trabecular pattern and mandibular alveolar bone mass on dental radiograph to identify fracture risk in postmenopausal osteoporosis.

Methods: 90 Postmenopausal women were included in this study with the complaint of osteoporosis like symptoms. Patient with suspected conditions affecting bone mineralisation and edentates were excluded from this study. All patient were evaluated by dual energy X-ray absorptiometry (DXA) for bone mineral density (BMD), TBS using TBS insight free software for GE-Prodigy advance BMD machine and digital dental radiographs for mandibular trabecular pattern and mandibular alveolar bone mass (MABM). All patients were divided into three groups according to mandibular trabecular pattern as group A (Sparse), group B (alternative Sparse and Dense) and group C (Dense).

Results: The results showed that TBS was lower in group A (1.273±0.108) than group B (1.296±0.103) and group C (1.301±0.09). MABM was also lower in group A (74.94±21.93) than group B (92.32±15.23) and group C (93.09±18.03) those was statistically significant (p<0.05).

Conclusion: Mandibular trabecular pattern and MABM on dental radiograph is significantly effective as TBS and BMD for prediction of osteoporosis and fracture risk.

P157**EFFECTS OF PULSED ELECTROMAGNETIC AND STATIC MAGNETIC FIELDS ON MUSCULOSKELETAL LOW BACK PAIN: A SYSTEMATIC REVIEW APPROACH**M. Javaherian¹, S. Bashardoust Tajali¹, M. Hadizadeh¹¹Physiotherapy Department at Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran

Objective: This systematic review was conducted to evaluate effects of pulsed electromagnetic (PEMF) and static magnetic fields (SMG) on pain and functional improvement in patients with musculoskeletal low back pain (LBP).

Methods: Seven electronic databases were searched systematically by two independent researchers to identify the published randomized controlled trials (RCTs) on the efficacy of pulsed electromagnetic, static magnetic, and therapeutic nuclear magnetic fields. The identified databases for systematic search were Ovid Medline[®], Ovid Cochrane RCTs and Reviews, PubMed, Web of Science, Cochrane Library (from 1968 to December 2015), CINAHL, and EMBASE (from 1968 to February 2016). The appropriate keywords were selected through Mesh Scopus. All references of the selected studies were searched to identify second hand relevant manuscripts. All human published RCTs in English would be included to the study if they reported changes on pain and/or functional disability following application of magnetic fields on musculoskeletal low back pain. All studies with surgical approaches, patients with pelvic pain, and combination of other treatment techniques (such as acupuncture or diathermy) were excluded from the systematic review. The identified studies were critically appraised and the data were extracted independently by two raters (M.J and S.B.T). Probable disagreements were resolved through discussion between raters.

Results: In total, 1505 abstracts were found through initial search of the international databases. The abstracts were reviewed to identify appropriate relevant manuscripts. Seventeen potentially relevant studies were retrieved as full-text of which 1448 were excluded based on inclusion/exclusion criteria. Ten selected articles were categorized into three subgroups: PEMF (6 articles), SMF (3 articles), and therapeutic nuclear magnetic fields (tNMF) (1 article). Since one study evaluated tNMF, we had to exclude it. In the PEMF group, one study of acute LBP did not show significant positive results and majority of relevant studies were in favour of the PEMF effectiveness on chronic low back pain (CLBP) indicated that magnetic fields might relief pain level and improve function in patients with CLBP. Among all relevant studies, only one article did not report significant differences between treatment and control groups. In the SMF group, two articles reported near significant pain reduction without any functional improvement

Conclusion: The PEMFs with a strength of 5 to 150 G (or 0.1 to 0.3 G) and frequency of 5 to 64 Hz with sweep current of 7 to 7KHz may be an effective modality to relief pain and improve function in patients with chronic low back pain. There is no sufficient evidences to confirm this effectiveness in acute low back pain. To achieve appropriate effectiveness, it is suggested to perform this treatment modality at least 20 minutes per day for 9 sessions. The SMFs have not been reported to be substantially effective in decreasing pain or improving function following chronic musculoskeletal low back pain. More RCTs are necessary to achieve much effective characteristics for these modalities.

P158**AN AUDIT ON THE INVESTIGATION AND MANAGEMENT OF MALE OSTEOPOROSIS IN MALTA**M. Rogers¹, J. S. Gauci², J. M. Gauci², M. Azzopardi², A. Borg¹¹Rheumatology, Mater Dei Hospital, Msida, Malta,²Medicine, Mater Dei Hospital, Msida, Malta

Objectives: Osteoporosis is becoming increasingly recognized as an important health problem in men, with one in four men over the age of 50 years developing at least one osteoporosis-related fracture¹. The primary aim of our audit was to evaluate whether male patients with a low bone mineral density (BMD) are being investigated and managed in concordance with the Endocrine Society Guidelines². We also assessed whether BMD scans are being requested according to guidelines.

Materials and Methods: All consecutive male patients who had a BMD measurement between over a period of four months at Mater Dei Hospital were included. Information on patient demographics, indication for BMD assessment and investigations were obtained from patients' medical notes and iSoft Clinical Manager[®].

Results: A total of 115 patients had a BMD scan performed during the study period. Mean age was 56.6 years (SD±14.6). BMD assessment was indicated in 54.8% (n=63) of patients [age >70 years or age >50 years with presence of one risk factor]. 56 patients had their BMD scan result recorded in their notes. Of these, 33.9% had osteoporosis (n=19) and 42.9% osteopenia (n=24). Twenty-one (48.8%) of these patients were referred for BMD assessment by a rheumatologist. From the cohort of patients with low BMD, 25.6% (n=11) had Vitamin D levels checked [mean 28 ng/ml], 41.9% (n=18) had testosterone levels checked [mean 10.3 nmol/L] (14% and 20.9% requested by rheumatologists respectively). All patients had renal, calcium, phosphate and liver function tests; none had 24-hour urinary calcium levels checked. 81.4% (n=35) were prescribed calcium and 79.1% (n=34) Vitamin D supplements. 63.1% of patients with osteoporosis were on treatment

[bisphosphonates (n=11) or denosumab (n=1)]. Advice on weight-bearing exercise was documented in 20.9% (n=9). Smoking cessation advice was documented in 10.3% of smoking patients.

Conclusions: A significant proportion of BMD assessments are not being requested according to guidelines and investigation for secondary causes of low BMD in men is often incomplete. Increased awareness of guidelines is required to optimise patient management to reduce fracture risk thus avoiding potential complications leading to significant morbidity, mortality and increased healthcare costs.

References:

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P159

FRACTURES IN INDIGENOUS COMPARED TO NON-INDIGENOUS POPULATIONS: A SYSTEMATIC REVIEW OF RATES AND AETIOLOGY

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Objectives: Compared to non-indigenous persons, indigenous persons experience disproportionately greater morbidity, and a reduced life expectancy; however, conflicting data exist regarding whether a higher risk of fracture is experienced by indigenous compared to non-indigenous persons. We systematically evaluated evidence for whether differences in fracture rates exist between indigenous and non-indigenous populations of any age, and to identify risk factors that might explain potential differences.

Methods: In August 2016 we conducted an e-search of PubMed, OVID, MEDLINE, CINAHL, and EMBASE. Using the World Health Organization reference population as standard, hip fracture incidence rates were re-standardized for comparability between countries.

Results: Our search yielded 3,227 articles; 27 articles were eligible for review. Differences in hip fracture rates appeared to be continent-specific; lower rates were observed for indigenous persons in all countries except for Canada and Australia where the opposite was seen. Indigenous persons had higher rates of trauma-related fractures; the highest were observed in Australia where jaw fracture was 22-times greater for indigenous compared to non-indigenous women. After adjustment for confounders, indigenous compared to non-indigenous persons had a three-fold greater risk of osteoporotic fracture and five-fold greater risk of craniofacial fracture; diabetes, substance abuse, comorbidity, income, locality, and fracture history independently increased fracture risk.

Conclusions: The paucity of data, and apparent continent-specific differences, suggest an imperative to further investigate indigenous status and fracture epidemiology and aetiology. Our findings also have implications for communities, governments and healthcare professionals to enhance the prevention of trauma-related fractures in indigenous persons, and an increased focus on modifiable lifestyle behaviours to prevent osteoporotic fractures in all populations.

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UTILITY AND PITFALLS OF THE FRAX[®] TOOL RESULTS IN BRAZILIAN ELDERLY POPULATION

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Background: The Fracture Risk Assessment Tool (FRAX[®]) was introduced by the World Health Organization (WHO) to estimate the 10-year probability of osteoporotic fractures in untreated patients with osteopenia. This tool is validated for Brazilian population since 2013 but the applicability in this developing country has not been confirmed.

Objectives: To compare the indication for pharmacological treatment in a Brazilian elderly population considering the results of FRAX with bone mineral density (FRAX/BMD), FRAX without BMD (FRAX) and of BMD classification according to the WHO.

Methods: The study population consisted of patients over 60 years of age from primary care units who had clinical indication for BMD assessment. BMD was undertaken at lumbar spine and femur by dual-energy X-ray absorptiometry (DXA) Hologic Discovery W system and BMD results were classified according to the WHO criteria. Clinical data was obtained from patient records (secondary osteoporosis, smoking, alcohol consumption, use of

glucocorticoids, rheumatoid arthritis, family history of hip fracture, and previous history of fracture) and the 10-year probability of hip and major fractures was calculated using FRAX. Receiving operator curve (ROC) analysis, model calibration and decision curve analysis were used to compare fracture prediction in FRAX® and FRAX/BMD groups.

Results: 1,000 subjects were included, mean age 76.4 years, 755 (75.5%) women. Osteoporosis, osteopenia and normal BMD were found in 439 (43.9%), 426 (42.6%) e 135 (13.5%) patients, respectively. One hundred and nine (10.9%) patients have already suffered a fragility fracture and 40 of those individuals presented with normal BMD or osteopenia. In 366 (36.6%) patients it was not possible to calculate FRAX score due to inability of recollection. The application of FRAX tool would lead to the indication of treatment for 40% of the osteopenic patients and for 62.4% of the osteoporotic patients. Correlations between FRAX and FRAX/BMD were positive and statistically significant for both the 10-year probability of hip fracture and major fracture (0.704 and 0.594, respectively, $p < 0.001$). ROC curve analysis showed that the FRAX/BMD was superior in identifying patients at risk of hip (Figure 1) and major fractures.

Conclusion: Despite the easy access and simplicity of FRAX it is not possible to disregard DXA, especially for patients with risk factor for fragility fractures.

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THE EFFECT OF GRAFT ORIENTATION IN THE ARTHROSCOPIC OSTEOCHONDRAL AUTOTRANSPLANTATION

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Purpose: To introduce the clinical results of arthroscopic osteochondral autotransplantation are greatly affected by surgical technique and graft orientation.

Methods: 76 arthroscopic osteochondral auto transplantations were practiced. The Lysholm knee score and NRS scale was recorded initially and 3, 6 and 12 months after the surgery. Follow up knee MR were done on 30 patients. The radiologic parameter, alpha angle and beta angle was analyzed in the group.

Result: The mean Lysholm knee score improved from 64.43 to 91.1. The Pearson coefficient of the clinical results of patients with alpha angle and beta angle was -0.548, -0.792, respectively. P-value was 0.002, 0.0001 respectively.

Conclusion: The surgical technique and graft orientation in the arthroscopic osteochondral autotransplantation is important parameter affecting clinical results of patients. Beta angle was stronger parameter to predict the clinical results.

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TRENDS IN POST-OSTEOPOROTIC HIP FRACTURE CARE FROM 2010 TO 2014 IN A PRIVATE HOSPITAL IN MALAYSIA

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Aim: To look at the treatment of patients after a low trauma hip fracture and to study the trends between 2010 to 2014.

Materials and Methods: The hospital admissions database was searched for all patients over the age of 50 years who were admitted with a hip fracture. Hip fractures due to accidents or hip replacements for arthritis were excluded. Data was analysed using IBM SPSS version 22 for Windows.

Results: 370 patients over the age of 50 years were admitted with a hip fracture, of which 257 (69.5%) were low trauma, presumed osteoporotic, hip fractures. The median age was 79.0 years (IQR=12.0). 75.1% were female and 77.4% of Chinese ethnicity. 93/257 (36.2%) received treatment after their hip fracture, but out of these, 22/93 (23.7%) were on calcium/vitamin D only. The median duration of patients' treatment was one month (IQR=2.5). The percentage of patients treated following a hip fracture from 2010 to 2014 were 52.5%, 31%, 34%, 29.5% and 30.2% respectively. Significantly more patients were treated in 2010 compared to the other years, but there was no difference in the number of patients treated in the years 2011-2014.

Conclusions: The number of patients being treated after an osteoporotic hip fracture in Malaysia remains low with only 36.2% given treatment; of those, only 76.3% received active osteoporosis medication. There was a reduction in patients getting treated from 2011-2014 compared to 2010 which is disappointing. Once on medication, the median duration of treatment was only 1 month.

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OSTEOPOROSIS IN A PATIENT WITH SPINAL CORD INJURY: CHALLENGES IN THE THERAPEUTIC APPROACH

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Objective: Osteoporosis is a frequent complication after spinal cord injury, with a cumulative risk of 6.17 times superior to the normal population. The loss of bone mass begins early, and is of approximately 1% of bone mineral density (BMD)/week in the first months after lesion. The complications associated with osteoporosis in this population are potentially severe and the therapeutics available present little success. We report a clinical case of osteoporosis in a spinal cord injury patient and therapeutic challenge.

Material and Methods: Clinical case report - 38 year-old male patient, with C4 AIS A spinal cord lesion due to neuroborreliosis, with 11 years of evolution. When the lesion occurred supplementation with vitamin D and calcium, associated with a bisphosphonate (pamidronate) was started and maintained (pamidronate for 5 years). In January 2015 the patient began complaints of lumbar discomfort with mobilizations. A lumbar CT revealed diffuse and accentuated signals of osteoporosis with lumbar fractures between L1 and L4 vertebrae. The metabolic study presented normal values of ionized calcium, beta-crosslaps, osteocalcin, parathormone (PTH) and vitamin D. Treatment with teriparatide was initiated in January 2015. Eight months after, a CT reevaluation showed slight worsening of the osteoporotic fractures, with sinking of the vertebral platforms from L1-L5. A discrete rise of bone reabsorption markers, with normal PTH was also seen.

Results: The antiosteoporotic therapies in spinal cord lesion show accentuated therapeutic limitation both concerning bone formation and eviction of progression of the disease. In this clinical case we show that despite the use of a bisphosphonate and posterior introduction of teriparatide we could not improve the bone mass, with tomographic worsening of the lesions and rising of the bone reabsorption markers.

Conclusions: The osteoporosis in the medular lesion is associated with diverse factors: immobilization, osteoanabolic effect of the loss of sensorial and sympathetic innervation, lowering of anabolic factors and paracrine influence of local amyotrophy. Bisphosphonates seem to diminish the loss of BMD but do not lead to new bone formation, and teriparatide, thought less studied, does not seem to relate to BMD increase. New experimental drugs are currently in research, but the pharmacologic approach stills limited.

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INCREASED OSTEOCLASTOGENESIS IN PATIENTS EXPERIENCING VERTEBRAL FRACTURES FOLLOWING DENOSUMAB DISCONTINUATION

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Purpose: To investigate clinical and biochemical characteristics of patients with vertebral fractures following denosumab discontinuation.

Methods: Detail history and serum samples were obtained from postmenopausal women who: a) sustained vertebral fractures following denosumab discontinuation (Dmab/Fx+, n=5); b) sustained vertebral fractures while treatment-naïve (Fx+, n=5); c) sustained no fractures 18-20 months off-denosumab (Dmab/Fx-, n=5). Serum measurements included: i) procollagen type 1 N-terminal propeptide (P1NP), C-terminal cross-linking telopeptide of type 1 collagen (CTX), osteoprotegerin (OPG), soluble receptor activator of nuclear factor kappa B (NF-κB) ligand (sRANKL) and sclerostin levels; ii) circulating microRNAs (miRs) that regulate osteoclastogenesis through modulation of expression of the receptor activator of NF-κB (RANK), RANKL, and cathepsin K (CTSK) and tartrate-resistant acid phosphatase (TRAP) (namely miR-503, miR-21-2 and miR-222-2, respectively); iii) serum gene expression of RANK, CTSK, TRAP, OPG and RANKL.

Results: Compared to Fx+, Dmab/Fx+ women had higher lumbar spine BMD values (p=0.019), P1NP (p=0.036) and CTx (p=0.123) levels, decreased miR-503 (p=0.044) and miR-222-2 (p=0.038) expression, and higher RANK (13-fold increase, p<0.05) and CTSK (2.6-fold increase, p<0.05) mRNA expression. Compared to Dmab/Fx-, Dmab/Fx+ women had similar BMD values and higher CTx levels (p=0.015). Compared to Fx+, Dmab/Fx- women had changes in miRs and mRNA levels in the same direction with Dmab/Fx+ women but considerably smaller and nonsignificant.

Conclusions: Bone fragility in women with clinical vertebral fractures after stopping denosumab therapy is pathophysiologically different from that of treatment-naïve women with osteoporosis and clinical vertebral fractures and is associated with upregulation of osteoclastogenesis. The small number of women with this rare event studied is a limitation.

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BONE LOSS AND MUSCLE WASTING INDUCED BY BOTULINUM TOXIN (BTX) IN MICE CAN BE

IMAGED AND QUANTIFIED BY MICROCOMPUTED TOMOGRAPHY (MICROCT)

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Objectives: Muscle and bone masses are highly correlated, muscular activity is responsible of the loading regimen of each bone. Immobilization induces a severe sarcopenia associated with a marked bone loss. Sarcopenia induced by BTX has been poorly investigated while bone loss is better acknowledged.

Material and methods: Twenty-one female mice were spread into 7 groups. At day-0, 18 mice received a BTX injection in the right quadriceps to induce paralysis; the left contralateral side was used as control. Mice were sacrificed at 7, 14, 21, 28, 56 and 90 days post-BTX (3 mice per group). The day-56 and day-90 periods correspond to the recovery of disuse because of reversible effect of BTX. The remaining group was not injected and sacrificed at day-0. Bones of both hindlimbs were imaged by microCT; morphometric analysis was done on the femur and tibia (bone volume). The same hindlimb were immersed in a contrast agent solution containing Hg. This heavy metal strongly binds to myoblasts. Three parameters were calculated for the gastrocnemius and quadriceps femoris: area (mm²) occupied by each muscle in 2D section, circularity and aspect ratio (form factors). Then, the muscles were carefully dissected and weighed on a precision scale.

Results: Bone volumes were significantly reduced on the paralyzed side after day-21 ($p=0.02$) and recovery was observed after day-90. Area of both muscles was significantly lower in the paralyzed limb from day-7 ($p=0.03$); the decrease was maximum at day-21 (-46.9%, $p=0.001$) for the gastrocnemius and day-28 (-47.9%, $p=0.001$) for the quadriceps. No difference in geometric form factors was found between the paralyzed and non-paralyzed limb confirming a global atrophy of the muscles. Similar results were obtained with the anatomical method which identified weight loss. Significant correlations were obtained between the area (microCT) and weight for the gastrocnemius and quadriceps muscle ($r=0.782$, $p < 0.001$). Recovery of the muscles was complete at day-90.

Conclusion: The use of specific contrast agents as “stains” for microCT opens new perspectives to better understand muscular and skeletal relationships. The present study illustrates the relationships between evolution of bone and muscle mass during the onset and recovery of sarcopenia and bone wasting.

P166

A NON-INVASIVE METHOD TO ANALYZE LAMIN A EXPRESSION IN CIRCULATING OSTEOPROGENITOR (COP) CELLS AS A BIOMARKER FOR MUSCULOSKELETAL DISEASE

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Background: Circulating osteoprogenitor (COP) cells are considered a surrogate of the stem cell population in muscle and bone. Low levels of COP cells are associated with frailty and disability (Gunawardene et al. J Gerontol A Biol Sci Med Sci. 2015). Lamin A, a protein of the inner nuclear membrane, plays vital role in stem cell survival, replication, and differentiation. Lamin A deficiency affects osteoblast differentiation and muscle mass and has been associated with osteosarcopenia (Tong et al, Mech Ageing Dev. 2011). Therefore, we hypothesized that quantification of lamin A in stem cells could be used as a more robust biomarker for musculoskeletal diseases, and also as a predictor of frailty and disability in older persons. However, a non-invasive method to quantify lamin A expression in stem cells was still required. Considering that COP cells are a non-invasive source of stem cells, in this study, we aimed to develop and validate a flow-cytometric protocol to quantify lamin A expression in COP cells.

Methods: A random sample of community-dwelling individuals aged 65 and older enrolled in the Nepean Osteoporosis and Frailty (NOF) Study (mean age 82.8; N=77; 70% female; 27 fit, 23 pre-frail and 27 frail). COP cells were identified by flow cytometry using selective gating of CD45/OCN+ cells. Lamin A was quantified in COP cells using percentage of lamin A/C+ COP cells and also Mean Fluorescence Intensity (MFI) for lamin A in COP cells. Logistic regression models estimated the relationship between the percentage of lamin A-expressing COP cells and prevalent disability and frailty.

Results: percentage of lamin A-expressing COP cells is decreased with age. Low lamin A expression in COP cells is also associated with disability. Both Barthel (activities of daily living) and OARS (instrumental activities of daily living) scales decreased with lamin A values ($p < 0.004$, $p < 0.01$ respectively). Lamin A MFI also decreases with age ($p < 0.001$), in addition, low MFI values were associated with a significantly higher score in the frailty index (Rockwood) ($p < 0.03$). Moreover, lower percentage of COP cells expressing lamin A was associated with two-fold greater odds of being frail than being fit (odds ratio (OR)=2.06, 95%CI=0.98-4.3).

Conclusion: In this study we demonstrated the feasibility of a new non-invasive diagnostic method to quantify of lamin A expression in COP cells. Low levels of expression of lamin A were associated with the presence of disability and frailty. Although longitudinal studies are still required, this diagnostic method offers a valid a reliable tool to diagnose

osteosarcopenia and to predict frailty and disability in osteosarcopenic patients.

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NON-TRAUMATIC OSTEONECROSIS OF THE FEMORAL HEAD IS ASSOCIATED WITH LOW BONE MASS

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Objective: This prospective study was undertaken to determine whether osteonecrosis of the femoral head (ONFH) was associated with an increased prevalence of osteoporosis (OP) and whether the increased prevalence of OP was related to the stage of ONFH at diagnosis.

Methods: We included 243 patients with ONFH and 399 age and sex-matched healthy controls. Data were gathered including demography, risk factors, ARCO staging of ONFH and bone mineral density (BMD).

Results: Overall, BMD (defined by the T-score) was significantly lower in the ONFH group at both the femoral head (-0.96 ±1.11) and the lumbar spine (-1.22±1.47) compared to the control group (-0.55±0.97 and -0.73±1.31) ($p < 0.01$). The ONFH group depicted a significantly higher proportion of osteopenia (50.39% vs. 40.87%, $p = 0.027$) and of OP (18.78% vs. 7.33%, $p < 0.001$) relative to the control group. Stage 1 and 2 ONFH patients (53.86%, adj. p -value=0.0203; odds of 1.54 (95% CI: [1.04; 2.29])) were at a higher risk of osteopenia than the control group (40.88%), but not stages 3 or 4 (48.47%, adj. p -value=0.2569; odds ratio of 1.27 (95% CI: [0.78; 2.06])). Patients with stage 3 or 4 ONFH (25.31%, adj. p -value<0.001; odds ratio of 3.93 (95% CI: [1.63; 10.96])) were at a higher risk of osteoporosis than patients in the stage 1 and 2 ONFH (7.24%), and compared to the control group (7.33%, adj. p -value<0.001; odds ratio of 4.89 (95% CI: [2.77; 8.76])). Multivariate logistic regression showed that the GC use was the only independent factor associated with a higher risk of OP in stage 3 and 4 ONFH.

Conclusions: This study showed that fractural stages ONFH were associated with a 5-fold risk of osteoporosis. Therefore, we advise that patients suffering of ONFH should be screened for low bone mass.

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THE PRODUCTIVITY LOSS ASSOCIATED WITH OSTEOARTHRITIS

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Objectives: To describe the productivity loss associated with the clinically confirmed osteoarthritis (OA).

Methods: We analysed data from the population-based EpiReumaPt study (Sep2011-Dec2013). 10,661 inhabitants were surveyed to capture all cases of rheumatic and musculoskeletal diseases within a representative sample of the population. We analysed all participants aged 50-64 years, near the official retirement age and all OA cases were clinically validated, according to the ACR classification criteria. For retired participants, years of working life lost (YWLL) were determined as the difference between each OA participant's age and the respective retirement age when self-reported retirement was caused by a rheumatic condition, while the potential YWLL (PYWLL) was the difference between official and actual retirement ages. An official wage database was used to estimate productivity by gender, age and region using the human capital approach. The effects of OA on the likelihood of early exit from paid employment and the attributable fractions estimates were obtained at the individual level by multivariable logistic regression.

Results: In the survey, more than half of the population aged between 50 and 64 years were out of paid work (51.8%) and had an OA prevalence of about 30% (29.7%; men: 16.2% and women: 43.5%. Knee OA: 18.6%; hand: 12.6%; hip: 3.6%). OA is associated with early exit from paid employment, specifically knee OA (OR: 2.25; CI: 1.42-3.59; $p = 0.001$). Other OA locations do not have a statistically significant effect on work loss. Early exit from paid employment due to OA led to a total of 143,262 YWLL and 338,822 PYWLL (84 and 198, respectively, per 1000 inhabitants in the age group 50-64). The estimated annual indirect cost attributable to OA was €656 million (€384 per capita; €1294 per OA patient and €2095 per OA patient out of work). Females contributed with 61.6% of these costs (€404 million).

Conclusions: A considerable amount of productivity loss is associated with OA. Premature withdrawal from employment attributable to OA amounts to approximately 0.39% of the national GDP. The high prevalence and the impact of this disabling chronic disease highlight the need to prioritize policies targeting early exit from work in OA.

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THE IMPORTANCE OF THE ORTHOPAEDIC SURGEON IN THE PREVENTION OF A SECOND FRAGILITY HIP FRACTURE

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Introduction: Hip osteoporosis fracture in elder patients is a frequent pathology in Trauma and Orthopaedics Units. It is estimated 9 million fragility fractures per year around the world, which 1.6 million are hip fractures. This disease would increase due to the people aging. So the surgeon has double role, treating the fracture surgically and preventing refracture by administrating drugs in order to reduced morbidity and mortality as well as health cost.

Objectives: The aim of this work is to know hip refracture index in those patients who suffer their first hip fracture in our area (Teruel, Spain) and if they were correctly treated with osteoporosis drugs for secondary prevention. Furthermore, to analyse the factors that could change this refracture index.

Methods: Prospective randomized study of 100 patients who suffered their first episode of hip fragility fracture in Trauma and Orthopaedic Unit of Hospital Obispo Polanco of Teruel. We excluded the cases of high energy traumatism. The mean age was 82 years old and 73% of the patients were women. 60% suffered an intracapsular hip fracture. The mean surgery delay was 3.6 days. Before the episode of hip fracture, 35.4% of the patients had been previously diagnosed of osteoporosis disease. However, only 10% of them were treated with osteoporosis drugs.

Results: Osteoporosis treatment was prescribed in 8% of the patients at hospitality discharge and 22% first one month-consultation. It means that only 30% of them received secondary prevention drugs for osteoporosis. In a mean of 20 months period, 18% of the patients had a hip refracture, all of them on the contralateral side. So 1 of 4.5 patients of our area suffered a second hip fracture. The rate of hospital mortality was 7%. We observed a higher mortality rate in the first year after the first hip fracture in comparison with the next five years. At five year of following-up, more than half of the cases had died. The refracture index was statistically significant with two variables. First, the type of hip fracture ($p=0.05$), having higher risk those patients who suffered an extracapsular fracture [OR=1, 6 (IC 95% 1,04-2,6)]. Second, the presence of a previous osteoporotic fracture ($p=0.03$) [OR=2,7 (IC 95% 1,16-6,5)].

Conclusion: Hip fragility fracture is a prevalent disease in our Trauma and Orthopaedics Services. As it is known and we showed in our study, fragility fracture is a predictor to suffer another fragility fracture. Therefore, we should raise awareness in clinicians and surgeons to ensure secondary osteoporosis prevention in order to avoid a second hip fracture as well as other fragility fractures.

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USE OF ANTI-OSTEOPOROSIS DRUGS IN TYPE 2 DIABETIC PATIENTS: A POPULATION-BASED COHORT STUDY

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Objective: An increased fracture risk has been described as a complication of type 2 diabetes mellitus (T2DM), despite T2DM patients having a relatively high bone mineral density compared to the general population. We analyzed the association existing between T2DM status and the prevalence of 1.anti-osteoporosis drugs (AOD) use and 2.previous fracture/s.

Material and methods: Population-based cohort study using data from the SIDIAP Database which contains clinical information from primary care, hospital admission records, and pharmacy invoice data for >5 million patients (80% of the population) in Catalonia, Spain. We selected all ≥ 50 years old T2DM patients registered in SIDIAP in 2006-2013 and 2 diabetes-free controls were matched to each T2DM participant on age (± 2 years), gender and primary care center. Main outcomes were prevalent fractures (except face, skull, jaw, hand or fingers) and the use of AOD grouped into bisphosphonates (BF), calcium and vitamin D supplements (CaD) and any anti-osteoporosis drug (AAOD). We used logistic regression to estimate the risk of AOD use according to T2DM status, adjusted for age, gender, body mass index, smoking, alcohol intake, previous ischemic heart (IHD), cerebrovascular disease (CVD), and previous fractures.

Results: We identified 166,106 T2DM patients and 332,212 matched non-diabetics. T2DM subjects had higher prevalence of previous fractures (1.3% vs. 0.3%), CVD (5.9% vs. 3.0%) and IHD (9.9% vs. 4.1%) than non-diabetic. The use of BF in T2DM was of 6.59%, compared to 9.26% in non-diabetic ($p<0.001$); the use of CaD 9.72% vs. 12.34% ($p<0.001$); and the use of AAOD 7.64% vs. 10.66% ($p<0.001$). After adjusting for confounders, T2DM patients appeared less likely to receive BF (OR=0.67; 95% CI 0.64 to 0.68), CAD (OR=0.71; 95% CI 0.70 to 0.73) or AAOD (OR=0.66; 95% CI 0.64 to 0.67) therapy than non-diabetics.

Conclusion: Although T2DM patients have a higher prevalence of fracture, they are 30% less likely to receive any anti-osteoporosis therapy when compared to matched non-diabetics. Fracture risk underestimation (due to higher BMI and BMD) and lower awareness in T2DM patients might explain these findings.

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TREATMENT OF OSTEOARTHRITIS KNEE WITH AUTOLOGOUS CONDITIONED SERUM: COMPARATIVE, PROSPECTIVE STUDY

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Objective: To compare the efficacy of the standardized injection therapies of (1) autologous conditioned serum (ACS) against (2) corticosteroid in patients with knee pain secondary to osteoarthritis.

Material and Methods: 92 patients with knee pain (more than three months) secondary to radiographically confirmed osteoarthritis were followed prospectively after intra-articular knee injection of either ACS (series of four injections over 2 weeks) or corticosteroid (one time injection). All patients were followed prospectively and at 6 and 12 months after the injection. Pre- and post-treatment values were determined by Visual Analog Scale (VAS), global patient assessment, and WOMAC score.

Results: In group 1, 68.9% of patients experienced 50-100% pain reduction at 6 month and 70.5% after 12 months. Average pain relief (VAS) at 12 months was 58.4% (6.07 to 2.52) ($p < 0.05$). The WOMAC score showed significant ($p < 0.05$) increase in function (70.3 vs. 27.2), mobility (8.6 vs. 3.1), and significant decrease in pain (20.9 vs. 9.0) at 12 months.

In group 2, 15.2% of the 34 knees experienced 50-100% pain reduction at 6 month and 4.7% at 12 months after injection. Average pain relief (VAS) at 12 months was 0.13% (5.57 to 5.56). The WOMAC score showed decreases in function (69.9 vs. 73.9), minimal decrease in pain (20.17 vs. 20.16), while slightly increase in mobility (8.63 vs. 7.9). When comparing the two groups at 6 and 12 months post-injection, the changes in pre- and post-injection pain (VAS and WOMAC), function and Mobility (WOMAC) was more significant in group 1 ($p < 0.05$).

Conclusion: Treatment with conditioned autologous serum (Orthokin) effectively reduces pain in osteoarthritic knees. The risk profile is minimal for both treatment regimens.

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A SYSTEMATIC REVIEW OF ORTHOTICS ON BALANCE PERFORMANCE IN IDIOPATHIC SCOLIOSIS SUBJECTS

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Background: Adolescent idiopathic scoliosis (AIS) patients have postural equilibrium problems and using spinal braces are common nonsurgical methods in treatment of these subjects.

Objective: To evaluate the effect of brace treatment on balance performance in AIS subjects.

Study design: systematic literature review

Method: The search strategy was based on the Population Intervention Comparison Outcome method. A search was performed in PubMed, Scopus, ISI web of knowledge, Ovid, Cochrane library (CENTRAL) and Google scholar databases by using selected keywords. Eleven articles were selected for final evaluation.

Results: Most of the studies showed AIS subjects were characterized by a significant increase in the center of pressure parameters compare with healthy subjects. Wearing brace in AIS subjects can improve quiet standing balance via muscle co-contraction and proprioceptive stimulation, but after weaning brace duration, improvement in balance parameters in the scoliosis subjects was not observed.

Conclusion: In longer follow up, brace can improve balance control but studies using high quality methods are needed to support effectiveness of bracing on balance performance in AIS subjects.

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CONDITIONAL ABROGATION OF ATM IN OSTEOCLASTS EXTENDS OSTEOCLAST LIFESPAN AND RESULTS IN REDUCED BONE MASS

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Objectives: Ataxia-telangiectasia mutated (ATM) is a 350 kDa Ser/Thr protein kinase that plays an essential role in DNA damage repair. While mice lacking ATM exhibit reduced bone formation and increased bone resorption, the potential cell-autonomous functions of ATM in osteoclasts are not yet fully understood. In the present study, we generated mutant mice in which *Atm* is specifically abrogated under the control of the cathepsin K promoter (*Atm*^{Ctsk} mice) to elucidate the potential function of ATM in regulating osteoclast activity.

Methods and Results: In a preliminary experiment, we found that ATM is activated at a higher level in mature osteoclasts than in bone marrow-derived macrophages, indicating that ATM is involved in a later stage of osteoclastogenesis or in the maintenance of osteoclast functions. Bone morphometric analysis and μ CT analysis showed that *Atm*^{Ctsk} mice have reduced bone mass compared to control mice, indicative of increased bone resorption activity in osteoclasts lacking ATM. Abrogation of ATM in osteoclast precursors did not result in

any remarked impact on their differentiation; however, we found that osteoclasts lacking ATM are less prone to apoptosis both in vivo and in vitro, indicating that ATM negatively regulates osteoclast longevity. In accordance, osteoclasts lacking ATM showed an overall increase in the amount of bone resorption compared to control cells in vitro. Of note, we found that NF- κ B, a signaling molecule critically involved in the regulation of osteoclast survival, is highly activated in osteoclasts in the absence of ATM. Taken together, these observations indicate that ATM suppresses NF- κ B activity and thereby indirectly regulates osteoclast survival and bone resorption.

Conclusions: Our data show that *Atm*^{Ctsk} mice exhibit reduced bone mass due to increased bone resorption, and that abrogation of ATM in osteoclasts renders these cells less prone to apoptosis and extends their lifespan by enhancing NF- κ B activity.

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IMPACT OF SKIN-COLOUR ON HYPOVITAMINOSIS D IN A MIDDLE EASTERN POPULATION.

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Background: Abu Dhabi, is the capital city of the UAE enjoys year round sunshine and hot climate (average 34.46°C). The population is extremely heterogeneous. Arabs and Asians from the Indian- subcontinent form the majority of the population. Despite the ample sunshine however, most people tend to stay indoors avoiding the exposure to the excessive heat during the daytime. This and some other social and dietary factors could have an impact on the existing high prevalence of hypovitaminosis D. Several studies in the past have attempted to identify the factors behind the vitamin inadequacy. This work is focusing on the skin colour type of the residents and whether it adds to the understanding of the problem.

Patients and methods: The records of 247 adult patients with hypovitaminosis D (<30 ng/ml) have been studied. They were categorized according to their skin colour using Fitzpatrick skin scale. Data of 25(OH)D, total calcium (tCa), ionized calcium (iCa) and PTH were also sought. Data of patients with chronic renal failure, on vitamin D supplementation, on corticosteroids were excluded. Comparison made between the lightest and each of the other groups separately.

Results: 179 (72.5%) were Arabs and 56 (22.5%) were Asians. The lightest skin type was type 2. Table 1 shows the distribution and the characteristics of the patients according their skin type. The mean of 25(OH)D was 18.3±5.76 (3-29 ng/ml) in the whole group, (18.0±5.77, 18.6±5.73, 17.3±6.32, 19.4±4.66 in (. 6 were D deficient (9%) in individuals with type 2.

Table 1.

| Type of Skin color | Number | % | Mean of 25(OH)D ng/ml (N >30 ng/ml) | Number of D deficiency, 25(OH)D <10ng/ml, % | Mean of total calcium (tCa) mg/dl, N=4mg-10.5mg/dl | Mean of ionized Calcium (iCa, N=1.16-1.32mmol/l) | Frequency of subnormal iCa <1.13mmol/l (%) | Mean of PTH in 239 (N 15-65pg/ml) in 239 | Frequency of Secondary hyperparathyroidism (%) |
|--------------------|--------|-------|-------------------------------------|---|--|--|--|--|--|
| Type 2 | 68 | 27.5% | 18.3±5.77 | 6 (9%) | 9.55±0.40 | 1.14±0.12 | 37/67 (55) | 60.9±26.6 | 22/65 (34) |
| Type3 | 111 | 45% | 18.6±5.73 | 12 (11%) | 9.67±0.43 | 1.16±0.13 | 39/110 (35.5) | 55.7±22.6 | 35 (32) |
| Type4 | 48 | 19.5% | 17.3±6.32 | 9 (19%) | 9.58±0.41 | 1.17±0.14 | 24 (50) | 55.5±30.1 | 15/46 (32.5) |
| Type 5 | 17 | 7% | 19.4±4.66 | 1 (6%) | 9.51±0.32 | 1.16±0.12 | 9 (53) | 50.8±18.2 | 4 (23.5) |
| Type6 | 3 | 1% | 20.8±2.82 | 0 | 9.26±0.25 | 1.17±0.13 | 3(100) | 75.7±68.3 | 1 (33.5) |

The mean of 25(OH)D was 18.3±5.76 (3-29 ng/ml) in the whole group, 28 (11.5%) were deficient (<10 ng/ml of 25(OH)D). Eucalcemia was a feature in the whole group (mean of 9.60±0.40, range 8.70-11.1 mg/dl) with exception to 3 patients with borderline hypercalcaemia in patients with type 2. On average iCa was within normal values (1.16-0.112 mmol/l), yet 112/244 (46%) expressed subnormal levels. All comparisons of 25(OH)D, tCa and iCa between type 2 (lightest) and other groups were non-significant apart from the frequency of subnormal iCa in type 2 vs. type 3, p=0.0123. The mean of PTH was 56.9±25.7 pg/ml yet 77/239 (32%) expressed secondary hyperparathyroidism (<65 pg/ml). The P value between type 2 and other types were NS as well.

Conclusions: By and large, the above data were not discriminatory between the groups with different skin types thus hypovitaminosis D could not be shed light upon on the basis of the color of the skin in this cohort. Information on dietary habits, dressing styles and duration of sun exposure if any are to be considered in conjunction with the above data.

P175

PREVALENCE OF BONE FRACTURES IN PATIENTS IN RENAL REPLACEMENT THERAPY: RELATIONSHIP WITH POTENTIAL RISK FACTORS

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Background: Bone fractures are an important cause of morbidity and mortality in patients in renal replacement therapy. The aim of this unicenter observational study was to quantify the prevalence of bone fractures by anatomical site in prevalent patients in hemo and peritoneal dialysis and to study its relationship to potential risk factors.

Methods: We performed a retrospective analysis of medical records of all adult prevalent patients in hemo and peritoneal dialysis at our center on July 1, 2016. We searched for factors that could be related to fractures as age, sex, dialysis vintage BMI, concomitant diseases, laboratory parameters and medications used.

Results: We included 118 patients, 110 in hemodialysis and 18 in peritoneal dialysis. Prevalence of bone fractures was

13.5% (16/118). There were no fractures in peritoneal dialysis patients. Fractured patients had a mean age of 61.4 ± 12.9 years; 52.2% were females with a time in dialysis of 62.6 ± 46 months. The most prevalent fracture site was the hip (6 pat. 55.6%); in 2 patients the fracture was bilateral followed by the spine (5 pat. 45.4%). Mean Pi was 5.0 ± 1 , calcium 8.4 ± 0.5 , CaxP 41.9 ± 9.2 , iPTH 462 ± 488 , Alk Phosp (U/L) 136 ± 175 . We could not find risk factors associated with fractures in this population.

Conclusions: Fractures were seen only hemodialysis patients and were more prevalent at the hip. We could not find risk factors associated with fracture prevalence.

P176

VERTECT JACK DEVICE: A NEW METHOD FOR AUGMENTATION OF VERTEBRAL FRACTURES

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Summary: Kyphoplasty is a proven minimally invasive procedure for the treatment of patients with osteoporotic fractures. By augmentation of fractured vertebral body, however, a very large portion of the intervertebral structures will be destroyed. With the help of a new device (Vertect Jack Device), the erection of the vertebral body will be carried out gentler.

Objective: In the present study, the new method should be clinically tested for efficacy and safety for the first time in patients. As a comparison results of previous treatments with kyphoplasty are used.

Material and methods: For Vertect Jack Device study patients with painful vertebral fractures were selected in which conservative treatment had not yielded sufficient results. For comparison random data from the records of patients who had been treated with kyphoplasty were selected. The Vertect Jack Device what placed under the central fractures and then erected. After having restored the vertebral height the device was removed and cement injected. Clinical and radiological examinations were carried out before and after 1,3, and 6 months.

Results: In the Vertect Jack Device Group the data of 40 patients were evaluated. For group 2 (kyphoplasty) 50 patients were selected. There was a significant difference in the duration of the surgery (Group 1: 27.4, Group 2: 45.9 minutes). A significant difference of 20 mm with regard to the reduction of VAS scores (0- 100 mm pain intensity) was detected. Under the application of Vertect Jack Device an average increase of 3.1 mm of vertebral height was achieved. In group 2, the erection averaged 0.4 mm. A correlation between the postoperative change of vertebral

body height and VAS scores could not be detected in both groups.

Conclusion: The comparative analysis of this study shows that promising results can be achieved with the augmentation of vertebral fractures with the Vertect Jack Device. When compared with kyphoplasty, advantages show in terms of targeted and thus more gentle application possibility and better pain relief over a period of 6 months after surgery. Further study results should help to demonstrate the efficacy and tolerability of the new method.

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LOW BACK PAIN ORIGINATING FROM THE SACROILIAC JOINT: 1 YEAR RESULTS FROM A RANDOMIZED CONTROLLED TRIAL OF CONSERVATIVE MANAGEMENT VS. MINIMALLY INVASIVE SURGICAL MANAGEMENT

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Background: In approximately 15-30% of patients with chronic low back pain (LBP) a significant part of the pain originates from the sacro-iliac joint (SIJ). Chronic SIJ pain is associated with disability and poor quality of life. Recently, minimally invasive surgical treatments have been developed for those who fail conservative or interventional therapies (e.g. steroid injections, RF ablation). We report here the 12-month results from a European multicenter randomized controlled trial comparing clinical outcomes of minimally invasive sacroiliac joint fusion (SIJF) vs. conservative management (CM) for patients with chronic SIJ pain.

Objective: To compare the safety and effectiveness of conservative management (CM) to minimally invasive sacroiliac joint fusion (SIJF) in patients' low back pain (LBP) originating from the sacroiliac joint (SIJ) pain.

Design and Methods: 103 adults with chronic LBP originating from the SIJ were randomly assigned to CM (N=51) or SIJF using triangular titanium implants (N=52). CM consisted of optimization of medical therapy, individualized physiotherapy and adequate information and reassurance as part of a multifactorial treatment. The primary outcome was the difference in change in self-rated LBP at 6 months, using the visual analogue scale (VAS). Other effectiveness and safety endpoints, including leg pain, disability using Oswestry Disability Index (ODI), quality of life using EQ-5D-3L, and

SIJ function using active straight leg raise test (ASLR), were assessed up to 12 months.

Results: At 12 months, mean LBP improved by 41.6 VAS points in the SIJF group vs. 14.0 points in the CM group (treatment difference of 27.6 points, $p < .0001$). Mean ODI improved by 25.0 points in the SIJF group vs. 8.7 points in the CM group ($p < .0001$). Also, mean improvements in leg pain and EQ-5D-3L were large after SIJF and superior to those after CM. CM subjects were allowed to cross over to SIJF after 6 months. Subjects who crossed to surgical treatment had no pre-crossover improvement in pain and ODI scores; after crossover, improvements were as large as those originally assigned to SIJF. One case of postoperative nerve impingement occurred in the surgical group. No important late adverse events occurred between month 6 and 12.

Conclusions: For patients with LBP originating from the SIJ, minimally invasive SIJF with triangular titanium implants was safe and more effective than CM in relieving pain, reducing disability, improving patient function and quality of life. Our findings will help to inform decisions regarding its use as a treatment option in this patient population.

P178

METOTHREXATE USE IN THE TREATMENT OF OSTEOARTHRITIS OF THE KNEE

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Objective: To evaluate the treatment with methotrexate in patients with osteoarthritis of the knee refractory by traditional treatment.

Material and Methods: This is a prospective cohort study that include 37 patients that fulfill clinical criteria of American College of Rheumatology for knee osteoarthritis. These patients were followed as outpatients. Inclusion criteria for treatment with methotrexate were synovitis, pain and inefficacy of traditional treatment to reduce pain and synovitis. Synovitis was detected clinically and by ultrasound imaging at the beginning and at the end of the study. Pain was assessed using the visual analogue pain scale (VAS), (0–100 mm), at the beginning and at the end of the study. Knee pain in all patient was at least $\geq 75/100$ mm on a VAS scale in activity. Patients have received methotrexate 10 mg/week for 24 weeks.

Results: The mean (\pm SD) age of the patients was 59.17 (± 8.75) years. The mean (\pm SD) duration of disease was 9.21 (± 3.54) years. Female patients are 20 (54%) and male patients are 17 (46%). Before treatment with methotrexate all patients were with severe pain, while after treatment with methotrexate at 24 weeks, 6 (16%) patients had no improvement, VAS remains $\geq 75/100$ mm; 19 (51%) patients had partial improvement, VAS

$< 74/100$ mm to $> 45/100$ mm and 12 (32%) patients had significant improvement VAS $< 44/100$ mm.

Conclusion: Treatment with methotrexate in patients with osteoarthritis of the knee, refractory by traditional drugs, could be an optional therapy. Its use can improve pain and synovitis.

P179

EFFECT OF ETORICOXIB ON CARTILAGE TISSUE METABOLISM IN PATIENTS WITH OSTEOARTHRITIS

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Objective: To study the effect of etoricoxib on cartilage tissue metabolism in patients with coxarthrosis.

Materials and Methods: There were examined 38 patients with newly diagnosed coxarthrosis, namely 31 (81.6%) females and 7 (18.4%) males. All the patients were divided into 2 groups: Group I (20 patients) received diclofenac sodium at a dose of 100 mg/day; Group II (18 patients) received etoricoxib at a dose of 90 mg/day. The state of cartilage tissue (matrix metalloproteinase (MMP)-3, MMP-9, osteoprotegerin (OPG) and pro-inflammatory cytokines (IL-1, TNF- α) was monitored at hospital admission and 6 months after starting treatment.

Results: In patients of Group II in contrast to Group I, more positive dynamics of changes in cartilage tissue evidenced by more pronounced reduction in the serum levels of MMP-3, MMP-9, and OPG 6 months after starting treatment was observed. There was a directly proportional correlation between the levels of IL-1, TNF- α and the levels of OPG, MMP-3 and MMP-9. 6 months after therapy, in patients of Group II, TNF- α and IL-1 titers were significantly lower compared to patients of Group I. High titers of pro-inflammatory cytokines (TNF- α , IL-1) worsened the course of osteoarthritis causing cartilage erosion.

Conclusions: 1) In patients with coxarthrosis, there was a clear directly proportional correlation between the processes of cartilage tissue degradation and the activity of chronic inflammatory process. 2) The use of etoricoxib (90 mg/day) in patients with coxarthrosis reduced the severity of the inflammatory syndrome, thereby preventing cartilage degradation, as evidenced by the values of MMP-3, MMP-9, IL-1, TNF- α and OPG levels.

Reference: Chen JJ et al. Asian Pac J Trop Med. 2014 Apr;7(4):297.

P180

ASSESSMENT OF PRO- AND ANTI-INFLAMMATORY CYTOKINES IMBALANCE WITH DISEASE SEVERITY OF RHEUMATOID ARTHRITIS

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Background: An array of cytokines is involved in the disease severity of systemic autoimmune diseases such as rheumatoid arthritis (RA). Study of cytokine balance in RA may persuade both the diagnostic process and therapeutic approaches.

Objectives: To assess the levels IL-18, TNF- α in serum samples and IFN- γ , IL-8, and IL-4 positive NK and NKT cells of peripheral blood of RA patients and their correlation with disease activity score.

Materials and Methods: This retrospective study included 70 newly diagnosed RA patients (49 females, 21 males) and matched 100 healthy controls. Disease activity score was calculated using standard DAS28. Levels of IL-18 and TNF- α in serum samples were quantified using ELISA while intracellular expression of IFN- γ , IL-4 and IL-8 in NK and NKT cells were determined by multicolour flow cytometry. Differences between the means were compared and levels were correlated with DAS28 using suitable tests.

Results: Mean age of patients and healthy controls were 35.2 and 33.8 years, respectively. Average DAS28 score of the patients was 5.21. Level of IL-18 was found to be 3.04-fold higher while 5.9-fold higher expressions was recorded for TNF- α in patients as compared to healthy controls. Moreover, IFN- γ + NK, IFN- γ + NKT, IL-8+ NK, and IL-8+ NKT cells were also raised in RA patients (67.3 \pm 14.6, 63.3 \pm 20.7, 62.2 \pm 16.8, and 72.6 \pm 14.2). However, IL-4+ NK and IL-4+ NKT cells were markedly (p <0.001) diminished (2.27 \pm 2.50 and 2.35 \pm 3.68) in patients. IL-18, TNF- α , IFN- γ , and IL-8 were positively correlated while IL-4 was inversely correlated with DAS28.

Conclusions: The balance of Th1 and Th2 cytokines were poised towards Th1 in RA. Anticytokine agents may serve as potent therapeutic agent in RA treatment. The work is in progress to investigate these cytokines as biomarkers of disease severity.

P181

DXA CONTRIBUTION IN BONE DENSITOMETRY EVALUATION ON OSTEOPOROSIS IN SENEGAL: RESULTS OF A STUDY REALIZED IN AFRICAN BLACK POPULATIONS

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Osteoporosis, a public health problem is able to occur severe fractures and its prevalence increases in developing countries.

Several factors involved in its pathogenesis. These factors are heredity, elderly, race, ethnicity, hormones, physical inactivity, sunlight exposure, vitamin D deficiency and certain drugs. In Africa, few data are available and the disease prevalence is may be underestimated. In Senegal, measure of bone mineral density is recent. In this study, our objective was to determine DXA patients profile and epidemiological, clinical characteristics of patients for densitometry examination. Thus, 43 cases were collected; lumbar and femoral sites were evaluated. Median lumbar T-score was - 0.91 and the femoral T-score - 0.16. Osteopenia was found in 35% of patients and osteoporosis in 26%. Bone Mineral Density was abnormal in 60% of cases. This study is another proof of documented reality of osteoporosis in Senegal. It determines frequency in a population at risk. For the future, it opens way for further larger studies to get better profile of the patients and prevalence osteoporosis in Senegal.

P182

PAGET'S DISEASE IN SENEGAL: TWO CASES OF A RARE DISEASE IN BLACK AFRICAN POPULATIONS

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Mr. MD is a man 72 years old is admitted for spontaneous pain, permanent, crushing type, pelvis above the right hip evolving for two years, without night or morning stiffness but increase with hearing loss, temporal and parietal headache. A physical examination of the musculoskeletal system, standing was unremarkable, walking without limp was done without help. The hip was painful to the active and passive mobilization movements including schedules and counter clockwise rotations upset as well as the abduction and flexion of the thigh on the pelvis. Pressure iliac spines and lower lumbar and sacrococcygeal was painful. The patient showed no inflammatory syndrome. Serum calcium was normal. We noted an isolated increase in alkaline phosphatase levels to 401 IU/l. The radiograph showed bilateral heterogeneous sclerosis of the spongy iliac bone thickening lines and iliac ischial pubic straight and almost disappearance of the right hip joint space. There was a marked thickening of the cortex on the femoral proximal third and thickening of the cranial vault. MRI showed cortical thickening of the right pelvic bone, a greasy type of signal at the bone marrow of the right pelvic bone with a hyper signal T1, an intermediate T2 signal cancellation with fat. After injection, there was a medullary enhancement of the right hip bone is remodelled. Bone scan showed: intense focal hyper fixations skull, the right clavicle, right hemipelvis, small and large left trochanter, sacrum, the sacroiliac left, the right external condyle of the shaft splints. This symptomatology was pathognomonic of Paget's disease.

The second patient is a man 72 year old with no history, received for pain electively serving basin on the right side, intense (VAS=8/10), pulsating, almost permanently, without irradiation, exacerbated by the local pressure with night recrudescence without morning stiffness. Physical examination objectified no musculoskeletal deformity, but woke pain on palpation and mobilization of the right hip. There was no oedema or collateral circulation or limitation of joint amplitudes. Biologically, serum alkaline phosphatase (ALP) was raised to 4 times normal. Osteocalcin, procollagen type 1 N the terminal pro-peptide, the marker CTX resorption were not assayed, helpful exam that if PAL is normal. Radiography showed cortical thickening of the ischial pubic branch, a heterogeneous sclerosis gypsy moth of the iliac wing, a steady narrowing of the femoral hip-spaced lines and thickening of the iliac ischial pubic. This aspect is pathognomonic of PD, the patient underwent treatment with zoledronic acid intravenously 5 mg. The outcome was favourable to 10 months with reduced pain (VAS=2/10) and normal PAL.

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HYPOTHYROID AND HYPERTHYROID STATUS WAS STRONGLY ASSOCIATED WITH MUSCULOSKELETAL ULTRASONOGRAPHIC ABNORMALITIES WITH ARTHRALGIA

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Objective: To determine whether musculoskeletal ultrasonographic (MSUS) abnormalities were observed according to the state of thyroid disease.

Methods: Patients with thyroid disease were categorized as euthyroid, hypothyroid, or hyperthyroid status according to their disease activity and evaluated the association with MSUS abnormalities. In addition, the association of the presence of thyroid autoantibodies with MSUS abnormalities was also studied. In MSUS, an experienced rheumatologist examined the presence of synovial fluid, synovial hypertrophy, and grade of power Doppler in the knee joint.

Results: A total of 109 patients participated in the study. MSUS abnormalities were statistically significantly higher in hyperthyroid or hypothyroid status than in euthyroid status ($p < 0.001$). However, there was no statistically significant difference between hypothyroid status and hyperthyroid status. The presence of MSUS abnormalities with abnormal thyroid function was corrected according to the presence of radiological Knee osteoarthritis. Both hypothyroid and hyperthyroid status was still associated with MSUS abnormalities

regardless of knee osteoarthritis. Visual analogue scale for knee pain was higher in patients with MSUS abnormalities ($p < 0.001$). But there was no statistically difference of MGUS abnormalities with presence of thyroid autoantibodies.

Conclusion: Both hypothyroid and hyperthyroid status was significantly associated with MSUS abnormalities with knee arthralgia. MSUS is a useful tool to detect clinically early joint abnormalities. We suggest that patients with diagnosed thyroid dysfunction and who remain uncontrolled, should assess the MSUS examination in patients with arthralgia. Moreover, a thyroid function test for unexplained arthritis maybe warranted.

P184

CHANGES IN KNOWLEDGE AND ATTITUDE ABOUT VITAMIN D AMONG SCHOOL STUDENTS IN ZAGAZIG DISTRICT, SHARKIA GOVERNORATE, EGYPT: AN INTERVENTION STUDY

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Objectives: To determine the impact of health education intervention program on students' knowledge, and attitude concerning vitamin D as well as the effect of vitamin D and calcium supplementation on serum levels of 25(OH)D, total Ca, ionized Ca and parathormone among studied students.

Subjects and methods: A randomized controlled intervention study in which subjects were randomly assigned to an intervention and control groups, with the intervention being a health education program with vitamin D and calcium supplementation during the academic year 2012-2013. The estimated sample size was 138 students (69 students in each group). The study was carried out over 3 phases: pre-test, intervention and 6 months. Knowledge and attitude of the studied students about vitamin D were measured as well as their level of serum 25(OH)D, total Ca, ionized Ca and PTH. Some associated risk factors were also studied.

Results: It was found that poor dietary habits among the studied students were prominent. Logistic regression analysis revealed that vitamin D can only be predicted by the level of ionized calcium, parathormone level, total calcium level and duration to sun exposure. Application of pre-test and posttest revealed a significant improvement among the group submitted to the health education. The highest improvement was noticed as regards how to prevent vitamin D deficiency, followed by health problems and complication related to vitamin D deficiency and finally causes of

vitamin D. In contrast the attitude did not show similar improvement. The comparison between the levels of 25(OH)D, total Ca, ionized Ca, and parathormone level before and after the intervention showed significant changes after health education and vitamin D and calcium supplementation.

Conclusion and Recommendations: Health education program had an appreciable impact in improving knowledge and positive attitude of students about vitamin D. Vitamin D and calcium supplementation as well improved the laboratory results. Accordingly, we need to consider the implementation of health education programs together with vitamin D and calcium supplementation for all students in the preadolescent and adolescent stages to avoid vitamin D deficiency and consequently improve their health.

P185

SMOKING IS ASSOCIATED WITH INCREASED RISK OF OSTEOPOROSIS IN DIABETES MELLITUS PATIENTS

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Background: Diabetes mellitus, in particular type 2 diabetes mellitus (T2DM), is a common metabolic disease with increasing prevalence throughout the world. Musculoskeletal (MSK) complications of diabetes mellitus (DM) are the most common endocrine arthropathies. Osteoporosis is considered a global public health problem currently affecting over than 200 million people. Osteoporosis is the most common systemic skeleton illness that characterized by reduce of bone mass and disruption of bone architecture resulting an increased risk of fragility fractures which represent the main clinical consequence of the disease. Smoking is associated with multiple complications of diabetes; the risk of complications associated with tobacco use and diabetes in combination has been stated to be approximately 14 times higher than the risk of either smoking or diabetes alone.

Objective: To assess the association of smoking with osteoporosis in diabetes mellitus patients.

Patients and Methods: A cross sectional study was conducted on 150 patients with diabetes mellitus mainly type 2. All patients were seen in the Department of Rheumatology in Hilla Teaching Hospital. Patients' data were obtained via face-to-face interview performed by rheumatologist. DM related data, such as duration, Smoking history, drug use (oral hypoglycemic drugs, insulin), body mass index (BMI), patient send for DXA to confirm diagnosis of osteoporosis, also after exclusion of other causes of osteoporosis by exclusion criteria which done by many hormonal and other laboratory investigations.

Results: Among 150 patients with DM, 60.70% were females and 39.30% were males, as the females predominant in the study. There is association between osteoporosis and age <50

years ($p < 0.004$) due to most patients were female at premenopausal age. There is significant association between smoking and osteoporosis in DM patients ($p < 0.002$). Also BMI show no significant association with osteoporosis in DM patients as most of patients were obese or overweight with increase bone mineral density.

Conclusion: There is significant association between smoking and osteoporosis in DM patients.

P186

MEAN SERUM 25OHD IN THE GENERAL POPULATION CORRELATES WITH DAY LENGTH AND UV INDEX

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Introduction: Vitamin D deficiency is a significant public health concern with inadequate vitamin D status in 31% of the Australian population¹. Up to 50% of the population may be vitamin D insufficient or deficient in winter months². Nationwide epidemiological studies show that latitude and season are independent factors affecting vitamin D status². The following study was performed to determine the relative influence of day length and UV index on serum vitamin D status.

Method: Mean monthly serum 25OHD for all samples analysed by pathology providers in SA (Adelaide 34.9285°S, 138.6007°E) and Victoria (Melbourne 37.8136°S, 144.9631°E) during 2012 (January to July)³ were linearly regressed against average monthly day length and UV index.

Results: The mean serum 25OHD for each month was higher in the SA population. The mean serum 25OHD in the population was correlated with average monthly day length and UV index to a similar extent. The correlation coefficient was higher for the SA population compared to Victorians. (0.9 vs. 0.7).

Discussion: Population vitamin D status is highly dependent on the average number of daylight hours and UV index. Despite public education regarding skin cancer, our population appears to be reliant on sunlight for vitamin D. Those with limited or no exposure to sun such as infants and the elderly therefore will require supplementation.

References:

1. Nowson CA et al. *Med J Aust* 2012;196:1.
2. Daly RM et al. *Clin Endocrinol* 2012;77:26.
3. Australian Bureau of Statistics, National Biomedical Survey, 2011-2012, released April 2014.

P187

AGE AND BMI ARE STRONGER DETERMINANTS OF SERUM PTH THAN CALCIUM INTAKE OR

VITAMIN D STATUS IN HEALTHY POSTMENOPAUSAL WOMEN

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Introduction: Serum parathyroid hormone level has been reported to rise with age. Hyperparathyroidism is a recognised cause of osteoporosis in postmenopausal women. The rising PTH level with age has been attributed to several factors and the present study was undertaken to estimate the relative importance of several factors in healthy postmenopausal women.

Method: Fasting blood samples were collected from community dwelling healthy postmenopausal women for biochemical analysis. Abdominal visceral fat content was measured using DXA and weight and height were recorded. Pearson correlation analysis was used to determine univariate relationships between variables and linear stepwise regression analysis was performed to determine multivariate relationships.

Results: PTH was significantly positively correlated with age, BMI and serum crosslaps and negatively correlated with calcium intake. Abdominal fat mass, fasting glucose and total cholesterol positively correlated with PTH but did not reach significance. Age and BMI were found to be significant determinants of serum PTH. Calcium absorption, serum ionised Ca or vitamin D status were not strong determinants of PTH. Vitamin D status was significantly negatively correlated with abdominal fat mass.

Discussion: The main determinants of serum PTH in healthy postmenopausal women appear to be age and BMI. The rise in PTH with age may be explained by a rising BMI, a rising creatinine level or a fall in calcium intake. When evaluating postmenopausal women with hyperparathyroidism their weight or BMI should be considered as well as biochemical parameters. Women with greater abdominal fat content are at risk of vitamin D deficiency.

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THE INFLUENCE OF INTRAOPERATIVE SEDATIVE ON ACUTE POSTOPERATIVE PAIN IN TOTAL KNEE ARTHROPLASTY UNDER SPINAL ANAESTHESIA: A COMPARISON BETWEEN DEXMEDETOMIDINE AND PROPOFOL – A RANDOMIZED TRIAL

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Objective: We investigated the role of adjuvant analgesics if used intraoperatively during total knee arthroplasty (TKA) under spinal anaesthesia. Propofol and dexmedetomidine were compared.

Methods: The dexmedetomidine group received 1 µg kg⁻¹ dexmedetomidine for 10 min followed by a continuous infusion at 0.1–0.5 µg kg⁻¹ h⁻¹. In the propofol group, propofol was infused continuously via a target-controlled infusion device, and the effect-site concentration was maintained with a range of 0.5–2.0 µg ml⁻¹. The numerical rating scale (NRS) for pain at rest, the cumulative amounts of fentanyl administered via intravenous patient-controlled analgesia (IV PCA), rescue analgesics, and antiemetics were compared between the two groups during the postoperative 24 h and 48 h.

Results: Dexmedetomidine significantly reduced the consumption of fentanyl during the postoperative 24 h [64.4 (64.0) vs. 177.5 (164.9) µg, *P* < 0.001] and 48 h [151.3 (112.5) vs. 393.8 (333.6), *P* = 0.001]. NRS was determined to be lower at postoperative 24 h [1.48 (0.9) vs. 2.9 (1.6), *P* < 0.001] and 48 h [2.3 (0.9) vs. 3.5 (1.4), *P* = 0.001] in the dexmedetomidine group than in the propofol group. There were no significant differences in the amount of antiemetics and rescue analgesics between the two groups at postoperative 24 h (*P* = 0.488 and *P* = 0.143) and 48 h (*P* = 0.155 and *P* = 0.078).

Conclusions: Intraoperative dexmedetomidine sedation was more effective in relieving acute postoperative pain after TKA with less opioid use compared with intraoperative propofol sedation.

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ESTIMATED LONG TERM COST SAVINGS FROM IMPLEMENTING A FRACTURE LIAISON SERVICE AT A HOSPITAL IN DENMARK

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Introduction: Osteoporosis (OP) affects hundreds of millions of people worldwide. A prior fragility fracture is a strong risk factor for future fractures. Programmes such as a fracture liaison service (FLS), that include identification, assessment and treatment, are successful interventions for secondary fracture prevention.

Aim: To estimate the budget impact over time after implementing FLS in a mid-sized hospital in Denmark.

Methods: The budget impact model, with a Markov structure and 6 months cycle length, estimated the cost and fracture consequences of implementing a FLS. The health states were hip, clinical vertebral, forearm and other OP fractures. In every cycle, the model population is at risk of fracture and death. The risk of fracture is reduced by patients receiving anti-OP treatment. Two scenarios were modelled: A scenario where FLS is not implemented (20% of patients receive treatment after a fracture) and a scenario where FLS is implemented (60% of patients receive treatment after a fracture). The population included men and women, 50 years or older with a fragility fracture in the last 6 months. The hospital perspective was used including cost of FLS (excluding drug costs) and direct healthcare cost of fractures.

Results: Over a 10-year period, assuming 3096 patients fracture each year, FLS management and diagnosis costs (DXA, x-rays, GP visits) were higher in the FLS scenario compared to non-FLS scenario (Danish Krone (DKK)-1.79million(M) and DKK-15.08M, respectively)(1DKK=0.13€). However, the cost of subsequent fractures was lower in the FLS scenario compared to non-FLS scenario (DKK84.08M). This resulted in a net savings of DKK67.22M for the FLS scenario. The net savings per patient entering a FLS was DKK1,171 and there were 35 avoided fractures per 1000 patients entering a FLS.

Conclusion: This model estimates a substantial net saving of DKK67.22M over 10 years with the implementation of a FLS compared to no FLS.

Disclosures: Study funded by Eli Lilly.

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TRABECULAR BONE SCORE UNCOVERS OSTEOPENIA AND OSTEOPOROSIS IN A LARGE FRACTION OF PATIENTS WITH THE METABOLIC SYNDROME

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Background: The metabolic syndrome (MetS) is a constellation of medical conditions consisting of central obesity, hyperglycemia, hypertension, and dyslipidemia, in which each acts on bone tissue in different ways. Since MetS often precedes diabetes mellitus (DM) and much like type 2 DM is largely driven by obesity, bone fragility might be under-estimated by bone mineral density (BMD) alone in MetS patients, as is the case in DM. The trabecular bone score (TBS) is a recently

introduced non-invasive tool which indirectly assesses bone quality and fracture risk independently of BMD.

Aim: To assess the added value of TBS in subjects with the MetS.

Subjects and methods: A retrospective cross-sectional study 104 Caucasian subjects diagnosed with the MetS using the ATPIII criteria. Body composition and bone density were assessed by dual X-ray absorptiometry (GE Lunar Prodigy) and the lumbar spine images were also analyzed using the TBS iNsite (version 2.1.2, Med-Imaps) in order to generate TBS-adjusted T-scores.

Results: The study group consisted of 57 men (55%) and 47 women (45%) with a mean age of 58±10 (±SD) and a mean BMI 32.9±4.4. The mean T-score was +0.05±1.3 while the mean TBS adjusted T-score was -0.8±1.4. Classified by lumbar BMD T-score, bone density was normal in 83 subjects (80%) but indicative of osteopenia in 19 (18%) and osteoporosis in 2 (2%) participants. After TBS adjustment, however, the number of subjects with abnormal T-score more than doubled to 43%, out of which 29 (28%) were classified as osteopenic and 16 (15%) were clearly within the osteoporosis range. Indeed, most osteoporotic subjects (14/16) were missed by standard BMD but identified by TBS-adjusted BMD. Notably, after TBS adjustment 31% of subjects originally defined as "normal" by BMD alone, had to be reclassified as osteopenic, and 6% as osteoporotic. Likewise, 32% of BMD-defined osteopenic subjects were reclassified as osteoporotic after TBS adjustment. Subjects reclassified as osteoporotic were significantly heavier (105 kg±5.5 vs. 93kg±1.7 p=0.015). Men were more likely to be reclassified than women but this was not statistically significant, the age of the subjects reclassified was not significantly different either.

Conclusions: In this sample of metabolic syndrome patients, bone mineral density identified only one of 7-8 subjects at risk for fragility fractures. In this setting, the assessed bone status is significantly shifted downwards following TBS-adjustment. Hence, the trabecular bone score seems to provide added value over standard bone mineral density in assessing bone fragility in metabolic patients and it needs to be further validated in this population.

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GLUCOCORTICOID-INDUCED CLINICAL VERTEBRAL FRACTURE AND MORTALITY IN JAPANESE FEMALE PATIENTS WITH AUTOIMMUNE RHEUMATIC DISEASES

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Although osteoporotic fracture is a known independent risk for mortality in postmenopausal osteoporosis, whether glucocorticoid (GC)-induced osteoporotic fracture is independently associated with mortality in autoimmune rheumatic diseases remains unclear. We investigated whether clinical vertebral fracture is a risk factor of 10-year mortality in pre- and postmenopausal female patients with autoimmune rheumatic diseases receiving high-dose GC treatment. This was a single-center observational cohort study conducted at Shimoshizu National Hospital (Chiba-Shimoshizu Rheumatic Cohort). Among female patients aged ≥ 18 years who were newly treated with high-dose GC (initial doses ≥ 20 mg prednisolone equivalent per day) for at least 6 months between 1986 to 2006, 42 patients who died within 10 years from treatment initiation, and 223 alive patients who were followed for 10 years were studied. The diseased group had significantly older age (61.2 ± 13.2 vs. 39.1 ± 13.5 , $p < 0.001$), lower daily dose (38.3 ± 12.5 vs. 45.6 ± 15.8 g/day, $p < 0.001$), lower BMI (20.0 ± 2.9 vs. 21.2 ± 3.1 , $p < 0.05$), higher rate of smoking (31.0 vs. 15.7%, $p < 0.05$) and higher prevalence of clinical vertebral fracture (64.3 vs. 17.9%, $p < 0.001$) compared to the alive group. Cox regression model demonstrated that the independent risks for mortality were age (> 50 years) [HR (95%CI): 4.79 (1.98-11.60), $P < 0.001$], smoking [2.30 (1.17-4.53), $p = 0.016$], and clinical fractures [3.07 (1.52-6.23, $p = 0.002$]. Clinical vertebral fracture was independently associated with mortality among pre- and postmenopausal female patients of newly receiving high-dose GC treatment for autoimmune rheumatic diseases.

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VITAMIN D AND TRABECULAR BONE SCORE IN YOUNG LEBANESE ADULTS

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Aim: To explore the relation between serum vitamin D and TBS in a group of young Lebanese adults.

Methods: 54 young Lebanese men (22 normal-weight, 23 overweight and 9 obese) and 61 young Lebanese women (45 normal-weight and 16 overweight) whose ages range from 18 to 35 years participated in this study. Bone mineral content (BMC) and BMD were determined for each individual by DXA at whole body (WB), lumbar spine (L1-L4), total hip (TH), and femoral neck (FN) (GE Healthcare, Madison, WI). Body composition and trabecular bone score (TBS) were also

evaluated by DXA. Serum 25-hydroxyvitamin D level was measured by the Nichols Advantage competitive binding chemiluminescence immunoassay. Vitamin D insufficiency is defined as a 25(OH)D concentration of < 30 ng/ml.

Results: In men ($n = 54$), weight, BMI and fat mass were negatively correlated to TBS ($r = -0.38$; $p < 0.01$, $r = -0.30$; $p < 0.05$ and $r = -0.31$; $p < 0.05$ respectively) while serum vitamin D level was positively correlated to TBS ($r = 0.36$; $p < 0.01$). The positive association between TBS and serum vitamin D remained significant after adjustment for BMI. Vitamin D-sufficient men ($n = 22$) had a significantly higher TBS (1.423 ± 0.081 vs. 1.347 ± 0.082 ; $p < 0.01$) compared to vitamin D insufficient men ($n = 32$). In women ($n = 61$), weight, BMI and fat mass were not significantly correlated to TBS while serum vitamin D level was positively correlated to TBS ($r = 0.47$; $p < 0.001$). The positive association between TBS and serum vitamin D remained significant after adjustment for BMI. Vitamin D-sufficient women ($n = 18$) had a significantly higher TBS (1.417 ± 0.113 vs. 1.364 ± 0.079 ; $p < 0.05$) compared to vitamin D insufficient women ($n = 43$).

Conclusion: Our study suggests that serum vitamin D is a positive determinant of TBS in young Lebanese adults. To our knowledge, this is the first study to find positive correlations between serum vitamin D and TBS in young adults. Optimizing serum vitamin D levels may be associated with higher TBS values in young adults. Our study provides an additional evidence of vitamin D on bone health.

P193

DIAGNOSIS AND TREATMENT OF MYOTONIC AND MYOFASCIAL SYNDROMES OF NECK PAIN

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Objectives: The dynamic monitoring of 195 patients with myotonic and myofascial syndromes of neck pain was done against the control group of 45 people.

Methods: An extended neurological examination was carried out which included roentgenometry of cervical and vertebrocranial areas of spinal column, electromyography of 7 to 9 relevant muscles, finding of the "key" muscle and the overall computer aided assessment of osteomuscular, cardio-respiratory and oxygen transport system disorders.

Results: Clinical and electromyographic criteria for diagnosis of myotonic and myofascial syndromes of neck pain were identified based on the occurrence rates. The role of major system disorders in pathogenesis of neurological manifests of neck pain was studied. New therapeutic approaches to stopping pain and myotonic syndromes were developed; the effectiveness of early rehabilitation measures was demonstrated.

The prevailing myotonic syndromes were identified which were the musculus obliquus capitis inferior syndrome (in 68, or 39.4% patients); superscapular area syndrome (33% of patients); musculus scalenus anterior and musculus scalenus medius syndromes (18.9%); musculus pectoralis minor syndrome (9.7%). Hypodynamia caused system disorders were noted in 78.3% patients including excessive body mass and fat content; reduced blood circulation rate and heartbeat volume and the pronounced decrease of PWC₁₇₀. The most informative spondylographic findings were reduced thickness of posterior areas of intervertebral disks from CI to CVII (52.3 to 77.9% of patients), cervical lordosis impression (76.4%) and uncovertebral arthroses (58.2%).

Conclusion: The most seriously affected ("key") muscles in neck pain patients were found. Diagnosis and treatment strategies for neck pain patients were developed.

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SOME ASPECTS OF REHABILITATION FOR PATIENTS WITH LOW BACK PAIN

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Objectives: Examination of 78 patients with myotonic (MT) syndrome of lumbar osteochondrosis.

Methods: Patients went through the clinical estimation of neurologic status, manual testing of muscles, CT and MRI of back bone lumbar department, interferential and needle electromyography of the most damaged muscular groups, dosed loading veloergometry, revasography of feet, and shins.

Results: It was established for the first time, that among MT-syndrome patients 54 (69,2%) an associated damage of two or more muscles prevailed. The most damaged ("key") muscles appeared to be gastrocnemius muscle (43; 55,1%), gluteus medius (42; 53,82%), quadriceps femoris (36; 46,2%), rectus abdominis and external oblique (32; 41,1%), peroneal muscle (29; 37,2%), piriform muscle (29; 37,2%), lumbar quadratus muscle (28; 35,9%), gluteus maximus (19; 24,3%), gluteus minimus (16; 20,5%), adductor (14; 17,9%) and abductor (9; 11,5%) thigh muscles. Medical-rehabilitation complex on damaged extremity was approved in 27 patients with MT syndrome. The complex included oral reception of katadolon (100 mg 3 times a day for 10 days), tractions on Fintrac-471 table (with force from 3 to 55 kg, a course of 8-10 sessions) and also acupuncture with use acupuncture points of general action with vascular autonomic nervous system orientation (G14, MJ6, E36, RP6, TR5, V40) and locally-segmented points on the most damaged muscular groups (AT60, VB30 with deep introduction to piriform muscle; VB 34, VB41, F3). **Conclusion:** After treatment damaged extremity pain has completely disappeared in 19 patients.

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ACUPUNCTURE TREATMENT FOR PATIENTS WITH LOW BACK PAIN

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Objectives: 78 patients with myotonic (MT) syndromes of lumbar osteochondrosis surveyed in dynamics for the purpose of their early diagnostics, studying of frequency, search of the most interested muscles with revealing of a "key" muscle for applying differentiated acupuncture

Methods: The complex of methods including dynamics of the neurologic status, manual testing of muscles, CT, MRI, electromyography of 5-6 muscular groups, reovasography of feet was used.

Results: Most clinically pronounced were the following syndromes: transverse muscle(23; 29,4%), oblique muscle (32; 41,1%) abdominal muscles, stomach, lumbar quadratus muscles (28; 35,9%), big (19; 24,3%), large (42; 53,8%) and small muscle(16; 20,5%), gluteus, piriform (29; 37,2%), and also adductor (17; 21,8%), abductor (19; 24,3%), quadriceps femoris (41; 52,6%) muscles, gastrocnemius (43; 55,1%) and peroneal (29; 37,2%). In 54 (69,2%) patients prevailed associated (two and more) syndromes. Acupuncture points of general action (GJ4, MJ6, E36, RP6, TR5, V40) and local muscular points were used to stop pain muscular spasm, taking into account the revealed MT-syndromes. Katadolon was additionally prescribed for stable pain syndrome (100mg/days, 10 days) for powerful analgesic, muscle relaxing effects, deleting of «painful memory», preventing of pain chronification. Complex therapy appeared to be effective in 75 (96,2%) patients.

Conclusion: Timely diagnostics of associated MT-syndromes of lumbar osteochondrosis allows to validate adequate therapy methods.

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SOME CLINICAL AND ELECTROMYOGRAPHIC CRITERIA FOR DIAGNOSIS OF MYOTONIC AND MYOFASCIAL SYNDROMES OF NECK PAIN

A. Filippovich¹

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Methods: The dynamic monitoring of 195 patients with myotonic and myofascial syndromes of neck pain was done against the control group of 45 people. An extended neurological examination was carried out which included roentgenometry of cervical and vertebrocranial areas of spinal column, electromyography of 7 to 9 relevant muscles, finding of the "key" muscle and the overall computer aided assessment of

osteomuscular, cardiorespiratory and oxygen transport system disorders.

Results: Clinical and electromyographic criteria for diagnosis of myotonic and myofascial syndromes of neck pain were identified based on the occurrence rates. The role of major system disorders in pathogenesis of neurological manifests of neck pain was studied. New therapeutic approaches to stopping pain and myotonic syndromes were developed; the effectiveness of early rehabilitation measures was demonstrated. The prevailing myotonic syndromes were identified which were the musculus obliquus capitis inferior syndrome (in 68, or 39.4% patients); superscapular area syndrome (33% of patients); musculus scalenus anterior and musculus scalenus medius syndromes (18.9%); musculus pectoralis minor syndrome (9.7%). Hypodynamia caused system disorders were noted in 78.3% patients including excessive body mass and fat content; reduced blood circulation rate and heartbeat volume and the pronounced decrease of PWC_{170} . The most informative spondylographic findings were reduced thickness of posterior areas of intervertebral disks from CI to CVII (52.3 to 77.9% of patients), cervical lordosis impression (76.4%) and uncovertebral arthroses (58.2%).

Conclusions: The most seriously affected ("key") muscles in neck pain patients were found. Diagnosis and treatment strategies for neck pain patients were developed.

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FEATURES OF CEREBROSPINAL FLUID DYNAMIC DISORDERS IN PATIENTS WITH INITIALLY CHRONIC VIRAL ENCEPHALITIS

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Methods: MRI head, spinal cord, research of cerebrospinal fluid and its dynamic, immunological researches.

Results: At an estimation of the received data of general content of IgE in blood serum the following parameters of the food allergy were considered: 0 - absence or below a threshold [0,00-0,34 IU/ml], 1 - threshold level [0,35-0,69 IU/ml], 2 - moderately increased [0,70-3,49 IU/ml], 3 - considerably increased [3,50-17,49 IU/ml], 4 - high [17,5-49,9 IU/ml], 5 - very high [50,0-100 IU/ml], 6 - exclusively high level [$>100,0$ IU/ml]. Thus it is necessary to underline, that threshold level was regarded by us as a fact of presence of a food allergy at patients MS, which indicators (the general IgE) could accrue, especially at increase of available clinical symptoms MS or occurrence of the new symptoms. Thus changes of immunogram indicators simultaneously took place. Among 23 patients with MS surveyed by us, the food allergy is revealed in 4 people (17,4%). It has allowed to exclude the application of glucosteroid therapy, which is counter-

indicative and not safe for patients and to appoint the effective pathogenetic treatment including antiallergic, antihistamine preparations in a combination with probiotics (linex, etc.).

Conclusion: At formation of the program of medical rehabilitation of patients with MS it is necessary to consider not only activity of demyelination process, but also to exclude food allergy presence. It is necessary to exclude also the use of multi-component dishes by patients with MS with a food allergy.

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TECHNICAL MEANS OF REHABILITATION FOR PATIENTS WITH BACK PAIN

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Examination of 78 patients with myotonic (MT) syndrome of lumbar osteochondrosis in the age group of 21-60 years old was conducted. Out of them men – 40 (51,3%), women – 38 (48,7%). Patients went through the clinical estimation of neurologic status, manual testing of muscles, CT and MRI of back bone lumbar department, interferential and needle electromyography of the most damaged muscular groups, dosed loading veloergometry, revasography of feet, and shins.

It was established for the first time, that among MT-syndrome patients 54 (69,2%) an associated damage of two or more muscles prevailed. The most damaged ("key") muscles appeared to be gastrocnemius muscle (43; 55,1%), gluteus medius (42; 53,82%), quadriceps femoris (36; 46,2%), rectus abdominis and external oblique (32; 41,1%), peroneal muscle (29; 37,2%), piriform muscle (29; 37,2%), lumbar quadratus muscle (28; 35,9%), gluteus maximus (19; 24,3%), gluteus minimus (16; 20,5%), adductor (14; 17,9%) and abductor (9; 11,5%) thigh muscles.

Medical-rehabilitation complex on damaged extremity was approbated in 27 patients with MT syndrome. The complex included oral reception of katadolon (100 mg 3 times a day for 10 days), tractions on Fintrac-471 table (with force from 3 to 55 kg, a course of 8-10 sessions) and also acupuncture with use acupuncture points of general action with vascular autonomic nervous system orientation (G14, MJ6, E36, RP6, TR5, V40) and locally-segmented points on the most damaged muscular groups (AT60, VB30 with deep introduction to piriform muscle; VB 34, VB41, F3). Course of treatment - 12-15 sessions.

After treatment damaged extremity pain has completely disappeared in 19 patients, pain essentially decreased and increased tolerance of physical activity in 6 patients. It is established, that katadolon shows not only analgesic and neuroprotective, but also myorelaxing action on muscles of pelvic girdle and feet in patients with acute and chronic pain syndrome.

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ACTIVITY CRITERIA OF DEMYELINIZATION PROCESS

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Methods: 396 multiple sclerosis patients from 15 to 33 years old were examined and assessed by a set of factors: clinical methods, immunoassays, myelinotoxic activity (MTA), CT and MRI of cerebrum and spinal cord, myelinotoxic activity (MTA).

Results: A latent phase (the first group, 79 patients, 19.9%) is characterized by slight increase in MTA of blood serum (7.6 ± 1.2 units; control group – 3.9 ± 0.82 units; $p < 0.001$), decrease of CD4+ in blood ($34.8 \pm 1.64\%$, control group – $40.1 \pm 2.4\%$; $p < 0.001$) and by large increase in CIC levels (92.56 ± 3.1 optical units compared to 69.32 ± 4.28 in control group; $p < 0.001$).

A slow progradient phase of MS (second group, 156 patients, 39.4%) is distinguished by moderate evident (apparent) increase in MTA of blood serum (22.3; $p < 0.01$ in comparison with 1st group), significant decrease of T-lymphocyte in blood serum by 32.4%, CD22+ by 71.1%, CD4+ by 33.9%, CIC levels by 12.4%, along increase in CD8+ by 1.3 times, weak induction of TNF- α at 84.3%; IL-8 at 4.8% patients. An acute phase (third group, 144 patients, 36.3%) coupled with significant increase in MTA of blood serum (40.4 ± 1.22 units) in comparison with 1st and 2nd groups. Acute condition of MS distinguished by significant increase in blood CD8+, IL-2P+, Ig G,A,M, CIC level along decrease of T-lymphocyte ($51.7\% \pm 1.56\%$) and CD22+ levels. Increase in IL-2P+ at 64.1% patients coupled with significant increased TNF- α и IL-8. In the fourth group (17 patients, 4.4%) fast progress of MS distinguished by high MTA level of blood serum (78.2 ± 4.4 units), persistent immunological changes: increase in CD4+, CD8+, IL-2P+, IgG, IgM, IgA, CIC along decrease of T-lymphocyte, CD22+. In comparison with 3rd group significant decrease of CD8+ along increase in CIC took place.

Conclusions: Measurement of blood serum MTA and immune reactivity in combination with clinical and MRI findings helps to correctly estimate the rate of demyelination in multiple sclerosis patients.

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Aim: To compare compression strength index (CSI), bending strength index (BSI) and impact strength index (ISI) among obese, overweight and normal-weight young women.

Methods: 117 young women (20 obese, 36 overweight and 61 normal-weight) whose ages range from 18 to 35 years participated in this study. Bone mineral content (BMC) and BMD were determined for each individual by DXA at whole body (WB), lumbar spine (L1-L4), total hip (TH), and femoral neck (FN) (GE Healthcare, Madison, WI). Body composition was also evaluated by DXA. Composite indices of femoral neck strength (CSI, BSI and ISI) were calculated as previously described [1].

Results: WB BMC and WB BMD were significantly higher in obese women compared to normal-weight women ($p < 0.05$). Lumbar spine BMD was not significantly different among the three groups. TH BMD and FN BMD were significantly higher in obese women compared to normal-weight women ($p < 0.001$). CSI, BSI and ISI values were significantly lower in obese and overweight women compared to normal-weight women ($p < 0.001$). In the whole population ($n=117$), BMI was negatively correlated to CSI ($r=-0.66$; $p < 0.001$), BSI ($r=-0.56$; $p < 0.001$) and ISI ($r=-0.54$; $p < 0.001$) but positively correlated to WB BMC ($r=0.27$; $p < 0.01$), WB BMD ($r=0.36$; $p < 0.001$), TH BMD ($r=0.32$; $p < 0.001$) and FN BMD ($r=0.27$; $p < 0.01$). Moreover, body weight was negatively correlated to CSI ($r=-0.58$; $p < 0.001$), BSI ($r=-0.50$; $p < 0.001$), ISI ($r=-0.38$; $p < 0.001$) but positively correlated to WB BMC ($r=0.45$; $p < 0.001$), WB BMD ($r=0.47$; $p < 0.001$), TH BMD ($r=0.38$; $p < 0.001$) and FN BMD ($r=0.39$; $p < 0.001$). Finally, fat mass percentage was negatively correlated to CSI ($r=-0.62$; $p < 0.001$), BSI ($r=-0.52$; $p < 0.001$), ISI ($r=-0.46$; $p < 0.001$) but positively correlated to WB BMD ($r=0.20$; $p < 0.05$).

Conclusion: This study suggests that obesity is associated with lower CSI, BSI and ISI values in young women. Implementing strategies to increase femoral neck strength indices in young obese women may be useful for preventing osteoporotic fractures later in life.

Reference: Karlamangla AS et al. Osteoporos Int 2004;15:62.

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DECREASED COMPOSITE INDICES OF FEMORAL NECK STRENGTH IN YOUNG OBESE WOMEN

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THE NATURAL ANTIOXIDANTS LYCOPENE AND POLYPHENOLS SHOWN PREVIOUSLY TO LOWER THE RISK OF POSTMENOPAUSAL OSTEOPOROSIS ARE NOW SHOWN TO STIMULATE BONE FORMATION AND INHIBIT OXIDATIVE STRESS IN OSTEOBLASTS CULTURED IN-VITRO

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Separate clinical trials previously showed that tomato lycopene and polyphenol-containing nutritional supplements lowered the risk of postmenopausal osteoporosis with increased total antioxidant capacity and decreased lipid and protein oxidations and bone resorption marker (1,2).

Objectives: To delineate the mechanisms involved in the action of lycopene and polyphenols *in vitro* on the bone-forming osteoblasts cells.

Materials and Methods: *Lycopene Study*; cloned human CD34+ osteoblasts were pre-treated separately with 1 mM of various *cis:trans* lycopene for 48 hours prior to or after induction of oxidative stress with 250 mM of H₂O₂ for 3 hours. *Polyphenol Study*; Extracts of nutritional supplements greens+TM or bone builderTM were added alone or in combination to osteoblasts SaOS-2 cells. For both studies, Mineralized bone nodule formation (MBNF) was quantified using Von Kossa stain and the oxidative stress parameter reactive oxygen species (ROS) measured using a fluorescent dye assay.

Results: *Lycopene Study*; Addition of H₂O₂ resulted in significant increase in ROS. ($p < 0.001$), and a decrease in MBNF (both: $p < 0.001$). Pre- and post-treatment with 45:55 or 28:72 but not with 5:95 *cis:trans* lycopene resulted in significant lower ROS ($p < 0.001$) and higher MBNF ($p < 0.05$), compared to treatment with H₂O₂ alone. *Polyphenol Study*: greens+TM alone inhibited ROS in a dose-dependent manner. greens+TM, and the bone-builderTM extracts when added separately had a significant dose-dependent stimulatory effect on MBNF, while a combination was six times more effective than either one alone. (significant, $p < 0.05$).

Conclusions: The beneficial effects of lycopene and polyphenols from nutritional supplements in lowering the risk of postmenopausal osteoporosis may be attributed to their antioxidant properties to lower oxidative stress and ability to stimulate bone formation in osteoblasts. The results of our clinical and *in vitro* studies provide good evidence for the potential use of these natural antioxidants as alternative or complementary agent with other drugs for the prevention and management of postmenopausal osteoporosis.

References:

- (1) Rao LG et al. Osteoporos Int 2007;18:109.
- (2) Kang NN et al. J Nut Health Aging 2012;1:183.

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EFFECT OF IBANDRONATE THERAPY ON SERUM HOMOCYSTEINE AND LEPTIN IN POSTMENOPAUSAL OSTEOPOROTIC FEMALES

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Objective: The incidence of osteoporosis and osteoporotic fractures is increasing in the world. Therefore, it is essential to find out the modifiable risk factors contributing to osteoporosis. The current study was planned to determine the effects of ibandronate on serum homocysteine and leptin levels in postmenopausal osteoporotic females and to correlate these with BMD.

Methods: Forty-two newly diagnosed and untreated postmenopausal osteoporotic females were selected on the basis of their BMD (BMD < -2.5) from Orthopaedic Outpatient Department of Shaikh Zayed Hospital, Lahore, Pakistan and thirty-six, age and BMI matched nonosteoporotic postmenopausal females were also selected as a control group. Baseline physical and biochemical parameters were compared. In osteoporotic patients, changes in circulating leptin and homocysteine levels were studied after six months therapy with ibandronate (150 mg). The collected data was analyzed on SPSS 16.

Results: There was no significant difference observed in the mean value of all baseline parameters except BMD in both groups. After six months treatment with ibandronate, a significant change was observed in serum leptin levels (19.48±1.60 ng/ml vs. 14.09±0.85 ng/ml, $p < 0.002$), while no considerable change observed in serum homocysteine levels (16.22±0.95 μmol/l vs. 16.80±1.03 μmol/l, $p < 0.63$). Serum leptin was found significantly correlated with anthropometric parameters. No correlation of serum leptin and homocysteine was found with BMD ($r = 0.09$, p -value=0.54; $r = -0.17$, p -value=0.27).

Conclusion: Our results show that the ibandronate reduces serum leptin levels while it has no effect on serum homocysteine levels. Further studies are needed to explain how the decrease in serum leptin level may help in reducing the progression of osteoporosis.

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CALCANEAL ULTRASOUND ASSESSMENT OF BONE HEALTH AND ASSOCIATION OF SOCIO-DEMOGRAPHIC CHARACTERISTICS WITH BONE

MINERAL DENSITY IN PRE AND POSTMENOPAUSAL FEMALES

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Objective: The current study was planned to measure the bone status and to identify associated risk factors, so that further strategy can be developed for preventing and managing osteoporosis in females.

Methods: The present study was conducted at a tertiary care hospital. Females of age group 20-80 years were included in the study, 1810 females were assessed for their eligibility for the present study, and finally 1205 females were selected. From all participants, information was collected about socio-demographic characteristics (age, marital status, education, occupation, place of living), medical history and gynecological history. The bone mineral density (BMD) assessment was done on the calcaneus (heel) by peripheral ultrasound bone densitometry. The collected data was analyzed with SPSS 22.0.

Results: Univariate analysis showed that education (secondary and primary education, illiterate), age (30-39 yrs, and 60-69 yrs) and occupation (housewives) were significantly associated with low bone mass density (LBMD). Multivariate analysis showed that primary education (OR=3.83, 95%CI 2.30 - 6.38), illiterate (OR=3.83 95%CI 2.52 - 5.82) and age 30-39 years (OR=0.25 95%CI 0.13 - 0.49), age 40-49 years (OR=0.30 95%CI 0.15 - 0.59), age 50-59 years (OR=0.42 95%CI 0.22 - 0.79), were significantly associated with low bone mineral density (LBMD). The prevalence of osteoporosis and osteopenia was 27.2%, 29.8%, respectively, while 43% subjects had normal BMD. In the premenopausal group, 9.9% and 32.2% were osteoporotic and osteopenic respectively and in the postmenopausal group, 39%, 28.1% were osteoporotic and osteopenic respectively.

Conclusion: Our results show that within our country population, the prevalence of osteopenia and osteoporosis is very high, and osteopenia occurs at a very early age and less educated or illiterate women have more chances to have LBMD.

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ASSOCIATION OF SERUM LEPTIN WITH BONE MINERAL DENSITY IN POSTMENOPAUSAL OSTEOPOROTIC FEMALES

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Objective: Leptin plays a pivotal role in body weight control and it is considered a regulator of bone mass density. This study was aimed at finding out whether leptin is a predictor of bone mass density (BMD) in premenopausal women (PMW) and postmenopausal osteoporotic women (PMOPW) or if it has any association with BMD.

Methods: 192 women (98 PMOPW and 94 PMW) were recruited for this study. The control group was BMI matched with osteoporotic subjects. BMD assessment was done on the calcaneus by peripheral ultrasound bone densitometry. Serum leptin concentrations were measured by ELISA.

Results: Serum leptin and BMD values were significantly different in both groups (leptin, 18.56±8.65 ng/ml vs. 21.64±9.80 ng/ml, p=0.02) and (BMD, -.70±.19 vs. -.3.17±.59, p=0.000), respectively. In PMOPW, the Serum leptin and BMD were considerably correlated with weight (lep, r=0.53, p≤0.001; BMD, r=-0.21, p=0.02), BMI (lep, r=0.52, p≤0.001; BMD, r=-0.27, p=0.005), waist circumference (lep, r=0.61, p≤0.001; BMD, r=0.18, p=0.04), hip circumference (lep, r=0.58, p≤0.001). Multivariate linear stepwise regression analysis showed that weight and BMI in PMW and PMOPW, were independent predictors of BMD. In both groups, the serum leptin level was not the predictor of BMD.

Conclusion: The present results indicate that body weight and BMI have an impact on BMD, while serum leptin is not associated with BMD in both PMW and PMOPW.

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IMMUNOLOGICAL MONITORING OF OSTEOARTHRITIS SPA TREATMENT

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A differentiated treatment of 55 patients with osteoarthritis (OA) depending on the disease stage activity, presence of synovitis, as well as associated diseases was carried out in Gelendzhik resort in terms of Mediterranean seaside-mountain climate with moderate humidity.

Aim: To objectify activity, stage and spa treatment efficiency evaluation the immobilized granular antigen drugs with

magnetic properties based on collagen type I and II were used in the diagnostic test complex.

Materials and methods: A correlation between the level of specific antibodies, articular cartilage destruction degree and inflammation in the synovial membrane severity was observed in immunoassay (ELISA) method.

Results: Thus, when rapidly progressive OA, the antibodies level to collagen I was 0.115 ± 0.020 , to collagen II 0.118 ± 0.023 in comparison with healthy persons (to collagen I 0.026 ± 0.003 , to collagen II 0.030 ± 0.002). Regarding radiological stage OA, the highest antibodies level to collagens I and type II was in stage III. The role of synovitis in the development and OA progression deserves special attention being one of the most frequent complications of degenerative processes in joints with OA, secondary synovitis exacerbates the disease, increases arthralgia severity and is accompanied by dysfunction of the joints. With the development of reactive synovitis in OA patients, the antibody level to collagen of types I and II increases (type I -0.128 ± 0.013 , II -0.124 ± 0.01), unlike patients without signs of synovitis (type I -0.089 ± 0.01 , II -0.093 ± 0.01).

Conclusion: The surveyed patients, who were treated with iodine-bromine baths and magnetic therapy, manifested the reduction of joint pain, signs of reactive synovitis, improved joint function, and reduction of anti-inflammatory drug use.

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COMBINATION OF TERIPARATIDE AND DENOSUMAB ACCELERATE PROXIMAL FEMUR FRACTURE HEALING

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Background: Teriparatide and denosumab as isolated therapy has been shown to increase bone mineral density and to reduce the rate of fractures in patients with osteoporosis. Teriparatide alone could improve fracture healing. The purpose of the present prospective, randomized, study was to evaluate the effect of combined therapy on the course of proximal femoral fracture-healing and functional outcome in postmenopausal women that was not receiving any osteoporotic medications prior to fracture.

Methods: One hundred eighty patients had routine dual radiographs, to document proximal femoral fractures all fractures internally fixed with gamma nail one or two days post admission. Sixty patients (group 1) received a once-daily injection of 20 [μg] of PTH starting within two days after admission to the hospital, and forty-six (group 2) patients received denosumab 60 mg subcutaneous injection starting second day after surgery, repeated every six months and seventy four patients (group 3) received combined therapy. All

patients received 1200 mg of calcium and 800 IU of vitamin D. plain radio graphs were repeated every fourth week until radio graphic evidence of fracture healing was confirmed. Functional outcome was assessed with use of Western Ontario and McMaster Universities Osteoarthritis (WOMAC) index and the Short Musculoskeletal Functional Assessment (SMFA)

Results: The mean time to fracture healing was 12 weeks for (group 1), compared with 12.6 weeks for (group 2) and 9 weeks for (group 3). At 16 weeks, all fractures in the treatment group were healed. Healing was assessed radiologically.

Conclusions: Evidence that teriparatide combined with denosumab promote fracture healing and improves the functional outcome in cases of proximal femoral fracture more than either drug alone.

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SUBJECTIVE SLEEP QUALITY IN SARCOOPENIC VS. NON-SARCOOPENIC OLDER ADULTS FROM THE SARCOPHAGE COHORT

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Objective: The present analysis seeks to compare subjective sleep quality measures between sarcopenic and non-sarcopenic elderly subjects diagnosed following 6 different definitions of sarcopenia.

Material and Methods: Cross-sectional data used in this analysis were collected from the SarcoPhAge (for *Sarcopenia and Physical Impairment with Advancing Age*) cohort, a prospective study aiming to assess the incidence of sarcopenia and its related clinical and physical parameters among subjects aged 65 years and over. A diagnosis of sarcopenia was established according to 6 different definitions: Baumgartner *et al*, 1998; Delmonico *et al*, 2007; Cruz-Jentoft *et al*, 2010; Fielding *et al*, 2011; Morley *et al*, 2011; Studenski *et al*, 2014. For this purpose, 3 main assessments were carried out: an evaluation of lean mass using Dual-Energy X-Ray Absorptiometry (Hologic Discovery A, USA), a measure of muscle strength with a hand-dynamometer (Saehan Corporation, MSD Europe Bvba, Belgium) and an assessment of physical performance by the Short Physical Performance Battery test. To evaluate the subjective quality parameters of participants' sleep, we used the validated French version of the Pittsburgh Sleep Quality Index (PSQI). This self-administered questionnaire evaluates 7 different components of sleep. Points are awarded to each aspect (maximum 3 points) and are added to obtain a total score (maximum 21 points). The higher the score, the more it reflects major sleep difficulties.

Results: A total of 255 individuals, aged 74.71±5.79 years, have completed the questionnaire. Depending on which of the 6 different definitions was employed for the diagnosis, the prevalent cases of sarcopenia ranged from 15 subjects (5.88%) to 83 subjects (32.55%). Only one definition gave rise to a significant difference between sarcopenic and non-sarcopenic subjects (Cruz-Jentoft *et al*, 2010). It indicated that sarcopenic participants had higher scores for 2 of the sleep components: the sleep latency and the day-time dysfunction, which would both be altered in sarcopenic subjects compared to others ($p=0.003$ and $p=0.048$, adjusted for age and number of co-morbidities). However, for the 5 other definitions, there was no statistically significant difference between sarcopenic and non-sarcopenic subjects regarding the PSQI score or any of its 7 components separately.

Conclusion: No major clinically relevant differences in subjective sleep quality between sarcopenic and non-sarcopenic subjects were found, regardless of the definition of sarcopenia employed.

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THE RISK OF SUBSEQUENT OSTEOPOROTIC FRACTURES IS DECREASED IN PATIENTS EXPERIENCING FRACTURE WHILE ON DENOSUMAB: RESULTS FROM THE FREEDOM AND FREEDOM EXTENSION STUDIES

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Objective: Assess the risk of subsequent fracture among patients experiencing fracture on FREEDOM and FREEDOM Extension (Ext).

Materials and Methods: In FREEDOM, postmenopausal women with osteoporosis were randomized to placebo (pbo) or denosumab (DMAb) for 3 yrs. During the 7-yr Ext, all subjects received DMAB. We report subsequent osteoporotic (OP) fractures (new vertebral or nonvertebral) in subjects who received ≥ 2 doses of DMAB during FREEDOM or Ext, had an OP fracture on treatment, and continued treatment post-fracture, compared with subsequent fractures in pbo subjects. Subsequent fractures were analyzed as recurrent events using a stratified Cox model with the robust variance estimation adjusting for prior fracture.

Results: During FREEDOM, 438 pbo and 272 DMAB subjects had an OP fracture (mean age at first on-study fracture: 74.1 and 74.5 yrs). Of these, 54 (12.3%) and 24 (8.8%) subjects had ≥ 1 subsequent fracture in the pbo and DMAB groups, respectively. Adjusted subject incidence per 100 patient-yrs was lower for DMAB (6.7) vs. pbo (10.1). Combining all DMAB subjects from FREEDOM and Ext, 794 (13.7%) had an OP fracture (mean age at first on-study fracture: 76.5 yrs). Of these, ≥ 1 subsequent fracture occurred in 144 (18.1%) subjects, with an adjusted subject incidence of 5.8 per 100 patient-yrs, similar to FREEDOM DMAB (6.7 per 100 patient-yrs). Among subjects with ≥ 1 subsequent fracture, 90% had only 1, and spine fracture was most frequent. The risk of having subsequent on-study OP fracture was lower in all DMAB subjects compared with pbo (HR 0.60 [95% CI: 0.43–0.81]; $p=0.0012$).

Conclusions: The risk of a second fracture with continued DMAB treatment remains lower than pbo, suggesting a fracture sustained while on DMAB is not necessarily indicative of treatment failure, and treatment continuation should be considered.

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Wang – employee and holds stock of Amgen. HG Bone – grants/research support from Amgen, Merck, Shire; consultant for Amgen, Merck, Grunenthal; Speakers' Bureau for Amgen, Shire.

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EFFECTS OF UP TO 10 YEARS OF DENOSUMAB TREATMENT ON BONE MATRIX MINERALIZATION: RESULTS FROM THE FREEDOM EXTENSION (EXT)

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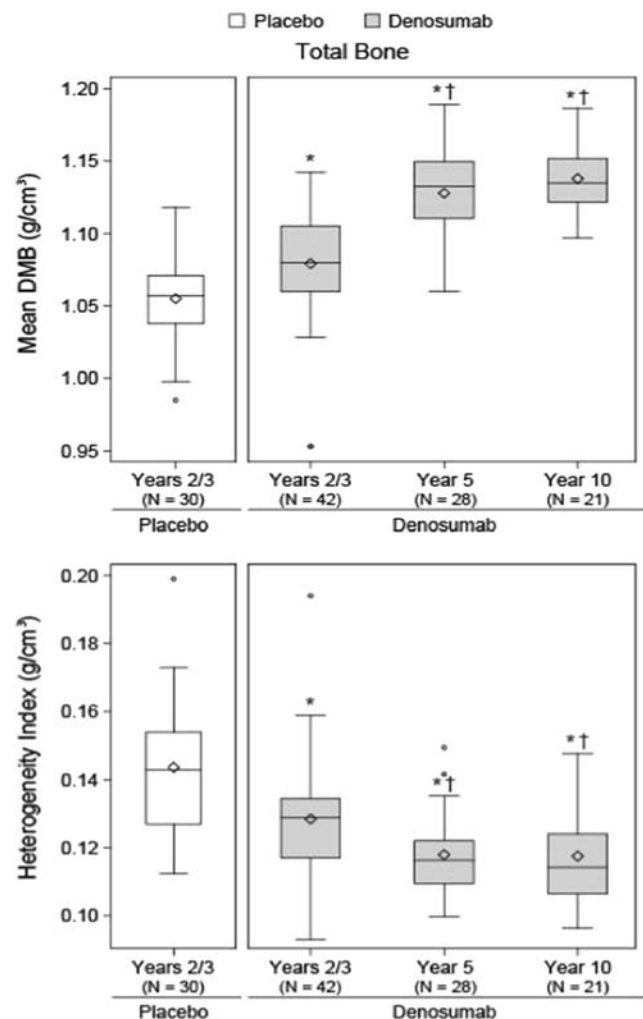
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Objective: Report bone matrix mineralization indices at yrs 2 and 7 of the FREEDOM Ext, representing 5 and 10 yrs of DMB treatment, respectively.

Materials and Methods: Transiliac crest bone biopsies were performed at yr 2 and/or 3 of FREEDOM (Reid *JBMR* 2010) and yrs 2 (Brown *JBMR* 2015) and 7 (Dempster *ASBMR* 2016) of the Ext. Bone matrix mineralization was assessed by digitized quantitative microradiography in a blinded fashion and analyzed using a Matlab program (Montagner *J X-Ray Sci Technol* 2015). The mean degree of mineralization of bone (DMB) and heterogeneity index (HI) of DMB were calculated for cancellous and cortical bone, endocortical and periosteal cortical sub-compartments, and total bone.

Results: Biopsies from 72 women in FREEDOM (30 placebo, 42 DMB at 2 or 3 yrs) and 28 and 21 women in the Ext who had received DMB for a total of 5 and 10 yrs, respectively, were evaluated. Subject demographics in this sub-study were comparable to FREEDOM. Through 10 yrs, DMB resulted in significant increases in mean DMB and a significantly lower HI in total bone compared with placebo ($p < 0.05$; Figure). There were no significant differences in mean DMB or HI between 5 and 10 yrs of DMB treatment; DMB and HI plateaued between 5 and 10 yrs. Similar results were seen in all bone compartments assessed.

Conclusions: These data suggest mean DMB reaches a maximum by yr 5. Clinical outcomes (BMD gains and low fracture incidence) with DMB through 5 yrs likely reflect closing of the remodeling space and increases in secondary mineralization of bone matrix. Additional mechanisms may contribute to long-term clinical outcomes, including reduction in cortical porosity and preservation of modeling-based bone formation.



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PREVALENCE OF JOINT PAIN AND OSTEOARTHRITIS IN OBESE BRAZILIAN POPULATION

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Purpose: To define the prevalence of joint pain and osteoarthritis of the knees and hips in obese patients awaiting bariatric surgery.

Material and Methods: Prevalence study (cross-sectional) conducted in patients referred to bariatric surgery. We applied the visual analogue pain scale (VAS) and the WOMAC questionnaire. X-rays of the hips and knees were evaluated. The primary endpoints were self-reported joint pain and the diagnosis of osteoarthritis by clinical and radiological criteria of the American College of Rheumatology.

Results: 141 patients were interviewed (85.1% women) with a mean age of 40 years. The mean body mass index was 46. The lumbar spine and knee joint were the most commonly reported as painful (77.9% and 73.2% respectively). Prevalence of osteoarthritis of the knees or hips was 77.7%. Prevalence of knee osteoarthritis was 63.1% and hip osteoarthritis was 40.8%. Age, mean VAS and WOMAC scores were higher in the osteoarthritic individuals.

Conclusion: We found a prevalence of 90.1% of pain symptoms and 77.7% of osteoarthritis in hips or knees, in morbidly obese patients referred to bariatric surgery. The prevalence of knee osteoarthritis was 63.1% and hip osteoarthritis was 40.8% in this sample.

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MOBILE AND WIRELESS TECHNOLOGY TO COMBAT OSTEOPOROSIS USING ONLINE PROGRAM OF GOOD NUTRITION AND WRIGHT DIET: PREVENTION AND PART OF THE TREATMENT OF OSTEOPOROSIS.

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Introduction: It is too much easier and cheaper to prevent a decrease a bone density and fractures, than in the future to treat osteoporosis and its complications.

Materials and methods: We used an online system for patient education based on the video lessons, full of humor, pictures, and cartoons to convey the necessary information on good nutrition, necessary to do exercises and the need for exposure to the sun to our patients.

Results: Watching the short movies, the patients formed the habits of good nutrition during the first month already, which includes a diet with restriction of fat, digestible carbohydrates and daily consumption of low-fat dairy products, slow carbohydrates, protein and fiber. We also

presented recommendations for compliance with the physical activity, as well as vitamin D consumption. A patient was in touch with a doctor-endocrinologist, if he has any additional questions. We examined data from a survey of 500 patients registered in the online system www.rightdiet.ru and 50 patients control group who were given the same recommendations on the appointment. Surprisingly, the consumption of milk and dairy products increased by 2.7 times, compared with patients in the control group. The exposure to the sun was observed 15 to 30 minutes daily, compared with the control group 5-10 minutes. Regular physical activity were the main group of 260 minutes per week, in control group 80 minutes per week.

Conclusions: Very important how we can make delivery of the material. We live in a world of high technologies and lack of time. Often the patient has no opportunity to go to the doctor for an appointment, and during reception it is not always possible to discuss all aspects, and even if it was possible, some information is forgotten by patients. So we need to improve the quality of information material, including using online technologies to improve the quality and duration of life of our patients

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RADIOGRAPHIC MEASUREMENTS IN THE HIP JOINT AND PATIENT-REPORTED OUTCOMES: A POPULATION-BASED STUDY

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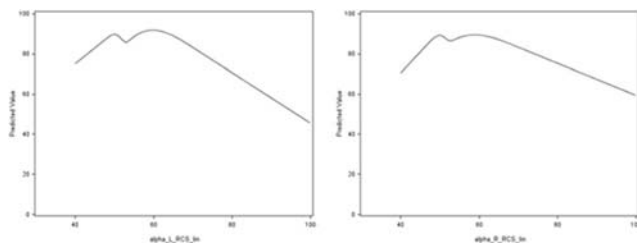
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Objectives: Radiographic measurements of alpha angle and lateral centre edge angle in the hip joint are important for the diagnosis of femoroacetabular syndrome, a major risk factor for hip osteoarthritis. Our objective was to determine if these measurements are associated with hip-related patient-reported outcomes (PROs) in young and middle-aged individuals in the general population.

Materials and Methods: A stratified random sample of Caucasian men and women aged 20-49 with and without hip

pain was selected using random digit dialling from the population of Metro Vancouver, Canada. The alpha and lateral centre edge angles were measured bilaterally on x-ray using Dunn and AP views, respectively. PROs were measured by the Copenhagen Hip And Groin Outcome Score (HAGOS), which has scales for symptoms, pain, daily activities, sports, physical activity, and quality of life. We performed descriptive analyses and a regression analysis with restricted cubic splines, adjusted for age and sex and weighted for sampling design.

Results: Data were obtained for 499 subjects. Alpha angle distribution was bimodal (modes at 50–55 and 60–65) with a mean at 54°. Lateral centre edge angle distribution was symmetric with a mean of 34°. In the spline analysis, higher alpha angle was generally associated with better HAGOS scores for alpha < 50° and worse scores for alpha > 60°. The associations were statistically significant for symptoms (Left and Right, see Figure), daily living (R), sports (L and R), physical activities (L and R), and quality of life (R). No association was found between the lateral centre edge angle and HAGOS scales.



Conclusions: In young and middle-aged individuals, alpha angle, but not lateral centre edge angle, is associated with patient-reported hip outcomes, such as symptoms, function, activity, and quality of life.

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DENOSUMAB TREATMENT FOR 10 YEARS IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS WAS ASSOCIATED WITH SUBSTANTIALLY LOWER FRACTURE INCIDENCE RELATIVE TO THEIR BASELINE FRAX-PREDICTED PROBABILITY

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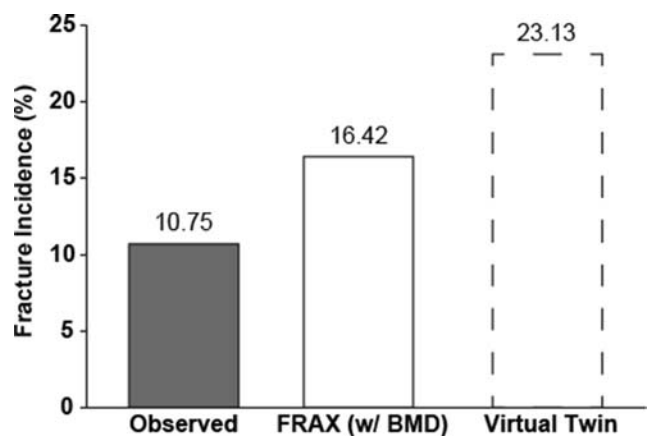
Purpose: Compare cumulative 10-yr incidence of major osteoporotic (MOP; hip, spine, forearm, humerus) and hip fracture (fx) in subjects completing FREEDOM Extension (Ext) with 1) 10-yr fx probability predicted by FRAX, 2) that estimated for a hypothetical cohort of 10-yr placebo (pbo) controls.

Methods: Subjects in this analysis received 10 yrs of DMAB (3 yrs FREEDOM; 7 yrs Ext; 60 mg Q6M), completed the 10-yr visit, and missed ≤ 1 dose in FREEDOM and ≤ 1 dose in the Ext (n=1,278). Kaplan-Meier estimates of cumulative 10-yr incidence of MOP and hip fx were calculated; 10-yr fx probability predicted by FRAX (with femoral neck BMD) at FREEDOM baseline was also calculated. MOP fx rate in a hypothetical cohort of 10-yr pbo controls (virtual twins) was estimated using simulation and baseline characteristics identical to the 10-yr DMAB completer group.

Results: The observed cumulative 10-yr fx incidence (95% CI) was lower than the 10-yr mean (SD) fx probability predicted by FRAX for both MOP (10.75% [9.05%–12.46%] vs. 16.42% [9.06%]) and hip (1.17% [0.58%–1.76%] vs. 6.14% [6.52%]) fx. The observed cumulative 10-yr MOP fx incidence was significantly lower than that estimated for the virtual twins (10.75% [9.05%–12.46%] vs. 23.13% [17.76%–28.87%]; RR=0.49 [0.36–0.64]).

Conclusions: Fx incidence with 10 yrs of DMAB treatment was lower than the 10-yr probability predicted by FRAX for both MOP and hip fx. 10-yr MOP fx incidence was also lower than the fx rate estimated in a hypothetical cohort of 10-yr pbo controls. These data support the long-term efficacy of DMAB in reducing MOP and hip fx.

Figure. Ten-year Observed, FRAX-predicted, and Virtual Twin-estimated MOP Fracture Incidence



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OSTEOSARCOPENIA: A PRACTICAL APPROACH FOR THE PREVENTION OF FALLS AND OSTEOPOROTIC FRACTURES

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In older persons, the combination of osteopenia/osteoporosis and sarcopenia - known as osteosarcopenia - has been proposed as a subset of frailer individuals at higher risk of institutionalization, falls, and fractures. Osteosarcopenic patients have very particular clinical, biochemical, diagnostic, and functional characteristics that could be identified in clinical practice. In addition, new therapies targeting both muscle and bone are being developed. In this symposium, we will present a clinical definition of osteosarcopenia aiming to describe the clinical, functional, and biochemical features that are unique to these patients. The use of imaging combined with functional assessments for the diagnosis of osteosarcopenia will be discussed. In addition, we will analyze preventive measures and therapeutic interventions that can benefit both muscle and bone simultaneously. We intend to go over the translational aspects of sarcopenia and osteoporosis research, and highlight expected outcomes from different interventions for both conditions. We will initially review the clinical, functional and biochemical characteristics of this syndrome (Dr. Frisoli). Next, we will discuss the benefits and

limitations of current diagnostic schemes for both conditions. For instance, the benefits and limitations of dual energy X-ray absorptiometry (DXA) as a diagnostic and research tool will be analyzed (Dr. Binkley). Then, we will discuss evidence-based diagnostic and therapeutic interventions that pose promising opportunities for both conditions, which include the review of nutritional, physical activity and pharmacological interventions (Prof. Duque). Finally, we will translate this information into practical approaches that can improve older adult care.

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PHYSICAL ACTIVITY, NUTRITION AND BONE MINERAL DENSITY IN OLDER ADULTS

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The main purpose of this study was to evaluate the association between habitual physical activity, nutritional intake and BMD in elderly. The sample consisted of 128 participants, 91 women (71.1%), aged between 60 and 84 years old. Data collection comprised: (i) questionnaire to collect demographic data; (ii) Dual-energy X-ray absorptiometry (DXA -total and hip) for body composition and bone density measurement; (iii) accelerometers (7 days) to assess habitual physical activity; (iv) nutritional intake was assessed by food records (4-days recall). For statistical analysis descriptive statistics, student t-test for independent measures, Pearson's correlation coefficient were used and for analysing BMD in function of nutritional intake the Generalized Linear Models was used. The level of significance in all tests was 5%. Results showed: (i) a statistical significant association between anthropometric variables, namely, weight, height and muscle mass, and bone density; (ii) no statistical differences in mean physical activity according to the T-score value was observed; (iii) considering nutritional intake, a statistically significant association was found between the average intakes of vitamin A, vitamin K as a function of the T-score value in men, but in women, only a statistically significant association was found in the consumption of saturated fatty acids and vitamin D. The findings of this study indicate that the older subjects with a greater weight, taller and with larger amounts of muscle mass, present healthier values of bone mineral density. In spite of habitual physical activity did not have a significant effect on BMD it seems that nutritional intake, particularly in relation to vitamin D, vitamin A, vitamin K and saturated fatty acids, seems to be important to bone health of older adults.

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RELATIONSHIPS BETWEEN MARKERS OF INFLAMMAGING AND MUSCLE MASS, STRENGTH AND FUNCTION: RESULTS FROM THE HERTFORDSHIRE COHORT STUDY

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Objectives: To investigate the longitudinal relationships between markers of inflammaging and the following outcomes in a population-based UK cohort study: appendicular lean mass, walking speed, level and change in grip strength and EWGSOP sarcopenia.

Materials and Methods: Analyses were based on a sample of 336 community-dwelling older men and women (aged 59 to 70 years) who participated in the Hertfordshire Cohort Study (HCS). Inflammaging markers were ascertained at baseline using enzyme-linked immunosorbent assay (ELISA) techniques and Bio-Plex Pro Assays. Grip strength was measured at baseline and follow-up (median follow-up time: 10.8 years [inter-quartile range 10.2 to 11.6]) and change in grip strength was ascertained using a residual change approach. At follow-up, appendicular lean mass was ascertained using DXA; customary walking speed was measured; and EWGSOP sarcopenia status was ascertained. Gender-adjusted linear and Poisson regression was used to examine the associations between inflammaging markers and outcomes with and without adjustment for anthropometric and lifestyle factors.

Results: Mean (SD) age at baseline was 63.8 (2.5) and 65.6 (2.7) years among men and women respectively. Higher levels of CRP were associated ($p < 0.04$) with lower grip strength and higher appendicular lean mass at follow-up, and accelerated decline in grip strength from baseline to follow-up. Higher levels of IL-1Ra were associated ($p < 0.05$) with slower walking speed; and higher levels of cortisol and IL-8 were associated with lower appendicular lean mass ($p < 0.05$). Higher levels of IL-8 were also associated with increased risk of sarcopenia (fully-adjusted relative risks per SD increase in IL-8: 1.37 [95%CI: 1.10, 1.71], $p = 0.005$). All associations were robust in gender adjusted and fully adjusted analyses.

Conclusions: This study provides evidence that markers of inflammaging are associated with muscle mass, strength and function in community-dwelling older people. These relationships may partly explain the link between elevated levels of inflammaging and age-related outcomes such as morbidity,

mortality and functional decline. Further work is required to replicate these associations and to delineate the underlying biological mechanisms.

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BOTH HIGH AND LOW SERUM SEROTONIN LEVELS PREDICT INCIDENT NON-VERTEBRAL FRACTURES

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Objectives: To investigate if circulating serotonin is associated with incident fractures and falls in elderly men.

Material and methods: The MrOS (osteoporotic fractures in men) study is a population based study of elderly men. In the Swedish Gothenburg part, 950 men (aged 69-81 years) with baseline serotonin measurements were included. Fasting serum serotonin was measured with enzyme-linked immunosorbent assay (Immuno-Biological Lab Inc, Minneapolis MN, USA). Risk for fracture was determined by Cox proportional hazards models.

Results: In total 233 incident fractures were observed in radiographic registers up to 10 years from baseline, of which 104 were non-vertebral fractures with 60 hip fractures. Serotonin levels were positively associated with hand grip strength

($r=0.09$, $P=0.005$), inversely with total hip bone mineral density (BMD) ($r=-0.10$, $P=0.003$) and body mass index (BMI) ($r=-0.13$, $P<0.0001$), but not with lumbar spine BMD ($r=-0.04$, $P=0.20$). Serum serotonin was associated with all fractures in a non-linear way tested with quadratic term models ($P=0.03$) indicating u-formed risk curve with quintiles of serotonin. No association was seen between serotonin and all fractures in linear models. The hazard ratio (HR) was 1.93 (CI 1.19-3.13) for non-vertebral fracture when comparing quintile 1 to quintile 2-4 (referent group) and 2.36 (CI 1.51-3.71) for quintile 5 vs. referent group. The HR for hip fracture was 1.60 (CI 0.81-3.20) for quintile 1 vs. referent group and 2.95 (CI 1.68-5.21) for quintile 5 vs. referent group. A multivariate analysis adjusting for age, BMI, BMD hip, smoking, fall, SSRI did not substantially alter these results. No association was seen between serotonin and vertebral fractures. A multivariate analysis showed odds ratio (OR) 1.90 (CI 1.28-2.82) for falls in serotonin quintile 1 vs. quintile 2-5 during the last year preceding the measurements.

Conclusions: Both low and high levels of serotonin predict non-vertebral fractures but not vertebral fractures in elderly men, indicating a relation between cortical bone and serotonin. Serotonin is positively associated with hand grip strength and inversely with hip BMD which in part might explain the u-formed fracture risk.

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EFFECTS OF KINESIO TAPING METHOD ON PAIN AND QUALITY OF LIFE IN PATIENTS WITH KNEE OSTEOARTHRITIS (OA)

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Introduction: OA is the most common degenerative joint disorder and a major public health problem worldwide. OA of the knee is a major cause of mobility impairment, which has an unpredictable and negative impact on health and QoL.

Aim: To determine if kinesio taping method can change pain and quality of life in patients with OA.

Methods: Twenty-five patients with OA (ages 59.74+10.58), remain of disease 6.8 + 2.9 year, were evaluated using VAS scale, WOMAC scale and Short Form 36 (SF36). Patients had tri time in 12 days therapy with kinesio taping method. VAS scale, WOMAC and SF36 were analyzed at baseline and after two weeks. Statistical analysis included Wilcoxon's rank sum test.

Results: After two weeks of kinesio taping therapy all patients were with no side effect. Patient showed a decrease of pain measured by VAS scale -21 patients (84.0%), improvement of WOMAC scale 22 patient (88.0%) and improve quality of life -21 patients(84%).

Conclusion: This study showed significant reduction of pain and improvement in quality of life, after kinesio taping therapy in patients with knee OA and can be safely prescribed.

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LOW BONE MINERAL DENSITY AND FRACTURES ARE ASSOCIATED WITH INCIDENT CARDIOVASCULAR DISEASE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective: An emerging evidence base suggests that low bone mineral density (BMD) and fractures are associated with cardiovascular disease (CVD). We conducted a systematic review and meta-analysis summarizing the evidence of low BMD and fractures as risk factors for future CVD.

Material and Methods: Two independent authors searched major databases from inception to 1st August 2016 for longitudinal studies reporting data on CVD incidence (overall and specific CVD) and BMD status and fractures at baseline. The association between low BMD, fractures and CVD across longitudinal studies was explored by calculating pooled adjusted hazard ratios (HRs)±95% confidence intervals (CIs) with a random-effects meta-analysis.

Results: Twenty-eight studies (18 regarding BMD and 10 fractures) followed-up a total of 1,107,885 participants for a median of 5 years. Taking those with higher BMD as the reference, people with low BMD were at increased risk of developing CVD during follow-up (11 studies; HR=1.33; 95%CI: 1.27-1.38; $I^2=53%$) after adjusting for a median of 8 confounders. This finding was confirmed using a decrease in one standard deviation of baseline BMD (9 studies; HR=1.16; 95%CI: 1.09-1.24; $I^2=69%$). The presence of fractures at baseline was associated with an increased risk of developing CVD (HR=1.20; 95%CI: 1.06-1.37; $I^2=91%$). Regarding specific CVD, low BMD was associated with an increased risk of developing coronary artery disease, cerebrovascular conditions, and CVD associated death. Fractures at baseline was associated with an increased risk of both cerebrovascular conditions and death due to CVD.

Conclusion: Low BMD and fractures are associated with a higher CVD risk and possibly death.

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ADHERENCE TO A MEDITERRANEAN DIET IS ASSOCIATED WITH LOWER INCIDENCE OF FRAILTY: DATA FROM THE OSTEOARTHRITIS INITIATIVE

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Objective: To investigate if adherence to a Mediterranean diet pattern is associated with a lower incidence of frailty in a large cohort of North Americans.

Material and Methods: Adherence to the Mediterranean diet was evaluated using a validated Mediterranean diet score (aMED) classified into five categories. Frailty was defined using the Study of Osteoporotic Fracture (SOF) index as the presence of ≥ 2 out of: (i) weight loss $>5\%$ between baseline and the subsequent follow-up visit; (ii) inability to do five chair stands; (iii) low energy level according to the SOF definition. The strength of the association between aMED (divided into categories) and incident frailty was investigated using Cox's regression models used to obtain a hazard ratio (HR) with 95% confidence intervals (CIs), adjusted for potential confounders.

Results: During the 8 year follow-up, of the 4,421 participants initially included, 362 became frail. The incidence of frailty was approximately half in those with a higher adherence to the Mediterranean diet vs. those with a lower adherence. After adjusting for 10 potential confounders, the participants with the highest aMED scores were found to have a significant reduction in incident frailty (HR=0.71; 95% CIs: 0.50-0.99, $p=0.047$) with respect to those in a lower category. With regard to individual components of the Mediterranean diet, low consumption of poultry was found to be associated with higher risk of frailty.

Conclusions: Higher adherence to a Mediterranean diet was associated with a lower incidence of frailty over an 8-year follow-up period, even after adjusting for potential confounders.

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DIETARY MAGNESIUM INTAKE AND FRACTURE RISK: DATA FROM THE OSTEOARTHRITIS INITIATIVE

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Objective: Research considering the relationship between dietary magnesium (Mg) and osteoporosis and fractures are sparse and conflicting. We thus aimed to investigate of Mg intake and the onset of fractures in a large cohort of American men and women involved in the Osteoarthritis Initiative (OAI) over a follow-up period of 8 years.

Material and methods: A longitudinal study design using the OAI dataset was employed. Dietary Mg intake (including those derived from supplementation) was evaluated through a food frequency questionnaire at baseline and categorized using gender-specific quintiles; osteoporotic fractures were evaluated through self-reported history.

Results: Overall, 4,436 participants (1,858 Males; 2,578 Females), mean age of 61.3 ± 9.1 years were included. During follow-up, 789 individuals (284 men and 505 women; 17.8% of the baseline population) developed a new fracture. After adjusting for 12 potential confounders at baseline and taking those with lower Mg intake as reference (Q1), all the remaining quintiles according to Mg intake, were at a significant lower risk of fractures, ranging from a reduction of 26% in Q2 (HR=0.74; 95%CI: 0.58-0.93, $p=0.01$) to a reduction of 44% in Q5 (HR=0.56; 95%CI: 0.42-0.75, $p<0.0001$). These results were, however, significant only in women when we stratified our data by sex. 27% of the sample met the recommended Mg intake and were at an 18% decreased risk of future fractures.

Conclusions: Higher dietary Mg intake has a protective effect on future osteoporotic fractures, particularly in women. Those meeting recommended Mg intake appear at lower risk of fractures.

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THE RELATIONSHIP BETWEEN KNEE OSTEOARTHRITIS AND INCIDENT HYPERTENSION: A REPRESENTATIVE LONGITUDINAL STUDY

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Objective: Whilst people with osteoarthritis are more likely to have cardiovascular disease, there is a paucity of

information considering incident hypertension vs. controls. The aim of this study was to determine whether knee osteoarthritis was associated with an increased risk of developing hypertension.

Material and Methods: Data were identified from the Osteoarthritis Initiative (OAI) dataset, a multi-center, longitudinal, observational study, collected data on community-dwelling adults. Knee osteoarthritis was defined through radiological and clinical assessment. Incident hypertension was defined as a systolic BP >140 mmHg and/or a diastolic value >90 mmHg. Multivariate Cox's regression analyses were constructed where the presence of knee osteoarthritis as the exposure and incident hypertension during follow-up interval (96 months) as the outcome.

Results: 3,558 people with normal blood pressure values at baseline were analyzed (1,930 with knee osteoarthritis/1,628 without). The incidence of hypertension within the follow-up interval was significantly higher in people with knee osteoarthritis compared to those without (60 vs. 55 1000 persons/years; $p < 0.0001$). After adjusting for 12 potential confounders, people with knee osteoarthritis had a 13% higher chance of developing hypertension (hazard ratio=1.13; 95%CI: 1.01-1.26, $p=0.03$). Propensity score analysis substantially confirmed these findings.

Conclusions: This is the first longitudinal data analysis to demonstrate that people with knee osteoarthritis have a higher chance of developing hypertension compared to those without osteoarthritis. Our data suggest that blood pressure should be monitored in this population and preventing interventions provided to mitigate the potential adverse consequences of hypertension.

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MONOCLONAL GAMMOPATHY OF UNDETERMINED SIGNIFICANCE AND BONE HEALTH OUTCOMES: A SYSTEMATIC REVIEW AND EXPLORATORY META-ANALYSIS

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Objective: Monoclonal gammopathy of undetermined significance (MGUS) is a common condition in the elderly. A number of studies have investigated the relationship between MGUS and bone health outcomes including bone mineral density (BMD), osteoporosis and fractures, but no meta-analysis exists. We conducted a systematic review and

exploratory meta-analysis comparing bone health outcomes in patients with MGUS vs. controls.

Material and methods: Two independent authors searched PubMed and Scopus from inception until November 11, 2015. A meta-analysis of cross-sectional and longitudinal studies investigating fractures and BMD was conducted. Standardized mean differences (SMD) \pm 95% and confidence intervals (CIs) were calculated for BMD, and risk ratios (RRs) were calculated for prevalent and incident fractures.

Results: Of 174 initial hits, 10 studies of moderate methodological quality were eligible, including 8,711 individuals with MGUS vs. 52,865 controls. Compared to controls, subjects with MGUS showed significantly lower values for radial cortical volumetric BMD (1 study; SMD=-5.45, 95%CI: -7.24 to -3.66), but not at the lumbar spine, femoral neck or hip. The incidence of fractures was higher in people with MGUS ($n=7,466$) vs. controls ($n=52,304$) (RR=1.36, 95% CI: 1.28-1.44, $I^2=0\%$) over a median of 12.5 year follow up. The incidence of vertebral fractures was particularly elevated (RR=2.50, 95%CI: 1.53-4.06) although limited to two studies.

Conclusion: although with limitations, our preliminary meta-analysis suggests that patients with MGUS are at higher risk of fractures despite evidence for differences in BMD being equivocal. Future longitudinal research is required to confirm our findings and determine if fracture prevention interventions are warranted in people with MGUS.

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MODERATE-TO-VIGOROUS PHYSICAL ACTIVITY IS MORE IMPORTANT THAN SEDENTARY TIME FOR IMPROVING MUSCULOSKELETAL HEALTH OUTCOMES IN MIDDLE-AGED WOMEN

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Objectives: The effects of physical activity (PA) and sedentariness on musculoskeletal outcomes remain unclear in middle-aged adults. We aimed to describe associations of objectively measured PA and sedentary time and self-reported strenuous physical activity (SPA) and time watching television/videos (TTV) with musculoskeletal outcomes in middle-aged women.

Material and Methods: This was a 10-yr follow-up of a 2-yr osteoporosis education randomized controlled trial among 470 women aged 25-44 years (36-57 years at follow-up) examining associations of time spent sedentary and in light and moderate-to-vigorous PA (MVPA)

(by Actigraph GT1M accelerometer) with lumbar spine (LS) and femoral neck (FN) bone mineral density (BMD) (by dual-energy X-ray absorptiometry), lower limb muscle strength (LMS) and balance (timed up and go test (TUG), functional reach test (FRT), lateral reach test (LRT) and step test (ST)) using linear regression. Associations of baseline SPA and TTV with these outcomes were also tested.

Results: MVPA was beneficially associated with FN BMD (0.005 g/cm², 0.001 to 0.009), LMS (β =1.48 kg, 95% confidence interval (CI) 0.45 to 2.52), ST (0.12 steps, 0.02 to 0.23) and TUG (-0.043 seconds, -0.070 to -0.016). Associations between MVPA and LMS, TUG and ST but not FN BMD persisted after adjusting for sedentary time. Neither sedentary time nor light PA was associated with any outcome after adjustment for MVPA. After adjusted for confounders, including SPA, TTV was detrimentally associated with LMS (-6.8, -12.6 to -1.1 for 2-3 and -3.8, -12.8 to 5.1 for ≥ 3 vs. ≤ 1 hour/day), TUG (0.11, -0.04 to 0.26 and 0.17, -0.06 to 0.40), ST (-0.64, -1.22 to -0.05 and -1.02, -1.93 to -0.10) and LRT (-1.10, -2.0 to -0.18 and -1.23, -2.66 to 0.20) but not FRT. Conversely, SPA was beneficially associated with LMS and all balance tests except for LRT. Neither SPA nor TTV was associated with BMD.

Conclusions: MVPA appears more important than light physical activity or sedentary time for many musculoskeletal outcomes in middle-aged women. Moreover, both SPA and TTV in younger age independently predicted LMS and balance in midlife, suggesting potentially detrimental role of specific sedentary behaviours beyond total sedentary time. These need to be considered when developing interventions to improve habitual physical activity and sedentary behaviours across young adulthood that aim to improve musculoskeletal health.

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SUBCHONDRAL TIBIAL BONE TEXTURE PREDICTS INCIDENT RADIOGRAPHIC KNEE OSTEOARTHRITIS: DATA FROM THE OSTEOARTHRITIS INITIATIVE

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Objective: Evaluate whether trabecular bone texture (TBT) parameters measured by computer radiographs [1] predict incident radiographic knee osteoarthritis (IRKOA).

Material and Methods: Knee Radiographs grades 0 were selected based on Kellgren-Lawrence (KL) scale from the Osteoarthritis Initiative public use dataset. Each patient had a bilateral fixed flexion computed radiographs acquired 48 months apart among 4 different centers. Each baseline radiograph was semi-automatically segmented into a patchwork of 16-squared

region of interest (ROI). On each ROI a fractal parameter was computed along vertical and horizontal axis for two ranges of scales. The obtained TBT parameters were combined with the patients age, gender and BMI in logistic regression models evaluated using the area under the receiver operating characteristic curves (AUC) and the diagnostic odds ratio (DOR).

Results: Within the 344 knees, only 63 (18%) developed IRKOA after 48 months. Among these knees 44 (13%) worsen their JSN grade. Neither age, gender and BMI, even combined did predict IRKOA (AUC 0.56) nor JSN (AUC 0.59) worsening. However, severe cases, (i.e., knees that developed a KL grade of 3 or more) were more predictable (AUC 0.67). For all the models including only the clinical covariates, the DOR were always <1 indicating a poor efficiency for IRKOA prediction. The inclusion of the TBT parameters to the models improved significantly the global prediction results for IRKOA (AUC 0.64) and for JSN worsening (AUC 0.72). Severe cases were better predicted (AUC 0.76). The DOR confirmed the added value of TBT for the KL (DOR 4.97) and JSN worsening (DOR 5.16) prediction.

Conclusions: These results indicate that TBT parameters assessed when JSN and osteophytes are not yet apparent on radiographs may be useful in predicting the onset of radiological tibiofemoral OA. The enhanced prediction in the JSN and severe cases may suggest that the subchondral bone changes reflected by TBT are more associated with the JSN process than the osteophytes.

Reference: [1] Janvier T et al. Osteoarthritis Cartilage 2016 Oct 11. pii: S1063-4584(16)30314-4.

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TUMOR-INDUCED OSTEOMALACIA (TIO): A CASE SERIES

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Objectives: TIO is a rare acquired syndrome characterized by severe hypophosphatemia due to abnormal production of fibroblast growth factor 23 (FGF 23) and we hereby report four cases of TIO with diagnostics and therapeutic challenges.

Material and Methods: all patients have similar clinical and biochemical features with long history of diffused pain, progressive fatigue and fragility fractures, low serum phosphorus with reduced tubular resorption, increased serum alkaline phosphatase, normal serum calcium, iPTH and 25-OH-D, calcitriol inappropriately low and elevated FGF 23 levels.

Results: the 1st patient is 40-year old man with primary TIO, had FGF 23 value of 690 RU/mL (n.r. <100) due to hemangiopericytoma in the right maxillary sinus. The 2nd patient is 54 years old woman with neurofibromatosis causing

TIO, the FGF 23 was 237 RU/mL. The 3rd and 4th patients were diagnosed with TIO-like syndrome, they are women of 50 and 61 years old, FGF 23 levels of 560 and 440 RU/mL respectively, neoplasm production FGF 23 was not detected and genetic causes of hypophosphatemia were excluded. The 1st patient showed normalization of FGF 23 levels after tumour removal and after 6 months he recovered completely. The 2nd and the 3rd patients were treated with phosphate supplements and calcitriol with partial response. For the 4th patient the standard medical therapy of TIO was failed, then it was decided to treat him with cinacalcet resulting increased serum phosphorus and significant bone healing.

Conclusions: patients with acquired form of hypophosphatemic osteomalacia driven by FGF-23 where the source of ectopic FGF 23 is not detected, are classifiable as TIO-like syndrome. It is not known whether this is due to inability to find the tumor or they represent separate forms of the same syndrome. Cinacalcet-induced hypoparathyroidism reduces phosphaturic effect of FGF 23, therefore it can be promising option for TIO-like syndromes resistant to the therapy with phosphate and calcitriol. To our knowledge this is the 2nd report in the international literature reporting the efficacy of cinacalcet in TIO syndrome (1).

Reference: 1) Geller JL et al. *J Bone Miner Res* 2007;22:931.

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DETERMINING THE EFFECTS OF VITAMIN D ON OSTEOPOROSIS AND OSTEOPENIA

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Problem: Vitamin D deficiency is a concern, not only in the United States, but worldwide. Identifying a correlation for osteoporosis and osteopenia in vitamin D deficient patients may reduce the risk of osteoporosis-related fractures. The PICO question for this capstone project was: In osteoporotic or osteopenia patients, what is the relationship between reduced serum levels of vitamin D OH 25 compared to normal serum levels of vitamin D OH 25, in the incidence of osteoporosis or osteopenia? Osteoporosis contributes to fracture risk in patients, which subsequently has been shown to result from an insufficiency in vitamin D.

Purpose: The purpose of the project was to evaluate the relationship between osteoporosis and osteopenia and Vitamin D OH 25 levels.

Goals and Objectives: The goal of this study was to determine if a relationship existed between vitamin D deficiency and osteoporosis or osteopenia and note its significance. Identifying a correlation between these factors may help to raise awareness in the investigator's practice and community.

Plan: The issue was identified as outlined above, and the project was implemented using PICO analysis at the doctorate

level. This quality improvement (QI) project utilized a quantitative retrospective study design involving 91 patients. Outcome data was compared on patients who had previously undergone a bone density test using a DXA scan and also had Vitamin D OH 25 laboratory testing over the previous three-year period. The main outcome that was measured was the number of patients diagnosed with osteoporosis or osteopenia and the laboratory blood level value of vitamin D OH 25. Other variables included DXA scan results, vitamin D OH 25 lab results, gender, age, steroid use history and exercise history. Using one-way ANOVA testing, the study identified four groups; once this was completed, multiple regression was used to analyze the variables involved.

Outcomes and Measures: The study consisted of 12 men and 79 women. 39% of patients had both osteoporosis or osteopenia and vitamin D deficiency, 36% of patients had osteoporosis or osteopenia and did not have vitamin D deficiency, 5% of patients had normal bone and were vitamin D deficient and 20% of patients had normal bone and normal vitamin D results. Results of the one-way ANOVA test showed a significance of $p=0.026$ for vitamin D when compared to the control group diagnosis. The results of this analysis show that vitamin D deficiency is a statistically significant factor in osteoporosis and osteopenia. The factor of vitamin D deficiency had a higher statistical significance than exercise history, steroid use, gender, and age.

P229

THE ROLE OF A NOVEL GENE, FAM210A (FAMILY WITH SEQUENCE SIMILARITY 210, MEMBER A) IN BONE AND MUSCLE

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Background: Linkage between muscle and bone has recently noted. Genome-Wide Association Studies have identified SNPs intronic to FAM210A, which are strongly associated with the risk of fracture, but less so with bone mineral density (BMD) reduction [Nat Genet 2012]. However, the skeletal function of FAM210A remains unknown.

Objective: We investigated the effect of Fam210a on bone and muscle using 2-month-old mice with targeted deletion of Fam210a (Fam210a[±] and tamoxifen-inducible Fam210a^{-/-}). We examined tissue expression of Fam210a protein by Lac Z staining, and investigated serum and urine biochemistry, BMD, bone mineral content (BMC), biomechanical tests, parameters of trabecular and cortical bone micro-architecture using micro computed tomography (μ CT), grip strength,

average quadriceps muscle cross-sectional area (MCA) and mRNA levels of myogenic genes.

Results: By Lac Z staining, Fam210a was mainly expressed in muscle, heart and brain. There was no difference in the levels of serum and urine calcium as well as phosphate between wild-type (WT) and Fam210a±mice as well as between control (Cont) and Fam210a^{-/-} mice. BMD and BMC of Fam210a^{-/-} were significantly lower than those of Cont (female: $p=0.01$ and $p=0.01$, respectively, male: $p=0.03$ and $p=0.01$, respectively). Three point bending tests showed that the maximal load, stiffness and work to failure of Fam210a±and Fam210a^{-/-} mouse bones were significantly lower than those of WT and Cont, respectively ($p<0.05$). In addition, by μ CT, cortical bone volume and cortical thickness of Fam210a±were significantly lower than those of WT ($p=0.01$ and $p=0.02$, respectively), and cortical porosity of Fam210a±was significantly greater than that of WT ($p=0.02$). Interestingly, grip strength and average quadriceps MCA of Fam210a±and Fam210a^{-/-} were significantly lower than those of WT and Cont, respectively ($p<0.01$). Moreover, mRNA levels of MyoD, myogenin and Myf6 of Fam210a±were significantly lower than those of WT (female: $p=0.03$, $p=0.01$ and $p=0.01$, respectively; male: $p=0.03$, $p=0.03$, and $p=0.04$, respectively).

Conclusions: These findings indicate that Fam210a has a crucial role in modulating bone strength via effects on bone and muscle. Fam210a might be an important factor in the interaction between muscle and bone.

P230

DOSE-RESPONSE RELATIONSHIPS FOLLOWING 3 MONTHS RESISTANCE TRAINING IN OLDER ADULTS ON CIRCULATING IL-6: PRELIMINARY RESULTS FROM THE SENIOR'S PROJECT INTENSIVE TRAINING (SPRINT)

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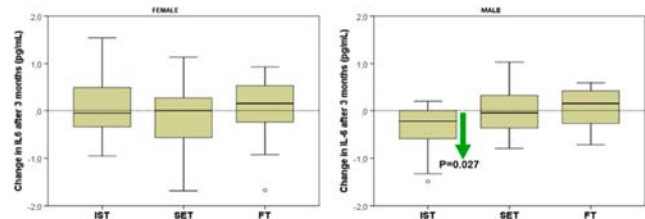
Background: Exercise is known to counter age-related chronic low-grade inflammation. Less is known about the dose-response relationships following resistance training in older adults.

Methods: 113 older persons aged 71±5 years participating in the Senior's Project Intensive Training (SPRINT, an ongoing exercise intervention study) were randomized into 3 months exercise 3x/week at either: intensive resistance training (IST, 3x 10 repetitions @ 70-80% 1RM, 13 male, 21 female), strength endurance training (SET, 2x 30 repetitions @ 40% 1RM, 16 male, 25 female) or flexibility training (FT, 3x 30 seconds, 12 male, 26 female). Resistance training consisted in leg press, chest press, leg abductor, leg adductor, low row and vertical traction. All exercise sessions were supervised by a trained exercise coach. Every 2 weeks, training weights were adapted according to the strength gains

obtained. Serum was collected for IL-6 determination at baseline and after 3 months of training (>24 h after the last training in order to avoid bias due to acute exercise-induced changes).

Results: All exercise interventions were well tolerated by the participants. 3 months IST induced a significant decrease ($p=0.027$) in circulating IL-6 in male only. No significant changes were observed in the other exercise groups nor in female participants.

Conclusions: Resistance training at high external load can reduce circulating IL-6 levels in older male subjects, contrary to resistance training at lower external resistance which did not result in significant changes. The lack of effect of IST in female persons is in line with earlier reports and might be related to sex-differences in body composition, which needs further investigation.



P231

INFLUENCE OF SUNLIGHT EXPOSURE ON BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WITH ESTROGEN DEFICIENCY IN MENSTRUAL HISTORY

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Objective: Estrogen deficiency is associated with low bone mineral density. The objective of this study was to examine influence of sunlight exposure on bone mineral density in postmenopausal women with estrogen deficiency in menstrual history.

Material and Methods: The study included 100 postmenopausal women, aged 50 to 65 with estrogen deficiency in menstrual history. The subjects were divided in two groups, examination and control group, based on bone mineral density values. The women in the examination group (n=50) had osteoporosis. The women in the control group (n=50) had osteopenia or normal mineral bone density. Bone mineral density was measured at the lumbar spine and proximal femur by Dual-Energy X-ray Absorptiometry using Hologic QDR-4000 scanner.

Results: The average daily exposure to sunlight, in the summer, in women with osteoporosis who had estrogen deficiency in the menstrual history amounted to 43.40 minutes and in women without osteoporosis 56.60 minutes. The difference in

the length of sunlight exposure between a group of women with osteoporosis and group of women without osteoporosis was statistically significant, $p < 0.001$. The average daily exposure to sunlight, in the winter, in women with osteoporosis who had estrogen deficiency in the menstrual history amounted to 20.00 minutes and in women without osteoporosis 25.80 minutes. The difference in the length of sunlight exposure between the group of women with osteoporosis and group of women without osteoporosis was statistically significant, $p < 0.01$.

Conclusion: Results of this study suggest that sunlight exposure has positive influence on bone mineral density in postmenopausal women with estrogen deficiency in menstrual history. Protective effects have been demonstrated in case of daily exposure to sunlight for a period of 56.60 minutes in the summer and 25.80 minutes in the winter.

P232

A RARE SCLEROSING BONE DISORDER: A CASE OF MELORHEOSTOSIS

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Melorheostosis is a rare, non-familial sclerosing bony disorder of poorly understood etiology. It was first described by Leri in 1922. It is characterized by soft tissue contractures with overlying slowly evolving linear hyperostosis. It usually occurs in the limbs and frequently crosses synovial joints, and there is often ossification in local soft tissues. The typical presentation is painless, asymmetric joint contracture prior to age 6 years, however, patients can present at any age with various symptoms, including pain, limb swelling, and restricted range of motion of extremity due to soft tissue contracture. Although melorheostosis can affect any bone, the lower extremities are more frequently involved. The overlying skin may be thickened due to lymphedema, tense, erythematous, and shiny. Other changes in soft tissue include anomalous pigmentation, induration and edema of the subcutaneous tissues, periarticular fibrosis, weakness and atrophy of muscles, perivascular fibrosis with obliteration of blood vessels, and linear scleroderma. We report a case of a 52 year old Caucasian man, admitted to our unit for the presence of acute arthritis involving both knees and ankles, associated with joint contractures and a limitation in the range of motion of his left knee. Skin of both legs was characterized by cutaneous hardening and thickening, and erythematous changes. The patient was previously diagnosed as having Eosinophilic Fasciitis, although his lab tests did not reveal any raise in eosinophil count and/or hypergammaglobulinemia, but only a mild increase in acute phase reactants. The diagnosis of melorheostosis became clear when the patient underwent X-ray evaluation, which revealed the typical linear hyperostosis on his left femur, the so called "candle-wax" aspect. The patient was given symptomatic treatment and immunosuppressants

(steroids and methotrexate 20mg/week) for the concomitant arthritis.

P233

VITAMIN D AND HOMOCYSTEINE INVERSELY RELATED IN POSTMENOPAUSAL WOMEN

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Objectives: Osteoporosis is a most common age related, multifactorial disease. The study was designed to see the correlation between serum homocysteine (Hcy), vitamin D and bone mineral density (BMD) in postmenopausal non-osteoporotic, osteopenic, and osteoporotic females and compare these values between the three groups.

Material and Methods: In this cross sectional study postmenopausal females between 50-70 years of age were taken and divided into three groups, non-osteoporotic (n=52), osteopenic (n=69), and osteoporotic (n=47) females. ANOVA and Kruskal-Wallis test were applied to compare groups while spearman's rho correlation was used to establish correlations.

Results: Significant negative correlation of homocysteine was observed with vitamin D in postmenopausal non-osteoporotic females ($\rho = -0.428$, $p = 0.002$) and vitamin B₁₂ in non-osteoporotic ($\rho = -0.410$, $p = 0.003$) and osteopenic ($\rho = -0.415$, $p < 0.001$) females, but no significant correlation was observed with T-Score, Z-Score and ultrasound bone profile index (UBPI).

Conclusion: There is significant inverse relation between vitamin D and homocysteine in postmenopausal non-osteoporotic females, but no significant results are found in osteoporotic women and no significant relation of homocysteine and vitamin D was found with BMD.

Disclosures: The research has been funded by grant from higher Education commission, Islamabad, Pakistan.

P234

COMPARISON OF PARAMETERS OF BONE PROFILE AND HOMOCYSTEINE IN PHYSICALLY ACTIVE AND NON-ACTIVE POSTMENOPAUSAL FEMALES

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Objectives: Optimal physical activity is important in attaining a peak bone mass. Physically active women have better bone mineral density and reduce fracture risk as compare to females living a sedentary life. The objective of this study was to compare parameters of bone profile and serum homocysteine levels in physically active and non-active postmenopausal females.

Material and Methods: In this cross sectional study postmenopausal females between 50-70 years of age were recruited and divided into two groups: Physically inactive (n=133) performing light physical activity and Physically active (n=34) performing moderate physical activity. Physical activity (in metabolic equivalents), bone mineral density and serum homocysteine levels were assessed. Spearman's rho correlation was applied to observe correlations. Two independent



sample t test and Mann Whitney U test were applied to compare groups. P-value ≤ 0.05 was taken statistically significant.

Results: Parameters of bone profile were significantly higher and serum homocysteine levels were significantly lower in postmenopausal females performing moderate physical activity as compared to females performing light physical activity. Homocysteine was not significantly related to T-score and Z-score in both groups.

Conclusion: It is thus concluded that improving physical activity could be beneficial for improving the quality of bone, decreasing fracture risk and decreasing serum homocysteine levels.

Disclosures: The research has been funded by grant from higher Education commission, Islamabad, Pakistan.

P235

RELATIONSHIP OF ANTHROPOMETRIC MEASURES WITH BONE MINERAL DENSITY IN POSTMENOPAUSAL NON-OSTEOPOROTIC, OSTEOPENIC AND OSTEOPOROTIC WOMEN

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Objectives: Body mass index (BMI) has been shown to be more important predictor of bone mineral density (BMD). The objective of this study was to investigate the relationship of anthropometric measures including body mass index with BMD in postmenopausal non-osteoporotic, osteopenic and osteoporotic women.

Material and Methods: In this cross sectional study postmenopausal females between 50-70 years of age were recruited and divided into three groups: non-osteoporotic (n=52), osteopenic (n=69) and osteoporotic females (n=47). Anthropometric measures and bone mineral density were assessed. ANOVA was applied to compare groups while post hoc Tuckey's test was used for multiple comparisons between the groups. Spearman's rho correlation was used to establish correlations.

Results: BMI (p=0.034) and hip circumference (p=0.013) were significantly higher in osteopenic as compared to osteoporotic females and waist to hip ratio was significantly higher (p=0.005) in osteoporotic as compared to non-osteoporotic females. Significant positive correlation of BMI was found with T-score (p=0.022) and ultrasound bone profile index (p<0.001) in postmenopausal females.

Conclusion: High BMI is associated with high BMD and reduced fracture risk in postmenopausal females. Increasing age and high waist to hip ratio can also lead to reduced BMD in postmenopausal females.

Disclosures: The research has been funded by grant from higher Education commission, Islamabad, Pakistan.

P236

ASSOCIATION STUDY OF SINGLE NUCLEOTIDE POLYMORPHISM OF RANK, RANKL AND OPG GENES IN POSTMENOPAUSAL OSTEOPOROTIC SAUDI SUBJECTS

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Background and aims: Osteoporosis is determined by an interaction between genetic, metabolic and environmental factors. Thus, the present research aimed to determine the association between genetic variants in the RANK, RANKL and OPG gene and osteoporosis in postmenopausal Saudi women. In addition, to evaluate whether these genetic variants has any influence on serum biochemical and bone markers.

Study design: 100 Osteoporotic and 100 age-matched healthy controls were enrolled and were genotyped for two SNPs in RANK gene (rs1805034 and rs35211496) and one each in RANKL (rs2277438), and OPG (rs2073618) genes using

TaqMan genotyping assays. Serum levels of RANKL and OPG were determined using ELISA

Results: There was no significant difference in genotypic and allelic frequencies of all the four studied SNPs among osteoporotic and normal group. However, CC and CG genotypes of rs2073618 SNP in OPG gene is significantly associated lower BMD at femur in control subjects (p>0.0001).

Conclusion: None of the four studied SNPs (rs1805034, rs35211496, rs2277438 and rs2073618) in RANK, RANKL, and OPG gene are associated with osteoporosis risk. However, C allele of rs2073618 in OPG gene is a risk for lower BMD at femoral site. Further studies with larger sample size are required to confirm this association.

P237

FEATURES OF PREOPERATIVE PLANNING OF TOTAL HIP REPLACEMENT IN PATIENTS WITH HIP-SPINE SYNDROME

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Relevance: Stabilometry is a quantitative evaluation method of the function of balance in a vertical position with vibrating supports. It is one of the most promising diagnostic methods for the development of hip spine syndrome in patients during the preoperative period of total hip replacement.

Materials and methods: The average age of the study patients is 67.2±1.2 years. The first group (n=43) includes patients with end-stage coxarthrosis during the preoperative period of total hip replacement who are experiencing Low back pain (LBP). The second is a control group (n=32) including relatively healthy people of average age 43.6±2.3 years. Using the stabilometric complex ST 150, the following parameters were investigated: 1. The function of balance on the pressure center (PC,%) in different foot configurations in the frontal and sagittal planes; 2. Weight distribution difference on the lower limbs (WD,%); 3. Statokinesigram area.

Results: In the first group for PC on the frontal plane, pressures were symmetrical in all configurations. PC indicator in the sagittal plane showed asymmetry inclined towards the «inoperable» limb on average + 12.2 (+5.1; +24.6)% tending to hind pressure. In the second group for PC the frontal plane was stable. WD on the lower limbs in the first group amounted to an average of 7 (4,5; 13)% in favor of the healthy limb. In the second group, there were slight fluctuations±1-2% in both directions. The statokinesigram of the first group showed an elongated ellipse tending to deviate along the abscissa by 7-10 °, along the ordinate by 3-5 ° tending towards the upper pole. In

the second group, the statokinesigram was located in the center of the intersection of the axes with a wavering central point.

Conclusions: Stabilometric analysis of functional deformations can be used as a component in the preoperative planning of total hip replacement in patients with comorbid LBP syndrome.

P238

MODIFICATION OF SAVAGE TENDON REPAIR

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Relevance: Many of the popular tendon suture techniques have several flaws: lack of strength and adaptation, circulatory disorder, a large number of nodes and all of that is the cause of early postoperative complications.

Materials and methods: 80 pig tendons were used for the experiment. The tendons were sutured using modified Savage, Bunnell-Cuneo, Kraskow and Kessler techniques. A blocked encircling suture was used as adaptive suture. Suture material: Polysorb 2-0 and for adaptive sutures Prolene 4-0. Tensile strength was determined using a dynamometer with a load of 300 N (30 kg).

Results: The modified Savage technique involved the following: reducing the number of core sutures to four, stitching both the front and the rear walls to avoid passing the strand through the whole tendon, thus reducing the number of needle injections, enabling better edge adaptation, reducing the number of threads on the tendon surface and avoiding disrupting blood supply to the tendon. The experimental results obtained indicate that the strongest suture is the modified Savage technique with an average tensile strength of 282 N (28.2±1.6 kg). Suture 221 N (22.1±2.2 kg), Kessler technique 92 N (9.2 ±1.7 kg), Bunnell-Cuneo technique – 81 N (8.1±1.7 kg).

Conclusions: The modified Savage tendon suture technique is the most durable and makes it easier to adapt the tendon edge as compared to other techniques.

P239

THE EFFECT OF THE OSTEOPOROSIS DURATION ON THE ADHERENCE TO CALCIUM, VITAMIN D AND DRUGS FOR OSTEOPOROSIS

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Objective: To show the level of adherence to calcium, vitamin D and drugs for osteoporosis in order to osteoporosis duration.

Material and Methods: The prospective analysis is performed from 20 November to 20 December 2015 at the Special Hospital for Rheumatic Diseases Novi Sad, Serbia. The study involved 80 postmenopausal women who were diagnosed with reduced bone mineral density (BMD) by dual X-ray absorptiometry and all respondents filled in the same questionnaire. Morisky scale was used to analyze adherence to calcium, vitamin D and drugs for osteoporosis. We also monitored correlation of adherence to calcium, vitamin D and drugs of osteoporosis in order to osteoporosis duration. The central tendency measures, ANOVA test and T-test were used for statistical analysis.

Results: The average age of participants was 65.52±8.29 years. 67.5% had osteoporosis (duration M 4.29±3.36 years) and 32.5% osteopenia (duration M 3.54±2.42 years). Most patients showed a low level of adherence to calcium (92.7%), vitamin D (77.8%) and drugs for osteoporosis (67.9%). Looking at the osteoporosis duration there is no statistically significant difference in relation to adherence to calcium (T-test=-1.32, p=0.196) and drugs for osteoporosis (T-test=0.167, p=0.867). On the other hand, there is statistically significant difference in relation to adherence to vitamin D in order to osteoporosis duration (T-test=-2.02, p=0.049). Women with low level of adherence to vitamin D had longer osteoporosis (M=4.4) and women with medium level of adherence to vitamin D had osteoporosis approximately 2 years (M=2.11).

Conclusion: Adherence to calcium, vitamin D, and drugs for osteoporosis is critically low among postmenopausal women which may cause serious complications. Physicians should actively seek causes of the low adherence and ways of its increase in order to better treatment and prevention of complications.

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MODELING- AND REMODELING-BASED BONE FORMATION IN THE ANABOLIC VS. ANTIRESORPTIVE (AVA) STUDY IN POSTMENO-PAUSAL WOMEN WITH OSTEOPOROSIS

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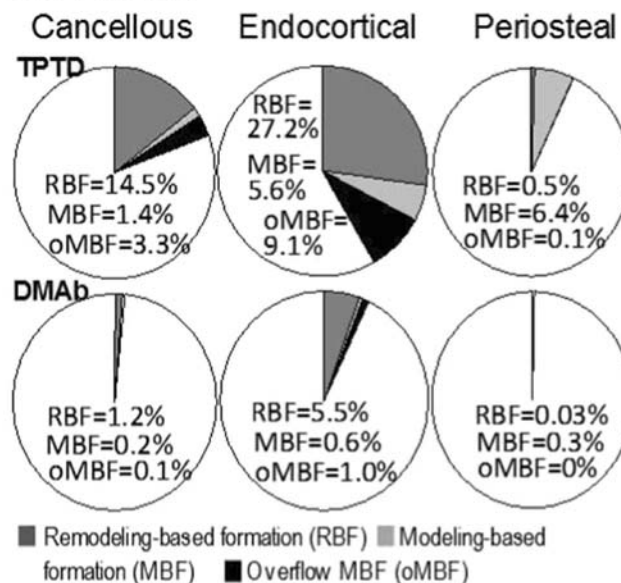
Objective: To compare early effects of an established anabolic (teriparatide: TPTD) vs. a prototypical antiresorptive (denosumab: DMAb) agent on modeling- and remodeling-based bone formation (MBF and RBF).

Materials and Methods: Postmenopausal women with osteoporosis were randomized to open-label TPTD (20 mcg/day) or DMAb (60 mg once) for 6 months. Double fluorochrome labeling was performed at baseline (BL) and prior to transiliac biopsy at month 3, when any effects of a transient rise in endogenous PTH with DMAb should be observable. Bone formation was expressed as a proportion of bone surface (BS), and was considered RBF if the underlying cement line was scalloped, MBF if it was smooth, and overflow MBF (oMBF) if over a smooth cement line adjacent to RBF. Mean changes from BL were compared between treatment groups using ANCOVA; within group differences were tested by paired T-tests.

Results: At BL, mean RBF/BS, MBF/BS, and oMBF/BS were similar between the TPTD and DMAb groups in the cancellous, endocortical, and periosteal envelopes. At 3 months, with TPTD, all types of formation increased significantly in the cancellous and endocortical envelopes (range: 3-22-fold; all differences $p < 0.001$), as did MBF/BS in the periosteal envelope (4-fold, difference $p < 0.001$). Response to TPTD was especially robust in the endocortical envelope (Figure). In contrast, with DMAb all types of formation were decreased or unchanged except MBF, which increased 2-fold in cancellous envelope (BL=0.1%, 3 month=0.2%, difference $p = 0.048$). All types of bone formation were significantly greater with TPTD vs. DMAb, excepting oMBF in periosteal envelope.

Conclusions: A short course of TPTD generally increased RBF, MBF, and oMBF in the 3 bone envelopes, while these were mostly reduced or unchanged with DMAb, reflecting the marked difference in mechanism of action of the 2 drugs. The results also provide the clearest evidence to date that TPTD stimulates MBF on the periosteal surface.

Bone formation as a proportion of bone surface after 3 months



P241

THE PROTECTIVE EFFECT OF HONOKIOL ON HUMAN UMBILICAL CORD DERIVED MESENCHYMAL STEM CELLS IN TNF- α AND IL-1 β INDUCED INFLAMMATORY ENVIRONMENT OF OSTEOARTHRITIS

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Objectives: Mesenchymal stem cells have been expected to be a promising seed cell for cartilage repair, but the outcome was far from satisfaction. Osteoarthritis (OA) is degenerative and inflammatory disease of synovial joint. TNF- α and IL-1 β are main pro-inflammatory cytokines responsible for initiation and progression of OA, trigger different downstream pathways, lead to chondrocytes apoptosis and cartilage degradation. Honokiol is an extract from a herb and anti-inflammation is one of its main features. We hypothesize that an OA dose of TNF- α or IL-1 β has the suppressive effect on human umbilical cord-derived mesenchymal stem cells (hUC-MSCs), meanwhile, honokiol can partly protect hUC-MSCs by blocking NF- κ B pathway.

Material and Methods: hUC-MSCs were cultured in different culture medium for osteogenesis, chondrogenesis and adipogenesis. Differentiation results were evaluated by specific cytochemical staining and quantitative real-time polymerase chain reaction (qRT-PCR). Different group were treated with TNF- α (20ng/ml), IL-1 β (10ng/ml) and Honokiol (10 μ M) for 2 weeks, then cells

were collected and analyzed by qRT-PCR, western blot, ELISA and fluorescence microscopy. Results were expressed as mean \pm SD. Groups were compared by student t-test, $p < 0.01$.

Results: Positive staining results were found in osteogenesis, chondrogenesis and adipogenesis. qRT-PCR analysis showed high expression of differentiation marker genes (Runx-2, ALP, Sox-9, Col2a1, Aggrecan, CEBP, FABP4/aP2). TNF- α or IL-1 β induced apoptosis of hUCMSCs, promoted expression of Caspase-3, COX-2, MMP-1, -9, 13, IL-6, and suppressed expression of Sox-9, Aggrecan and Col2a1 in hUCMSCs. Honokiol partly reversed these effects by blocking p-IKK α/β , p-I κ B α and p-p65 expressions in NF- κ B pathway.

Conclusions: TNF- α and IL-1 β suppressed the survival and chondrogenesis of hUC-MSCs. But honokiol protected hUC-MSCs and maintain the chondrogenic potential in inflammation by blocking NF- κ B pathway. Our findings suggest that combination of anti-inflammation and stem cell may improve the outcome of cell-based cartilage repair.

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WHEN IN DOUBT, WHO TO ASK? GUEST-5, AN INTERNET BASED GUIDED E-SELF STUDY FOR LEARNING MUSCULOSKELETAL EXAMINATION

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Background: Studies reveal that trainee doctors lack confidence in Musculoskeletal (MSK) examination. As Generation-Z prefers internet-based learning, medical educators can consider e-based guided teaching. There is limited data on e-based teaching of MSK examination.

Objective: A pilot study to assess current learning opportunities among doctors and acceptability of e-learning of MSK examination.

Methods: A cross-sectional study among junior doctors in our teaching hospital. Interested participants were given access to the 5-step e-based, pre-verified GUiDed E-Self sTudy material for learning musculoskeletal examination. Step (1): History taking (2): Differential diagnoses using the Diagnosaurus (3) Joint anatomy using Youtube videos (4) Physical examination using YouTube videos, (5) Discussion with experts via an online platform. Participants feedback on current learning opportunities in MSK examination as well as pre and post intervention change of confidence in MSK examination using a voluntary questionnaire e-survey.

Results: 97 doctors participated in the pre-intervention survey. Only 21% of them were confident in conducting MSK examinations. 79% opined they were less confident in

musculoskeletal examination compared to examination of other systems. Only 21% opined that they had enough opportunities to learn MSK examination. Of the remaining, 51% felt inadequate opportunities for learning MSK examination while 28% had neutral replies. It was noticeable that only 50% of participants had a Rheumatology or Orthopedics rotation. The pre-test survey showed a majority were independent learners. 80% used free internet based materials, preferably YouTube or Medscape (81%) while 61% discussed with peers. It is worrying that most (55%) are confident in the reliability of e-materials. Almost 40% preferred a self-study methodology and 38% remained neutral. 14 out of the 15 learners who participated in the voluntary posttest survey had completed the GUEST 5 step methodology. All agreed their confidence in doing an independent MSK examination improved after going through the GUEST e-learning methodology. All of them chose e-learning, especially a reliable website, over other methods. They feedback that GUEST based e-learning was simple and easy.

Conclusion: Internet-based learning is preferred among “Gen Z” doctors, We propose a guided e-learning methodology for musculoskeletal examination. E-learning could be part of a structured training programme for the relevant group.

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ASSOCIATION OF SELF-REPORTED MUSCULOSKELETAL SYMPTOMS WITH SERUM LEVELS OF VITAMIN D AND MULTIVARIATE CYTOKINE PROFILE IN HEALTHY WOMEN

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Objective: Although a large number of studies investigated possible relation between serum levels of vitamin D or cytokines with disease progress and prognosis, similar studies with respect to self-reported symptoms are still controversial. The overall objective of this study was to look into the association between serum levels of vitamin D, pro- and anti-inflammatory cytokines with self-reported symptoms related to musculoskeletal pain in an adult healthy women population.

Methods: Venous blood samples were collected from 117 adult, healthy women and serum levels of vitamin D, pro-inflammatory cytokines (IL-1b, IL-6, IL-8, IL-17, IFN-g TNF-a) and anti-inflammatory cytokines (IL-4, IL-10, IL-13) were measured. Groups were tested for differences in single parameters, pro-/anti-inflammatory cytokine ratios as well as for differences in multivariate cytokine patterns.

Results: There were no significant associations between serum levels of vitamin D and the self-reported musculoskeletal

symptoms studied. However, serum levels of the pro-inflammatory cytokine IL-8 were significantly higher in subjects with musculoskeletal pain as compared to subjects who reported no symptoms ($p=0.008$). The pro-/anti-inflammatory cytokine ratio showed a pro-inflammatory cytokine dominance in subjects with self-reported symptoms particularly in groups with deficient levels of vitamin D. However, the multivariate cytokine pattern analysis was not significantly different between the two groups.

Conclusion: These data point to a possible role of pro-inflammatory cytokines as a contributing factor in self-reported symptoms related to musculoskeletal pain.

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DOES NSAIDS PROVIDE ANY ADDITIONAL BENEFIT IN THE TREATMENT OF ANSERINE SYNDROME? A RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED TRIAL

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Introduction: Anserine syndrome displaying the symptoms of spontaneous medial knee pain with tenderness in the inferomedial aspect of the joint is a common complaint in clinical practice. There is no definite consensus for the treatments of this syndrome; however, the common treatments include steroid injection and oral administration of non-steroidal anti-inflammatory drugs.

Objectives: We hypothesized that there would be no significant difference in the success rates (patient's symptoms and physical signs were completely resolved, and > 70% improvement in the pain VAS) when anserine syndrome is treated with triamcinolone injection with or without oral meloxicam.

Materials and Methods: A randomized, double-blind trial was conducted in 64 patients with anserine syndrome given an injection of 20 mg of triamcinolone. The patients were randomly separated into two groups: Group A received oral meloxicam for 7 days ($n=32$) and Group B received placebo tablets for 7 days ($n=32$). At three weeks after the injection, primary outcomes (patient's symptoms, physical signs and pain scores) and adverse reactions were assessed by an independent, blinded evaluator.

Results: The success rates were 50% and 40.6% for Groups A and B, respectively. No significant difference of the success

rates between the two groups was observed ($p=0.62$). Common adverse reactions were found to be pain after the injection and dyspepsia.

Conclusions: Injection of triamcinolone seems to be sufficient and safe to treat anserine syndrome. The oral administration of meloxicam, and perhaps other NSAIDs, does not improve the efficacy of triamcinolone in the treatment of the anserine syndrome.

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COMPARISON BETWEEN DIARY-ACTUATED REHABILITATION PROGRAM AND CONVENTIONAL PHYSICAL THERAPY ON MOBILITY AND FUNCTION FOLLOWING TOTAL KNEE ARTHROPLASTY

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Introduction: Alleviation of pain and improvement of physical function are the main expected outcomes after total knee arthroplasty (TKA). Although TKA is an effective treatment for patients with end-stage knee osteoarthritis (OA), patients sometimes exhibit strength, functional, and mobility deficits as compared to preoperative status. All these residual impairments affect patients' ability to perform normal daily activities and ambulation.

Objectives: (i) to investigate the effectiveness of diary-actuated rehabilitation program compared to routine rehabilitation program at 2- and 6-weeks post-TKA, (ii) to investigate whether the diary-actuated rehabilitation program was able to provide significant improvements from baseline of clinical outcomes at 6 weeks after TKA.

Material and Methods: Eighty OA patients who underwent primary TKA were randomly assigned to the diary-actuated rehabilitation or routine rehabilitation groups. All patients received a 6 weeks of home-based rehabilitation program and were evaluated preoperatively (baseline), and at 2-, and 6-weeks postoperatively. The primary outcomes were evaluated by using range of motion (ROM), the American Knee Society Clinical Rating System (KSS 1989) and the new Knee Society Scoring System (KSS 2011). The secondary outcomes were obtained through six-minute walk test (6MWT) and stair-climbing test (SCT).

Results: The patients who received diary-actuated rehabilitation exhibited significantly greater values in active knee extension, total active knee ROM, total passive knee ROM and all subscales of KSS 1989 (knee score and functional score), and KSS 2011 (objective knee score,

satisfaction score, and functional activity score) than routine rehabilitation at 2- and 6-weeks after surgery. Moreover, diary-actuated rehabilitation provided an earlier recovery in active knee extension, passive knee flexion, total passive knee ROM, satisfaction score of KSS 2011, and functional score of KSS 1989 and KSS 2011 whereas routine did not yield such outcomes.

Conclusions: The newly designed diary-actuated rehabilitation program enhanced greater improvement and early recovery of knee mobility and knee function with a high rate of patient satisfaction even during subacute period following TKA.

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CONNECTION BETWEEN OSTEOPOROTIC FRACTURES AND TIME UP AND GO TEST IN POSTMENOPAUSAL WOMEN WITH LOW BONE MINERAL DENSITY

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Introduction: Fractures connected to falls in patients with low bone mineral density are in rise as a health problem.

Objective: To investigate connection between number/localization of osteoporotic fractures and Timed Up and Go Test (TUG test) in postmenopausal women with low bone mineral density.

Material and methods: The retrospective-prospective cross-sectional study encompassed 74 postmenopausal women averaging 71.73±5.37 years of age, who have been referred to the Special Hospital for Rheumatic Diseases in Novi Sad, Serbia. All patients had their bone mineral density measured at L spine and at the hip, and the results were interpreted as the T score according to the valid definition of osteoporosis. Exclusion factors: patients with a T score higher than -1 SD, having other metabolic bone diseases, hypotension, vision or hearing disturbances, Parkinson's disease, cognitive disorders, gait and balance disturbances. All subjects were tested by TUG test and questioned regarding presence, number and localization of low-impact fractures. The correlation was observed between T score, number/localization of fractures and TUG test. All subjects had signed the informed consent form. Statistical analyze was done using SPSS v.20.

Results: The low-trauma fractures were present in 44.6% of subjects, from which there were 0.47±1.3 vertebral and 0.36±0.71 and nonvertebral ones, respectively. There is a statistically significant negative correlation between TUG test and T score ($p<0.001$) being moderately expressed for all T scores (T-score for femoral neck $r=-0.512$, $p<0.001$; T-score for hip $r=-0.489$, $p<0.001$; T-score for spine $r=-0.440$, $p<0.001$). Therefore, the lower T-score, the higher TUG test result. There is a statistically significant positive correlation between number of fractures and TUG test ($p<0.001$) being moderately expressed ($r=0.48$). Therefore, the higher number of fractures, the higher TUG test score. There is also a correlation between number of vertebral fractures and TUG test score ($r=0.49$, $p<0.001$), positive and moderately expressed.

Conclusion: By timely assessment and treatment of patients with low bone mineral density, falls could be prevented and therefore the fractures too.

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SELF-ASSESSMENT OF HEALTH IN POSTMENOPAUSAL WOMEN WITH LOWER BONE MINERAL DENSITY IN COMPARISON TO NUMBER AND LOCALIZATION OF LOW-IMPACT FRACTURES

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Introduction: Effect of low-impact fractures on quality of life is often underestimated.

Objective: To investigate how postmenopausal women with lower bone mineral density self-assess their health regarding number and localization of low-impact fractures.

Material and methods: The retrospective-prospective cross-sectional study encompassed 74 postmenopausal women averaging 71.73±5.37 years of age, who have been referred to the Special Hospital for Rheumatic Diseases in Novi Sad, Serbia. All patients had their bone mineral density measured using the central DXA method, and the results were interpreted as the T score according to the valid definition of osteoporosis. Exclusion factors: patients with a T score higher than -1 SD, having other metabolic bone diseases, hypotension, vision or hearing disturbances, Parkinson's disease,

cognitive disorders, gait and balance disturbances. All subjects were asked to self-assess their health on a scale from 0 (worst) to 100 (best) and were questioned regarding presence, number and localization of low-impact fractures. Correlation was observed between self-assessed health and number/localization of fractures. All subjects had signed the informed consent form. Statistical analyze was done using SPSS v.20.

Results: The low-trauma fractures were present in 44.6% of subjects, from which there were 0.47 ± 1.3 vertebral and 0.36 ± 0.71 nonvertebral ones, respectively. The self-assessed quality of life is in statistically significant negative correlation with the number of vertebral fractures ($r = -0.253$, $p < 0.05$). The correlation is low, pointing to weak connection. Therefore, the more vertebral fractures, the lower life quality. The number of nonvertebral fractures and total number of fractures were not connected to the quality of life. There is a statistically significant positive correlation between self-assessment of life quality and T score. Correlation is moderately expressed for T-score for femoral neck $r = 0.280$, $p < 0.05$; T-score for hip $r = 0.322$, $p < 0.001$ and T-score for spine $r = 0.470$, $p < 0.001$. Therefore, the higher T-score, the lower self-assessed quality of life.

Conclusion: By prevention and treatment of patients with low bone mineral density, fractures could be prevented and therefore the quality of life increased.

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EARLY DIAGNOSIS, PATHOGENESIS, PROGNOSIS AND TREATMENT OF EARLY INFLAMMATORY ARTHRITIS, IN A SOUTHERN EUROPEAN POPULATION

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The aim of this proposal is to determine knowledge in the southern European general population with rheumatoid inflammatory arthritis.

Inflammatory arthritides (rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis, reactive arthritis/ Including and Cardiovascular Disease one Resic Factors which bring to them) affect approximately 1-1.5% of the population of Greece. Recent data have highlighted their significant social and economic cost. If not adequately treated, irreversible joint damage may occur and is accelerated during the first 1-2 years of the disease. However, recognition of inflammatory arthritis

at the early stages is challenging to the non-rheumatologist. Referral to special early arthritis clinics can improve considerably the outcome. We have established an early arthritis clinic to set up a network with primary care physicians for the prompt referral of patients with suspected inflammatory arthritis of recent onset. This clinic offers full diagnostic and prognostic evaluation, prompt therapeutic intervention and patient education. Control of the disease in this cohort will be tight aiming at DAS scores less than 2.6 (remission) by defined treatment escalation protocols involving DMARDs alone or in combination with biologics. In this cohort, issues related to the pathogenesis and prognosis of early arthritis will also be addressed.

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ASSESSMENT OF KNOWLEDGE ABOUT THE BARC CENTRE AND SATISFACTION WITH THE EDUCATIONAL SERVICES AVAILABLE

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The aim if this proposal is to determine knowledge in the general population about arthritis; to ascertain if this has improved in the decade since our Needs Assessment; and the satisfaction with the educational material now available to support communities and arthritis sufferers.

Background: BARC (Birmingham Arthritis Resource Centre) was set up to provide education and support to people with arthritis and their cares, based on a formal Needs Assessment. BARC aims to promote self-coping – to help people to deal with the physical and social disabilities caused by their disease. It is sited in the city centre public library and works alongside the regular medical NHS service provision. Services for Rheumatology have always had lower priority (and funding) than those for acute services such as Cancer and Heart disease. In addition they have historically been somewhat restricted in the West Midlands (the UK region where Birmingham is the central city) compared to the rest of the UK. The picture is also complicated by the high percentage of ethnic minority groups locally (generally referred to as BME groups – Black and Minority Ethnic). Birmingham is set to become the first major UK city where BME groups will become the majority within the next ten years. There is evidence that “excluded groups” - such as immigrants, the poor and the less-well educated – have poorer health but do not access the NHS in the same way as the white middle-class population for a variety of reasons, including cultural, language and poverty barriers. This is

clearly relevant to the wider European scene where there is increasing pressure from immigration while currently both health and social programmes are threatened by the financial recession.

The BARC project was started a decade ago with a formal research process to determine the extent of current services and what people wanted. This "Needs Assessment" showed that both medical profession and public perceived a need for more information provided in an informal setting (i.e. a non-medical setting) - and wanted it in a range of languages (Adab et al *Rheumatology* 2004). There was also a widespread desire for more support services for patients. The BARC centre was set up on the basis of this in space provided by the City in the Central Library and is manned by volunteers. These have been selected and trained by the Centre manager, Chan Gordhan, who has a long background in social and voluntary work. The volunteers come from a range of ethnic backgrounds and importantly they have all had some personal rheumatic problem. Thus they fit what the UK government is now calling "expert patients" - and promoting the idea that they are best placed to help others since they have learnt how to cope. Interestingly our experience shows that volunteering to help others also empowers them to deal with their own lives, so they should also be the best placed group to teach us how to empower our clients. Our data also shows that the BARC service is wanted as well as needed locally.

The key point in developing any new service is to provide an evidence base for it. BARC set out to do this from the outset. Following the initial "Needs Assessment" We carried out a focus group study to determine what patients from BME groups were looking for from the local health services (Bacon'05). A key factor expressed by the participants was the desire to be listened too. They were dissatisfied with their doctors who were seen to lack time to take in the patients broader complaints. This echoes wider concerns about poor doctor-patient communications - an area which the Royal College of Physicians is holding an enquiry into at present.

BARC has set up sympathetic listening as one of the basic parts of the service (Gordhan'03 and '08). This is provided by trained volunteers. They are themselves patients and come from a range of ethnic and linguistic backgrounds, so that they are able to provide culturally sensitive guidance to clients. We have collected data on who has attended and how satisfied they are with the service provided (Treharne'04). Approximately 40% of attendees come from the BME groups, similar to the general population. Thus we are getting through to target populations - but not in large enough numbers. We have also had high gradings for client satisfaction.

We have also addressed the need for relevant patient-education material understandable to those for whom English is not their mother tongue. We recently completed a set of educational leaflets, designed as "bottom-up" material - that is based on questions people actually ask rather than information doctors think patients ought to know. They are in simple English, avoiding technical terms, so as to be easily understood. The first six have been translated into Urdu and recorded on CD's in both languages, as well as in print format with a few cartoons to illustrate them. A preliminary piece of market research in the BARC Centre shows that the volunteers think they are what is needed (and a small sample of clients listening to the first one agreed). The Urdu translation has also been approved by a range of Indian colleagues as being both true to the English information and understandable by a range of local language speakers. The translation is not strict Urdu but includes phrases used in Bollywood films (watched by all the local S. Asian groups) as well as some English words generally used in the version of "Urdu" widely used around Birmingham.

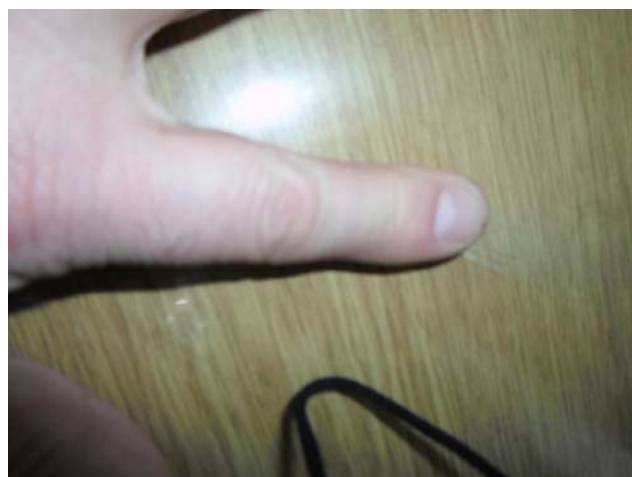
questionnaire-based assessment of the first of these CD's - on Understanding Arthritis - showed that clients gave it high scores for clarity of information and obtaining information that they wanted. In general they found the CD helped them to cope (Sharif'08). We are just completing an assessment of the CD on rheumatoid arthritis and the outcome is very exciting. The challenge was far greater here as the usefulness of the CD was examined in a specialist RA clinic which already had a highly trained specialist nurse providing explanations and support to patients. Despite this the comments made at the focus groups demonstrated that the study participants had found the additional BARC service a major help (Kumar et al'09). There is now patient pressure to set up such a service on a regular basis in the hospital setting. This would be in line with the recent Report from the influential Kings Fund which noted a lack of understanding on the quality of RA care and the struggle many RA patients have to access quality care (Kings Fund'09).

In the same way, we have struggled to reach our target for new attendees at the BARC centre, despite the evidence for the need for and the success of the BARC service. Total numbers accessing the BARC service, including phone calls and website hits, have increased year-on year but surprisingly there has been no increase in personal visitors. A number of community centres have asked for the manager to go out to specific groups with promotional and educational talks. This alternative approach has proved very popular but many attendees have said they were not aware of the BARC centre. These outreach sessions are demanding on Chan Gordhan's time and there is an excellent service available at the library. Thus the next essential step is a study of why people are not coming in the predicted numbers.

Hypothesis: We propose that the population in general tend to downplay the importance of their musculoskeletal problems. This is reinforced by the poor publicity that arthritic diseases get compared to some others. Analysis of the relative importance given by press or TV showed that heart disease and cancer got far more attention and were treated as serious scientific problems. Rheumatic diseases by contrast were seen as “lifestyle problems” for which there was no real medical treatment. The existence of a ground-breaking local service does not appear to have changed that mold to any major extent. Each time that the BARC Centre has been discussed on local radio there has been a sharp rise in client enquiries – but only for a short period. We intend to analyse the degree of local awareness of the BARC and at the same time look further into the responses of those who do actually come to seek help.

Methods: The first aspect will be carried out by collecting data about knowledge of BARC and satisfaction with current educational support using standardised questionnaires. This will target both a random population (people accessing the Central Library for any purpose) and specific communities such as local Sikh and Somali populations who have already identified a perceived need for an increased service for their groups. A minimum of 200 library people will be sampled at random in each grouping. The second part (analysis of satisfaction with current services) will be completed by analysis of the data collected over the past two years from attendees at the Centre, who are all asked to complete such a form. The data from this project will be compared to that obtained 10 years ago in the original Needs Assessment

Broader Aspects of Fellowship: The advantages of taking on this project would be to widen your experience into qualitative research and introduce you to a new but important area of rheumatology, patient education. The latter has many messages for someone practicing in a major city with an immigrant population and you have already reported working with several ethnic minority groups in Kosova. We have been thinking about this project for some time, so there are some things already in place to facilitate your research. We have already trialled a simple questionnaire for these assessments. A sociology student is currently using these to collect some preliminary data from library visitors. That experience will focus the further development of the project. A trained health psychologist is available to help with analysing the questionnaires and the unstructured material coming from the “free comment” section at the end of each form. In the same way, the set of forms collected from clients attending the Centre in its early years have been analysed and will form a useful comparison with the planned analysis of the comments collected from recent clients. This exercise will definitely lead to at least one published paper. The methodologies used will be of value to you in assessing the worth of conventional treatment options across the field of rheumatology. Our specialty deals with incurable chronic disease and there is increasing evidence that patients have a different perspective on the outcome to their doctors (Hewlett’03).





Helping people to cope with chronic disability, improving their life by addressing their real concerns rather than measuring “medical outcomes” like degree of swelling or ESR, is becoming increasingly important. Finding ways of reaching out to the large percentage of the population who have a disability related to a rheumatic problem is also essential to persuade politicians to take the subject seriously (and invest in it!). Thus the experience gained from this would be advantageous to your career in many ways – and I believe you would find working in BARC both interesting and rewarding. Once in place here you can join in all the usual University Rheumatology Departmental activities, from seminars to clinical meetings. We would also work to get you some exposure to Rheumatoid Arthritis clinics as an observer on an informal basis. That will be easier to do with colleagues on the ground than to set up formally in advance with the current NHS bureaucracy.

You will have free time to catch up on your reading, particularly on the fairly large literature on self-coping and on what people expect from health services. You would need this to write a good paper and I would expect you to write up a comprehensive introduction and methods section well before data collection has been completed. Of course we will be available to discuss that with you – but it will be your responsibility to produce the first version. I believe that an important part of such a fellowship is learning how to plan and write up your own research projects for the future.

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VITAMIN D DEFICIENCY IN ECUATORIAN POSTMENOPAUSAL WOMEN WITH TYPE 2 DIABETES

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Objectives: To evaluate the prevalence of vitamin D deficiency in postmenopausal women with type 2 diabetes mellitus (T2DM), and investigate whether there is correlation between serum levels of vitamin D with the bone mineral density (BMD) and other metabolic variables.

Materials and Methods: Ninety six women postmenopausal who attended to clinical control of T2DM in Service of Endocrinology of HDPN-G2 in the period January 2012 to November 2015, we measure serum levels of vitamin D (VD), glycosylated hemoglobin (HbA1c), HOMA, parathyroid hormone (PTH), ionic calcium, osteocalcin, urinary deoxypyridinoline, and the lumbar spine and neck of femur BMD by DXA. Premenopausal women, impaired renal function, type 1 diabetes, secondary osteoporosis and women who received treatments which alter metabolism of bone were excluded. We divided in two groups of patients according to serum levels VD ≥ 30 (sufficiency) and < 30 (insufficiency). This last group is subdivided in severe deficiency (< 10 ng/mL), moderate insufficiency (10-19 ng/mL) and mild insufficiency (20-29 ng/mL). We performed an analysis of linear correlation between VD and all variables and one multiple regression analysis with VD such as the dependent variable. The results are expressed by mean \pm standard deviation. The software Epidat 3.1 was used for data analysis.

Results: We found a significant reduction in serum levels of VD in patients with T2DM. Mean of age 64 ± 11 , BMI 29 ± 5 , VD 22 ± 8 , and PTH 39 ± 27 . We found with sufficiency of VD in 12.5% of cases, insufficiency of VD reported 87.5%; insufficiency were graded mild 52% (n=44), moderate 42% (n=36) and severe 4.8% (n=4).

| | Total Group n=96 | Sufficiency VD (n=12) | Insufficiency VD (n=84) |
|-------------------------------|---------------------|--------------------------|----------------------------|
| Age (years) | 63.86 \pm 10.79 | 62 \pm 13 | 64 \pm 10.41 |
| BMI (Kg/m ²) | 29.04 \pm 4.91 | 28.99 \pm 5.09 | 29 \pm 4.86 |
| HOMA | 8.06 \pm 15.69 | 4.87 \pm 3.44 | 9 \pm 16.77 |
| HbA1c (%) | 7.32 \pm 2.07 | 7.74 \pm 1.56 | 7 \pm 2.14 |
| VD | 21.86 \pm 7.64 | 36.19 \pm 5.95 | 20 \pm 5.3 |
| PTH (12 a 72 pg/mL) | 38.56 \pm 26.54 | 34 \pm 10.07 | 39 \pm 28.2 |
| ionic calcium (4.5-5.6 mg/dl) | 4.91 \pm 0.27 | 4.99 \pm 0.15 | 5 \pm 0.28 |
| Osteocalcin (12-41 ng/mL) | 17.7 \pm 10.58 | 14.96 \pm 5.66 | 18 \pm 11.09 |
| Deoxypyridinoline | 6.89 \pm 2.51 | 6.91 \pm 2.52 | 7 \pm 2.52 |
| T Score BMD LS | -1.41 \pm 1.5 | -1.08 \pm 1.65 | -1 \pm 1.48 |
| T Score BMD FN | -1.19 \pm 1.27 | -0.88 \pm 1.5 | -1 \pm 1.23 |

Conclusions: Our results show a high prevalence of vitamin D deficiency in ecuatorian postmenopausal women population with diabetes mellitus type 2. We found no correlation between VD and other variables nor with BMD.

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DIFFERENCES IN THE EARLY EFFECT OF ANTI-RANKL ANTIBODY ON BONE RESORPTION AND BONE FORMATION

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Objective: We examined the early effects of anti-RANKL (receptor activator of nuclear factor κ B ligand) monoclonal antibody in ovariectomized mice to evaluate the differences of the speed of drug effect on bone resorption and bone formation in histological findings.

Material and Methods: Twelve-week-old female C57BL/6 mice were ovariectomized. Four weeks after the surgeries, the ovariectomized mice were treated with anti-RANKL antibody (single injection of 5mg/kg). We euthanized mice before injection of anti-RANKL antibody (Day0) and after 1, 2, 3, 4, 5 or 6 days from the day of injection (Day1, 2, 3, 4, 5 or 6). Hind limbs and lumbar spines were subjected to histological and histomorphometric analysis.

Results: In the cancellous bone of tibia and lumbar spine, histomorphometric analysis demonstrated that there was no significant difference in bone volume (BV/TV and Tb. N). Bone resorption parameters (ES/BS and Oc.S/BS) rapidly decreased to almost undetectable levels at day 3. There were significant differences between Day 0 and Day 2, 3, 4, 5 and 6, and between Day 1 and Day 2, 3, 4, 5 and 6. On the other hand, bone formation parameters (OV/BV and Ob.S/BS) and bone formation speed parameters (BFR/BS and MAR) kept almost same level from Day 0 to Day 6. In the cortical bone of femur, histomorphometric analysis demonstrated that bone resorption parameter (Ps. ES/Ps) rapidly decreased. There were significant differences between Day 0 and Day 2, 3, 4, 5 and 6, and between Day 1 and Day 2, 3, 4, 5 and 6. However, there was no significant difference in bone formation parameters (Ps. MAR and PS. BFR/PS).

Conclusion: Anti-RANKL antibody rapidly decreases bone resorption parameters. However, bone formation maintains in the early phase after the treatment. This is one of the reasons why anti-RANKL antibody increases bone mineral density both in cancellous bone and cortical bone.

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OSTEOPOROSIS PREVALENCE IN LUNG TRANSPLANT PATIENTS

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Background/Purpose: Osteoporosis prevalence in lung transplantation candidates is between 1621%. In the last years, the

survival rate after lung transplantation has definitely improved, due to the improvement of the surgical techniques, of the treatment in the intensive care unit and the development of better immunosuppressive therapy. In spite of this, it was observed that there is a rapid loss of bone mass in these patients in the first year posttransplantation, probably due to prolonged immobilization postsurgery, to high doses of glucocorticosteroids used to prevent acute rejection and to the immunosuppressive regimen. Prospective studies have been conducted which demonstrated changes in bone mass and a major incidence of fractures in lung transplant patients. Our objectives were to determine the prevalence of osteopenia, osteoporosis and fractures in lung transplantation candidates and lung transplant patients in a reference center as well as to evaluate the change of bone mass pre and post transplantation.

Methods: We included 179 patients from the cohort of lung transplant patients of Vall d'Hebron University Hospital, whose femoral and lumbar bone mineral density determinations pre and posttransplant were available. Since it is a retrospective study and the moment of the posttransplant bone densitometry could not be standardized, the patients were stratified depending on the moment of the realization of the densitometry: less than 6 months, between 7 and 12 months and more than 12 months after the transplant.

Results: Out of the 179 patients, 110 were men and 69 were women, and their average age was 51 ± 10.4 years. The prevalence of pre and posttransplant osteoporosis, osteopenia and symptomatic fractures is shown in table 1.

| Prevalence (%) | Pretransplant | Post-transplant |
|----------------|---------------|-----------------|
| Osteoporosis | 38 | 38.5 |
| Osteopenia | 45.8 | 48.6 |
| Normal | 16.2 | 12.8 |
| Fractures | 9.5 | 11.2 |

No significant differences were observed when comparing the percentage of men and women with osteoporosis and osteopenia before and after the transplant, in relation to the patients' sex or age. The change of bone mass posttransplant, expressed in gr/cm^2 was of 1.3% (± 15.3) in the lumbar spine, 2.1 (± 11.3) in the femoral neck and 2.1 (± 9) in the total femur. The patients' diagnostic change after lung transplant is shown in table 2.

| | | Post-transplant | | |
|----------------|---------------------|-----------------|-------------------|---------------------|
| | | Normal (n=23) | Osteopenia (n=87) | Osteoporosis (n=69) |
| Pre transplant | Normal (n=29) | 18 (62.1) | 11 (37.9) | - |
| | Osteopenia (n=82) | 4 (4.9) | 62 (75.6) | 16 (19.5) |
| | Osteoporosis (n=68) | 1 (1.5) | 14 (20.6) | 53 (77.9) |

More than 60% of the patients did not have a diagnostic change after the transplant. Out of the 11 patients with normal pre transplant bone densitometry and posttransplant osteopenia, 9 had previously received osteoporosis treatment. Out of the patients with pre transplant osteopenia, 16 had osteoporosis afterwards, 8 of whom had not received previous treatment. 14 patients that

had pre transplant osteoporosis improved to osteopenia posttransplant, out of which 12 had been previously treated.

Conclusion: In our series the prevalence of osteoporosis and osteopenia was of 38% and 45.8%, respectively. The prevalence of pretransplant symptomatic fractures was of 9.5%. The prevalence of posttransplant osteoporosis and osteopenia was of 38.5% and 48.6%, respectively. The prevalence of posttransplant symptomatic fractures was of 11.2%. In our cohort, the majority of patients whose bone densitometry worsened from normal/osteopenia to osteoporosis had not received pre transplant prophylactic treatment. The posttransplant bone mass loss was between 12%, and the most affected regions were the total femur and the femoral neck.

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EVALUATION OF OSTEOPOROSIS RISK FACTORS IN LUNG TRANSPLANT PATIENTS

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Background/Purpose: Patients with a terminal lung disease have a great number of risk factors for the development of osteoporosis. Although much has been learned about the factors that contribute to bone mass loss, in our study we try to determine the risk factors in groups of similar diseases. The study's objective is to determine if the known risk factors for low bone mass are more prevalent in each of the studied lung diseases and if these correlate with the presence of osteoporosis in lung transplantation candidates.

Methods: 179 patients were included, from the cohort of lung transplant patients of the Vall d'Hebron University Hospital, whose pre transplant bone densitometry at lumbar spine and femoral neck were available. 3 groups of lung diseases were selected, due to the differences related to the grouping of risk factors and the glucocorticosteroid doses required before transplantation. The groups were: Chronic Obstructive Pulmonary Diseases (COPD), Interstitial Lung Diseases (ILD) and Other Diseases (lymphangiomyomatosis, cystic fibrosis, primary and secondary pulmonary hypertension). The glucocorticosteroid dose was stratified as follows: high dose if it was more than 5mg/day for more than 3 months (or prednisone equivalent) or more than 3 times a year, and low dose if it did not meet these conditions.

Results: 179 patients were included, with an average age of 51 ± 10.4 years, without sex related differences. 69 were women (66% of them were at menopause at the moment of the transplantation). 12.3% (22 patients) of the patients had a low body mass index, 57% were smokers with an average of 24.7 packages/year, 5% consumed more than 40 grams of alcohol per day, 44% were sedentary, 8.4% had first degree relatives with an osteoporotic fracture, 15.6% had osteopenia and 86% had

received glucocorticosteroids, 56.4% of them at high dose. The risk factors more prevalent in Chronic Obstructive Pulmonary Disease in comparison with the other groups as well as the prevalence of each of them are shown in Table 1.

| Risk Factor | Total (n=179) | COPD vs. ILO | | | COPD vs. ILO | | COPD vs. Other | |
|--|------------------|----------------|---------------|-----------------|------------------|-------|------------------|-------|
| | | COPD (n=65) | ILO (n=62) | Other (n=52) | RRP (CI) | P | RRP (CI) | P |
| Menopause | 40 (22.3) | 14 (21.5) | 24 (38.7) | 0 (0.0) | 0.33 (0.71-1.20) | 0.420 | 2.16 (1.20-3.89) | 0.007 |
| Low calcium intake | 41 (22.9) | 19 (29.2) | 17 (26.7) | 5 (12.2) | 1.23 (0.81-1.87) | 0.235 | 1.44 (0.71-2.90) | 0.213 |
| Low BMI | 22 (12.3) | 8 (12.3) | 5 (8.1) | 9 (26.1) | 2.01 (0.69-5.98) | 0.153 | 0.44 (0.19-1.03) | 0.053 |
| Smoking packets/year | 102 (57) | 58 (89.2) | 39 (61.3) | 6 (18.8) | 1.92 (1.50-2.48) | 0.000 | 4.75 (2.30-9.83) | 0.000 |
| Alcoholism | 9 (5) | 5 (7.7) | 4 (6.3) | 0 | 1.57 (0.44-5.64) | 0.356 | - | 0.126 |
| Sedentarism | 79 (44.1) | 37 (56.9) | 34 (54.5) | 8 (25) | 1.37 (0.96-1.91) | 0.045 | 2.27 (1.20-4.30) | 0.003 |
| Previous fracture | 17 (9.5) | 7 (10.8) | 10 (12.2) | 0 | 0.88 (0.36-2.19) | 0.500 | - | 0.054 |
| Fracture in a relative | 15 (8.4) | 5 (7.7) | 5 (8.1) | 5 (15.4) | 1.26 (0.39-4.17) | 0.475 | 2.03 (0.63-6.51) | 0.195 |
| Osteoporosis disease | 28 (15.6) | 9 (13.8) | 7 (8.5) | 12 (37.5) | 1.62 (0.64-4.12) | 0.220 | 0.37 (0.17-0.78) | 0.009 |
| Oral Glucocorticosteroids -High doses | 154 (86) | 62 (95.4) | 75 (91.5) | 17 (52.3) | 1.04 (0.96-1.14) | 0.270 | 1.79 (1.29-2.49) | 0.000 |
| Vitamin D (ng/ml) | 10.1 (12.3) | 10.2 (11.3) | 10.2 (11.3) | 10.4 (15.7) | 0.980 | 0.980 | 0.002 | 0.002 |
| Parathormone (pg/ml) | 66.7 (39.2) | 73.2 (48) | 59.8 (28) | 71.1 (40.2) | 0.960 | 0.960 | 0.521 | 0.521 |

The risk factors associated with osteoporosis in all the patients were a low body mass index, smoking and previous fracture. In the different groups of lung diseases, the risk factor associated with osteoporosis in the Chronic Obstructive Pulmonary Disease group as well as in the Interstitial Lung Disease group was the presence of a previous fracture, with an OR of 1.81 (1.442.28) and 3.31 (1.0710.24), respectively. In the group of other diseases the risk factor associated to osteoporosis was the glucocorticosteroid treatment, with an OR of 1.95 (1.083.52), without differences related to the dose.

Conclusion: In our cohort, the risk factors for low bone mass, depending on the disease, were smoking and sedentarism in the Chronic Obstructive Pulmonary Disease group. In the same group there was a major prevalence of menopause and glucocorticosteroid treatment, in comparison to the other groups. But the prevalence of high glucocorticosteroid dose in this group was lower than in the others. The risk factors for osteoporosis in lung transplantation candidates were previous fractures, smoking and a low body mass index. In the Chronic Obstructive Pulmonary Disease and Interstitial Lung Disease groups the factor with greater association to osteoporosis was the presence of previous fractures and in the other diseases group glucocorticosteroid treatment.

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THE EFFECT OF IMMUNOSUPPRESSIVE AND ANTIRESORPTIVE THERAPY ON BONE MINERAL DENSITY IN LUNG TRANSPLANT PATIENTS

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Background/Purpose: Osteoporosis is a very frequent complication in recipients of a lung transplant. The factors that

intervene can be previous to the transplant, such as the individual risk, the underlying disease, the treatments received but also the ones related to the lung transplant, like the prolonged postsurgery immobilization. The rate of bone mass loss in the lumbar spine and the femoral neck in the first year is around 25% and fracture prevalence is between 18-37%. The objectives of this study were to evaluate the effect of antiresorptive, glucocorticosteroids and other immunosuppressive treatments on bone mineral density in lung transplant patients.

Methods: This is a retrospective study on a cohort of 179 patients who were submitted to lung transplant between 2004 and 2014 in the Vall d'Hebron University Hospital. A bone densitometry was practiced to all patients before and after the lung transplant. The comparison between the determinations was made by calculating the percentage of change in bone mass expressed in g/cm² at each of the explored region: the lumbar spine (L2-L4), the femoral neck and the total femur. For the analysis of the effect of immunosuppressant therapy on bone mineral mass, a subgroup of 136 patients was selected, who were receiving a standard treatment regimen: glucocorticosteroids, tacrolimus and mycophenolate. 3 groups were established, depending on the moment of the densitometry realization: in the first 6 months, between 6 and 12 months and more than 12 months after the lung transplant. The correlation between bone mineral loss in the regions of interest and the accumulated dose of each of the treatments was evaluated using logistic regression and multivariate analysis.

Results: Out of the 179 patients, 121 received treatment for osteoporosis after the lung transplant (89 were previously receiving it). Table 1 shows the number of treated patients as well as the received treatments. The average time (rank) between the start of the treatment and the realization of the bone densitometry posttransplant was of 24 months (5-120).

| Table 1. Osteoporosis treatment post-transplant | Treated (n=121) | No treated (n=58) | P |
|---|--------------------|----------------------|-------|
| Osteopenia | 61 (50.4) | 26 (44.8) | 0.272 |
| Osteoporosis | 48 (39.6) | 23 (39.7) | 0.480 |
| Normal | 14 (11.6) | 9 (15.5) | |
| Drug | | | |
| Oral bisphosphonate | 64 (52.9) | | |
| Intravenous bisphosphonate | 46 (38) | | |
| Strontium ranelate | 2 (1.7) | | |
| Teriparatide | 2 (1.7) | | |
| Calcitonin | 1 (0.8) | | |
| Denosumab | 3 (2.5) | | |

Among the 136 patients (58.8% men) who were selected for the study of the effect of immunosuppressants on bone mineral mass, 49 (36%) had been diagnosed of Chronic Obstructive Pulmonary Disease, 64 (47%) of Interstitial Lung Disease and 23 (17%) of other pulmonary diseases. The average percentage of variation of the bone mineral mass in all 136 patients was of +1.3% in lumbar spine, 3.4% in femoral neck and 2.3% in total femur. The percentage of variation of bone mineral mass pre and posttransplant in the treated patients was of 2.8% for the lumbar spine, 0.5% for the femoral neck and 1.3% for the total femur, in comparison to

the group of untreated patients where the variation was of 2.5, 5.4% and 3.9, respectively. There was no significant difference in the average accumulated dose of glucocorticosteroids and immunosuppressants between patients whose posttransplant bone mineral mass improved or worsened, in none of the studied regions, nor in the global study or in either of the subgroups of studied diseases. In the multivariate analysis, feminine sex was the only variable which was associated to bone mineral loss in all the studied regions, except for the femoral neck.

Conclusion: The patients who received antiresorptive treatment pre transplant have a major increment of bone mineral mass at the lumbar spine and a lower posttransplant bone mineral mass loss than the not treated ones. No association was observed between glucocorticosteroid and other immunosuppressants and posttransplant bone mineral mass.

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SENSITIVITY AND SPECIFICITY OF THE SARC-F QUESTIONNAIRE ACCORDING TO DIFFERENT DEFINITIONS OF SARCOPENIA: RESULTS FROM THE SARCOPHAGE STUDY

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Objective: Our aim was to assess the performance of the SARC-F questionnaire in a cohort of Belgian elderly subjects, according to the various existing definitions of sarcopenia.

Material and Methods: We analyzed cross-sectional data available from the SarcoPhAge (for *Sarcopenia and Physical Impairment with Advancing Age*) cohort, a research project seeking to gather scientific data characterizing sarcopenia in a population of subjects over 65 years old. We carried out 3 main assessments: the skeletal muscle mass index using Dual-Energy X-Ray Absorptiometry (DXA) (Hologic Discovery A, USA), the muscle strength with a hand-dynamometer (Saehan Corporation, MSD Europe Bvba, Belgium) and the physical performance with the Short Physical Performance Battery test (including data regarding gait speed). Moreover, for this specific investigation, we used a French-translated version of the SARC-F questionnaire, composed of 5 questions and reflecting 5 components: strength, assistance in walking, rise from a chair, climb stairs and falls. A maximum of 2 points are assigned to each question and subjects with a score greater than or equal to 4 are considered sarcopenic. We proceeded to a one-to-one comparison analysis regarding the tool performance (i.e., calculation of sensitivity and specificity), following 7 different definitions of sarcopenia. Two are based on the concept of a low muscle mass: Baumgartner *et al.* (1998); Delmonico *et al.* (2007). The

5 others use the concept of low muscle mass plus a weakness in the muscle function: Cruz-Jentoft *et al.* (2010); Fielding *et al.* (2011); Morley *et al.* (2011); Chen *et al.* (2014); Studenski *et al.* (2014).

Results: The 306 subjects enrolled in this analysis were 74.9±5.93 years old and included 182 women (59.5%). Depending on the definition employed, the prevalence of sarcopenia varied from 5.88% (Morley *et al.*) to 33.99% (Delmonico *et al.*). The sensitivity of the SARC-F questionnaire ranged from 22.12% (Delmonico *et al.*) to 75.00% (Chen *et al.*) and the specificity from 84.86% (Studenski *et al.*) to 87.06% (Cruz-Jentoft *et al.*). We noted that a lower sensitivity was found for the 2 definitions of sarcopenia involving only the notion of muscle mass (Baumgartner *et al.*; Delmonico *et al.*). Moreover, all positive predictive values were always less than 50%, with a minimum of 17.31% (Chen *et al.*) and a maximum of 44.23% (Delmonico *et al.*). The lowest predictive negative value was 68.11% (Delmonico *et al.*) and the best one reached around 99% (Chen *et al.*).

Conclusion: Globally, for most of the definitions considered in our analysis, our results are in line with the performance established in the initial validation of the SARC-F tool (i.e. a poor sensitivity and an excellent specificity). This screening tool seems thus to detect with precision the absence of sarcopenia but seems less precise in affirming the presence of this geriatric syndrome.

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DOES FORCE-TIME CHARACTERISTICS DURING SUSTAINED CONTRACTIONS DIFFERENCE IN YOUNG CONTROLS, OLD COMMUNITY-DWELLING AND HOSPITALIZED GERIATRIC PATIENTS?

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Introduction: Fatigue is considered as one of the key-elements for physical frailty at higher age, but surprisingly data on strength drop characteristics during sustained maximal contraction in elderly are scarce.

Methods: A secondary data-analysis was performed on continuously recorded force-time data during sustained maximal grip effort until exhaustion in 91 geriatric patients (83±5 years), 100 old community-dwelling (74±5 years) and 100 young adults (23±3 years). Fatigue resistance (FR) was expressed as the time during which grip strength (GS) drops to a certain percentage of its maximum. The GS curve was divided into 4 parts for each participant: 1) from GS_{max} to 75% GS_{max}; 2) from 75% GS_{max} to 50% GS_{max}; 3) from 50% GS_{max} to 25% GS_{max}; and 4) from 25% GS_{max} to fatigue.

Results: The initial phase (first 25% strength drop) was significantly shorter in geriatric patients compared to the 2 other groups. Subsequently, the second part was almost twice as long in old community-dwelling compared to old patients and young healthy. However, although the second part of the GS decay was longer in old community-dwelling, the third part was significantly shorter in this group compared to young controls and hospitalized patients. The last part of the GS decay was markedly longer in the young controls.

Conclusion: Force-time characteristics during sustained maximal handgrip effort are different according to age and clinical condition. Especially the differences in the initial phases of the strength drop can be an opportunity for simplifying the procedure of the available FR test in the future.

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ALTERATION OF CARTILAGE AND SUBCHONDRAL BONE (OSTEOARTHRITIS LIKE) INDUCED BY PROTEIN MALNUTRITION IS TREATED BY NUTRITIONAL ESSENTIAL AMINO ACIDS SUPPLEMENTS

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Elderly patients frequently suffer from protein malnutrition leading to major alteration of the somatotrophic axis including lower systemic and local IGF-I production known as major anabolic agent for cartilage and bone homeostasis. Protein malnutrition could affect both cartilage and SB and may contribute to osteoarthritis development while essential amino acids supplements could reverse these potential deleterious effects.

Mature Sprague Dawley rats (6-months-old) were pair fed a chow diet (NP, 15% casein, 1 group) or an isocaloric low protein diet (LP, 2.5% casein, 2 groups) for a period of 12 weeks. Following this period, one of the two groups submitted to LP was treated with essential amino acids supplementation (LP+EAA, 2.5%+5%). Femurs were collected 24 weeks after protocol initiation. Phase-contrast microcomputed tomography using contrast agent allowed determination of trabecular morphometric parameters as well as hyaline and calcified cartilage thickness, and proteoglycan content estimation of both condyle. Indentation allowed determination of cartilage material level properties in three indentation zones of each condyle chosen according to their joint mechanical loading pattern related to rat ambulation.

LP diet induce lower systemic IGF-I (-45%, $p < .001$) and lower SB trabecular mass and mineral density (respectively -30% and -3%, $p < .001$). Despite additional histologic study is

warranted, LP did not alter cartilage thicknesses as well as proteoglycan content but hyaline cartilage biomechanical properties were impaired. In each investigated zone, and independently of the joint mechanical loading pattern, elastic modulus and indentation force necessary to reach a depth of 25 μm were decreased in a respective range of -20 to -45% ($p < .001$) and -10 to -30% ($p < .001$). EAA supplementation restored IGF-I systemic level from 4 week of treatment and fully normalized SB and cartilage quality alterations.

We suggest that protein malnutrition alters cartilage quality and could predispose to osteoarthritis while EAA supplement had a curative effect.

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OSTEOPOROSIS, A COMMON CONDITION AND YET SO COMPLEXE: DO WE HAVE SOLUTIONS FOR ALL CASES?

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Aims: We present the case of a male patient, 65 years old who is hospitalized for swollen and tender joints. He also presents petechial lesions all over his body.

Methods: The patient is known with rheumatoid arthritis from 2010 diagnosed and monitored in Dr. I. Cantacuzino Hospital, Department of Internal Medicine and Rheumatology, and follows treatment for this disease with conventional synthetic DMARDs (csDMARDs) and corticosteroids. The patient has a long medical history and associate at this time a complex pathology: rheumatoid arthritis with extra-articular manifestations (vasculitis), chronic myeloid leukemia (in treatment with rituximab and imatinibum). Also he had multiple orthopedic interventions over time (total right hip prosthesis for aseptic osteonecrosis of the femoral head without a definite cause-1998, complete left subtrochanteric fracture with Intramedullary nail fixation 2014). At the initiation of corticosteroid therapy (2010) was performed bone densitometry test that showed T score of -3 at the hip. We started treatment with bisphosphonates, calcium with vitamin D3. Paraclinic exams reveals severe thrombocytopenia (PLT count 24.500/mm³), intense biologically inflammatory syndrome (ESR 105 mm/h, CRP 51.2 mg/dl) and pelvis x-ray showed intramedullary nail without signs of fracture strengthening for the left hip. After we consulted the haematologist who recommended pulsetherapy with corticosteroid, we decided to repeat the

osteodensitometry test, showing a T score of -3.5. Given the current circumstances, we decided administration of pulsetherapy with methylprednisolone, with favorable evolution of platelets count and inflammation tests.

Results: Despite treatment with bisphosphonates, calcium and vitamin D3 patient shows increased degree of osteoporosis and presents fragility fracture without signs of consolidation.

Conclusions: At a patient receiving important immunosuppressive treatment (csDMARDs, rituximab, imatinibum) who also requires further administration of corticosteroids, to prevent worsening of osteoporosis and fractures, do we have optimal therapeutic solutions?

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TREATMENT OF OSTEOPOROSIS AND INTERFERENCE BETWEEN SPECIALTIES

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Aims: We present the case of a 68 years female patient, who is hospitalized in the Rheumatology Clinic in May 2015 with suspicion of rheumatoid arthritis. She complains also of low back pain and polyarticular swelling and tenderness.

Methods: The patient was recently hospitalized in a Hematology Clinic where she was diagnosed with multiple myeloma IgG kappa (May 2015), but without starting a specific treatment. She is guided to our clinic due to painful joint symptoms. Based on physical examination, laboratory tests (rheumatoid factor, anti-CCP antibodies, inflammation tests positive) and X-rays we confirm the diagnosis of rheumatoid arthritis. The x-ray for spinal column shows multiple vertebral compressions and spine bone densitometry (T-score) is -3. We begin treatment with bisphosphonate and corticosteroids in small doses, with favorable evolution.

Results: After 6 months of treatment the joint symptoms were remitted, the tests for inflammation are negative, but T score now is -3.5. The Haematologist consider myeloma controlled and recommends continuation of treatment with bisphosphonates and corticosteroids.

Conclusion: At a patient with multiple myeloma controlled by bisphosphonate therapy with glucocorticoids, in which osteoporosis is widening, against the risk of fragility fracture, which is the appropriate treatment? Haematologist should interfere therapeutically, allowing elimination of corticosteroid treatment?

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GENOMIC ANALYSIS OF A MULTIGENERATIONAL FAMILY WITH EARLY ONSET AND SEVERE FORM OF OSTEOPOROSIS

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Osteoporosis is a common complex disease caused by the interplay of genetics and environmental factors. In our clinical unit we described an early and severe form of osteoporosis segregating in an Italian family according autosomal dominant (AD) inheritance pattern and presence of multiple vertebral fractures treated with pharmacological therapy.

Genes reported in association with osteoporosis are frequently involved in hormonal pathway (ESR1) osteoclast function (RANKL, OPG) or underlie well known syndromic phenotypes as osteogenesis imperfecta (COL1A1, COL1A2). In addition to these, several studies have reported associations in other genes or loci apparently without a direct link with the pathogenesis mechanism of osteoporosis (MHC, ZBTB40, FONG).

We analyzed the pedigree using a panel of microsatellite markers located to investigated regions. The presence of linkage was ruled out for candidates genes (LOD<-2) As a consequence, we did not attain the identification of one gene as responsible of this early and severe osteoporosis. These results confirmed the small contribution of numerous genes to the pathogenesis of osteoporosis, leading to a lack in the identification of single responsible genes, every in severe and apparently AD transmitted forms.

To our knowledge, this is the second report of a severe and early form of osteoporosis, after Parisi et al. in 2001. Our results underline the importance of familial evaluation to define BMD, in order to detect family members at high risk of fracture. Moreover, the linkage analysis confirms the genetic heterogeneity of osteoporosis. Further researches are necessary to identify major genes primarily contributing to the phenotype of the disease.

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EFFECTS OF 12 MONTHS OF RESISTANCE TRAINING VS. ENDURANCE TRAINING ON BONE MINERAL DENSITY IN YOUNG OVERWEIGHT MEN

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Aim: The aim of this study was to analyze the effects of two different training protocols on body composition, bone mineral content (BMC) and bone mineral density (BMD) in a group of young overweight men.

Methods: Forty-two young overweight men (body mass index >25 kg/m²) whose ages range from 18 to 32 years were randomly assigned to resistance training group (RTG), endurance training group (ETG), or a control group (CG). The experimental groups performed incremental training for 12 months, three sessions per week. Weight, height, body composition, BMC, BMD, maximal strength and maximal aerobic velocity were measured before and after the training period.

Results: Both experimental groups (RTG and ETG) showed significant decreases in weight, body mass index (BMI), fat mass and fat mass percentage. RTG showed significant increases in maximal strength, maximal aerobic velocity, whole body BMC and lumbar spine (L1-L4) BMD. ETG showed significant increases in maximal aerobic velocity and L1-L4 BMD but a significant decrease in whole body BMC. CG did not show any significant changes in bone variables. RTG showed the highest improvements in bone variables and muscular strength.

Conclusion: In conclusion, the present study shows that resistance training is an effective method to decrease fat mass and to increase bone mineral density in young overweight men.

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EXAMINING THE CLINICAL CORRELATES OF MRI-DETECTED SUBCHONDRAL BONE MARROW LESIONS (BMLS) USING TWO MRI SEQUENCES

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Objective: To determine the association of BMLs present on two different MRI sequences and baseline Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scales, change in WOMAC scales, cartilage defect progression, and cartilage volume loss in older adults over 2.7 years.

Materials and methods: 394 community-dwelling adults aged 50-80 years were assessed at baseline and 2.7 years. BML presence at baseline was scored on T1-weighted fat-suppressed 3D gradient-recalled acquisition and T2-weighted fat-suppressed 2D fast spin-echo MRI sequences, at the medial and lateral tibial and femoral, and superior and inferior patellar sites. Knee pain, physical function limitation, and stiffness were assessed using WOMAC. Cartilage volume and defect scores were assessed using validated methods. Ordinal logistic, linear, log binomial, and mixed effect model regression were used to describe the association between baseline BML presence with baseline WOMAC, change in WOMAC, cartilage defect progression, and cartilage volume loss adjusting for confounders.

Results: BMLs were commonly present on both MRI sequences (86%). BMLs present on T2- and T1-weighted sequences were associated with increased odds of a higher category of knee pain and physical function limitation (OR=1.45 – 1.70; all $P<0.05$) but not stiffness. Longitudinally, BMLs present on T2- and T1-weighted sequences were associated with worsening knee pain ($\beta=1.04$ and 1.31 , respectively; $P<0.05$) and worsening stiffness ($\beta=0.46$ and 0.47 , respectively; all $P<0.05$) but not worsening physical function limitation. Site specific BMLs present on T2- and T1-weighted sequences predicted cartilage defect progression (RR=1.30 – 5.26; all $P<0.05$). Lateral tibiofemoral BMLs present on T2- and T1-weighted sequences predicted lateral tibiofemoral cartilage volume loss ($\beta=-41.95$ and -37.92 , respectively; $P<0.05$).

Conclusions: Subchondral BMLs were commonly detected on both T1-and T2-weighted MRI sequences. They were associated with clinical outcomes including symptoms, cartilage damage and loss, suggesting that either MRI sequence could be used to measure BMLs.

Disclosures: JPP and JMP are shareholders in ArthroLab.

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TREATMENT OF SPONTANEOUS OSTEONECROSIS OF THE KNEE (SPONK) AFTER ARTHROSCOPIC MENISCECTOMY

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Spontaneous osteonecrosis of the knee affects a different patient population with a different pattern of bony involvement. **Materials and methods:** We report on a series of 23 patients (the average patients age was 61 years) who had symptomatic medial meniscus degenerative tear followed-up with magnetic resonance imaging (MRI). All patients had arthroscopic meniscectomy.

When we see SPONK condyles of the femur or tibia, we examined bone resorption markers (Urinary free deoxypyridinoline, serum collagen type 1 crosslinked) and prescribed (in the postoperative period): alfacalcidol 0.75-1.0 µg/day, ossein hydroxyapatite 2 tablets 2 times a day, zole-dronic acid 5 mg 1 times per year.

Results: In 43% noted the presence of avascular necrosis of bone condyles, forming the joint. In 57% of them showed an increase in bone resorption markers, suggesting an activity of the process and that these persons antiresorptive therapy has been assigned.

Conclusion: Often meniscus damage combined with aseptic necrosis of the femoral condyles.

We believe that use of adequate bone therapy can improve of outcome meniscectomy.

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MAJOR RISK FACTORS OF OSTEOPOROSIS IN RHEUMATOID ARTHRITIS FEMALE PATIENTS

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Prevalence of osteoporosis (OP) is much higher in rheumatoid arthritis (RA) patients as compared to general population in all age groups, and OP development is associated with both common or “traditional” risk factors, and RA – linked factors. Although, specific contribution of each factor into OP development in RA patients remains unclear.

Objective: To identify major risk factors of OP development in RA female patients.

Materials and methods: The study included 261 RA female patients (1987 ACR criteria), aged 20-75 years (mean age - 56,8±11,4 years). An individual patient’s file contained anthropometric parameters, social and demographic data, case history, clinical examination and lab findings, traditional OP risk factors, patient’s joint status, info on concurrent diseases, pain intensity and general health status evaluation by VAS. Hand and distal feet plain X-rays were taken for each patient. Van der Heijde modified Sharp method was used to score the erosions and joint space narrowing in hands and feet. Axial bone mineral density (BMD) was measured using DXA scan. DXA T-score was used in postmenopausal women (n=210), and Z-score in menstruating women (n=51).

Results: Patients were grouped into two arms: with OP - 154 females (59%) and without OP -107 (41%). OP patients were older as compared to patients without OP (59,5±10,8 vs. 52,9 ±11,2 years, p=0,0001), with longer RA duration (12(7-20) vs. 9(6-15) years, p=0,001) and more pronounced destructive changes by Sharp score (168,5(96,5-216,5) vs. 93,5(53,5-136,5), p<0,0001). OP patients demonstrated significantly higher incidence of more severe functional decline (FD) (HAQ > 2 scores) (43,4 vs. 29,5%, RR=1,47, 95% CI 0,98–2,21, p=0,05), and had longer intake of glucocorticoids (GCs) (72(26,5–120) vs. 48(11–79,5) month, p<0,01), in higher daily doses during the previous year (5(3,8–8,8) vs. 3,75(2,5–5) mg/day, p=0,002), with higher total dose (14,4(5,4–24,2) vs. 7,2(1,5–14,4) g, p<0,01) as compared to patients without OP. Analysis of traditional risk factors showed that OP patients had lower body weight (65,2±11,4 vs. 70,4±14,3 kg, p=0,001), the majority of them were in post-menopause (90,9 vs. 65,4%, RR=1,39, 95%CI 1,2–1,61, p<0,0001), experienced long immobilization periods earlier (16,2 и 7,4%, RR=2,3, 95% CI 1,08-4,9, p=0,02) and fractures (49,4 vs. 23,4%, RR=2,17, 95% CI 1,49-3,16, p<0,0001). Multivariate logistic regression identified the following major OP risk factors in RA patients: menopause (odds ratio (OR)=5,2, 95% CI 1,9–14,5, p=0,001); low energy fractures (except vertebral and femoral neck fracture) in anamnesis (OR=2,6, 95% CI 1,2–5,5, p=0,02); FD HAQ (OR=1,6, 95% CI 1,04–2,6, p=0,03); RA duration (OR=1,05, 95% CI 1,003–1,1, p=0,03), and average GCs daily dose during the previous year (OR=1,3, 95% CI 1,2–1,5, p<0,001).

Conclusion: RA duration, functional decline by HAQ, and average GCs daily dose during the previous year, alongside with menopause and low energy fractures are the major risk factors of OP development in RA female patients.

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SURGICAL STATUS OF PATIENTS WITH ORTHOPEDIC DISEASE BASED ON THE ESTIMATED GLOMERULAR FILTRATION RATE

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Introduction: We determined the percentage of patients, over 70 years of age and rheumatoid arthritis (RA), with suspected chronic kidney disease (CKD) with estimated glomerular filtration rate (GFR) <60 mL/min/1.73 m² among orthopedic patients, and compared these patients with those suffering from renal anemia as chosen concurrent controls. Subjects and

Methods: Among 7,810 patients in whom eGFR and Hemoglobin (Hb) values were determined in our Hospital between 2012 and 2016, the possibility of CKD and the number of surgical cases were investigated in (1) 702 patients with RA, (2) 1,194 orthopedic patients age 70 years or older, and (3) 498 patients receiving erythropoietin therapy for renal anemia.

Results and Discussion: (1) There were 197/702 (28.1%) RA patients with eGFR <60 mL/min/1.73 m², and 105 underwent surgery: preoperative autologous blood donation was used in 38 patients, intraoperative and postoperative blood recovery in 62, and allogeneic blood transfusion in 11 (10.4%). (2) There were 500/1,194 (41.9%) patients age 70 years or older who showed eGFR <60 and 232 underwent surgery: preoperative autologous blood donation was used in 66 patients, intraoperative and postoperative blood recovery in 98, and allogeneic blood transfusion in 33 (14.2%). (3) Sixty-one/498 patients (12.2%) underwent surgery: preoperative autologous blood donation was not feasible, intraoperative and postoperative blood recovery was used in 32 patients, and allogeneic blood transfusion in seven (11.5%).

Conclusion: When the possibility of renal anemia was examined in orthopedic patients who had RA or who were 70 years of age or older.

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BONE QUALITY ASSESSMENT AMONG SARCOPENIC AND NON-SARCOPENIC ELDERLY SUBJECTS FROM THE SARCOPHAGE STUDY

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Objective: Sarcopenia (Sp) and osteoporosis both represent a public health burden because of potential harmful consequences for elderly health. A new medical imaging technique, the “*Trabecular Bone Score*” (TBS) indirectly measures bone microarchitecture. Some studies have already suggested an association between sarcopenia and osteoporosis but none has examined the relationship between bone quality and muscle parameters of sarcopenia. For this reason, we sought to compare bone quality (i.e., TBS values) among sarcopenic and non-sarcopenic subjects.

Material and Methods: The current analysis used data available from the SarcoPhAge study (for *Sarcopenia and Physical Impairment with Advancing Age*), an ongoing project following 534 community-dwelling elderly subjects with a main objective of assessing outcomes of sarcopenia. For this ancillary investigation, we analyzed cross-sectional data related to

muscle and bone health. Subjects who had spinal surgery were excluded as well as subjects with a body mass index (BMI) >35kg/m², because TBS values in excess of this value affect the accuracy of TBS. Sp was diagnosed according to the European Working Group on Sarcopenia in Older People (EWGSOP) (i.e., a low muscle mass plus either low muscle strength or low physical performance). The appendicular muscle mass index (SMI) and the total hip Bone Mineral Density (BMD) were determined using Dual-Energy X-Ray Absorptiometry (DXA) (Hologic Discovery A, USA), muscle strength was assessed by a hand-dynamometer (Saehan Corporation, MSD Europe Bvba, Belgium) and physical performance by the Short Physical Performance Battery (SPPB) test (/12 points). We used the cut-off limits proposed by the EWGSOP, classifying women in the “low SMI group” when its value was <5.50kg/m², the “low muscle strength group” when strength was <20kg and the “low physical performance group” when SPPB <8 points. The thresholds of <7.26kg/m² (for SMI), <30kg (for muscle strength) and <8 points (for physical performance) were used for men. Bone quality was determined using the “*Trabecular Bone Score*” software (TBS iNsight®, Med-Imaps, Geneva, Switzerland, version 2.1). A low TBS value reflects poorer bone microstructure and, conversely, a higher TBS value is correlated with better bone microstructure. Analyses were performed both on univariate and multivariate model (model 1 adjusted for age and number of comorbidities and model 2 adjusted for age, number of comorbidities and BMD).

Results: Our study sample comprised 288 elderly subjects aged 74.7±5.7 years (59.0% women). Sp was diagnosed in 43 individuals (14.9%). Of the 288 participants, 81 (21.8%) had a low SMI, 98 (34.0%) a low muscle strength and 57 (19.8%) a poor physical performance. In the univariate analysis, there were no statistically significant differences in TBS value between Sp and non-Sp subjects (1.270 vs. 1.299, p=0.10), nor between subjects with low SMI compared to those with higher SMI (1.192 vs. 1.196, p=0.74). However, in subjects with weaker muscle strength and those with adequate muscle strength, TBS values were significantly lower in elders with low muscle strength (1.266 vs. 1.310, p<0.001). This difference remained significant when adjusted for age and number of comorbidities (model 1) (p=0.02) but was not evident in model 2, when BMD was added as a covariate (p=0.45). A significantly lower TBS value was also observed among participants with poor physical performance compared to those with better physical performance (1.260 vs. 1.304, p=0.005). As in the case of muscle strength, TBS values were significantly lower in subjects with low physical performance in the multivariate model including age and number of comorbidities (p=0.03) but was no longer statistically different when BMD was also included in the model (p=0.14).

Conclusion: TBS score, reflecting bone architecture and, subsequently, bone strength, is decreased in elderly subjects

presenting a low muscle strength and a decreased ability to physical performance. However, this difference is no longer significant when the values are corrected for bone mineral density. This reflects a major interaction between bone quantity and quality in elderly subjects. Further prospective researches are needed to explore the relationship between muscle parameters and bone quality to support the hypothesis of common pathways in the concomitant age-related decline in muscle and bone tissues.

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COMPARISON OF THREE TREATMENT PROTOCOLS WITH INTRA-ARTICULAR LOW OR INTERMEDIATE MOLECULAR WEIGHT HYALURONIC ACID IN EARLY SYMPTOMATIC KNEE OSTEOARTHRITIS

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Introduction: Viscosupplementation with hyaluronic acid (HA) is indicated for non-responders to non-pharmacological therapy, to analgesics or when NSAIDs are contraindicated. The aim of this study is to compare the efficacy, safety and costs of three different HA treatment (Sinovial HighVisc, Sinovial One and Hyalgan).

Patients and methods: 90 patients with grade I/II Kellgren-Lawrence knee OA were included in three groups, the first was treated with Hyalgan (weekly for 5 weeks), second with Sinovial HighVisc (weekly for 3 weeks) and the third group with a single injection of Sinovial One.

Results: All three treatments were effective with an average reduction of WOMAC score of 18.9 points for Hyalgan, 18.04 points for Sinovial HighVisc and 17.92 points for Sinovial One. The comparison of the three groups did not show any statistical difference in terms of efficacy. NHS and social costs are respectively 419,12 and 853,43 € for Hyalgan, 338,64 and 599,22 € for Sinovial HighVisc, 221,56 and 308,42 € for Sinovial One.

Conclusion: All three treatment resulted equally effective with no statistically significant differences thus, the treatment with Sinovial One may be considered clinically effective as other two regimens but with a very efficient cost profile in early symptomatic knee OA.

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EFFICACY OF AN ORAL COMBINATION OF COLLAGEN, GLUCOSAMINE AND CURCUMIN FOR EARLY SYMPTOMATIC KNEE OSTEOARTHRITIS

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Objective: In the last years, symptomatic slow acting drugs for OA (SYSADOA) have been largely studied and have met considerable interest among clinicians. SYSADOA are used generally as a ground therapy with the main rationale to reduce consumption of nonsteroidal anti-inflammatory drugs (NSAIDs) and thus to limit the related adverse events.

Materials and methods: In this study, we have evaluated the short-term effect on an oral combination of collagen, glucosamine and curcumin on early symptomatic knee osteoarthritis. 40 patients were treated for 1 month and could assume analgesics or NSAIDs if necessary.

Results: At 2 months, the mean reduction of the WOMAC score was 36% ($p < 0.001$) and the mean reduction of the WOMAC pains score was 40% ($p < 0.001$). Only two patients reported sporadically need to assume analgesics, no side effects during the study period.

Conclusion: These data demonstrate that the oral combination of collagen, glucosamine and curcumin is safe, well tolerated and shows a rapid action reducing pain and improving joint function and stiffness in early symptomatic knee osteoarthritis.

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DIFFERENCES BETWEEN YOUNG AND OLDER ADULTS IN THE RATE OF POWER DEVELOPMENT EXCEED DIFFERENCES IN PEAK POWER

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Objective: Age-related declines in muscle mass and maximal muscle strength have been extensively documented. However, maximal strength requires at least 300ms to be achieved, which makes it less functionally relevant in situations that require quick and powerful responses of muscles, such as balance recovery following sudden perturbations. Parameters that characterize the ability to produce force rapidly, such as power and the rate of power development, might be more functionally relevant, but have been less studied. The aim of the present study was to investigate the age-related differences in power and in the rate of power development during isotonic knee extensions (Biodex System 3 dynamometer).

Material and methods: Thirty-six young (♂ 21, ♀ 15, age=22±2 yrs) and fifty-six older adults (♂ 26, ♀ 30, age=68±5 yrs) performed four ballistic isotonic contractions against four loads (0, 20, 40 and 60% of the maximal isometric strength at 90° knee angle). Power was calculated as the product of torque and velocity. Peak Power (pP) was calculated as the highest value of the power-time (P-t) curve. Mean rate of power development (RPD_{mean}) was calculated as the linear slope from the start of the movement till pP was reached. Maximal RPD (RPD_{max}) was determined as the steepest part of the P-t curve.

Results: Young men and women showed higher pP (♂ 24-41%, ♀ 31-37%), RPD_{mean} (♂ 37-45%, ♀ 41-44%) and RPD_{max} (♂ 35-52%, ♀ 43-46%) compared to older men and women at all loads (all p <0.01). In addition, the ratio RPD_{mean}/pP was significantly higher in young as compared to older men and women at all loads (all p <0.05).

Conclusions: Age-related differences in the rate of power development exceed differences in peak power regardless of the load, which may have important implications to age-related functional decline. Future research should focus on identifying appropriate exercise regimens to improve the rate of power development in old age.

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THE SARCOPHAGE STUDY: EVOLUTION OF SARCOOPENIC SUBJECTS AFTER 2 YEARS OF FOLLOW-UP

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Background: The SarcoPhAge study (for Sarcopenia and Physical impairments with advancing Age) has been designed to measure, among other things, the relationship between sarcopenia and the incidence of falls, hospitalisations, fractures, mobility decline and mortality after two-years of follow-up.

Methods: This SarcoPhAge study is an ongoing longitudinal study which enrolled 534 subjects aged 65 years or older. A complete diagnosis of sarcopenia has been performed for all subjects according to the algorithm developed EWGSOP at inclusion and once a year every following year. Muscle mass was measured by Dual Energy x-ray absorptiometry, muscle strength was measured by grip strength and physical performance was measured with the Short Physical Performance Battery (SPPB). A research assistant was in charge of meeting the participants once a year during a 1-hour clinical visit during which a large number of sociodemographic, anamnestic and clinic data were collected.

Results: Among the 534 subjects (60.5% of women, mean age of 73.5±6.16 years) enrolled in the study, 73 have been diagnosed sarcopenic, which represented a prevalence of 13.7%. After two years, only 336 subjects came for the follow-up evaluation (T2 evaluation), which represents 62.9% of the total sample. Reasons for the 198 subjects for not coming back are as follow: 20 died, 59 presented a physical incapacity (e.g. institutionalisation, mobility impairment, serious comorbidities, etc.), 12 were lost to follow-up, and unfortunately, 107 refused to pursue the study. Only 33 of the 73 sarcopenic subjects diagnosed at baseline were seen at T2 evaluation. This is partly due to a significantly higher incidence of deaths among the sarcopenic (9.59%) subjects compared to non-sarcopenic (2.82%) with a crude OR of 3.65 (IC95% 1.41–9.49) and an adjusted OR (on age, number of comorbidities and number of drugs) of 4.00 (IC95% 1.51–10.6). Moreover, 9 sarcopenic subjects (12.3%) announced, during the two years of follow up, being physically unable to pursue the study. Between inclusion and T2, a significantly higher incidence of hospitalisation has also been observed for sarcopenic subjects (52.9%) compared with non-sarcopenic ones (29.0%) (p=0.004) with a crude OR of 2.75 (IC 95% 1.34–5.63) and an adjusted OR (same adjustments than those used for the analysis of deaths) of 2.61 (IC95% 1.18–5.76). No differences between groups regarding the incidence of falls (p=0.63), fractures (p=0.34), physical decline (reported as decline of gait speed (p=0.34), of the SPPB test (p=0.63) and of the chair rising test (p=0.63)) have been reported.

Conclusion: The results of the SarcoPhAge study at T2 indicate a higher incidence of death and hospitalisation among sarcopenic subjects compared to non-sarcopenic ones after two-years of follow-up, which highlights the public health burden of sarcopenia.

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MUSCLE MASS AS THE MAIN COMPONENT OF BODY COMPOSITION ASSOCIATED WITH BONE MINERAL DENSITY

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Objective: To investigate the relationship between obesity and low muscle mass and low bone mineral density.

Material and Methods: This cross-sectional study included 214 subjects aged ≥50 years, both sexes, from the Health Survey-Sao Paulo (ISA-Capital 2014/2015). Body composition and bone mineral density (BMD) were assessed by DXA (Lunar iDXA Advance). Appendicular skeletal muscle mass (the sum of muscle mass of arms and legs, kg) was divided by height² (m²) and classified according to the European

Working Group on Sarcopenia in Older People. Body Fat was evaluated by applying the Fat Mass Index (fat mass (kg)/height²) using the reference values from NHANES. BMD was obtained from spine (L1-L4) and femoral neck and diagnosed according to T-score values. Osteopenia and osteoporosis were pooled and regarded as the risk category (low BMD). A joint variable was created as: without obesity or low muscle mass (no change); obesity; low muscle mass; obese and with low muscle mass (obesity + low muscle mass). The relationship between such categories and low BMD in both sites was investigated by logistic regression (crude) and adjusted for age, sex, and 25-hydroxyvitamin D (25OHD) concentrations.

Results: 86 (40.2%) and 105 (49.1%) individuals presented low BMD in spine and femoral neck respectively. The observed frequency of individuals without change was 39.7%, followed by 35.05% with obesity, 22.9% with low muscle mass, and 2.34% with obesity + low muscle mass. Only low muscle mass was associated with low BMD in spine after adjusting for age, sex and 25OHD (OR: 3.41, 95%CI: 1.58 - 7.37). The model for femoral neck showed the same behavior in the crude model, but after including the adjustment variables beyond low muscle mass (OR: 2.41, 95%CI: 1.07 - 5.40), obesity was also associated with low BMD (OR: 0.49, 95%CI: 0.25 - 0.99). The category obesity + low muscle mass was not significant in any model, but with tendency to risk.

Conclusion: Low muscle mass was associated with increased odds of low BMD at the spine and femoral neck, while obesity had a protective behavior only at femoral neck.

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THE ROLE OF EXERCISE IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

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Introduction: In the treatment of postmenopausal osteoporosis (PMO), except drug therapy, suitable program of exercise to maintain and improve bone mineral density (BMD) is necessary.

Material and methods: 92 women with postmenopausal osteoporosis were treated in Institute for Physical Medicine and Rehabilitation, Skopje, R. Macedonia, from January 2015 to September 2016. The exercises consisted of respiratory exercises, strengthening and stretching exercises for paravertebral, abdominal muscles and muscles of the upper and lower limb, and exercises for balance and coordination. The exercises were practiced twice a week, for 45 minutes. BMD was determined by dual-energy x-ray absorptiometry, at baseline and after 12 months research.

Results: The average age of patients was 60.64±6.7, education: primary 22 (23.9%), intermediate 45 (48.91%), and higher 25 (27.17%). Average BMI was statistically insignificant in start and after 12 months research (27.02±63.9 kg/m² vs. 27.07±3.8 kg/m², p=0.7). Statistically significant in mean BMD of the lumbar spine and femoral neck, at start and after 12 months research (lumbar spine 0.71±0.2 g/cm² vs. 0.77±0.1 g/cm², p<0.0001 and neck of femur 0.8±0.12 g/cm² vs. 0.83±0.1 g/cm², p=0.001).

Conclusion: Regular practice of exercises statistically significantly improves BMD in PMO.

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FALLS: RISK AND PREVENTION IN PRIVATE RHEUMATOLOGY PRACTICE

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Objectives: After identifying fall risk factors (RF) and defining the percent of fractured fallers and the part of osteoporotic women in this population, we want to evaluate the relevance of balance tests and favor prevention measures for those patients.

Materials and Methods: 110 patients >60 years (24 controls), having fallen within a year, have seen 28 private practice rheumatologists and were subject of our multicentre retrospective study.

Results: Fallers mean age was 75 years. 37% of the fallers within a year fractured after falling. Among them, 95% were postmenopausal (PM) fractures. Post-fall or PM fracture sites are identical. In order: spine 26%, wrist 18%, ribs 6%. The circumstances of the falls are: 1) lack of attention, 2) slipping, 3) stumbling. 61% of the fallers have at least one physical activity (PA), among them 71% a weight-bearing PA. The most common PA was walking 46%. Among the fractured, 32% had PA, 42% had not. 72% of the fallers had at least one fall RF, 94% had intrinsic RF, 28% extrinsic, and an average of 2 RF within the older than 80

Intrinsic factors: 1) osteo-articular, 2) eye-vision, 3) postural, 4) drugs, out of 13 items

Extrinsic: 1) obstacles, 2) footwear, out of 7 items. 45% of the fallers within a year had at least one osteoporosis RF 1) low BMI, 2) corticosteroids, 3) early menopause, 4) smoking, out of 9 items. 69% of the patients had recent bone density measures, which was lower only at femoral neck of fractured fallers vs. nonfractured fallers. The unipodal balance test was relevant (less than 5 seconds) in 42% of the patients with or without fractures. Get up and go test was not relevant. We recommended at least 2 fall prevention measures 1) correct D vitamin levels, 2) physical activity, 3) reeducation, 4) eye-vision correction, out of 12 items.

Conclusion: A significant part of menopausal women with anteriority of falls and fractures will refracture after falling again. After treating osteoporosis, we should correct fall RF by doing unipodal tests and encourage them to keep on PA and prescribe reeducation.

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FUNCTIONAL HYPOPARATHYROIDISM HAS NO PROTECTIVE EFFECT ON BONE MICROSTRUCTURE DETERIORATION INDIRECTLY ASSESSED BY TRABECULAR BONE SCORE IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN WITH FRACTURES

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Objective: With aging, functional hypoparathyroidism (FHoP) is a common biological profile, but the consequences of FHoP on bone remain unclear. In fact, some data suggested no protective effect on bone mineral density (BMD) in these circumstances, despite the lack of secondary hyperparathyroidism (SHP) in response to vitamin D insufficiency. We hypothesized that FHoP could rather alter bone microstructure. We conducted a cross-sectional study comparing Trabecular Bone Score (TBS), a parameter indirectly assessing bone microstructure, independent of BMD, in osteoporotic postmenopausal women with either FHoP or SHP.

Material and Methods: We retrospectively selected postmenopausal women visiting our Fracture Liaison Service (FLS) after a non-vertebral fracture (NVF), with a lumbar DXA measurement (Lunar iDXA) available for TBS calculation. FHoP was defined by the combination of normal PTH values and 25(OH)D levels <75nmol/L. A multivariate analysis was used to determine the association between TBS and age, body mass index (BMI), spine and hip BMD, and presence of FHoP or SHP.

Results: We included 234 women, mean age 64.8±10 years. Of these, 82.5% had FHoP and 17.5% SHP. These groups did not differ in age at menopause and BMI but those in the latter group were significantly older (p<0.002). There was no significant difference between FHoP and SHP groups in spine and hip BMD values (0.902±0.179g/cm² vs. 0.907±0.174g/cm² and 0.793±0.163 g/cm² vs. 0.787±0.216g/cm², respectively) before and after adjustment for age and BMI.

In the whole population, there was a significant correlation between TBS and spine or hip BMD (r=0.30 and r=0.20 respectively; p <0.0001). The TBS values were low and not

significantly different between FHoP and SHP groups (1.199±0.118 and 1.204±0.137 respectively), before and after adjustment for age, BMI and spine BMD. In multivariate analysis, low TBS value was associated (p<0.001) with ageing, high BMI and low spine BMD.

Conclusion: Our data show similar TBS values in patients with FHoP and those with SHP, suggesting no protective effect of FHoP on bone microstructure. This phenomenon could explain the high prevalence of this biological profile in postmenopausal women with fragility fracture.

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SERUM 25-HYDROXYVITAMIN D IN OSTEOPOROTIC PATIENTS TREATED WITH CALCIFEDIOL

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Objectives: a) To assess the serum concentrations of 25-hydroxyvitamin D (25 (OH) D) in patients treated for more than one year with bi-weekly or monthly doses of calcifediol; and b) to determine if there are any change in PTH levels after the administration of both doses of calcifediol.

Material and Methods: We studied 94 patients with osteoporosis (82 females and 12 males) aged 44-93 years (71±10 years) who had received calcifediol treatment for at least one year. Forty-one of them were treated with 0.266 mg of calcifediol every fortnight (biweekly) and the remaining 53 with the same dose of calcifediol per month (monthly dose). Serum levels of 25 (OH) D and parathormone (PTHi), before (baseline) and one year after initiation of treatment (post), were measured.

Results: Baseline levels of 25 (OH) D were lower in patients receiving biweekly calcifediol than in those receiving the monthly dose (p <0.05). With both treatment regimens a significant increase in 25 (OH) D concentration was observed. The concentrations reached with the monthly schedule were adequate, while those reached with the biweekly pattern approximate values that some authors consider excessive and potentially harmful. Serum PTHi levels decreased significantly after administration of calcifediol, although on this occasion there were no differences between the two treatment regimens (Table).

Biweekly Monthly Biweekly Monthly

Baseline Post Baseline Post

25(OH)D(ng/ml) 17.9±7.4 59.3±18.2* 21.9±8,1 38.1±16.5*

PTHi (pg/ml) 62.8±27.7 36.4±17.6* 57.4±19 39.3±13.2*

Conclusions: Monthly administration of 0.260 mg of calcifediol is sufficient to achieve adequate levels of vitamin D and prevents the increase of PTH.

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FROM PRECISION MEDICINE TO DRUG DISCOVERY: INHIBITION OF OSTEOBLASTIC SMURF1 PROMOTES BONE FORMATION IN DISTINCTIVE INDIVIDUALS WITH AGE-RELATED OSTEOPOROSIS

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Objective: BMP signaling is essential for osteoblastic bone formation. Recombinant human BMPs (rhBMPs) have been used for spinal fusion. However, emerging evidences demonstrate large inter-individual variations in local bone anabolic action of rhBMPs¹. Smurf1 ubiquitinates BMP transducers and is a bone formation suppressor. Recently, we classified age-related osteoporotic individuals into subgroups based on distinct intraosseous BMP-2 levels and Smurf1 activity. One major subgroup with a decreased BMP-2 level and normal Smurf1 activity (BMP-2^d/Smurf1ⁿ) showed satisfactory rhBMP-2 response during spinal fusion, whereas another major subgroup with a normal BMP-2 level and elevated Smurf1 activity (BMP-2ⁿ/Smurf1^e) had poor rhBMP-2 response (Fig. 1a-1b). Further, Smurf1 gene silencing improved rhBMP-2 response and osteogenic differentiation in BMP-2ⁿ/Smurf1^e subgroup, leading us to hypothesize that inhibition of osteoblastic Smurf1 could be a precision medicine strategy to promote bone formation in BMP-2ⁿ/Smurf1^e subgroup.

Materials and Methods: We designed *in silico* strategy to screen small molecular Smurf1 inhibitors and examined effects of the optimal inhibitor on local spinal fusion in BMP-2ⁿ/Smurf1^e subgroup. We conjugated the inhibitor to an osteoblast-targeting oligopeptide (DSS)₆² and examined its effects on systemic bone formation in BMP-2ⁿ/Smurf1^e subgroup.

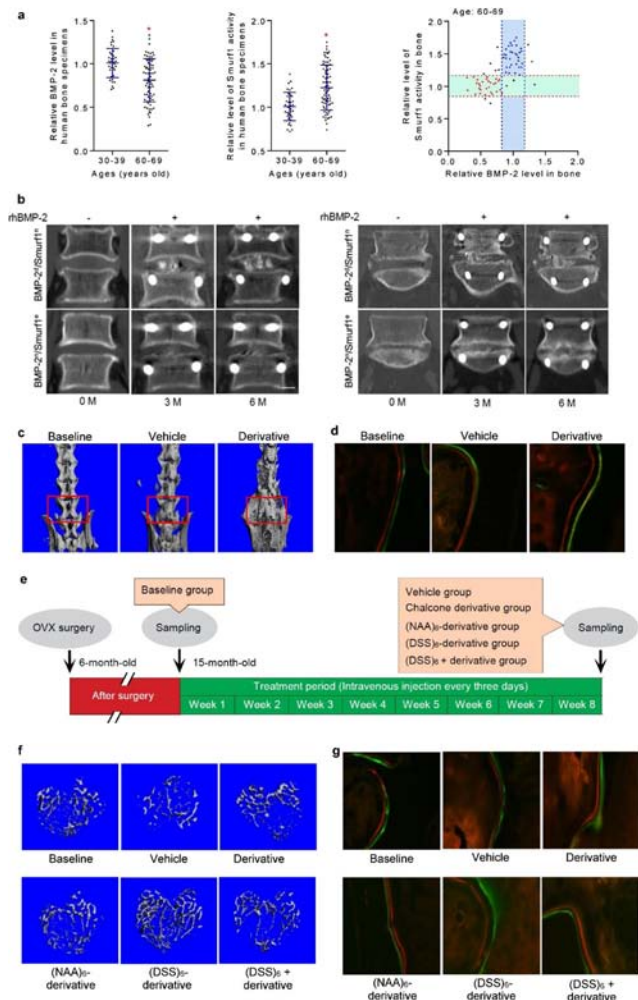
Results: We identified a chalcone derivative as the optimal Smurf1 inhibitor. For BMP-2ⁿ/Smurf1^e subgroup of aged osteoporotic mice, the chalcone derivative effectively inhibited Smurf1 activity, increased BMP signaling and promoted *in vitro* osteogenic differentiation. Local administration of the derivative enhanced spinal fusion with no obvious toxicity (Fig. 1c-1d). After conjugation of the derivative with (DSS)₆, (DSS)₆ facilitated the derivative entering osteoblasts,

decreasing Smurf1 activity, increasing BMP signaling and promoting osteogenic differentiation *in vitro*. *In vivo* data showed that (DSS)₆ facilitated the derivative targeting osteoblasts and promoting systemic bone formation with no detectable toxicity (Fig. 1e-1g).

Conclusion: Inhibition of osteoblastic Smurf1 could be a precision medicine-based bone anabolic strategy in BMP-2ⁿ/Smurf1^e subgroup of age-related osteoporotic individuals.

References:

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THE REGULATION OF BONE METABOLISM BY RESOLVIN D1

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Objective: We recently reported that resolvin D1 (RvD1), an ω 3 fatty acids derivative, strongly inhibits inflammation and catabolism in human osteoarthritic cartilage (Benabdoune et al. inflammation research. 2016). Thus, the objective of this study is to further investigate its effects on bone metabolism.

Materials and methods: First, to assess osteoclasts (OC) recruitment, murine macrophages RAW267.4 were incubated with LPS with or without RvD1 (0–1 μ M) for 48 hours. TRAP and cathepsin-K, were assessed by western blot, enzymatic staining and immunocytochemistry. TNF- α , IL-1 β , IL-6, IL-10 and PGE₂ levels were measured by ELISA. Second, to investigate bone resorption, human monocytes from healthy donors were seeded in hydroxyapatite plates and treated with LPS with or without RvD1 (0–1 μ M) for 3 weeks. Plot formation was assessed by Von Kossa staining. Third, to evaluate osteoblasts metabolism, human trabecular osteoarthritic osteoblasts (OAOB) were obtained from trabecular bone after total knee arthroplasty. OAOB were treated with either RvD1 (0.1–1 μ M) alone, or VitD3 with or without RvD1 (0.1–1 μ M), for 48 hours. Alkaline phosphatase (ALP) activity and osteocalcin (OCN) release were determined by ELISA.

Results: Our results clearly show that RvD1 inhibits OC recruitment and activation. Furthermore, it decreases bone resorption to background level, as indicated by the inhibition of the expression of OC phenotype markers (TRAP and cathepsin-K) and hydroxyapatite matrix resorption. Besides, RvD1 reduces by 2 to 3-fold inflammatory cytokines (TNF- α , IL-1 β , IL-6) as well as PGE₂ and concurrently enhances by 2-fold the anti-inflammatory cytokine IL-10 in OC. Moreover, RvD1 maintains ALP activity at a constant and slightly higher level than the control, while it has no effects on OCN release, either with or without VitD3 treatment, in human OAOB.

Conclusion: Our results clearly show that RvD1 may play an important role in the inhibition of bone resorption and the regulation of bone metabolism. Additionally to our previous data, our findings suggest that RvD1 presents a novel and original perspective to musculoskeletal and bone diseases therapy.

Objective: We previously reported efficacy on fracture risk reduction of monthly IV IBN 1mg in the MOVER study in Japanese osteoporotic patients (pts). This post-hoc analysis presents additional 3-year data on BMD gains with respect to achieving the BMD T-score target.

Material and Methods: MOVER was a randomised, double-blind study in ambulatory pts aged \geq 60 years with fragile fracture, BMD of the lumbar spine (LS) or proximal femur (hip and femoral neck) $<$ 80% of the young adult mean and 1–5 vertebral fractures in the thoracic and/or lumbar spine. 1265 pts received monthly IV IBN (0.5mg, 1mg) or oral risedronate (RIS) as active comparator.

Results: The per-protocol set comprised 1134 pts (IBN 0.5mg n=376, IBN 1mg n=382, RIS n=376). Baseline pt characteristics were balanced across the groups. Over 3 years, greatest (and significant) increases in BMD at the LS (9.0%) and proximal femur (3.1%) were seen with IV IBN 1mg [CTI, 2013; JBMM, 2015]. In pts with LS BMD T-score \leq –2.5 at baseline, the proportion of pts with LS BMD T-score $>$ –2.5 was: 21.8%, 27.0% and 20.5% after 1 year; 23.4%, 34.6% and 22.0% after 2 years; and 25.7%, 42.2% and 25.3% after 3 years, with 0.5mg IBN, 1mg IBN and RIS, respectively. The proportion of patients with LS BMD T-score $>$ –2.5 increased with treatment duration in all treatment groups. These findings were consistent for proximal femur BMD gains: the proportion of pts with hip BMD T-score $>$ –2.5 was: 14.8%, 19.4% and 16.8% after 1 year; 19.5%, 20.4% and 19.2% after 2 years; and 16.4%, 21.3% and 15.2% after 3 years, respectively.

Conclusions: Monthly IV IBN 1mg demonstrated the greatest BMD gains amongst treatments in the MOVER study. In the current analysis, IV IBN 1mg also showed the greatest proportion of pts with LS BMD T-score $>$ –2.5. The proportion of pts achieving a BMD T-score $>$ –2.5 increased with treatment duration. These findings suggest that treatment adherence is important for effective disease management with osteoporotic agents.

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THE EFFECT OF MONTHLY INTRAVENOUS (IV) IBANDRONATE (IBN) 1MG ON BONE MINERAL DENSITY (BMD) GAINS IN THE MOVER STUDY: ADDITIONAL TREAT-TO-TARGET ANALYSIS

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CORRELATION BETWEEN THE DURATION OF MENOPAUSE AND CLINICAL RISK: TEN-YEAR CROSS-SECTION

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Objective: To examine the influence of a number of clinical risk factors in order to evaluate the origin of osteoporotic fractures on the bone mass of women with osteoporosis and osteopenia, depending on the existence and length of menopause.

Material and methods: Observational analytical cross-sectional study covered a population specimen of 1159

persons who underwent central DXA osteodensitometry on the spine and hip in the Specialized hospital for rehabilitation "Banja-Kanjiža" in Kanjiža in the period between 2006 and 2016. All were tested for the presence of clinical risk factors. All the women (N=1096) were questioned on the time of the occurrence of menopause, and its duration was calculated from the moment of measuring of the bone mineral density.

Results: The study has a 93.7% power for a $\alpha=0,05$ error level to discover a statistically significant difference between female patients with the duration of menopause up to 9 years and those who had it for 10 and more years in relation to incidence of osteoporosis. Women with more than 2 clinical risk factors (CRFs 2+) are on the border of conventional levels of significance when it comes to incidence of osteoporosis ($p=0.070$ and $p=0.065$). CRFs number is a statistically significant predictor of osteoporosis when the influence of the duration of menopause is excluded ($n=0.022$). If the CRFs number is observed as a numerical parameter, the difference between women with osteoporosis and osteopenia is statistically significant only in the group of women with menopause lasting less than 9 years ($Z=-2.587$; $p=0.010$). Women with early menopause have a statistically lower T-score on the spine ($t=-2.353$; $p=0.019$) than women whose cycle stopped in the usual time. There is a statistically significant difference between women with osteoporosis with and without early menopause with CRFs 2+ ($X^2=54.904$ $p<0.001$), especially between the groups with menstruation vs. menopause 6=> years ($p<0.001$) and group menopause ≤ 5 vs. 6=> years ($p<0,001$). There is a higher T-score correlation on the femur ($Rho=0.293$ $p<0.001$) than on the spine ($Rho=0.830$ $p<0.030$) in women with menopause 6=> years (T-score femur $Rho=0.260$ $p<0.001$) with CRFs FR 2+.

Conclusion: Women with menopause for six and more years and have more than two CRFs for osteoporotic fracture have the highest risk of osteoporotic fracture of the femur.

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EVIDENCE FOR DIFFERENT CAUSES OF PAIN IN SSC PATIENTS: A CHALLENGE FOR THE RHEUMATOLOGIST IN PRACTICE

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Aim: to evaluate the prevalence of pain in patients with systemic sclerosis (SSc), to analyze the characteristics of pain and to compare different methods for pain assessment.**Methods:** In a group of 100 patients with SSc, pain was reported by 79 patients. Pain was assessed in 56 patients with: 1) the Pain Rating Index (PRI) of the McGill Pain Questionnaire (MPQ); 2) the Present Pain Intensity (PPI) of the MPQ; 3) a value obtained by a visual analogue scale (VAS) indicating the intensity of pain felt in the moment of the examination; 4) a

value obtained by VAS indicating the intensity of pain felt in the week preceding the moment of the examination.**Results:** A wide range of variation of every index was observed. The mean values of pain indexes observed in patients with limited cutaneous involvement were compared with the mean values of patients with diffuse cutaneous involvement: the mean of PRI of patients with limited cutaneous involvement was higher than the mean of patients with diffuse cutaneous involvement with a significant difference; no significant difference was instead observed in the comparison of the other indexes. No significant difference was observed in the comparison of mean values of the indexes observed in patients with different duration of the disease. Three subgroups of patients with SSc and pain were identified: 1) patients with pain due to digital ulcers; 2) patients with joint pain; 3) patients with other kinds of pain. The mean values of pain indexes observed in every subgroup were compared with the mean values observed in the other subgroups and in the whole group of patients with pain. No significant difference was observed.**Conclusions:** The data indicate that pain is a frequent and important cause of suffering in SSc patients. The association of different methods was useful to obtain a careful evaluation of pain and should be used in clinical research on pain in SSc and in other chronic diseases.

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MUSCULOSKELETAL TUMOR PROFILE IN SAIFUL ANWAR GENERAL HOSPITAL MALANG A 5-YEARS EXPERIENCE

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Introduction: Musculoskeletal tumor are relatively rare and they represent less than 1% of all malignancies in all age groups. Most common malignant tumors were osteosarcoma (1.68/million/year), chondrosarcoma (0.79/million/year) and Ewing sarcoma (0.76/million/year). Most common benign bone lesion were osteochondroma (5.81/million/year), simple bone cyst (2.13/million/year), and enchondroma (2.05/million/year).

Methods: Orthopaedic and Traumatology Department of Saiful Anwar Hospital as one of the health center in East Java has managed musculoskeletal patients for already 10 years, and the most complete data collected within last 5 years. This system were developed to gather type, location, final diagnosis, treatment and follow ups of the musculoskeletal tumor.

Results: Bone tumors had higher cases than soft tissue tumor. The peak of incidence for musculoskeletal tumor occurs in the patient older than fifty. Long bone is the most common place for musculoskeletal tumor. Metastatic Bone Disease or

Secondary Tumor achieve the highest cases for musculoskeletal tumor. Lung metastases distributed higher mortality rates for metastatic bone tumor patients.

Conclusion: Incidence of musculoskeletal tumor arising each year with high number of malignancy cases. Patients survival rates increased after early detection and undergo complete treatment. Based on that, our database in Orthopaedic and Traumatology Department of Saiful Anwar Hospital has a very important role to manage musculoskeletal tumor patients.

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OUTCOMES OF PATIENTS 90 YEARS OF AGE OR OLDER WHO UNDERWENT SURGERY FOR PROXIMAL FEMORAL FRACTURE

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Objective: We reported the usefulness of osteoporosis treatment for the very elderly at a congress last year. This study aimed to examine the outcomes of very elderly Japanese patients (³90 years of age) who underwent surgery for proximal femoral fracture according to treatment strategies and surgical procedures.

Methods: We surveyed age, sex, body mass index (BMI), comorbidities, treatment before fracture, preoperative bone mineral density, surgical procedures, and outcomes in 41 patients at least 90 years of age who underwent surgery for proximal femoral fracture and were followed up at hospitals affiliated with Kindai University.

Results and discussion: The ages at the time of surgery ranged from 90 to 98 years (mean, 93.6±2.4 years). There were 2 men and 39 women. BMI ranged from 16.3 to 27.3 (mean, 20.0±2.6). The following comorbidities were observed: hypertension in 22 patients, heart failure in 17, dementia in 10, diabetes mellitus in 8, chronic kidney disease in 7, and cancer in 5. While 30 patients had been treated for osteoporosis with bisphosphonate, parathyroid hormone, anti-receptor activator of nuclear factor-κB antibody, etc., before admission, 11 had received no treatment. The preoperative bone mineral densities ranged from 38% to 81% (mean, 60.7%±11.3%). The surgical procedures performed were femoral head replacement in 20 patients and intramedullary fracture fixation in the other 21. Follow-up periods ranged from 7 to 78 months (mean, 29.7±19.0 months) in surviving patients and from one to 36 months (mean, 14.5±13.9 months: both male patients died within one year after surgery) in those who died. No differences were observed in BMI or surgical

procedures. In the surviving patients, 18 of whom (60%) had been treated for osteoporosis before surgery, the preoperative bone mineral densities were high, ranging from 41% to 81% (mean, 62.1%±11.2%). On the other hand, in the deceased patients, only two of whom (18%) had received preoperative treatment, the preoperative bone mineral densities were lower, ranging from 36% to 66% (mean, 57.5%±10.7%).

Conclusion: Our observations suggest osteoporosis treatment before fracture to be associated with the outcomes of very elderly individuals, i.e., those age 90 years or older.

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FRAGILITY HIP FRACTURES IN PATIENTS UNDER 65 YEARS OLD: A PROSPECTIVE STUDY

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Objectives: There have been few prospective studies examining young and middle-aged patients with hip fracture. We therefore investigated postoperative complications and 1-year mortality in young and middle-aged patients with hip fracture.

Material and Methods: 106 consecutive patients younger than 65 years with hip fracture were prospectively included in a study lasting 6 years. Comorbidities, post-operative complications, length of hospital stay and 1-year mortality were recorded. Results were compared with another group of 250 patients with hip fractures over 65 years randomly selected and treated at the same hospital.

Results: Mortality was lower in patients younger than 65 years (3.77%) than in older patients (23.22%) ($p < 0.001$). However, the number of visits to specialists due to medical complications ($p < 0.05$), and hospital stay was longer ($p < 0.001$) in patients under 65.

Conclusions: Patients younger than 65 years with fragility hip fracture have a significantly lower mortality than older patients. Nevertheless, they have a greater number of complications, a longer hospital stay and therefore an increased health spending.

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ACETABULAR PERFORATION BY CEPHALIC SCREW AFTER INTRAMEDULLARY NAILING IN OSTEOPOROTIC HIP FRACTURE

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Introduction: Hip fractures are an important cause of morbidity and mortality in the elderly. Together with vertebral fractures, proximal humerus and distal radius, they constitute one of the most prevalent fracture groups in the adult

population. They have an incidence of 250000/year in the USA. Its age of maximum incidence is of 84 years in the women and 79 years in the man. Its incidence is increasing in recent years due to increased life expectancy and better control of comorbidities and associated pathology. Advances in medical and surgical treatment have allowed dramatic development in results, reducing mortality, and achieving better and better results.

Case: We report the case of a 84-year-old female patient, autonomous for the activities of her daily life, and with independent living in solitude, without comorbidities or serious diseases of interest. He had a proximal humerus fracture the previous year, and several osteoporotic, and asymptomatic vertebral collapses, discovered by chance on a previously performed chest X-ray. The patient suffers falling through the stairs of her home, and is brought to our hospital, where she is diagnosed of pertrochanteric hip fracture on the left. Emergency surgery is performed, with intramedullary nailing with a cephalomedullary nail of 180mm at 130° and dynamic distal block. Surgery is rapid, and proper reduction and fixation of the fracture is achieved. At 3 postoperative days the patient begins to walk with walker support and begins rehabilitation and physiotherapy immediately, without incident and with promising results. He walks autonomously with a walker every month, although discomfort in the left inguinal region persists. At three months, radiologic consolidation of the fracture is already confirmed, and the correct functioning of the implant is confirmed, although pain persists in the inguinal region. At 6 months the patient spontaneously suffers an accidental fall while walking, and is brought to our center, diagnosed of disassembly of the implanted intramedullary system. The head screw has perforated the acetabulum and has been lodged inside the major pelvis, and there has been a disconnection of the femur with the iliac. Due to the compromise of vascular, nervous and visceral structures, urgent surgical intervention is planned, with removal of the osteosynthesis material and partial left hip cemented arthroplasty. The femoral head severely damaged by osteoporosis has been partially destroyed as it has been subjected to gait stress, and the acetabulum has a significant perforation.

Discussion: Osteoporosis is the most prevalent bone metabolic disease in the population, and its incidence increases with increasing age and life expectancy. Due to their consequences, fractures called "by fragility" appear more frequently on a pathological bone severely damaged in its macro and microscopic architecture, which makes difficult the medical treatment as well as surgical, functional and rehabilitator, and as a consequence:

1. Decreases the quality of the bone fixation of the implants.
2. Consolidation problems.
3. Surgeries are more technically demanding and poorer surgical results are achieved.
4. Surgeries are more prolonged and have a higher index of post-surgical complications.
5. Causes greater comminution of the

posteromedial cortex (these are more unstable fractures).6. They have higher index refractories.

Conclusion: Osteoporosis is a silent disease with few clinical manifestations. Risk factor screening and monitoring of patients who have suffered previous fractures is critical. Medical treatment with antiresorptive and osteoformers, diet, physical exercise, rehabilitation, etc. must be meticulously cared for in these patients, and the surgical technique must be precise and exact to avoid complications arising from the stress that the implant causes in the osteoporotic bone. Complications of osteoporotic fractures are more frequent and more severe, and their results are often conditioned by prior surgery.

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USING TERIPARATIDE INJECTION IN TREATING COMMUNUTED FRACTURES IN NON-OSTEOPOROTIC ADULTS

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Objectives: To study the effect of using Teriparatide injection for 3 months after open reduction and internal fixation (ORIF) of comminuted fractures in healthy non-osteoporotic adults

Material and Methods: King Faisal Medical Complex in Taif is a referral central hospital accepting road traffic accidents (RTAs) occurring in Taif city and 8 other rural communities around. During the period of 31 months (from April 2014 to December 2016); we conducted a case series study for selected RTAs victims admitted in our hospital. We included young non-osteoporotic adult patients with comminuted fracture of the shafts of long bone who need ORIF. We excluded patients with associated head injuries and patients with previously hormonal disturbances. All patients underwent ORIF surgery with bridging plate or interlocking intramedullary nail with or without artificial bone substitute. As a result of the comminuted nature of our selected patients; none of these fixation was compressing the fracture edges. This situation calls for the use of Teriparatide injection in the first 3 months of the healing period, to catalyze the healing process. Patients were separately consented about using Teriparatide injection as it is an out of label indication for the medication. Calcium and vitamin D supplements were given. Monthly follow-up with check x-rays were done to all our patients till complete healing.

Results: 26 patients were included in our study, all patients completed the 3 months period of Teriparatide injection. 19 patients reached complete healing by the end of the first 3 months (73.1%), 5 patients reached complete healing in the second 3 months (19.2%), while 2 patients (7.7%) experienced non-union which needed revision surgery for them.

Conclusion: In our series; it was evident clinically and radiologically that Teriparatide promotes callus formation and

callus volume, thus promoting fracture healing. We are convinced through our experience that Teriparatide should be indicated for promoting fracture healing especially for comminuted fractures regardless the presence of osteoporosis. Many case-series studies in the literature agree with our findings. However, more studies are needed to gain required evidence level to consider Teriparatide injection in treating comminuted fractures in non-osteoporotic adults.

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ENVIRONMENTAL EFFECTS ON SERUM VITAMIN D AND PARATHYROID LEVEL VARIABILITY IN PEDIATRIC PATIENTS WITH ACUTE FRACTURE VS. HEALTHY CONTROLS

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Objectives: Vitamin D (25-OHD) deficiency and insufficiency are reported worldwide in healthy children; its relationship to parathyroid hormone (PTH) in bone health is not well studied in children. We investigated if children with fracture have lower serum 25-OHD than those without and evaluated relationships between 25-OHD and serum PTH and calcium, and effects of diet and sunlight exposure on 25-OHD.

Material and Methods: Cross-sectional study in an urban children's hospital emergency department in Northeastern U.S. to collect serum 25-OHD, PTH and calcium in children with fractures and "healthy" controls, ages 1-17 from 1/14-6/16. Exclusions: steroids >30 days in past year, IBD, malabsorption, bone dysplasia, malignancy, hypothyroidism. Nutrition and activity survey was administered. We defined 25-OHD ≥ 30 ng/ml sufficient, 20.0-29.9 ng/ml insufficient, 12.0-19.9 ng/ml deficient, <12 ng/ml severely deficient. Enrollment continues to 350.

Results: 105 in fracture group, 112 controls. Overall mean 25-OHD: 23.2 \pm 8.5 ng/mL, 22.8 \pm 7.6 in fractures, 23.6 \pm 9.2 in controls (ns). Overall: 21.2% 25-OHD sufficient, 42.4% insufficient, 29.0% deficient, 7.4% severely deficient. 25-OHD in Caucasians 26.2 \pm 8.6, 20.0 \pm 6.4 in Black/African Americans, 19.4 \pm 7.7 in Asians, 21.3 \pm 7.4 in Hispanics, 21.6 \pm 7.1 in Indians (p<0.001). Winter mean 20.4 \pm 6.6 vs. summer 25.8 \pm 8.4 (p<0.001). Self-reported sunscreen, multivitamin and dairy intake were not associated with higher serum 25-

OHD or different between fractures and controls. Subjects with >3 hours/day outdoors had higher 25-OHD (24.3 \pm 7.7 vs. 21.8 \pm 8.2 p=0.03); no difference between fractures and controls. Participants in outdoor sports >2 hours/week had higher 25-OHD (24.1 \pm 8.3 vs. 21.2 \pm 8.7, p=0.02); fracture group more likely than controls to play outdoor sports (p=0.04).

Between fracture and controls groups, mean serum calcium (9.8 \pm 0.6 vs. 10.0 \pm 0.4, p=0.04) and PTH (36.2 \pm 16.5 vs. 26.7 \pm 15, p<0.001) were different. Hyperparathyroidism was present in 5.7% of fracture subjects, 1% of controls; all insufficient, deficient or severely deficient for 25-OHD.

Conclusion: A majority was 25-OHD insufficient or deficient with lowest levels in Blacks/African Americans, Asians and Hispanics. 25-OHD was not significantly different between fracture and non-fracture groups. Despite high rates of hypovitaminosis D, calcium homeostasis was maintained. Dietary supplementation exerted no effect on serum 25-OHD but exposure to sunlight was associated with higher levels. Further investigation of higher PTH noted in the fracture group is warranted to understand its role in the setting of bone disruption.

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GENETIC PREDICTION OF LIFETIME RISK OF FRACTURE

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Aim: Residual lifetime risk of fracture (RLRF) is highly variable between individuals, and we hypothesize that the variation is partly due to genetic factors. This study sought to develop a genetic profiling of BMD-associated genetic variants for predicting the lifetime risk of fracture for men and women.

Methods: The study was designed as a population-based prospective study that involved 1326 men and 2189 women aged 60 years at study entry. During the follow-up period (1989-2009), the incidence of fragility fractures was ascertained from X-ray reports. The incidence of mortality was also ascertained. Femoral neck bone mineral density (BMD) was measured by dual-energy X-ray absorptiometry. A polygenic

risk score (GRS) was generated by summing the weighted number of risk alleles for each single-nucleotide polymorphism (SNP), with the weight being regression coefficients associated with BMD. The RLRf from the age of 60 was estimated by survival analysis taking into account the competing risk of death.

Results: After adjusting for competing risk of death, the RLRf for women and men from age 60 was 36% (95% CI, 34-39%) and 21% (95% CI, 18-24%), respectively. Individuals with greater GRS had higher mortality-adjusted lifetime risk of any fracture. For instance, among women with $GRS \geq 4.24$, the mortality-adjusted RLRf was 42% (95% CI, 35-47%), 1.17-fold greater than average. In men with $GRS \geq 4.24$, the RLRf was 24% (95% CI, 19-28%), 1.14-fold greater than the average. Moreover, the association between GRS and RLRf was independent of femoral neck BMD. For hip fracture, the mortality-adjusted residual lifetime risk was 10% (95% CI, 8-12%) for women and ~5% (95% CI, 3-6%) for men; among those with higher GRS, the risk was 15% (95% CI, 9-20%) and 6% (95% CI, 3-9%) for women and men, respectively.

Conclusion: These data suggest that a profiling of BMD-associated genetic variants could help identify individuals with high lifetime risk of fracture. These results can be useful in promoting efforts aimed at preventing development of risk factors for fracture in young individuals.

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FRAX (AUS) SCORES IN WOMEN WITH DYSGLYCAEMIA AND DIABETES

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Background: Individuals with diabetes have higher fracture risk despite higher BMD. Fracture prediction in diabetes is challenging, with FRAX underestimating risk for these individuals. This study aimed to investigate FRAX score with and without BMD for women with dysglycaemia.

Methods: This study included 566 women, aged 50+ years, enrolled in the Geelong Osteoporosis Study. Impaired fasting glucose (IFG) was defined as fasting plasma glucose (FPG) ≥ 5.5 mmol/L and diabetes as $FPG \geq 7.0$ mmol/L, use of antihyperglycaemic medication and/or self-report. FRAX (Aus) 10-year probabilities of major osteoporotic (MOF) and hip fracture were calculated, with and without BMD, resulting in four FRAX scores per participant. Kruskal-Wallis test for non-parametric data was used to examine differences between the three glycaemia groups.

Results: There were 252 women with normoglycaemia, 247 with IFG and 67 with diabetes. For MOF FRAX calculated without BMD, women with diabetes had a higher median

score (8.4, IQR 3.8-18.0) than normoglycaemia (5.5, IQR 2.4-10.0) and IFG (5.5, IQR 2.6-9.8) ($p=0.001$). A similar pattern was observed for hip FRAX without BMD; diabetes had a higher score (3.3, IQR 0.9-7.4) than normoglycaemia (1.3, IQR 0.4-3.7) and IFG (1.5 IQR 0.4-4.0) ($p=0.001$). When including BMD, the association with diabetes became non-significant. For MOF FRAX, median scores were 4.5 (IQR 2.4-8.3), 4.3 (IQR 2.3-8.9) and 5.7 (IQR 2.6-9.5) for normoglycaemia, IFG and diabetes, respectively ($p=0.392$). Hip FRAX scores for women with normoglycaemia, IFG and diabetes were, 0.8 (IQR 0.2-2.8), 0.8 (IQR 0.2-2.9) and 1.2 (IQR 0.3-3.0), respectively ($p=0.590$).

Conclusions: We report that women with diabetes had a higher FRAX score for both MOF and hip fractures when BMD was not included. However, when BMD was included, the association was attenuated. The results of this study concur with previous observations that fracture risk is higher in individuals with diabetes, despite a higher BMD.

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OCCURRENCE AND PREDICTORS OF OSTEOPOROSIS AND SARCOPENIA IN YOUNG EUGONADAL INDIANS WITH HIV INFECTION

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Objective: This study aimed to determine occurrence and predictors of osteoporosis in premenopausal women and eugonadal men with HIV.

Methods: 220 men and 214 women with HIV were screened, of which 115 men (30-50 years-age) and 103 women (25-45 years-age), clinically stable, having >1-year follow-up, underwent hormonal and DXA analysis. 40 male and 75 female matched controls were evaluated.

Results: HIV males and females had significantly lower BMD and Z-scores at all sites. Osteoporosis was diagnosed in 64.35% males; commonest site being radius total (RT) (49.56%), followed by radius 33% (45.21%), radius ultra distal (RUD) (36.52%), lumbar spine (LS) (19.13%), neck of femur (NOF) (17.39%), total femur (TF) and greater trochanter (GT) (7.82% each). Osteoporosis was diagnosed in 34.95% HIV females, commonest site being RUD (24.27%), followed by radius 33% (17.48%), RT (15.53%), GT, NOF

and LS (6.80% each). HIV males and females had significantly lower fat mass (FM), lean mass (LM), fat% (FP), bone mineral content (BMC), gynoid (G) fat,% skeletal muscle mass (PSMM) (sarcopenia), compared to controls. LM and FM was -15.65% and -11.54% lower in HIV. Sarcopenia was observed in 40% males and 17.5% females with HIV (controls none). HIV males with osteoporosis had higher HAART use, immune reconstitution inflammatory syndrome (IRIS), tuberculosis, lower FM, LM and sarcopenia. Logistic regression revealed PSMM, age and delta (Δ) CD4 count (change in CD4 count at 1 year of HAART, compared to pre-HAART) were best predictors of osteoporosis. Greater PSMM was associated with decreased osteoporosis, without adjusting for any variable (Model-1), adjusting for disease duration, tuberculosis and IRIS (Model-2), and adjusting for model-2 plus gonadotropins and sex steroids (Model-3). Greater Δ CD4 count and age were associated with increased osteoporosis after adjusting for models 1 and 3, and models 2 and 3 respectively. HIV females with osteoporosis had significantly higher use of HAART, lower LM, FM and FP. On logistic regression, LM followed by A/G ratio and BMI were best predictors of osteoporosis.

Conclusions: Osteoporosis and sarcopenia are major problems in young eugonadal men and women with HIV. Decreased skeletal mass, age and rapid improvement in immune function were predictors of osteoporosis.

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PARAOXONASE AND ARYLESTERASE LEVELS IN BEHÇET'S DISEASE AND THEIR RELATIONS WITH THE DISEASE ACTIVITY

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Objectives: To determine the paraoxonase (PON) and arylesterase (ARE) enzyme activity levels in Behçet's disease and to investigate whether they are associated with the disease activity.

Material and methods: Twenty-six patients (group 1) with active Behçet disease and 28 healthy controls (group 2) were included in this study. While the patients who had at least one of the symptoms related to genital ulcer, skin lesions (acneiform lesions, erythema nodosum-like lesion), active uveitis, arthritis, thrombophlebitis, or central nervous system (CNS) involvement in addition to oral ulcers were considered as the active group, the patients who did not show clinical symptoms in the last one month due to the medical treatment (using corticosteroid, colchicine or other immunosuppressive drug) were considered as the inactive group (remission group) in the clinical evaluation of patients with Behçet's disease. The

active group included 15 patients (9 men and six women, the average age 32.1 ± 10.2 years with a range of 17 to 52 years), and the inactive group 11 patients (8 men and three women, the average age 38.9 ± 9.0 years with a range of 17 to 50 years).

Results: The PON and ARE levels were found to be significantly lower in the patient group than the control group ($p < 0.01$). The PON levels of the active and remission groups were 96.23 ± 57.84 , and 112.2 ± 65.14 , respectively. The ARE levels of the active and remission groups were 30.49 ± 5.81 , and 30.85 ± 6.40 (Table 2). No significant correlations were found between clinical findings and the activity levels of PON and ARE in the active patient group ($p > 0.05$).

Conclusions: the activities of the antioxidant PON and ARE enzymes are reduced in Behçet's disease. Therefore, it may be useful to add antioxidant therapy to the conventional treatment of the disease. In later periods, for the demonstration of the relationship between reduced PON and disease activity, it may be possible to acquire clearer data particularly by conducting studies with higher numbers of patients.

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PERIOPERATIVE FACTORS AFFECTING THE OCCURRENCE OF ACUTE COMPLEX REGIONAL PAIN SYNDROME FOLLOWING LIMB BONE FRACTURE SURGERY: DATA FROM THE JAPANESE DIAGNOSIS PROCEDURE COMBINATION DATABASE

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Objectives: Complex regional pain syndrome (CRPS) describes a broad spectrum of symptoms that predominantly localize to the extremities. Although limb fracture is one of the most frequently reported triggering events, few large-scale studies have shown the occurrence of and factors associated with CRPS following limb-fracture. This study aimed to show the occurrence and identify the factors.

Methods: Using the Japanese Diagnosis Procedure Combination database, we identified 39 patients diagnosed with CRPS immediately after open reduction and internal fixation (ORIF) for limb-fracture from a cohort of 185,378 in-patients treated with ORIF between July and December 2007–2010. Patient and clinical characteristics, such as age, gender, fracture site, duration of anesthesia and use of regional anesthesia, were investigated by logistic regression analyses to examine associations between these factors and the in-hospital occurrence of CRPS after ORIF.

Results: The occurrence of CRPS was relatively high in fractures of the distal forearm, but low in fractures of the lower limb and in patients with multiple fractures. Generally, females are considered to be at high risk of CRPS; however, we found a comparable number of male and female patients suffering from CRPS after ORIF for limb-fracture. In terms of perioperative factors, a longer duration of anesthesia, but not regional anesthesia, was significantly associated with a higher incidence of CRPS.

Conclusion: Although a limited number of CRPS patients were analyzed in this study, reduced operative time might help to prevent the development of acute CRPS following limb fracture.

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COMPARISONS OF CLINICAL OUTCOME AFTER ANATOMIC DOUBLE-BUNDLE ACL RECONSTRUCTION BETWEEN REMNANT TISSUE-PRESERVING AND RESECTING PROCEDURES

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Introduction: Preservation of the ACL remnant tissue has attracted notice in the field of ACL reconstruction. However, no studies have shown clinical evidence regarding the utility of ACL remnant tissue preservation as of yet. We have hypothesized that, first, the remnant preservation in anatomic double-bundle ACL reconstruction may improve the postoperative knee stability without any detrimental effects on the clinical results. Secondly, the degree of the initial graft coverage may significantly affect the postoperative knee stability.

Methods: One hundred and seventy-nine patients underwent anatomic double-bundle ACL reconstruction. According to the Crain's classification of the ACL remnant tissue, 81 knees underwent the remnant-preserving procedure (Group P), and the remaining 98 knees underwent the remnant-resecting procedure (Group R). Concerning all background factors including the tunnel positions, there were no differences between the 2 groups. The patients were followed up for 2 years or more.

Results: The side-to-side anterior laxity was significantly less ($p=0.0277$) in Group P (0.9 mm) than in Group R (1.5 mm). The negative pivot-shift test was also significantly lower ($p=0.046$) in Group P (89%) than in Group R (78%). These clinical results were supported by the results of the arthroscopic observations. In addition, there were no significant differences concerning the intraoperative and postoperative complications between the 2 procedures.

Conclusions: The remnant preservation in anatomic double-bundle ACL reconstruction significantly improved the

postoperative knee stability without any detrimental effects on the clinical results. The degree of the initial graft coverage significantly affected the postoperative knee stability.

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ASSOCIATION BETWEEN FEMORAL FRACTURES AND SUPERIOR EXTREMITY FRACTURES IN THE OLDER PEOPLE

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Introduction: Femoral fracture is still one of the most prevalent pathologies in the older population. Often, they are secondary to low energy trauma, osteoporosis being the source of the problem. The association between femoral and superior fractures is not uncommon. However, there are a few reviews in the literature about this topic. Our goal is to study the frequency of this association, as well as establish the treatment when you find two fractures in the same patient and if there is any difference between one fracture and two fracture patients.

Material and Methods: We present a retrospective study. We took patients over 65 diagnosed with femoral fracture. They were admitted in our hospital between January 2010 and December 2015. We took into account sex, age, hospitalization days, functionality, comorbidities, destination when they were discharged and whether they had both fractures. Femoral and superior extremity fracture.

Results: We reviewed 961 patients diagnosed with hip fracture. 31 of them (3.32%) present another fracture. 23 of these patients with two fractures (74.19%) suffered from ipsilateral proximal humeral fracture. The rest presented fractures in distal radius and olecranon. Charlson index and Barthel index were measured at patient admission. The patients who presented hip fracture and measurements of 7.1 and 73.13 respectively. The patients who presented both hip fracture and another fracture had measurements of 6.62 and 79.51, respectively. Most of the patients were referred to a rehabilitation hospital. In addition to follow up their fractures, they could benefit from a rehabilitation program according to their functional capacity.

Discussion: We present a series of 961 patients older than 65 years old with hip fracture. 3.32% of them present superior extremity fracture at the moment of diagnosis. 74.2% were proximal humerus fractures. Based on this series' results, we can state that those patients presenting both fractures (hip fractures plus another one) don't have worse prognosis neither worse functional recovery than those presenting isolated hip fracture. There results agree with the literature published.

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THE APPROACH OF MILD PERSISTENT HYPERCALCEMIA DURING TERIPARATIDE TREATMENT

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Introduction: Teriparatide is an anabolic treatment for osteoporosis, indicated for patients with high risk of vertebral and nonvertebral fractures and for those with glucocorticoid induced osteoporosis. Common side effects include nausea, vomiting, hypertension, dizziness, allergic reactions. Although severe hypercalcemia is very rare, mild hypercalcemia has been reported in 1-3% of patients.

Case report: We report the case of an 83-year-old female who presented to our clinic in June 2015 with complaints of polyarthralgias, back pain, headaches. Her past medical history was significant for rheumatoid arthritis treated with methylprednisolone 8 mg/day and methotrexate 20 mg/week, severe postmenopausal and glucocorticoid induced osteoporosis treated with bisphosphonates for 8 years (2007-2015), non-toxic multinodular goiter. She had multiple fragility fractures (right malleolus -1986, left forearm -1997, L2 vertebra -2014). DXA lumbar spine T-score could not be interpreted due to degenerative changes, left hip T-score was -1.7 SD (BMD=0.725 g/cm²). Treatment with teriparatide 20 mg/day, calcium 1000 mg/day and cholecalciferol 1000 UI/day was started. Subsequent evaluations showed good tolerance and compliance of the treatment. One year later laboratory tests showed: calcium=10.5 mg/dl, PTH=23.69pg/ml, 25-OH vitamin D=21.2 ng/ml, osteocalcin=19.9 ng/ml(15-46), Beta-crosslaps=0.4 ng/ml(<1), normal biochemistry, TSH, FT4. Dorso-lumbar X-ray did not reveal any new vertebral fractures. DXA left hip T-score=-1.4 SD. One month later we repeated serum calcium 24 hours after the teriparatide injection and its value persisted mildly elevated (10.9 mg/dl). The patient had no symptoms of hypercalcemia and age-specific oncologic screening was negative. Therefore we decided to continue the treatment with teriparatide and reduce the daily dose of calcium at 500 mg with close evaluation of serum calcium.

Discussions: Several suggestions from literature for the management of hypercalcemia during teriparatide treatment include repeating serum calcium levels in 1-2 days, ensuring that calcium intake is about 1500 mg/day, searching for other potential causes of hypercalcemia, reducing the calcium intake by 500 mg/day if hypercalcemia persists, stopping teriparatide in severe cases.

Conclusions: Our case underlines the importance of close monitoring serum calcium levels during teriparatide treatment. Persistent hypercalcemia although not reported in

clinical trials could be seen as a rare side effect and clinicians should be aware of its existence.

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BACK PAIN AND ASYMPTOMATIC VERTEBRAL FRACTURES

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Introduction: Approximately ¾ of vertebral fractures are asymptomatic and remain unrecognized.

Aim: To determine the correlation between chronic pain in the back and appearance of asymptomatic vertebral fractures in women with postmenopausal osteoporosis.

Materials and Methods: The study involved 50 women in menopause for a period of one year, aged between 50 and 66 years and with back pain. All patients fulfilled criteria that they used to have severe pain in the back, documented in their medical history, and had never before determined the bone mineral density (bone mineral density-BMD) with dual X-ray absorptiometry (DXA). The intensity of back pain was measured through Visual Analogue Scale (VAS). It was made radiograph (X-ray) of the thoracic and lumbar spine as well as the DXA findings. Using questionnaires were determined risk factors for osteoporotic fractures. Statistic analyzes were done in the program Statistical Package for The Sociences 20.0.

Results: The mean age of patients was 61 years, in which the mean value of the intensity of back pain was 59 mm and lasted an average of 5.6 months. In 61% of the patients on the basis of X-ray of the thoracic and lumbar spine was confirmed vertebral fracture. The most common location of fractures were 35%-Th11, 32%-Th12 and 25%-L1. Based on the results of DXA findings osteoporosis had 11 examinees, 19 had osteopenia while normal findings were recorded in 20 patients. Most common risk factors were early menopause (41.5%), smoking (32.3%) and fractures in relatives (20.5%).

Conclusion: Asymptomatic vertebral fractures are associated with severe and chronic back pain, which increases with the number of fractures. Therefore, the occurrence of chronic back pain especially in patients with risk factors for osteoporosis requires the attention of clinicians and evaluation in the direction of vertebral fractures.

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SEASONAL VARIATION OF SERUM VITAMIN D IN ROMANIA

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Objective: Romania is located in the Northern hemisphere between 44 and 48 degrees latitude and the seasonal variation of serum vitamin D is currently unknown. Our objective was to evaluate the vitamin D seasonal variation (serum 25-hydroxyvitamin D [25OHD]) in an adult Romanian population.

Methods: We retrieved from our endocrinology center electronic database all 25OHD measurements between May 2012 and November 2016. We also evaluated age, sex, diagnosis and date of blood sampling. 25OHD was measured by chemiluminescence (Liaison XL) or electrochemiluminescence (Cobas E601 C).

Results: There were 14052 subjects of which 8024 (mean age 48.23±18.34 years; 1429 men, 6595 women) did not have a diagnosis of low bone mass (osteopenia or osteoporosis). In the 8024 subjects mean serum 25OHD was 19.9±9.9 ng/mL. 0.73%, 14.4%, 55.59% and 86.12% of subjects had a serum 25OHD level below 4, 10, 20 and 30 ng/mL respectively. Serum 25OHD showed a marked seasonal variation, with highest levels in September (25.20±10.03 ng/mL) and lowest levels in March (15.51±8.47 ng/mL; $p<0.001$). The mean values for winter ($n=1776$), spring ($n=2090$), summer ($n=1637$) and autumn ($n=2521$) were 17.9±9.38, 16.54±9.09, 22.55±10.02 and 22.63±9.69 ng/mL respectively. The seasonal variation (September vs. March) persisted in all age groups: 0-20 years (29.46±10.9 vs. 20.14±11.9 ng/mL), 21-40 years (26.54±8.41 vs. 14.66±7.17 ng/mL), 41-65 years (25.11±10.22 vs. 14.98±7.64 ng/mL) and over 65 years (21.44±9.57 vs. 14.86±8.51 ng/mL).

Conclusions: In our Romanian population serum 25OHD showed an important seasonal variation with highest levels in September and lowest levels in March. This seasonal variation persisted in all age groups. Also, the prevalence of vitamin D deficiency and insufficiency was very high.

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THE RELATIONSHIP BETWEEN ARTERIAL STIFFNESS CYTOKINE PRODUCTION AND BONE MINERAL DENSITY IN WOMEN WITH OSTEOPOROSIS

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Aim: To reveal the relationship of arterial stiffness with cytokine production and bone mineral density in women with osteoporosis

Materials and methods: 98 women (mean age 71,2±8,6) were examined. The patients were divided into 2 groups: group 1, $n=50$ (mean age 71,4±8,4), control group; group 2, $n=48$ (mean age 70,9±9,1), patients with osteoporosis. The levels of cytokines were studied by ELISA. The data of arterial stiffness were determined by applanation tonometry by SphygmoCor, Australia. BMD was studied in 2 areas: lumbar vertebrae and proximal hip by DXA densitometry (Challenger, France). We studied the following parameters: pulse wave velocity (PWV), central pulse pressure (CPP), augmentation pressure (AP), augmentation index (AI). For statistical analyses we used Wald-Wolfowitz criteria, multiple regression model. The study was based on GCP principles.

Results: Increased levels of IL-6 (11,4±11,9 vs. 7,0±9,4, $p=0,002$), IL-8 (31,1±38,5 vs. 22,1, $p=0,008$), TNF- α (4,86±3,46 vs. 3,4±4,1, $p=0,0006$), IL-10 (15,9±20,7 vs. 14,4±22,6, $p=0,008$), IL-4 (16,0±71,4 vs. 3,3±4,9, $p=0,002$) were determined in patients with osteoporosis. The central pulse pressure was higher in women with osteoporosis (48,5±20,1 vs. 45,5±15,5, $p=0,0000$). The increase of the augmentation index was revealed in women with osteoporosis, no significant differences of augmentation pressure between the examined groups were found out (15,9±9,5 vs. 14,9±8, $p=0,1$). PWV in the second group was higher than in the control group (9,7±2,3 vs. 9,0±2,1, $p=0,00000$). The decrease of BMD mean values in L1-L5 was established in women of group 2 (0,974±0,230 vs. 1,031±0,200, $p=0,00006$), Z-score (0,59±1,75 0,95±1,25, $p=0,000$), T-score (-0,8±1,6 -0,3±1,2, $p=0,0004$). BMD of total hip (0,80±1,6 0,86±0,15, $p=0,000$; Z-score 2,7±1,4 3,3±1,7, $p=0,0002$, T-score 0,94±1,66 1,19±1,45, $p=0,0000$) proved to be significantly lower in women with osteoporosis than in control group. Multiple regression analysis was conducted to identify factors affecting PWV. It was ascertained that age factor ($\beta=0,3$ 95CI 0,08-0,11, $p=0,027$), the level of IL-6 ($\beta=0,34$ 95CI 0,21-0,16, $p=0,04$), Z-score of hip ($\beta=5,02$, 95CI 8,4-10,6, $p=0,0059$), T-score of the Ward's area ($\beta=5,07$ 95CI 6,0-8,1, $p=0,005$) were the independent determinants of arterial stiffness.

Conclusion: Increasing performance of arterial stiffness, levels of some cytokines and decreasing BMD were determined in women with osteoporosis/age, BMD and level of IL-6 were independent factors affecting arterial stiffness.

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EVIDENCE FOR CIRCULATING CTRP3 AS A POSSIBLE MARKER IN PATIENTS WITH OSTEOARTHRITIS

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Objective: To examine serum levels of CTRP3 in women with knee osteoarthritis (OA).

Material and methods: A population based cross-sectional study was performed in women who complained of chronic knee pain. All subjects were followed by clinical and weight-bearing bilateral anteroposterior radiographical examinations. The Kellgren and Lawrence score was used for knee OA classification. Two subgroups of postmenopausal women were chosen to investigate CTRP3 (complement-C1q TNF-related protein 3) as an OA marker who had severe OA (grade=4) - as a case group- and mild or without OA (grade=0 or 1) - as a control group. Serum levels of CTRP3 and COMP (Cartilage Oligomeric Matrix Protein) were measured using ELIZA method.

Results: According to the Kellgren and Lawrence classification 34 subjects with severe knee OA and 51 age-matched with knee OA grade 1 or 0 were selected. After adjusting for BMI and taking NSAID drugs, serum levels of Ln CTRP3 were lower in patients with severe OA compared to control group (mean±SE, 0.38±0.04 ng/ml vs. 0.50±0.03 ng/ml, respectively, p=0.018). Our finding showed no significant differences in serum levels of Ln COMP in two groups (2.34±0.14 ng/ml vs. 2.25±0.11 ng/ml, respectively, p>0.05).

Conclusion: Our results indicate the association of CTRP3 with severe knee OA. It seems that CTRP3 can be considered as an emerging biomarker for OA, however, more studies are necessary to unravel the role of CTRP3 in OA progression.

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MUSCULOSKELETAL STATUS IN PATIENTS WITH SKELETAL DISCREPANCIES

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Objective: The purpose of this study was to investigate musculoskeletal status in people with skeletal discrepancy.

Material and methods: A total of 80 persons (33 patients with skeletal discrepancy as case group and 47 normal persons as control group) were recruited in this case-control study. All case group had mandibular, maxillary or both prognathism and were candidate for orthognathic surgery. Dual X-ray absorptiometry (DXA) densitometer (Hologic) were used to assess BMD at three bone sites (total hip, femoral-neck, and lumbar spine (L1-L4). Each person was categorized based on The WHO osteoporosis criteria; osteoporosis (T score ≤ -2.5), osteopenia (-2.5 <T score <-1) and normal (T score ≥ -1) in at least one region.

The skeletal muscle mass index (SMI) was measured based on the four limbs from the DXA scan. The gender-specific cut point for muscle mass was used based on 2 SD below mean of young adults.

Results: Among case group, 39.5% (13) subjects had a history of heart disease in their first or second relatives. Also 3 subjects had joint hypermobility and 3 subjects had gray sclera.

Regarding bone status, our data showed the BMD values, T-score, and Z-score of hip region were lower in case group compared to control group (p<0.04). Among case group, 53.1% had osteoporosis or osteopenia who had T-score less than WHO criteria in at least one region (total hip, femoral neck or lumbar) compared to 32.6% of those in control group. In logistic regression model, after adjusting for age and sex, there were significantly lower T-score levels in case group (p=0.03, Exp(B)=5.01). Regarding muscle mass, there was significantly lower SMI in subjects with skeletal discrepancy (case group) compared with control group (mean±SD, 13.98±2.4 vs. 16.8±2.8, respectively, p=0.0001). After adjusting for age and sex, there was not any significant association between skeletal discrepancy and muscle mass.

Conclusion: Our data show people with skeletal discrepancy are at risk of bone loss. In addition, based on high prevalence of family history of heart disease, physicians should pay attention to heart function as well as musculoskeletal status in people with skeletal discrepancy.

P300

OSTEOPOROSIS IN COMMUNITY SETTINGS: WHAT PHARMACISTS CAN OFFER?

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Background: Community pharmacists are highly accessible health care professionals, they can provide clinical services such as providing education, conducting screenings, and making referrals to improve population health. One of it is dealing with osteoporosis as a clinical problem that has social, psychological, and economic burdens. Having community

pharmacists provide opportunities for partnerships with other healthcare and public health professionals to expand the population's access to clinical services.

Method: A questionnaire was mailed to a sample of community pharmacists, focusing on clinical services, and its impact, that they provide in association with osteoporosis management settings.

Results: The initial data analysis supports the position of community pharmacists as key player in increasing appropriate use of services, either through direct delivery of services or by providing education and referrals. Building collaborative partnerships by community pharmacists can impact the interdisciplinary health team links and support improving population health. It is important to understand the legal framework that pharmacists operate within and to review any needed amendments that support pharmacists role in providing clinical preventive services directly to patients without direct oversight of a physician or other health care professional.

Conclusion: Data suggests the potential role for pharmacists to help reduce gaps in osteoporosis settings as screening services are important for early identification of this bone abnormality to ensure provision of appropriate treatment and reduction in fracture risk. Future direction for study should include perceptions and expectations of both patients and pharmacists as a modifiable factors that affects clinical services application in pharmacy practice

P301

CATABOLIC EFFECTS OF FGF-1 ON CHONDROCYTES WITH REDUCED CCN2 PRODUCTION THAT PROMOTES CARTILAGE REGENERATION: POSSIBLE ROLE IN OSTEOARTHRITIS

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Objective: Osteoarthritis (OA) is characterized by dramatic changes in chondrocyte metabolism including the action of CCN family protein 2 (CCN2) in the cartilage microenvironment. CCN family proteins (Connective tissue growth factor (CTGF)/CCN2, Cystein rich protein (Cyr61)/CCN1, and Nephroblastoma overexpressed gene (nov)/CCN3, play important roles in development and regeneration of cartilaginous tissues. By stimulating the proliferation and differentiation of chondrocytes, CCN2 plays a critical role in the development and regeneration of the cartilage. CCN2 interacts with several growth factors involved in endochondral ossification, which

include fibroblast growth factor 1 (FGF-1). However, the role of FGF-1 in chondrocyte metabolism has not been investigated well. Therefore, in this study, we evaluated the effect of FGF-1 on *CCN2* in chondrocytes.

Methods: Effect of FGF-1 on *CCN2* was evaluated with human chondrocytic HCS-2/8 cells. The cellular phenotype was estimated by the gene expression of chondrocytic markers. Effect of FGF-1 on *CCN2* protein level was evaluated by enzyme-linked immunosorbent assay (ELISA). Reporter gene assay was used to examine whether the *CCN2* regulation by FGF-1 was mediated by the proximal promoter, or not. Involvement of FGF-1 in OA development was assessed *in vivo* by using Immunohistochemistry.

Results: Our extensive analysis revealed a new finding that addition of FGF1 to chondrocytic cell culture repressed the mRNA levels of *CCN2* and other chondrocytic markers (*ACAN* and *COL2A1*) in HCS-2/8 cells. By contrast, FGF-1 induced MMP-13 mRNA in those cells. The ELISA revealed consistent results, in which the protein level of *CCN2* was drastically down-regulated by FGF-1. Reporter gene assay suggested that FGF1 decreased *CCN2* gene expression at a transcriptional level. Of note, FGF-1 was produced in articular cartilage upon OA induction, which was evaluated *in vivo* by immunohistochemical methodologies.

Conclusion: These results clearly indicate a strong impact of FGF-1 on chondrocytic metabolism, possibly through *CCN2*, which may lead to further degradation of cartilage in OA.

P302

TERIPARATIDE FOR TREATMENT OF SPINE FRACTURES IN A SPONDYLITIS

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Objective: Cervical fractures often require surgical treatment to achieve proper stabilisation and thus prevent neurological damage associated with an unstable cervical spine.

Systemic diseases such as ankylosing spondylitis hinder the surgical treatment of fractures, mainly because of the osteoporosis induced by long-term immunosuppressive and glucocorticoid treatments. They also pose a surgical challenge because the approach is limited by stiffness and kyphotic deformity of cervical spine.

Material and Methods: We report a 52-year-old male patient with a long history of ankylosing spondylitis, who suffered a whiplash injury, resulting in a C7 fracture. We were not able to perform the right approach because of patient's comorbidity, so we started with teriparatide and orthotic treatment.

Results: Two months after teriparatide treatment beginning, the patient was in significantly less pain. Cervical spine CT

showed a clear bone consolidation and 12 months later patient remains in the same clinical situation.

Conclusions: The combination of ankylosing spondylitis and vertebral fracture makes it very hard to treat these two conditions. In the event of pseudarthrosis or when it is impossible to perform appropriate surgical treatment, teriparatide may be an useful treatment because of its bone anabolic action that prevents the complications associated with prolonged orthotic treatment.

P303

STIMULATION OF BONE MASS BY A NOVEL METHYLATED FATTY ACYL AMIDE DERIVATIVE

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Objective: Among the several endogenous fatty acyl amides (FAAs) found in bone, oleoyl serine (OS) was demonstrated to be a potent anti-osteoporotic agent in both *in vitro* and *in vivo* models. However, OS is rapidly hydrolyzed by amidases that limit its activity. Here, we tested if hindering of the amide bond by adjacent methyl substituents may potentiate OS's activity by restraining its hydrolysis.

Materials and Methods: Methylated OS derivatives, oleoyl α -methyl serine (KAL671) and 2-methyl-oleoyl serine (KAL681) were synthesized. *In vitro* efficacy of the derivatives was evaluated both in osteoblast and osteoclast cultures. 8-week old female C57BL/6J mice were ovariectomized (OVX) or SHAM-operated, and 6 weeks later treated daily with OS, KAL671, KAL681 or vehicle (OS: 1, 3, 9 mg/kg/day; KAL671: 0.1, 0.5, 1 mg/kg/day; KAL681: 0.3, 1, 5 mg/kg/day) for additional 6 weeks. The compound's *in vivo* efficacy was examined by microcomputed tomography, bone histomorphometry, and serum levels of bone turnover biomarkers.

Results: KAL671 and KAL681 stimulated the number of osteoblasts similarly to OS. However, only KAL671 showed improved anti-osteoclastogenic effects over OS by inhibiting osteoclast number and activity at a peak of 10^{-13} M vs. 10^{-11} M, respectively. Treatment with OS or KAL671 completely rescued bone loss in OVXed animals, mainly by increasing trabecular thickness. The most effective dose of KAL671 was 0.5 mg/kg/day, an order of magnitude lower compared to OS. Increased bone density resulted from both enhanced bone formation and decreased bone resorption, findings that were paralleled with the serum levels of the bone remodeling markers osteocalcin and type-1 collagen C-terminal crosslinks.

Conclusion: Taken together, these data suggest that α -methylation interferes with amidase activity, thus enhancing the skeletal effects of OS by extending its availability to its

target cells. In addition, the present data provide a preclinical proof for the bone anabolic and anti-resorptive activities of KAL671, which further supports its preclinical development against osteoporosis.

P304

POLYMORPHISM OF SOME GENES OF BONE METABOLISM (VDR BSM1 C.IVS7G> A, LCT 13910 T> C, COL1A 12046 G-> T) AMONG THE REPRESENTATIVES OF RUSSIAN AND BURYAT NATIONALITIES

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Objective: To study the frequency of genotypes of the polymorphous marker of bone remodeling (vitamin D receptor gene Bsm1 c.IVS7G> A, the lactase gene LCT 13910 T> C and collagen gene COL1A 12046 G-> T) in healthy people and patients with osteoporosis (OP) among the indigenous population of Transbaikalye of Russian and Buryat nationalities.

Materials and methods: 97 women with OP were examined: 49 Russian and 48 Buryat people aged between 50 and 80. 123 healthy women of the same age group were included in the control group. The material for the molecular genetic analysis of the DNA samples was extracted from peripheral venous blood. The on-line calculator was used for data processing.

Results: It was found, that the recessive allele A of the polymorphism of VDR - Bsm1 c.IVS7G> A was accumulated among the women of Buryat nationality, but the statistical significance was not observed (OR=1.04, CI [0.68, 1.6]).

In the analysis of polymorphism of LCT-13910 T> C, it was found that the recessive mutant genotype T / T was present only among Russian women (p=0.0005). C allele was associated with the development of OP to a greater extent among the representatives of Buryat nationality (OR=1.04, CI [0.65, 1.6]), but the data were not statistically significant.

The analysis of gene polymorphism COL1A 12046 G->T showed that homozygous dominant allele G (about 97% p=0.0003) was more common in the people of Buryat nationality and the mutant allele T prevailed in the women of Russian nationality (p=0.0003). Genotypes G/T and T/T of the polymorphism COL1A 12046 G->T associated with the development of OP among women of both nationalities (OR 1.2 CI [0.8; 1.7]).

Conclusion: The gene allele VDR Bsm1 c.IVS7G> A leads to a higher risk of OP in women of Buryat nationality. The genotypes G/T and T/T of COL1A 12046 G-> T are associated with the development of OP in people of both nationalities.

P305

STRESS FRACTURE OF THE FEMORAL NECK IN A YOUNG FEMALE RUNNER

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Objectives: Stress fractures can be develop up to 15% of usual runners, within which the involvement of the femoral neck occurs about 5-10%. They can be classified as fatigue fractures when they occur due to repeated loads or insufficiency fractures when there are differences in bone quality, which can be related to cases of early menopause. It is important to know the clinic, diagnostic tests and treatment options, so a clinical case is presented at our center.

Material and Methods: A 33-year-old female runner who practices athletics 3-4 days a week, with a history of L4-S1 juvenile arthrodesis due to spondylolisthesis L5-S1, presented symptoms of lameness and pain in the left hip for 4 months. Hip X-ray and CT was performed where we observed a subcapital femoral neck fracture without displacement. After that, the osteosynthesis was performed with 2 percutaneous screws.

Results: During the postoperative period she presented no complications. The patient remained 3 weeks without weight bearing on the limb and partial load was introduced progressively to 6 weeks. After one year of follow-up the radiological controls are satisfactory and the patient is without pain or limp and has been reinstated to previous sports practice.

Conclusions: Hip fractures due to stress are an uncommon entity that is sometimes delayed because of the larval presentation that it has, so it is necessary to suspect them in the presence of pain of mechanical characteristics in typical locations, such as the metatarsals or the hip, especially in patients submitted to repetitive loads or with bone fragility (like early menopause). The treatment of these fractures will vary depending on the time and extent of the injury. They may be conservatively treated in the early evolved cases or the latter evolved cases may need surgical treatment the presenting good results.

P306

PROSPECTIVE ASSOCIATIONS OF LOW MUSCLE MASS AND STRENGTH WITH 10-YEAR HEALTH-RELATED QUALITY OF LIFE IN COMMUNITY-DWELLING OLDER ADULTS

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Background: Little is known about the extent to which low muscle mass and strength independently contribute to health-related quality of life (HRQoL). Furthermore, it is unclear whether upper-limb and lower-limb muscle strength have a different impact on HRQoL. This prospective study aims to describe the association of low muscle mass, handgrip (HGS) and lower-limb muscle strength (LMS) with health-related quality of life (HRQoL) over 10 years in community-dwelling older adults.

Material and Methods: Participants (N=817; 50% women; mean age 63±7.3 years) were prospectively followed for 10 years. HRQoL was measured using assessment of quality of life (AQoL) instrument. Appendicular lean mass (ALM) was assessed using dual energy X-ray absorptiometry. HGS and LMS were assessed using dynamometer. Low muscle mass and strength was defined as the lowest 20% of the sex-specific distribution for ALM-to-BMI ratio (ALM/BMI), LMS, and HGS. Linear mixed effect regression models, with adjustment for confounders, were used to estimate the association between low muscle mass and strength at baseline and 10-year HRQoL.

Results: Median AQoL utility score at 10 years was 0.76 (range -0.03, 1.00), and 49% of the participants obtained scores demonstrating a high HRQoL (>0.90). Participants with lower baseline LMS ($\beta=-0.057$, 95% CI: -0.084, -0.031) and HGS ($\beta=-0.046$, 95% CI: -0.073, -0.018) had a clinically meaningful difference in 10-year HRQoL compared to those with normal strength – the minimal clinically important difference in the HRQoL score is 0.06 for the Australian population. There was a weaker association between ALM/BMI and 10 years HRQoL ($\beta=-0.029$, 95% CI: -0.057, -0.001).

Conclusions: Muscle strength, which is closely related to physical performance and can be easily measured in clinical practice, is more important than muscle mass in estimating the long-term quality of life in community-dwelling older adults. LMS was slightly superior to HGS in estimating HRQoL. This could be due to the relationship between LMS and mobility.

P307

LONGITUDINAL ASSOCIATIONS BETWEEN SERUM 25-HYDROXYVITAMIN-D PHYSICAL ACTIVITY AND KNEE PAIN AND DYSFUNCTION WITH MUSCLE MASS, STRENGTH AND QUALITY IN COMMUNITY-DWELLING OLDER ADULTS

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Objective: Traditionally, analysis has focused on examining how loss of muscle mass, strength and muscle quality differ between individuals (*between-person comparison*). Less well recognized is how variability in risk factors over time within the same individual (*within-person comparison*) is associated with loss of muscle mass, strength and muscle quality. This study aims to describe the associations of between-person and within-person variability in serum 25-hydroxyvitamin D (25OHD), physical activity (PA) and knee pain and dysfunction with age-related loss of skeletal muscle mass, strength and muscle quality over 10 years in community-dwelling older adults.

Material and Methods: Participants (N=1033; 51% women; mean age 63±7.4 years) were measured at baseline, 2.5, 5, and 10 years. Lower-limb lean mass (LLM) was assessed using DXA, lower-limb muscle strength (LMS) using a dynamometer, and lower-limb muscle quality (LMQ) calculated as LMS/LLM. Knee pain and dysfunction were assessed using the Western Ontario and McMaster Universities Osteoarthritis (WOMAC) index. PA was measured using pedometers. Linear mixed effect regression models, with adjustment for confounders, were used to estimate the association of within-person and between-person variability in PA, 25(OH) D and WOMAC score with muscle mass, strength and muscle quality.

Results: Between-person effects showed that 10-year average LLM, LMS, and LMQ were higher in participants with a higher average 25OHD and PA (all $p < 0.05$). Within-person effects also showed that LLM, LMS, and LMQ were higher at time-points when participants had higher PA levels than their 10-year average PA level (all $p < 0.05$). Within-person increases in 25OHD were associated with a higher LMS ($\beta = 0.10$ per nmol/l, 95% CI: 0.03, 0.17) and LMQ ($\beta = 0.01$ per nmol/l, 95% CI: 0.002, 0.01) but not LLM. Within-person and between-person increases in WOMAC scores were associated with lower muscle strength and quality but not LLM.

Conclusions: Between-person effects suggests that long-term maintenance of higher levels of PA and 25OHD were associated with higher muscle mass, strength and muscle quality. Within-person effects demonstrate that increasing one's own PA level further increases muscle mass, strength, and quality. Furthermore, fluctuations in 25OHD and WOMAC scores within an individual are also important for muscle strength, muscle quality but not muscle mass.

P308

PREVALENCE OF OSTEOPOROSIS AND RATE OF BONE LOSS IN KOREAN ADULTS: THE CHUNGJU METABOLIC DISEASE COHORT STUDY

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Context: The rate of age-dependent bone loss has been shown to be an important risk factor of fracture. However, longitudinal rates of bone mineral density (BMD) loss in Korea have not yet been reported.

Objective: To evaluate the longitudinal changes in BMD in Korea.

Design: This was a community-based cohort study. The 2nd examination was conducted approximately 4 years after the baseline examination.

Setting: The study was conducted in the rural area of Chungju City, Korea.

Participants: A total of 3,379 of the 6,007 subjects 40 years of age or older completed the follow-up visit, corresponding to rates of 60.68% and 53.51% in males and females, respectively.

Results: The age-standardized osteoporosis prevalence was 12.81% in males and 44.35% in females. In males, the average annual BMD loss at the total hip increased from -0.25% per year in their 40s to -1.12% per year in their 80s (p for trend < 0.001). In females, the average annual BMD loss at the total hip increased from -0.69% per year in their 40s to -1.51% per year in their 80s (p for trend = 0.001). However, the average annual percentage change in spine BMD in females increased from -0.91% per year in their 40s to +1.39% per year in their 80s (p for trend < 0.001).

Conclusions: A substantial number of subjects had osteoporosis. The spine BMD may not be recommended when assessing BMD change in adults because it was relatively stable or even increased.

P309

EFFECT OF ADJUVANT THERAPY ON BONE MINERAL DENSITY IN CAUCASIAN WOMEN WITH BREAST CANCER

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Objective: To assess the effect of Aromatase inhibitors (AIs) and selective estrogen receptor modulators (SERMs) on bone mineral density (BMD) in postmenopausal Caucasian women with estrogen receptor-positive (ER+) breast cancer.

Materials and Methods: 74 Caucasian women (46-74 years) were enrolled in the study. 38 patients were receiving Aromatase inhibitors (AIs): Anastrozole or Letrozole and 36 patients-selective estrogen receptor modulators (SERMs) - Tamoxifen. We have measured BMI, calcium ionized (Ca⁺⁺), Lumbar Spine (LS) and Total Hip BMD values using dual-energy X-ray absorptiometry at baseline, after 1, 2, and 3 years of therapy. 24 patients from AI group who were diagnosed to

have osteopenia at baseline started antiresorptive treatment with Bisphosphonates. 14 patients from AI group and all Tamoxifen treated patients, who had normal BMD at baseline were not given any bone protection treatment.

Results: Among Aromatase inhibitors treated patients, there was a decrease in median BMD from baseline to 3 years in lumbar spine - 5,22% and total hip - 6,10%. Only 3 patients with osteopenia at baseline developed osteoporosis on AI treatment. Breast cancer patients treated with Tamoxifen showed protection against postmenopausal bone loss. In Tamoxifen group patients there was a positive effect of SERM in both regions: Lumbar Spine +2,62% and Total Hip +2,03% respectively in 3 years of adjuvant treatment.

Conclusion: Aromatase inhibitors are associated with accelerated bone loss over the 3-years treatment period. In postmenopausal women, treatment with tamoxifen is associated with preservation of the bone mineral density.

P310

MULTIPLE FRACTURES AND SEVERE MUSCULO-SKELETAL PAIN SYNDROME IN PATIENTS WITH HYPOPHOSPHATEMIC RICKETS

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Objective: Hypophosphatemic rickets (HR), also vitamin D-resistant rickets is a genetic metabolic disorder with the prevalence of 1 in 20,000. Down-regulation of FGF-23 gene has been implicated in the pathogenesis, causing deficient calcification of bones and skeletal deformities.

Material and Methods: Two clinical cases of HR demonstrate the management of two patients with multiple fractures and severe musculoskeletal pain syndrome.

Results: Case 1. The 26-year-old woman had sustained muscle weakness proximal in extremities, pain in the back, left hip and knee for five years. Patient's mother had had serum 25-hydroxyvitamin D (25[OH]D) resistance. X-ray, CT and MRI scans revealed fractures of 7th and 8th ribs, the sacrum and left hip. Laboratory analysis confirmed serum 25(OH)D level – 14.00 ng/mL (N=30.00–100.00 ng/mL), alkaline phosphatase level – 172.00 U/L (N≤117.00 U/L), alkaline phosphatase bone fraction level – 51.20 µg/L (N=3.00–19.00 µg/L), serum phosphorus level – 0.51 mmol/L (N=0.80–1.60 mmol/L). Serum calcium, parathyroid hormone revealed normal findings. Transiliac bone biopsy confirmed osteomalacia. Case 2. The 29-year-old woman presented with complaints of progressive unilateral pain in the back and right hip, accompanied by reduced general mobility. X-ray exhibited multiple

vertebral compression fractures of the lumbar (L2, L3) spine and right hip. Laboratory analysis revealed alkaline phosphatase level – 236.00 U/L, alkaline phosphatase bone fraction level – 87.00 µg/L, serum phosphorus level – 0.53 mmol/L. Serum calcium, 25(OH)D, parathyroid hormone findings showed no abnormality. Femoral bone biopsy demonstrated endosteal osteoplasia. In both cases, total hip arthroplasty was done, and the patient was administered with cholecalciferol supplementation (8000 IU/day), calcitriol (2 µg/day) and sodium phosphate (2000 mg/day). Additional in case 2 daily subcutaneous injection of 20 µg of teriparatide was initiated for 10 months. Genetic analysis and follow-up programme are ongoing.

Conclusion: Dearth of the guidelines in HR management frequently leads to misdiagnosis and mismanagement. Multiple issues must be addressed, and choices for dose adjustment may not be straightforward. Treatment requires balancing the benefits of treatment and monitoring for potential risks.

P311

PREGNANCY- AND LACTATION-ASSOCIATED OSTEOPOROSIS IN THE PATIENT WITH OSTEOGENESIS IMPERFECTA

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Objective: Osteogenesis imperfecta (OI) simultaneously with pregnancy- and lactation-associated osteoporosis (PLO) is rare with an incidence 1 in 25,000 to 30,000. OI is a clinically and genetically heterogeneous connective tissue disease characterized by defects in type I collagen. PLO is an acquired skeletal disorder due to significant changes in calcium and bone metabolism during pregnancy and lactation. Both conditions lead to similar musculoskeletal abnormalities causing bone fragility and increasing the risk of fractures, as well posing serious complications in pregnancy.

Material and methods: A clinical case of OI in association with PLO presents the patient with multiple vertebral fractures and chronic pain during a peri-pregnancy period.

Results: The 29-year-old woman had musculoskeletal pain syndrome in the third trimester of pregnancy that worsened immediately post-partum. MRI showed vertebral compression fractures of the thoracic (Th11, Th12) and lumbar (L1) spine, fragility fracture of the L2 vertebra. The lumbar spine BMD was below the expected range of age (–4.5 SD). 25-OH vitamin D level was 21.6 ng/mL (N=30.0–100.0 ng/mL), osteocalcin level was 56.6 ng/ml (N=11.0–43.0 ng/ml), β CTX level was 0.759 ng/ml (N≤0.573 ng/ml). The red blood

cells, platelets, calcium, alkaline phosphatase, protein electrophoresis revealed normal findings. Additional extra-skeletal manifestations included blue-gray colored sclera. Other systemic diseases were excluded, though the woman avoided dairy products. Low BMD in the absence of fragility fractures, was observed in two patient's sisters. The patient was recommended to discontinue breastfeeding. Vitamin D supplementation (5000 IU/day), calcium (500 mg/day), analgesics and a once-yearly infusion of zoledronic acid for two years were administered. L2 vertebroplasty was indicated due to musculoskeletal pain syndrome. Genetic analysis and follow-up programme are ongoing.

Conclusions: Therapy with zoledronic acid and surgical stabilization of fracture had significantly beneficial effects: BMD has increased, the development of chronic pain and new fractures has been prevented. Appropriate treatments that reduce the risk of fractures by addressing both altered bone quality and high bone turnover remain elusive in this patient.

P312

OUR EXPERIENCE IN THE USE OF REVERSE TOTAL SHOULDER ARTHROPLASTY IN THE TREATMENT OF OSTEOPOROTIC FRACTURES OF THE PROXIMAL HUMERUS

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Objectives: Fractures of proximal humerus represent up to 6% of all fractures, and in the elderly patient is the third most frequent fracture. There are various treatment options and controversy about the best option. The occurrence of reverse total shoulder arthroplasty (RTSA) represents a new option that would be reserved for selected cases in elderly patients, such as complex fractures in 3-4 fragments, inability to osteosynthesis, high risk of compromising vascularization, rupture of the cuff Rotator or rescue of a failure of osteosynthesis. We present our experience in the treatment of these fractures using RTSA.

Material and Methods: We present 8 cases treated in our center with RTSA due to proximal humerus fracture in several fragments with a high risk of involvement of cephalic vascularization in patients older than 70 years. A CT scan was performed to complete the study and perform an adequate surgical planning. The intervention was performed by a deltopectoral approach, the humeral stem was cemented in all cases and the tuberosities were re-sutured.

Results: Patients did not present complications in the immediate postoperative period. They kept the arm in sling for 2 weeks, allowing them to perform passive assisted movements. Subsequent periodic checks and rehabilitative treatment were performed. At the follow-up year they were painless and with a functional joint balance (Constant Score).

Conclusions: There is still controversy about indications for treatment of proximal humeral fractures: conservative vs. surgical, and within the latter the various options. RTSA has gained popularity in recent years, especially in patients over 70 years of age with osteopenia, as it may provide a more predictable outcome compared to hemiarthroplasty due to a lower reliance on tuberosity consolidation and rotator cuff involvement. The use of RTSA in fractures of proximal end of humerus is an alternative in selected cases that presents satisfactory results.

P313

SARCOPENIA IN ELDERLY PATIENTS WITH END-STAGE RENAL DISEASE

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Objectives: Sarcopenia is a condition characterized by progressive and generalized loss of skeletal muscle mass and function. The prevalence of sarcopenia on elderly patients with end-stage renal disease (ESRD) has been scarcely investigated. The aim of this study is to investigate the prevalence of decreased muscle mass and strength alone or combined in elderly patients with ESRD according to different methods and cutoff limits and evaluated the agreement between dual energy x-ray absorptiometry (DXA) and surrogate methods for the assessment of muscle mass.

Material and Methods: In this observational cross-sectional study, data from 74 elderly (age > 60 years) patients with ESRD were recorded. Sarcopenia was considered when the patient fit one criteria for low muscle mass assessed by DXA, sum of skinfold thicknesses (SKF), calf circumference and mid-arm muscle circumference (MAMC) and one for low muscle strength evaluated by handgrip dynamometer. Normal values for sarcopenia were those recommended by the European Working Group on Sarcopenia in Older People (EWGSOP).

Results: Decreased muscle strength was found in 63 (85,13%) of the patients. The prevalence of decreased muscle mass varied from 4,05 to 72,97% and of sarcopenia (decreased muscle mass and strength combined) from 4,05 to 62,16%, depending on the method and cutoff limit applied. A small percentage of patients (2,7 to 14,86%) were classified

as sarcopenic by more than one diagnostic criteria. The agreement between DXA and the surrogate methods to assess muscle mass showed better kappa coefficients with SKF ($P < 0.01$).

Conclusions: A wide prevalence of sarcopenia is observed depending on the method and cutoff limit applied. This may limit extrapolate on to clinical practice. SKF were the surrogate methods to assess muscle mass with the best concordance with DXA in elderly patients with ESRD.

P314

EFFICACY OF AVOCADO/SOYBEAN UNSAPONIFIABLES IN A 3 MONTHS TREATMENT IN PATIENTS WITH OSTEOARTHRITIS OF THE KNEE

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Objectives: To evaluate the impact of avocado/soybean unsaponifiables (ASU) on the clinical activity, level of urinary crosslinked C-telopeptide of type II collagen (uCTX-II) and femoral cartilage thickness (FCT) assessed by ultrasound (US) in patients (pts) with knee osteoarthritis (KOA).

Methods: 16 pts with KOA (3 males, mean age 60.5 ± 3.46 , 9 pts had radiographic Grade II and 7 – Grade III) received ASU (300 mg/day) in addition to Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) or alone (10 and 6 pts respectively) during 3 months. Primary efficacy criterion was the change of the WOMAC-index from study begin to end of treatment. The secondary criterion was the change in Lecken's-index. uCTX-II were conducted by ELISA using test systems by "IDS" (UK) at baseline, after 1 and 3 months of the treatment. US imaging was conducted at baseline and after the end of treatment using US (SonoScape S2, PRC) with 12 MHz linear transducer. Medial, sulcus and lateral sites of femoral articular cartilage and synovial thickness (ST) were depicted and measured (in mm) by constant speed proximal-distal transducer sweeping over the supra-patellar region.

Results: The completion rate after the 3-month observation was 100%. The WOMAC-index decreased for approx. 25% to the end of the first months and for 52.4% to the end of treatment ($p < 0.05$ and $p < 0.01$ respectively). The decrease of Lecken's-index for 32.8% was statistically significant only at the end of treatment. That were accompanied by a decrease of uCTX-II level for 80.8% (from 15.1 ± 12.0 to 2.9 ± 1.9 ng/ml, $p < 0.01$) after 1 and 50.1% (to 7.4 ± 10.4 ng/ml, $p < 0.05$) after 3 months of ASU intake. 40% of the pts have been stopped NSAIDs during the treatment period. According to US data decrease of ST for both knees (from 2.58 ± 1.50 to 2.33 ± 1.99 , $p > 0.05$) was not statistically significant. The increase of the FCT was significant only for medial and sulcus sites of the right knee (from 1.42 ± 0.38 to 1.74 ± 0.56 , $p < 0.01$ and from 1.89 ± 0.53 to 2.06 ± 0.52 , $p < 0.05$ respectively). The changes

in uCTX-II level negatively correlated with the dynamics of FCT in medial site of the right knee ($r = -0.524$, $p < 0.05$).

Conclusions: the once daily intake of 300 mg ASU will lead to clinically significant improvement according to WOMAC and Lecken's indices with the positive changes in cartilage metabolism (decrease of uCTX-II level and increase of the FCT) in KOA pts.

P315

ASSESSMENT OF KNEE JOINT STABILITY IN ABNORMAL PREGNANCY

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Objective: This study was designed to evaluate the impact of gestational diabetes on the stability of knee joint. **Material and Methods:** Thirty primigravida pregnant women with single fetus in their 3rd trimester (after 36 weeks gestation) have participated in this study, their age was ranged between 20 and 40 years old and their body mass index was < 35 kg/m². They were selected from the outpatient clinic of obstetric and gynecological department at Kasr El Aini teaching hospital in period from March 2016 to May 2016. These women were assigned equally into two groups, group (A) consisted of fifteen pregnant women, they suffered from gestational diabetes, group (B) consisted of fifteen women with a normal pregnancy. Both groups were evaluated by glucometer for detecting blood sugar level during measurements. Then all women assessed by KT 1000 knee ligament arthrometer and Lachman test to detect knee stability affection.

Results: There was a statistically significant difference between the two groups which was in favor of gestational diabetes group during measurement of knee displacement by lachman test and KT 1000 arthrometer, while in comparison of both knees in the same group there was no statistically significant difference. Comparison between categorical data was performed using Chi-square test. According to the test of normality, the comparison between values of different variables in the two studied groups was performed using either t test or Mann-Whitney test whenever it was appropriate. Percent change of Kt 1000 was calculated from the equation:

$$\frac{\text{Mean value of Kt in normal} - \text{mean value of kt in diabetic}}{\text{Mean value of Kt in normal}} \times 100$$

Conclusion: It could be concluded that gestational diabetes has a great impact on the stability of knee joint during pregnancy, so care should be taken to avoid joint injury, falls and provide self-satisfaction as well as minimal complaints.

Women should be advised for wearing knee support for prevention of complications of knee joint instability and advised to perform strengthening exercises for the muscles supporting the knee joint for prevention from hypermobility complications

P316

IMPORTANCE OF BONE REMODELING IN BONE DEFECTS SURGERY

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Methods: The technique of reconstruction of bone defects by induction of biological membranes described by Masquelet in 1986 based on a case of pseudoarthrosis after open fracture osteosynthesis of tibia and fibula is presented. We performed an intervention in May 2013 following the Masquelet reconstruction technique, using a tricortical iliac crest graft and stimulating consolidation through medical treatment with teriparatide daily for 6 months, with radiological follow-up at 3 months, At 6 months and a year, aiming consolidation at the second postoperative month.

Results: The clinical and radiological evolution was satisfactory, achieving the consolidation at 2 months of follow-up the patient discharged from hospital and the follow-up in external consultations of our center without complications so far.

Conclusion: Teriparatide is a bone-forming agent, hPTH (1-34) is the active ingredient (1-34) of the endogenous human parathyroid hormone regulating calcium and phosphorus metabolism in bone and kidney. It is indicated in the treatment of osteoporosis but can be very useful as a therapeutic weapon more in case of fractures with poor prognosis, thanks to its direct effect on the osteoblasts producing an increase of the apposition of new bone in the trabecular bony surfaces and cortical.

P317

COMPARING THE EFFECTIVENESS OF LASER TREATMENT WITH EXTRACORPOREAL SHOCK WAVE TREATMENT (ESWT) IN PATIENTS WITH MYOFASCIAL PAIN SYNDROME (MPS)

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Objective: To investigate and compare the effectiveness of laser treatment and ESWT in patients with MPS.

Materials-Methods: Patients were divided into two groups randomly, and first group received stretching and postural

exercises along with fifteen sessions of laser treatment for a three week period whereas second group received stretching and postural exercises along with three sessions of ESWT with a 5-8 day intersession interval. Exercises those included range of motion exercises, stretching and postural exercises were programmed to be worked out at home three sessions a day with 10 repetitions each. Patients were instructed to perform those exercises for two months. All patients were evaluated before therapy, right after therapy and one month after therapy with VAS, pressure pain threshold algometer (PPTA), life quality short form 36 (SF-36) and Beck depression inventory (BDI).

Conclusion: Our study showed that both therapy techniques yielded beneficial results in patients with MPS. Our results also showed that laser and ESWT had similar benefits and had no superiorities over one another in the treatments of MPS. In conclusion, both laser and ESWT might be the choice of treatment in patients with MPS.

P318

ATYPICAL PROXIMAL FEMORAL FRACTURES: BISPHOSPHONATE RELATED FRACTURES

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Objectives: To describe a case of an atypical femur fracture for prolonged use of bisphosphonates treated with osteosynthesis and parathormone, in order to improve the knowledge of this entity.

Material and Methods: We present the case of a 69-year-old female patient who has been receiving a treatment with alendronate due to osteoporosis during a period of time greater than four years, with no side effects reported. She comes to our hospital after falling to the ground from her own height, suffering from severe pain and functional impotence at the level of the right hip. During examination, our patient shows her right lower limb in an external rotating attitude and marked shortening, and she is not able to move her hip active nor passively due to an intense pain. AP and axial radiographs of the right hip and an AP projection of the pelvis are performed, showing a subtrochanteric fracture of the right femur, with a transverse-slightly oblique pattern and a medial spicule. We performed an intramedullary nailing using a Gamma Nail (Stryker®), dynamically locked. Postoperative radiological controls are satisfactory.

Results: After the surgery, our patient is forbidden to apply weight on the injured hip for 6 weeks, with subsequent progressive partial loading, and alendronate is replaced by Parathormone. Periodic radiographic controls are performed

monthly, showing a correct consolidation of the fracture. Three months later, mobility is complete without pain.

Conclusion: Atypical fractures of the subtrochanteric region of the femur represent a group of lesions that appear in osteoporotic patients or those affected by other alterations of the bone metabolism. This type of fracture has typically been associated with bisphosphonates, usually after prolonged use. Epidemiological studies have shown that since the introduction of bisphosphonates as a standard treatment for osteoporosis, subtrochanteric fractures have increased over the same period, as these fractures may be more difficult to treat because of longer consolidation periods, with a greater tendency to pseudoarthrosis. Therefore, it is advisable to suspend the use of bisphosphonates and change the treatment to parathormone.

P319

TREATMENT OF A CUT-OUT CASE THROUGH OSTEOSYNTHESIS WITH DCS PLATE AND PARATHORMONE
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Objectives: We define cut-out as the proximal extrusion of the screw through the femoral head after the implantation of a centromedular nail. Its treatment poses a challenge for the surgeon and an important risk for the patient. The main objective of this work is to expose a case of CUT-OUT and its resolution using a DCS plate and parathormone.

Material and methods: >Here we present the case of an 87-year-old female patient with a history of hypertension, osteoporosis and heart failure, who presented a subtrochanteric fracture of the right femur after falling to the ground. For the diagnosis, simple hip Rx were used in AP and axial projections. During the admission she had an episode of atrial fibrillation, so it was necessary to postpone the surgery. Subsequently, an intramedullary nailing was performed with 125° Gamma Long Nail. The opening of the fracture site was avoided due to patient's heart condition, and it was impossible to obtain an anatomical reduction. Subsequently he was discharged home without permission to load weight on the damaged member. Six weeks after the intervention, a new fall occurred that led to the laterally expulsion of the head screw. For this reason, it was decided to replace the nail with a 9° DCS plate. Also, we started a two years treatment with parathormone. Achieving partial consolidation of the fracture, the reduction was maintained, adding hydroxyapatite graft. Given the good evolution, the patient was discharged home and he

was banned again from loading weight on the operated member.

Results: Two months after the implantation of the plate, the evolution of the consolidation process is promising, which has made possible to start walking with the help of crutches or a walker.

Conclusion: The use of the DCS plate, although infrequent in these cases, allows to obtain a new support in the femoral head avoiding the gap of the extruded screw of the Gamma Long Nail, thus solving the failure of the previous osteosynthesis. Also, the use of parathormone improves consolidation of the fracture.

P320

CLINICAL FACTORS PREDICT A GREATER INCREASE IN SPINE BONE DENSITY AFTER LACTATION (FACTORS AFFECTING BONE FORMATION AFTER BREASTFEEDING PILOT STUDY [FABB-PILOT])

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Background: Much of the calcium content of breast milk is resorbed from the maternal skeleton, independent of oral calcium intake. Bone mineral density (BMD) declines 5-10% during lactation, which increases the risk of fracture. After weaning the baby, the skeleton is restored, such that dozens of epidemiological studies have found that breastfeeding is neutral or protective against fractures and osteoporosis in the long-term. However, few studies have examined the speed and extent of BMD recovery after weaning, or which clinical factors influence this process.

Objectives: We hypothesized that physical activity, nutrition, hormones, and other clinical factors facilitate bone formation after lactation. Our aims were to determine the BMD increase at six months after weaning, and to obtain preliminary data regarding clinical factors that may predict gains in BMD.

Methods: All women must have breastfed near-exclusively for 4 to 6 months to cause a significant decline in BMD. At planned weaning and six months later, we assessed BMD, lean mass, and hip structural analysis (HSA) by DXA; chemistries; hormones; urine Ca/Cr; nutrition; physical activity; overall health.

Results: 31 women (31.6±3.5 years, 1.53±0.63 births) enrolled at 26.6±2.0 weeks post-partum and all completed the study. Most continued to lactate such that only 17% had fully weaned by the follow-up (12 months post-partum). Thoracic and lumbar spine increased by 5.1% (p<0.01) and 4.0% (p<0.03), respectively; cortical sites (hip, total body)

and HSA indices were unchanged. Estradiol increased (115 to 198 pmol/L, $p<0.01$), PTH increased (60 to 69 ng/mL, $p<0.04$), calcitriol decreased (198 to 115 pmol/L, $p<0.01$), 25OHD declined (80 vs. 64 nmol/L, $p<0.01$), CTX declined (0.47 to 0.37 ng/mL, $p<0.04$). P1NP, sclerostin, calcium, ionized calcium; intake of vitamin D and calcium; and physical activity did not change. Clinical factors that suggest an association with greater increases in BMD include return of menses, use of progestin-only pill, and reduced numbers of feeds per day.

Conclusions: Spine BMD increases significantly during six months after lactation, with greatest gains in those who begin to wean sooner, have menses return, and who use a progestin-only contraceptive.

P321

LONG TERM EFFICACY WITH THREE-MONTHLY INTRA-ARTICULAR HYALURONIC ACID (HYALUBRIX®) IN SYMPTOMATIC KNEE OSTEOARTHRITIS: PRELIMINARY RESULTS AT 24 MONTHS.

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Introduction: Osteoarthritis (OA) is the most common joint disease and the knee is one of the most frequently affected joints associated with activity limitations, need for walking devices and increased use of analgesic and non-steroidal anti-inflammatory drugs (NSAIDs). Hyaluronic acid (HA) is indicated for non-responders to non-pharmacological therapy, to analgesics or when NSAIDs are contraindicated.

Objective: To evaluate the long-term efficacy of a quarterly single intra-articular injection with Hyalubrix® (HA >1500 kDa, Fidia Farmaceutici Spa – Abano Terme (PD) Italy) in symptomatic knee OA.

Materials and Method: Fifty patients with symptomatic knee OA were enrolled in this longitudinal observational study. All patients were treated with a first 3-weekly regimen followed by a quarterly single injection with Hyalubrix®. The patients were assessed with the WOMAC score and NRS 0-10 pain scale at baseline (T0) and at each treatment (T1-T8). Kellgren-Lawrence grading (K-L) was assessed at baseline and at 24 months to evaluate radiographic disease progression. Descriptive analyses and GEE linear regression model was performed with SAS 9.3.

Results: Forty-seven of fifty patients have completed 24 months of follow-up. 3 patients withdrew from the study, one for accidental knee injury, one for spontaneous osteonecrosis (SONK), and the last for missing data. The mean age of the patients was 60.89±9.88 years; 63.8% of

the patients were female. At baseline 42.6% of patients was in K-L grade I, 27.6% in K-L II and 29.8% in K-L III. No radiographic changes were observed. During the study period, we found a progressive reduction in WOMAC (48.83±8.94 vs. 10.77±4.52) and NRS (6.32±1.09 vs. 1.00±0.88) values ($<.0001$).

Discussion: The data presented show the 24 months' efficacy of Hyalubrix® in knee OA in terms of pain, functionality and radiographic progression. The GEE linear regression model used in this study showed that the treatment reaches its maximum between the sixth and ninth month when the effect is stable and remains unchanged until the twenty-fourth month.

P322

UTILITY OF TERIPARATIDE IN THE AGED SPINE SURGERY

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Objective: Surgery for lumbar spine arthrodesis in elderly patients has experienced an increased frequency over the past few years; morbidity and mortality in this sense has been proven to be associated to the lack of bone quality and difficulties with fusion. Recombinant human teriparatide [rhPTH (1-34)], a drug used in the treatment of osteoporosis, has been proposed as a possible co-adjuvant treatment to improve these problems, thanks to its anabolizing effect on bone metabolism. In this study, we analyze the possible beneficial effect of teriparatide as co-adjuvant treatment in elderly patients with poor bone quality who have been operated due to lumbar degenerative disease with a posterolateral arthrodesis.

Material and Methods: We present a prospective clinical series of 60 patients of over 70 years of age in whom surgical posterolateral arthrodesis was carried out and who received teriparatide during 18 months as co-adjuvant treatment.

Results: In our series, we found a fusion rate of 95.1%, without observing any vertebral fractures, arthrodesis hardware failure (pull-out) or any other complications associated to bone failure. Moreover, a reduction in pain and in the disability in the VAS and ODI scales was verified after the combined treatment with surgery and teriparatide, which remained stable during follow-up.

Conclusions: In our series, we found promising results with a high rate of fusion, without recording any complications. Teriparatide could be a useful treatment when it comes to favoring lumbar arthrodesis by increasing mineral bone density. However, randomized studies with a greater number of patients are needed to demonstrate the possible beneficial effect.

P323**TREATMENT STRATEGIES ON MANAGING COMPLEX ACUTE AND SUB-ACUTE LOWER LIMB TRAUMA IN PATIENTS WITH OSTEOPOROSIS USING CIRCULAR ILIZAROV FRAME**E. Iliopoulos¹, N. Morrissey¹, S. Cho¹, A. Khaleel¹¹Ashford and St Peter's Hospitals NHS Trust, Chertsey, United Kingdom

Background: The treatment of complex acute fractures and non-unions is a challenge for the orthopaedic surgeons. The management of such conditions is becoming even more challenging in poor quality bone due to osteoporosis; and often we have to alter the normal practice to overcome these problems. The use of circular Ilizarov frame in such conditions could be a reasonable option, but is still not well established in the literature for elderly and osteoporotic patients.

Aim: The purpose of this study was to illuminate the technical alternations of the management of the osteoporotic bone and demonstrate the outcomes after severe acute and sub-acute lower limb trauma in elderly patients, who were treated with circular Ilizarov frame.

Materials and Methods: Data from all elderly patients (aged over 65 years), treated with an Ilizarov circular frame for severe acute and sub-acute lower limb trauma, between January 2002 and December 2014, was collected. Clinical, radiological and quality of life questionnaire (SF-12) data, mortality, complication and revision data were also collected.

The intact joint above or below was used as a reference to identify the mechanical axis of the limb. The mechanical axis was used in order to achieve alignment and a stable ring of appropriate size was applied with at least two wires on each ring. A separate wire was added away of the ring, to increase the stability of the ring when necessary (drop wire). The wires were tensioned with increased tension to 130kg force. Four connective rods were used to connect the rings, in order to achieve a more stable frame. The frame crossed the joint for intra-articular fractures in order to protect the reduction and allow immediate full weight bearing post-operatively. Olive or plain wires were added to achieve fracture reduction or compression across the non-union.

Results: During this period we treated 44 elderly patients with Ilizarov circular frame at a mean of age 70.67 years. Indications were tibia plateau fractures (Schatzker IV-V-VI) (41.9%), pilon fractures (20.9%), miscellaneous complex lower limb acute fractures (20.9%) and lower limb non-unions (16.3%). Mean time in the frame was 176.71 ±80.6 days. Mortality and complication rates were low (2.7-5.4%) at a mean follow-up 4.2 years. There was no case of new induced septic arthritis or deep infection.

Physical and Mental components of SF-12 questionnaire returned to normal for that age group (43.55 and 51.55 respectively). There was no difference between the sub-groups concerning the physical and mental subjective (PCS and MCS SF-12 component) outcomes ($p>0.05$). There was no significant correlation between age and subjective outcomes, neither between time of follow-up and subjective outcomes.

Conclusions: Complex acute and sub-acute lower limb trauma in patients with osteoporosis can be treated safely and reliably by using circular Ilizarov frame with good quality of life results.

P324**OSTEOPOROTIC VERTEBRAL FRACTURES: DIFFICULT TO MANAGE**N. Pérez-Jimeno¹, V. Roda¹, J. López¹, D. Peña¹, A. Charlez¹, C. Martín¹¹Hospital Universitario Miguel Servet, Zaragoza, Spain

Introduction and Objectives: Osteoporotic vertebral fractures are a common clinical problem and its importance is increasing with the aging population. The aim of this clinical case is to present the resolution of two consecutive vertebral fractures in the same patient.

Material and methods: 74 year old woman who was admitted from the emergencies for L4 vertebral fracture after low energy accidental fall. CT was reported as burst fracture with 50% invasion of the spinal canal. L3-L5 open arthrodesis was performed. In the immediate postoperative, she presented sciatica and paresis 2-3/5 in right L5 territory. TC was sought thinking about the possibility of a malposition of the right L5 screw, being our surprise that the cause of the clinic was a bone fragment located in the foramen that contacted with the right L5 root. We proceeded to a second surgical procedure performing a right L4-L5 hemilaminectomy, removal the bone fragment and review the right L5 root. Sciatica disappeared but the paresis persisted. After 2 weeks, the patient suffered a new fall and x-ray showed a new compression vertebral fracture in L1. It was decided to kyphoplasty.

Results: After a year and a half of follow-up, the patient has not got sciatica, has minimal lumbar discomfort but persists paresis 2-3/5 in right L5 territory. Good radiological evolution.

Discussion and conclusions: Osteoporotic vertebral fractures probably gain more health importance as the population ages. Fortunately, the most of them are asymptomatic and require minimal or no treatment. However, treatment of patients with painful fractures, whether or not surgical, can be very complex.

P325

GLOBAL DNA METHYLATION AS A POSSIBLE MECHANISM FOR THE EFFECT OF VITAMIN D IN BONE HEALTH

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Objective: The aim of this study was to determine the relationship between inter-individual global DNA methylation and vitamin D levels in postmenopausal women with osteoporosis.

Material and methods: The 5-methyl cytosine content was assessed by reverse phase high pressure liquid chromatography (RP-HPLC) of peripheral blood leukocytes obtained from postmenopausal women to determine individual global DNA methylation status (Cm%). Dual X-ray absorptiometry (DXA) densitometer (Lunar 7164) were used to assess BMD of three bone sites (total hip, femoral-neck, and spinal lumbar vertebrae (L2-L4)). Each person was categorized based on The WHO osteoporosis criteria; osteoporosis (T score \leq -2.5), osteopenia (-2.5 < T score < -1) and normal (T score \geq -1) in at least one region. Vitamin D levels were measured using electrochemiluminescence assay. The serum vitamin D levels lower than 30ng/ml were defined as vitamin D deficiency or insufficiency.

Results: A total of 150 postmenopausal women (40 persons with osteoporosis, 40 persons with osteopenia, and 70 persons) - who had not any chronic disorders- were recruited in this study. There was a negative significant correlation between DNA methylation levels and vitamin D levels ($r=-0.20$, $p=0.01$) without any association with age ($p=0.3$). There was significantly higher levels of DNA methylation in subjects with vitamin D deficiency (5.32 ± 0.58 vs. 3.98 ± 0.17 , respectively, $p=0.01$). In women with vitamin D deficiency, there was significant negative relationship between DNA methylation levels and T-score and BMD value of spinal lumbar region (L2-L4) ($p=0.012$, $r=-0.38$).

Conclusion: The findings of this study suggest that vitamin D levels could influence bone status through epigenetic mechanisms specially DNA methylation. So that, global DNA hyper-methylation was associated with lumbar bone loss in patient with vitamin D deficiency.

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THE IMPACT OF UNILATERAL ADRENALECTOMY ON BONE STATUS ON MENOPAUSAL WOMEN DIAGNOSED WITH NON-SECRETOR ADRENAL TUMORS: A LONGITUDINAL STUDY

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Introduction: Non-secretor adrenal tumors may cause bone mineral density (BMD) loss because of longtime exposure to mild persistent cortisol secretion which is found in more than one third of cases.

Aim: To analyze the bone profile of menopausal women diagnosed with an adrenal incidentaloma (AI) to whom adrenalectomy was performed or not.

Material and Method: The bone features are provided. The entire panel of endocrine adrenal profile excluded a typically secretor tumor confirming the diagnosis of an AI. This is a longitudinal retrospective study in a single tertiary centre of endocrinology from East Europe. The data were collected from 2010 to 2016. The patient agreed to anonymously use their medical records at admission. The patients who suffered unilateral adrenalectomy were referred to a surgical center where laparoscopic procedure was done. The indication of surgery was based on increased size of the tumor during follow-up. Central dual-energy x-ray absorptiometry was performed with a GE Lunar Prodigy machine.

Results: A total of 44 women were enrolled. The mean period of time for follow-up was 24 months. The two groups were similar as age of diagnosis (61 years) and there was not statistical significant difference between the levels of plasma morning cortisol (at baseline and after low dose of dexamethasone inhibition test) and ACTH (adrenocorticotrophic hormone) at baseline between first and the second group. Group 1 (patient who were followed without surgery) included 35 patients. Initial lumbar BMD was of 1.039 g/cm^2 , at after 2 years was of 0.89 g/cm^2 ($p<0.0005$). Group 2 included 9 patients who suffered a tumor remove and BMD increased to 1.137 g/cm^2 from 1.0004 g/cm^2 after 24 months ($p=0.003$). As limits of the study we mention that 5 patients from group 1 and 2 from group 2 were offered anti-osteoporotic specific drugs in addition to vitamin D supplements which might influence the interpretation of data.

Conclusion: The bone profile becomes a key-player in menopausal population diagnosed with AI related to adequate management during follow-up.

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HOW PAINFUL IS OSTEOPOROSIS?

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Introduction and Scope: Osteoporosis is recognized by the World Health Organization (WHO) as an established and well-defined disease that affects more than 75 million people in the United States, Europe and Japan. [1] According to the WHO scientific group on the assessment of Osteoporosis, its chronic progressive process of bone resorption and finally the loss of bone is not painful and does not create per se any kind of symptoms. The morbidity changes dramatically once a complication of bone continuity develops. That is why Osteoporosis is called a 'silent' condition.[2] What if Osteoporosis is not as silent as we believe it is and indeed it sends messages before its complications develop but we, the doctors, do not hear them and not take them into account when we treat osteoporotic patients?

Furthermore, we well know from previous studies, that some agents available in Osteoporosis' treatment which interfere in bone metabolism, like Calcitonin, have a positive effect on bone pain and we have adjusted our practice accordingly when an osteoporotic patient complaints of this type of pain. [3] Is there a direct connection between musculoskeletal pain and Osteoporosis? And finally, how painful is Osteoporosis? We wanted to further evaluate these questions and better understand the level of musculoskeletal pain the osteoporotic patients experience due to this disease.

Material and Method: Searching in the literature we realized that there is no specific instrument of measurement aiming to assess directly the level of pain the patients experience due to Osteoporosis. That is why we used two different quality of life questionnaires, the generic health survey Short Form 36 (SF-36 Greek version 1.0) and the International Osteoporosis Foundation Quality of Life in Osteoporosis (Qualeffo-41 Greek version) emphasizing onto the separate specific domain referred to pain. Both these instruments were previously translated and validated for the Greek population. [4] From June 2015 until June 2016 we distributed in Northern Greece, the SF-36 and the Qualeffo-41 questionnaires in 74 Caucasian osteoporotic patients who respected the inclusion criteria and filled anonymously and simultaneously both. We included in this study patients diagnosed with primary or secondary Osteoporosis according to the WHO criteria, who had no fragility fractures previously and also were not diagnosed with arthritis in their lumbar spine and the sacro-iliac (S-I) joints. [5,6] We assessed the level of musculoskeletal pain as these patients with Osteoporosis perceived it in their spine and their 4 limbs. The SF-36 instrument's pain domain, with the 7th and 8th questions,

assess directly the patient's intensity of pain in the last four weeks. The possible answers range, using multiple choices of descriptive characterizations, from the very intense pain until not at all. The Qualeffo-41 in its specific pain domain has 5 questions which assess the intensity of pain, using multiple descriptive choices of varying answers from no pain until unbearable. It also assess the duration of the experienced pain in the last week using numeric and descriptive values ranging from never to every day/night, all day.

Results: From the initial cohort of 74 patients (2 males) who respected the inclusion criteria in this study, 61 returned both the SF-36 and the Qualeffo-41 instruments of measurement with all the above named questions referred to pain answered. These 61 (2 males) participated patients had a mean age of 63 y.o. (38-81) and were on treatment with various anti-osteoporotic agents. 29 patients answered that in the last 4 weeks had no pain and 46 patients that had no pain in the last week. 9 patients had pain at least 2-3 days in the last week. 22 patients answered that in the last month they had at least moderate musculoskeletal pain and 20 patients answered that their pain interfered at least quite a bit with their normal work including both housework and outside the home. 12 patients experienced pain at least 3-6 hours during day time and 18 patients considered that their musculoskeletal pain disturbed at least twice their sleep in the last week.

Conclusions and Study limitations: From the above data is easy to understand that Osteoporosis has not the same impact on patients regarding the musculoskeletal pain but this is present in 52% of the participated patients who experienced in the last 4 weeks at least a very mild pain because of the disease. In an attempt to be skeptical about the study results, one could argue the study design, as the sample of 61 patients does not present homogenous characteristics. Patients with different types of Osteoporosis (postmenopausal, pharmaceutical, of endocrine causes, after prolonged immobilization) were included in different stages of severity with various T- and Z-scores and related complications which could act differently on the levels of musculoskeletal pain. This was done in order to increase the study sample in the 12 month time frame. Additionally we wanted to evaluate the pain due to the condition, as a result on the musculoskeletal system regardless of the Osteoporosis' main cause. Furthermore, the different levels of musculoskeletal pain could be attributed to the lack of documentation regarding the need of X-rays in all the participated patients in order to exclude arthritis in their spine or S-I joints. As an answer to that, according to the initial study design, we wanted to include only patients with X-rays. Although that there were some patients with X-rays and no arthritis, there were other patients with no X-rays who were not keen on having one. On the other hand, although muscle mass

was not assessed in the sample, the different levels of established Sarcopenia in the participated osteoporotic patients could play an important role in understanding the different answers given regarding the pain levels.

This initial attempt to answer and further evaluate the question of how painful is the Osteoporosis, demarcates the need for more studies, eventually better all around organized, in order to find safer answers. Towards this direction, an important role could play the development of a specific instrument of musculoskeletal pain measurement in osteoporotic patients with well structured questions regarding the different pain levels and the disability because of it. This could be proven a useful tool in our practice contributing to a spherical understanding of Osteoporosis in order to better treat our patients.

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BLOOD MANAGEMENT IN DEGENERATIVE LUMBAR ARTHRODESIS SURGERY AT ONE AND TWO LEVELS

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Introduction: The main surgical activity in the Spinal Surgical Unit at University Hospital Miguel Servet in Zaragoza is based on lumbar arthrodesis regarding the cases of degenerative disease of the lumbar spine with more than 150 cases per year. It is a routine procedure to order blood prior to the operation. However, the necessity of transfusion is uncommon in lumbar arthrodesis surgery which affects one or two levels. Taking into account this situation, it has been thought the possibility of reducing the routine blood ordering and crossmatch for surgeries of one or two levels, with the consequent economical saving and use of resources involved.

Objective: 1. To quantify in a prospective way the real necessities of blood transfusion in patients who are going to be

operated on lumbar arthrodesis stratifying it according to the levels that could be joined, the quantity of hematocrit and hemoglobin prior to the surgery, the comorbidities and previous treatments. 2. To identify the risk factors in transfusion in these patients. 3. To estimate the potential saving and reduction in the use of resources that could be obtained by not doing the routine blood ordering in this surgery.

Material and Methods: Data capture of all patients who are going to be operated on lumbar arthrodesis in the Spinal Surgical Unit at the University Hospital Miguel Servet in Zaragoza, classifying them according to the number of levels that could be joined (one level, two levels and three or more levels). The needed information about patients will be: age, sex, hematocrit-hemoglobin preoperative and post-operative, necessity of post-operative transfusion (Yes/No), volume of transfused milliliters, usual medicines that alter coagulation, diseases and physical conditions that may imply a high risk of bleeding and surgical incidents which have produced a higher bleeding.

Results: If the obtained results supported what has been analysed in our clinical experience, new criteria in blood.

reserves policy for the lumbar spinal fusion surgery of one or two levels could be established.

Conclusions: It is expected that our study means a saving for such a frequent process in lumbar spine surgery.

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COMPLICATION OF OSTEOPOROSIS: CUT-OUT IN PATIENT WITH PERTROCHANTERIC FRACTURE TREATED WITH STANDARD GAMMA NAIL

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The confluence of some factors (osteoporosis, fracture line, inadequate focus reduction, repeated motorizing, etc.) can hasten a cut-out in gamma nails, showing a prevalence of 2 to 4% of the diverse series. In this case, we present a patient with osteoporosis who presented a cut-out after being operated on pertrochanteric fracture with a gamma nail.

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WHY SOME OF THE RHEUMATOID ARTHITIS (RA) PATIENTS FRACTURED BUT NOT IN OTHERS?

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Objectives: To explore the risk factors of fragility fracture in RA.

Material and Methods: This is an interim analysis of a RA registry at Kaohsiung Chang Gung Memorial Hospital in Taiwan. Consecutive RA patients between 01-Sep- 2014 and 31-Nov-2016 were enrolled. On enrollment, we checked associated disease markers for each participant and recorded demographics, evidence of prevalent fragility fracture, life style, FRAX-associated risk factors of fragility fracture, and medication history. The descriptive summary is presented in the form of median (IQR). A level of statistical significance of $p < 0.05$ was used for all statistical tests performed.

Results: A total of 583 participants were enrolled. There were 110 (18.9%) participants had prevalent fracture. In univariate analysis, it disclosed older age, female, higher level of body mass index (BMI), more years after diagnosis of RA, longer disease duration, more comorbidity, higher disease activity score (DAS 28, ESR), less biologics users, higher wrist inflammation scale evaluated by sonography, glucocorticoid users, non-smokers, non-tea drinker, non-coffee drinker, higher levels iPTH or Vit D, lower bone mineral density (BMD), higher prevalence of osteoporosis, and previous fall are associated with prevalent fragility fracture. While, after adjustment, it revealed that only older age ($p < 0.0001$), higher level of BMI ($p = 0.0003$), more years after diagnosis of RA ($p = 0.0290$), glucocorticoid users ($p = 0.0204$), lower BMD at femoral neck (FN) ($p < 0.0001$), and previous fall in previous year ($p = 0.0097$) are independent risk factors of prevalent fracture.

Conclusions: Similar to the conventional risk factors in FRAX tool, older age, glucocorticoid users, and lower BMD at FN also are risk factors of fragility fracture in RA patients. In addition, later attention paid for fracture after diagnosis of RA and previous fall are two other risk factors of fracture in our cohort. It seems that disease activity of RA is not related to fragility fracture. Via this investigation, it suggests that to control disease activity for RA patients is not sufficient to prevent fracture but needs further investigation.

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UTILISING FRAX WITHOUT BMD TO IDENTIFY WHO TO TREAT VS. WHO TO INVESTIGATE WITH BMD IN THOSE OVER 70 YEARS AGE

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Purpose: Access and cost of DXA are barriers to osteoporosis screening. Risk-assessment tools may be useful alternatives. The objective was the use of FRAX fracture risk (without BMD) to stratify people into low risk (not requiring

assessment), intermediate risk (requiring BMD) or high risk (preventative treatment recommended without BMD).

Methods: A prospective multicentred cohort study recruited from metropolitan General Practices identified persons deemed to be at clinical risk of osteoporosis or aged over 70. Osteoporosis risk assessment using BMD and health questionnaire. FRAX[®] scores with and without BMD values were calculated for each patient. ROC curves with the area under curve (AUC) were generated to calculate sensitivity and specificity of FRAX[®] (without BMD) in identifying patients with osteoporosis.

Results: We identified age specific thresholds for identification of patients deemed low risk (BMD not required), intermediate risk (requiring BMD) or high risk (treatment recommended). These thresholds resulted in the correct clinical management decision in 77% of cases. Unnecessary BMDs avoided in 341/543 (63%). Osteoporosis was missed in 51/534 (8%). Absolute Positive Predictive value (+41.6%) and accuracy (+22%) of the FRAX 10-year Hip fracture improved over recommended cut-offs.

Conclusions: Age specific intervention thresholds based on fracture risk score may reduce the number and cost of unnecessary BMDs. It identifies who may require BMD and who to treat. Those with absolute risk below 1.8 (FRAX-Hip) and 3.85 (FRAX-Major) do not require DXA. The threshold to treat is influenced by user willingness to pay and risk – benefit.

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UTILISING GARVAN FRACTURE RISK CALCULATOR WITHOUT BMD TO IDENTIFY WHO TO TREAT VS. WHO TO INVESTIGATE WITH BMD IN PEOPLE OVER 70 YEARS OF AGE

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Background: Lack of access and cost of bone mineral densitometry (BMD) are barriers to osteoporosis screening. Risk-assessment tools may be useful to screen for osteoporosis.

Objectives: Use of GARVAN fracture risk scores (without BMD) to stratify people into low risk (not requiring assessment) moderate risk (requiring BMD) or high risk (requiring preventative treatment without need for BMD).

Design, setting and participants: A prospective multicentred cohort study recruited from metropolitan General Practices which identified persons either deemed to be at clinical risk of osteoporosis or aged over 70.

Measurements: Osteoporosis risk assessment using DXA BMD scan and health questionnaire. GARVAN[®] scores with and without BMD values were calculated for each patient.

ROC curves with the area under curve (AUC) were generated to calculate sensitivity and specificity of GARVAN[®] (without BMD) in identifying patients with osteoporosis.

Results: We identified age specific thresholds for identification of patients deemed low risk patients (BMD not required), intermediate risk (requiring BMD) or high risk (treatment recommended without BMD). These thresholds resulted in the correct clinical management decision 89% of the time. Unnecessary BMDs avoided in 350/543 (64%). Osteoporosis was missed in 28/534 (5%). It improved the absolute Positive Predictive value (+44.5%) and accuracy (+12%) of the FRAX[®] 10-year Hip fracture risk calculator tool over recommended cut-offs.

Conclusions: Estimating age specific intervention thresholds based on fracture risk score has the potential to reduce the number and cost of unnecessary BMDs. It successfully identifies who may or may not require BMD and who to treat. At the very least people with an absolute risk below 1.8 and 3.85 for GARVAN[®] Hip and Major (without BMD) respectively can safely be reassured without recourse to BMD. The threshold to treat will be influenced by user willingness to pay and risk – benefit.

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HAND EXTENSOR TENDON INVOLVEMENT IN PATIENTS WITH RA

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Background: Management of rheumatoid arthritis (RA) has evolved lately, in part due to new biologic therapies and part because of the new imaging techniques that can depict earlier involvement in joints and tendons.

Objectives: To evaluate, by ultrasonography (US), the prevalence and type of the hand extensor tendons involvement in patients with RA.

Methods: Twenty-two patients with RA were included in the study and twenty healthy age matched controls without inflammatory diseases were examined as well. The US evaluation included the dorsal aspect of the hand, both in transverse and longitudinal scan, for the evaluation of the following tendons: abductor policis longus, extensor policis brevis, extensor carpi radialis longus and brevis, extensor policis longus, extensor digitorum group tendons, extensor digiti minimi and extensor carpi ulnaris. The presence of US findings indicative of tenosynovitis and tendon damage was investigated.

Results: Tenosynovitis in at least one site, was statistically significant more frequent in patients with RA than in controls ($p < 0.001$). Between patients with RA, the most frequent tendon compartment involved was the 6th (extensor carpi ulnaris),

followed by the 4th and first compartment, compared to those in healthy subjects, where the most frequently involved is the first compartment, followed by the extensor carpi ulnaris.

Conclusions: This study reveals the high frequency of hand extensor tendon involvement in patients with RA and can guide the further assessment in the evaluation of those patients in daily practice.

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EFFECT OF HIGH DOSE VITAMIN D SUPPLEMENTATION ON BETA CELL FUNCTION IN OBESE ASIAN-INDIAN CHILDREN AND ADOLESCENTS, AGED 11-17 YEARS: A RANDOMIZED, DOUBLE BLIND, ACTIVE CONTROLLED STUDY

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Objective: To study the effects of high dose vitamin D supplementation on beta cell function and cardiovascular risk factors in Asian-Indian obese children and adolescents, aged 11-17 years.

Methods: A prospective, randomized, double blind active-controlled study, was carried out to investigate the effects of high dose vitamin D supplementation (Cholecalciferol - 4000 IU per day) in comparison to daily requirement dose (Cholecalciferol - 400 IU/day) for 12 months. Both the doses of vitamin D were calculated on daily basis but given as once a month, single, oral dose (120,000 IU vs. 12,000 IU once a month). Life style modification advice were given to both the groups before randomization (computer based randomization in 1:1). Beta cell functions were assessed by, disposition index (The primary outcome of the study, product of insulinogenic index and whole body insulin sensitivity; measured by oral glucose tolerance test) which was measured before and after 12 months of supplementation. As secondary outcomes, lipid profile, inflammatory cytokines (serum hsCRP, IL-6, TNF-alpha) and cardiovascular risk factors (aortic pulse wave velocity and radial pulse augmentation index) were also assessed before and after supplementation of vitamin D. Safety parameters, serum calcium, and urinary calcium creatinine ratio were assessed every two monthly.

Results: A total of 189 obese children and adolescents were recruited (Mean age: Boys - 12.94±1.51; Girls 13.13±1.72) After life style modification advice, were randomized into two groups, Group A (Intervention group) and group B (control group). No significant difference in any of the clinical and biochemical parameters were seen at baseline. The mean serum vitamin D level of the study population was 9.21±7.54 ng/ml (Intervention group- 8.36±5.45) Control Group- (9.01±5.59). At baseline, 94.7% subjects (Intervention group- 94.7%; Control Group- 94.6%) were vitamin D deficient (serum 25OH Vit.D <20 ng/mL). Only four subjects had serum vitamin D level >30 ng/ml. After 12 months of supplementation, there was a significant increase in serum 25OHD level in intervention group in comparison to controls (26.89±12.23 vs. 13.14±4.66 ng/ml, $p<0.001$). No significant difference in disposition index (primary outcome) as well as other parameters of insulin resistance and sensitivity were seen after 12 months of supplementation. Similarly, no significant difference in BMI, HbA1c, fasting blood glucose, lipid profile, inflammatory cytokines and pulse wave velocity were observed after 12 months. None of the study subjects in both groups developed hypercalcemia and hypercalciuria, suggesting safety of intervention.

Conclusion: Supplementation with vitamin D in doses of 4000 IU per day for 12 months in Asian-Indian children and adolescents did not affect beta cell function as well as cardiovascular risk factors.

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RELATIONSHIPS BETWEEN YOUNG MEN BONE MINERAL DENSITY, MUSCLE MASS AND STRENGTH
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Objective: Investigate the relationships between bone mineral density (BMD), muscle mass and strength.

Material and methods: We assessed 100 French young males (mean age: 24.4±2.8 years; height: 176.4±6.2 cm; weight: 72.9±9.3 kg). Appendicular lean mass (ALM), relative appendicular lean mass (ALM/H²) (RASM), fat mass (FM), relative fat mass (FM/H²) (RFM), percentage of body fat and BMD (at lumbar spine (LS), total hip (TH), trochanter (TROCH), femoral neck (FN) and whole body (WB)) were measured using DXA. Muscle strength was evaluated by

handgrip strength. Correlations and interactions between all variables were assessed using univariate and stepwise regression analyses.

Results: Results showed that, RASM was positively correlated with BMD at all assessed sites ($r=0.62$ for WB, $r=0.54$ for FN, $r=0.63$ for TROCH, $r=0.64$ for TH, $r=0.56$ for LS) $p<0.05$ whereas RFM was negatively correlated ($r=-0.15$ for WB, $r=-0.12$ for FN, $r=-0.08$ for TROCH, $r=-0.15$ for TH, $r=-0.10$ for LS). In stepwise regression analyses, the beta coefficient of RASM was high and contributed positively to the construction of the models producing a positive influence on the BMD ($\beta=0.07$ for WB, $\beta=0.04$ for FN, $\beta=0.05$ for TROCH, $\beta=0.06$ for TH) $p<0.05$. Conversely, RFM was negatively associated with BMD at all bone sites ($\beta=-0.02$ for WB, $\beta=-0.03$ for FN, $\beta=-0.02$ for TROCH, $\beta=-0.03$ for TH, $\beta=-0.07$ for LS) $p<0.05$. Handgrip strength was positively associated with BMD at all sites. Yet, the correlation coefficient values were weak ($r=0.35$ for WB, $r=0.28$ for FN, $r=0.38$ for TROCH, $r=0.36$ for TH, $r=0.29$ for LS).

Conclusions: Our data suggest that in young men, BMD is positively associated with lean mass while negatively with fat mass. We confirmed that RASM is the strongest factor associated with BMD in young men. We recommend, that physical activity that benefit to enhance lean body mass and reduce fat mass can contribute to promote bone health.

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EXERCISE-INDUCED PAIN AND HEALTH STATUS DIFFER BETWEEN DROP-OUTS AND RETAINERS OF AN EXERCISE PROGRAM FOR KNEE OSTEOARTHRITIS
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Background: Exercise effectiveness is related to adherence, compliance and drop-out. The aim of this study is to investigate if exercise-induced pain and health status are related to these outcomes during two exercise programmes in knee osteoarthritis patients.

Methods: Symptomatic knee osteoarthritis patients were randomly allocated to a walking or strengthening programme (N=19/group). At baseline, patients were categorized according to their health status. Exercise adherence and compliance were calculated and drop-out rate was registered. For exercise-induced pain, patients rated their pain on an 11-point numeric rating scale (NRS) before and after each training session. Before each session the maximal perceived pain of the last 24 hours (NRS_{max24}) was

assessed. Patients rated their global self-perceived effect (GPE) on a 7-point ordinal scale after the intervention period.

Results: 53% of the participants felt they improved after the programme, 6 patients dropped out. The mean adherence and compliance rates were higher than .83 in both groups. Worse health and higher exercise-induced pain were seen in drop-outs. NRS_{max24} during the first 3 weeks did not significantly increase compared to baseline, but correlated negatively with adherence during the home sessions ($r = -.56$, $p < .05$). Lower adherence during supervised sessions was significantly related with higher pre-exercise pain scores ($\rho = -.35$, $p < .05$).

Conclusion: Patients who drop-out show a worse health condition and higher exercise-induced pain levels compared to patients that retained the programme.

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CAN MAGNETIC RESONANCE IMAGING PROVIDE ADDED VALUE TO EXERCISE PROGRAMS FOR KNEE OSTEOARTHRITIS?

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Purpose: Exercise is effective for reducing knee osteoarthritis (OA) pain but effect sizes vary widely. Moreover, not all knee OA patients perceive beneficial effects. Tailoring specific exercises to subgroups of knee OA patients may increase effectivity. Bone marrow lesions (BMLs) have been suggested as a criterion to define such subgroups.

This study aimed to investigate whether BMLs' presence/absence is related to treatment outcomes in a group of knee OA patients who exercised for 18 weeks. **Methods:** Subjects with symptomatic knee OA started a strength or walking exercise program. BMLs' presence at baseline was assessed. Pain was assessed before and after the intervention with the ICOAP questionnaire. Also the global perceived effect (GPE) on the patient's complaints was rated.

Results: Thirty-five patients (strength (N=17) and walking (N=18)) were analyzed for BMLs. BMLs were present in 25 (71%) knees. Five (14%) patients dropped out and 19 (54%) improved ($GPE \geq 5$). All drop-outs had BMLs but no difference was seen between drop-outs and retainers ($p > .05$). Pain scores did not differ between intervention groups ($p > .05$) or between patients with BMLs and without BMLs ($p > .05$).

Conclusions: Pain scores and GPE was not different between knee OA patients with and without baseline BMLs in this sample.

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FRACTURE RISK AND LEVEL OF PHYSICAL ACTIVITY IN FEMALE OSTEOPOROTIC PATIENTS

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Introduction: The most common reason for reduction of bone mineral density is physical inactivity.

Aim: Assessment of fracture risk and the level of physical activity in female osteoporotic patients.

Material and methods: Our cross-sectional study included 82 female patients (41 physical active-PA, 41-physical inactive IP), average age 64,12±8,21 yrs. The data were based on anamneses, questionnaire, as well as measurements of the bone mineral density by DXA method using the Lunar Prodigy Primo device. Center of Vojvodina in Novi Sad. The assessment of the fracture risk was executed by applying FRAX index.

Results: The results showed the presence of statistically significant differences between physically inactive (IP) and active patients (PA) of certain factors which influence into bone mineral density of bones (using of alcohol ($t = 2,357$, $p = 0,05^*$) and practicing exercise at the young age ($t = -3,342$, $p = 0,01^{**}$). The majority number of physical active patients has low risk level for major osteoporotic fracture 21 (51,2%), then intermediate 13 (31,17%), and finally high 7 (17,1%). The most of physically inactive patients has medium level of risk 20 (48,8), low level has 12 patients (29,2%) and finally high level of risk has 9 (22%) patients for major osteoporotic fracture. Results showed no statistically differences in term of the level for major osteoporotic fracture between PA i IP. There are statistically significant differences of FRAX for fracture of hip between physical active (PA) and inactive patients (IP) (medium level PA-15(36.6%); IP 22 (53,7%) ($p > 0.05$).

Conclusion: Based on obtained results we confirm that physical activity affects onto increasing of mineral density of bones. Physically inactive patients who often consume alcohol have higher risk of reduction of mineral density of bones and possibility of fracture, while physically active patients who practiced exercise at the younger age have better bone mineral density.

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**THE ASSOCIATION OF OSTEOSARCOPENIA, SARCO-
PENIA AND OSTEOPOROSIS WITH WEAKNESS AND
MOBILITY IN OLDER ADULTS WITH CARDI-
OVASCULAR DISEASE: DATA FROM SARCOS STUDY**A. F. Frisoli¹, F. G. M. Martim¹, S. I. Ingham², A. C. C. Carvalho¹, P. H. C. Chaves³¹Federal University of São Paulo - Brazil, São Paulo, Brazil,²Sao Paulo Federal University, Sao Paulo, Brazil, ³Florida International University, Miami, United States

Sarcopenia has been associated with worst physical functions. Recent articles have been demonstrated that muscle and bone present a very intrinsic and heterogeneous interaction. However, to date, it is unclear whether the association of osteoporosis with sarcopenia modifies the association of sarcopenia with physical functions. We hypothesized that the addition of osteoporosis with sarcopenia by Baumgartner, presents higher association with loss of mobility and weakness, than sarcopenia and osteoporosis alone.

Methods: Cross-sectional analyses of data from SARCOS study, an observational study of the epidemiology of Sarcopenia and Osteoporosis in older outpatients from Cardiology Division of Federal University of Sao Paulo-Brazil. All subjects were underwent DXA of total body and bone sites. Sarcopenia was defined by Baumgartner method (appendicular muscle mass/height² <5.45kg/m² women and 7.27kg/m² men). Osteoporosis was diagnosed by WHO criteria. We defined Osteosarcopenia by the presence of Osteoporosis plus Sarcopenia. Osteoporosis and Sarcopenia were analyzed in an isolated way. Loss of Mobility (LM) was diagnosed by the inability to stand 5 times from a chair, by Chair Stand Test Performance. Weakness (W) was established by EWGSOP criteria (Grip strength <20kgf women and <30kgf men). Logistic regression, models adjusted for age and gender. SPSS 17 performed statistical analyses.

Results: In 340 subjects, 57.7% were women with mean age 78.88±7.4 yo and 77.86±6.7 yo for men. Osteosarcopenia occurred in 15.9%, Osteoporosis alone in 20.6% and Sarcopenia alone in 20% of the sample. Subjects with osteosarcopenia presented substantially more W and LM (48.3% and 29.1%), than those with sarcopenia alone (W-22.9% and LM-10%), osteoporosis alone (W-25% and LM-13.2%) or none (W-14.9% and LM-8.1%) (W-*p*<0.001, and LM- *p*=0.001). The presence of osteoporosis in subjects with sarcopenia modified significantly the relationship of sarcopenia with weakness and loss mobility. Specifically, osteosarcopenia showed higher and statistical significant association with W (OR:3.86; 95%CI:1.85-8.06; *p*<0.001) and LM (OR: 3.21, 95%CI: 1.32-7.82; *p*=0.010) compared to

sarcopenia alone (W-OR: 1.74; 95% CI: 0.81-3.73; *p*=0.154, and, LM-OR:1.49; 95%CI: 0.53-4.22; *p*=0.446) or osteoporosis alone (W-OR:1.60; 95%CI: 0.76-3.36; *p*=0.212, and, LM-OR: 1.26; 95% CI: 0.48-3.29; *p*=0.634).

Conclusion: Osteosarcopenia, sarcopenia and osteoporosis alone were prevalent and similar in older adults, however; only osteosarcopenia presented strong and significant association with loss of mobility and weakness.

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**NEUROPATHIC PAIN SYMPTOMS IN PATIENTS
WITH HIP, KNEE OR ANKLE OSTEOARTHRITIS**A. Knežević¹, M. Jeremic Knezevic¹, S. Tomasevic-Todorovic¹, J. Ivacic², D. Simić-Panić¹, K. Boskovic¹¹Faculty of Medicine, University of Novi Sad, Novi Sad, Serbia, ²General Hospital, Senta, Serbia

Objective: The objective of this study was to investigate whether neuropathic pain symptoms are present in patients with osteoarthritis and to investigate the connection between these symptoms, pain duration and pain intensity in these patients.

Material and Methods: This research was designed as a prospective study which included 62 patients with hip, knee, or ankle osteoarthritis (the average age 56.61±13.53 years). The patients were recruited in the period from June 2016 to November 2016. We collected the data of the average pain intensity in the last four weeks on numeric rating scale (NRS). We measured neuropathic component to the pain with the PainDETECT (PD) questionnaire and grouped patients in three groups: group I negative on neuropathic symptoms, group II – unclear and group III positive on neuropathic symptoms. All patients had pain that lasted more than 3 months.

Results: Our sample consisted of 42 women (67.7%), 42 patients with knee osteoarthritis (67.7%), 15 patients with hip osteoarthritis (24.2%) and 5 patients with ankle osteoarthritis (8.1%). The majority of the patients were in group I (31(50%)), 15 (24.2%) were in the group II and 16 (25.8%) patients were in group III; in other words they were positive on neuropathic pain according to PD. The average pain intensity during last four weeks was 6.44±1.63, while the average duration of the pain was 57±64.83. When we compared pain duration with three PD categories, we found that there was a significant difference between pain duration in these groups (group I 27.87±27.02 months vs. group II 87.47±77.79 months vs. group III 84.88±80.45 months; χ^2 (Kruskal Wallis Test)=9.026; *p*=0.011). The average pain intensity on NRS was significantly different between groups (group I 5.97±1.72 vs. group II 6.6±1.18 vs. 7.19±1.56; *F*=3.303, *p*=0.044).

Conclusion: The findings of our study show that neuropathic pain symptoms measured with PD were present in

about one quarter of the patients with chronic hip, knee, or ankle osteoarthritis. Patients in group III had higher average pain intensity during past 4 weeks and their pain lasted significantly longer than in the case of the patients who were negative on neuropathic pain symptoms according to PD. These facts should be considered when planning the treatment for these patients.

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HIP FRACTURE AND RENAL IMPAIRMENT IN HONG KONG: HOW MANY CAN BE SAFELY TREAT WITH BISPHOSPHONATE?

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Introduction: Osteoporosis is a major public health concern. A number of pharmacological options are available for the management of osteoporosis. Bisphosphonates are widely regarded as the drug class of choice for the prevention of fractures in postmenopausal women, and is the first line drug for secondary prevention of osteoporotic fracture after hip fracture in Hong Kong. However, bisphosphonates was contraindicated in patient with creatinine clearance less than 35. As both osteoporosis and renal insufficiency become more prevalent with age, we conduct a study on what is the prevalence of renal impairment in geriatric hip fracture patient to evaluate the percentage of patient that can benefit from bisphosphonate after geriatric hip fracture in Hong Kong.

Methods: We included all geriatric primary hip fracture patients who received surgery admitted to Kowloon West Cluster Orthopaedic Rehabilitation Centre consecutively in one year 2014-2015. Basic demographics and anthropometric measurement were collected. Creatinine clearance (GFR) was calculated with Cockcroft-Gault formula using Creatinine immediate after operation and body weight.

Results: There were 360 patients with mean age 81.6 (SD 7.57). There were 245 female and 115 male. The mean GFR was 41.1 (95% CI 38.6-43.5) for female and was 43.8 (95% CI 40.4-47.2) for male. 45.3% of female and 31.3% of male are within the group of GFR <35ml/min, indicated stage 3 chronic kidney disease.

Discussion: Renal function is known to decline with age and declines at a faster rate after 50 to 60 years of age. Although bisphosphonates are widely prescribed, it was contraindicated in patients with severe renal impairment (CrCl <30 or <35 mL/min). Our study showed there is high prevalence of severe renal impairment in patient with primary geriatric hip fracture. This group of patients is not eligible for the first line treatment

for secondary prevention of hip fracture under current medical system in Hong Kong. Based on these data the drug allocation should be adjust in order to provide acceptable coverage for patients.

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NOVEL INSIGHTS INTO THE CHARACTERISTICS AND IMPACT OF BONE PAIN IN ADULTS WITH FIBROUS DYSPLASIA

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Background: Bone pain is more common in adults with fibrous dysplasia (FD) and variably responsive to bisphosphonate therapy. However, the mechanism of the pain remains unknown. Current research into the aetiology of pain in other rheumatic disorders such as osteoarthritis, indicate in some patients there is a significant neuropathic component. We here describe the proportion of patients with characteristics of neuropathic pain and the impact on other patient reported health outcomes.

Methods: We used data from a UK prospective cohort of patients with rare diseases of bones, joints and vessels (www.rudystudy.org) that includes patients with FD. Participants are recruited via their clinicians, patient groups and social media to facilitate recruitment across the range of disease severity. Participants completed a specific questionnaire for neuropathic pain (painDETECT) as well as other patient reported outcome measures including quality of life (SF-36, EQ-5D-5L), sleep (Pittsburgh Sleep Quality Index) and activities of daily living (Nottingham Activities of Daily Living).

Results: Of the 43 adults with FD, 88% patients reported pain, with 20.9% scoring of $\geq 8/10$ in the last month. Using the painDETECT questionnaire, 18.6% had neuropathic pain and 55.8% had nociceptive pain with 25.6% unclear. Those with neuropathic pain rated their general health as significantly worse on the EQ-5D-5L than those with nociceptive pain ($p < 0.001$). Patients with neuropathic pain reported significantly worse sleep ($p = 0.007$) as well as lower activity of daily living scores ($p = 0.001$).

Conclusions: Almost a fifth of adults with fibrous dysplasia satisfied criteria for neuropathic pain. Having neuropathic pain was associated with lower quality of life, more sleep disturbance, reduced activities of daily living. Assessment of neuropathic pain should be considered for adults with fibrous dysplasia as it may inform different management decisions.

P343**KNEE OSTEOARTHRITIS AND NEUROPATHIC PAIN SYMPTOMS**

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Objective: To determine the frequency of neuropathic pain symptoms in patients with knee osteoarthritis.

Material and Methods: This research was designed as a prospective study which included 100 subjects with knee osteoarthritis (the average age 62.81±11.96 years). The subjects were recruited in the period from March 2016 to December 2016. We collected the data of the present, maximum and average pain intensity in the last four weeks on numeric rating scale (NRS). We measured neuropathic component to the pain with the Douleur Neuropathique with 4 questions (DN4). We divided the patients into two groups according to the results of this instrument; the first having the values of DN4<4 and the second with scores on DN4≥4. All patients had pain that lasted more than 3 months.

Results: There was four times more women than men in our study (80 (80%) vs. 20 (20%)). The majority of patients (68 (68%)) scored less than 4 on DN4. There was no significant difference in age between two groups (62.65±11.91 vs. 63.16±12.24; t=-0.198, p=0.844). When we compared the pain intensity in these two groups we did not find a significant difference for the pain intensity at the moment of the examination (5.75±2.20 vs. 6.28±2.11; t=-1.140, p=0.257). On the other hand we have found significantly higher NRS in the second group for strongest (8.6±1.5 vs. 9.38±0.98; t=-3.083, p=0.003) and average (5.69±1.92 vs. 6.69±1.87; t=-2.441, p=0.016) pain intensity during the last four weeks.

Conclusion: The findings of our study show that neuropathic pain symptoms measured with DN4 were present in about one third of the patients with chronic knee osteoarthritis. Patients in the second group had higher NRS for strongest and average pain intensity during past four weeks. We should keep this in mind when planning the treatment for these patients.

P344**BONE MINERAL DENSITY, FRACTURE RISK AND ASSOCIATED FACTORS IN PATIENTS WITH HYPERURICEMIA**

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Objectives: Fragility fractures are associated with higher morbidity and mortality. The aim of this study was to compare Bone Mineral Density (BMD) and fracture risk (FR) by the Fracture Risk Assessment Tool (FRAX index), between patients with or without hyperuricemia aged 50 years or older and to investigate potential underlying associated factors.

Materials and methods: We conducted a study evaluating BMD and FR in a 123 (54 male, 69 female) group with hyperuricemia (mean age 63,72 years) compared with a 64 patients (27 male, 37 female) control group (mean age 64,56 years). All subjects were Caucasian, above 50 years of age. Patients who presented any cause of secondary osteoporosis, as those who were receiving drugs which affect BMD were excluded. BMD was assessed by dual-energy X-ray absorptiometry (DXA). We obtained anthropometric parameters, habits, personal and family history. FR was evaluated by FRAX index, which was calculated according to interrogatory and femoral neck BMD.

Results: We found that patients with hyperuricemia had higher BMD in all areas: femoral neck T-Score (-0,42 vs. -1,47; p<0,0001) and L1-L4 T-Score (0,13 vs. -0,99; p<0,05). Despite, they had a significant elevated hip FRAX index (2.74 vs. 1.43; p<0,01). In our population the patients without hyperuricemia had more healthy habits including lower alcohol, caffeine and soft drinks consumption, more physical activity, less tobacco consumption. Patients with hyperuricemia had increased abdomen circumference (107,6 vs. 92,32 in the control group), BMI was 31,87 in patients with hyperuricemia and 27,09 in the control group, having a positive correlation between BMI and hip T-Score. BMD did not correlate with glucose control, as measured by glycosylated hemoglobin.

Conclusions: Hyperuricemia is pointed as an independent factor for fragility fractures. Bone fractures in patients with hyperuricemia lead to higher morbidity that worsens quality of life and increases mortality, secondary to cardiovascular conditions. The susceptibility to fractures may be due to worse bone quality and increased risk of fall. We consider it is important to continue working in identifying the causes of this association so as to work on the prevention of hip fractures in these patients.

P345**STRESS FRACTURE IN PATIENT WITH HYPOPHOSPHATEMIC RICKETS**

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Objective: Hypophosphatemic rickets is characterized by renal phosphate loss and normal serum calcium levels. The most

common form of this disease is linked to the X chromosome. Characteristic symptoms include delayed growth, bone pain and skeletal deformities.

Our purpose is to present a case of stress fracture in a patient with this condition and its treatment.

Materials and Methods: We present a 59 years old female with 5 months of right coxalgia. No previous trauma; No history of interest except hypophosphatemic rickets. No acute bone lesions were evidenced on initial X-Ray. TC is performed, which reported subcapital femur fracture, unconsolidated with signs of pseudoarthrosis. We performed osteosynthesis of the fracture. Given the marked coxa vara, with a cervicodiaphyseal angle close to 90°, we used a 95° DCS plate, which was better coupled to the patient's anatomy.

Results: In the immediate postoperative period, no complications were recorded. The patient was allowed to partial weight-bearing with crutches. There was no pain. In control X-Ray, good reduction and adequate adaptation of the plate was appreciated. During admission, the patient was evaluated by Endocrinology unit, which adjusted medical treatment.

Conclusions: The main complication of surgical treatment in these patients is delayed consolidation, which until now can only be resolved by intervening in the metabolism of calcium and phosphorus. These patients with stress or low energy fractures should be subject to multidisciplinary management and the best implant should be decided for each case.

P346

DAIRY INTAKES IN OLDER IRISH ADULTS AND EFFECTS ON VITAMIN MICRONUTRIENT STATUS: DATA FROM THE TUDA STUDY

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Background: Consumption of dairy products has been associated with positive health outcomes including a lower risk of hypertension, improved bone health and a reduction in the risk of type 2 diabetes. The suggested dairy intake for health in older adults is three servings per day but recent analysis of the NHANES data for older adults

reported 98% were not meeting these recommendations. No studies have investigated the consequences of such declines in the dairy intakes of Irish older adults and the subsequent effects on vitamin micronutrient status. Objectives: To study the daily dairy intakes of older Irish adults and to examine how the frequency of dairy food consumption affects vitamin micronutrient status.

Methods: Participants (n 4,317) were from the Trinity Ulster Department of Agriculture (TUDA) Study, a large study of older Irish adults (aged >60 yrs) designed to investigate gene-nutrient interactions in the development of chronic diseases of aging. The daily intake portion for milk, cheese and yoghurt was calculated from food frequency questionnaire (FFQ) responses. Blood samples were analysed for vitamin biomarkers as follows: vitamin B12 (total serum cobalamin and holotranscobalamin (holoTC)), folate (red cell folate (RCF) and serum folate), vitamin B2 (erythrocyte glutathione reductase activation coefficient (EGRac)), vitamin B6 (serum pyridoxal phosphate) and vitamin D (serum 25(OH)D).

Results: The mean total reported dairy intake was 1.16 (SD 0.79) portions per day with males consuming significantly fewer total dairy portions compared to females (1.07 vs. 1.21 respectively) (P80 yrs). Overall, only 3.5% of the total population (n 151) achieved the recommended daily dairy intake of three or more servings per day. A significantly higher proportion of females (4%) compared to males (2.4%) met these dairy requirements (P=0.011). Blood concentrations of vitamin B12 biomarkers, RCF, vitamin B2 and vitamin B6 were significantly worse in those with the lowest tertile of dairy intake (0-0.71 servings) compared to those in the highest tertile (1.50-4.50 servings) (P<0.05).

Conclusion: This study found that more than 96% of the older adults sampled did not meet current daily dairy intake recommendations. The study is the largest to-date examining dairy intakes in older Irish adults, and provides evidence that daily dairy intakes (in particular yogurt) contribute significantly to the B-vitamin and vitamin D biomarker status of older adults. These results suggest that older adults who are already vulnerable to micronutrient inadequacies, are forgoing the nutritional advantages of vitamin-rich dairy products.

P347

COMPLIANCE WITH AND ACCEPTANCE OF TERIPARATIDE INJECTION IN SEVERELY OSTEOPOROTIC PATIENTS

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Objectives:

- to evaluate patients compliance with the use of the Teriparatide injection;

- to obtain additional safety data that will supplement the existing safety profile;
- to investigate the possible causes of therapy discontinuation.

Material and Methods: This is a single-center, prospective, cohort study over 30 months (from April 2014 to October 2016) in King Faisal Medical Complex in Taif which is a referral hospital that receive referrals from eight surrounding rural communities around Taif city with a collective population of about 800,000 citizen.

All patients included in the study had been started on teriparatide because they had been diagnosed with osteoporosis. These patients were stratified into two groups

1. First group included 382 patients with osteoporosis (BMD -2.5). Of these, 70 were male (15.3%) and 312 were female (84.6%). They also suffered from fragility fracture either vertebral or non-vertebral.
2. Second group included 112 patients with severe osteoporosis (BMD -3.5). Of these, 14 were male (15.3%) and 98 were female (84.6%). They did not suffer from any fractures

All patients were covered by medical insurance, and received education regarding compliance with Teriparatide injection treatment. Compliance was defined by administration of the drug up to 12 months, and was recorded during their follow up at 3, 6 and 12 months. Data were collected using a questionnaire that was provided to the patients during their follow up visits. Exclusion criteria: High serum calcium levels, High serum alkaline phosphatase and high parathyroid hormone levels in the blood or other secondary causes of osteoporosis.

Results: 89% of patients in the first group (with fractures) were compliant while only 76% in second group (without fractures) were non-compliant. Causes of non-compliant varied from confusion 11 (2.2%); nausea, 9 (1.8%); back spasms 12 (2.4%); muscle cramps 14 (2.8%) and nonspecific cause 24 (4.9%). Site of injection pain and daily injection were improved as patient proceed with the use of the medications

Conclusion: Teriparatide injection was well tolerated and showed higher compliance in the group with fragility fractures compared with the group without fractures.

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THE CONTRIBUTION OF THE PALMARIS LONGUS MUSCLE TO THE STRENGTH OF WRIST FLEXION AND EXTENSION

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Objective: To compare the strength of wrist flexion and extension in healthy volunteers to individuals with and without Palmaris longus muscle (PLM).

Methods: Seventy healthy subjects between the ages of 18 and 22 years, volunteering to take part were included into this trial. The Institutional Review Board approved the study procedures. The inclusion criteria were as follows: sedentary lifestyle, unknown musculoskeletal disorders and right-handedness. The exclusion criteria included the previous history of any fracture or deformity in the forearm, any limitation in the range of motion of the wrist and any known peripheral nerve injuries. Musculoskeletal ultrasound imaging (MUS) was used to assess the presence of PLM. The examination was performed by an experienced physiatrist and radiologist. The elbow flexion and extension strength was measured by an independent physician blinded to MUS results. A hand-held digital dynamometer was used to assess the peak force of wrist extension and flexion.

Results: Seventy individuals participated into the study, six of whom were excluded according to criteria, and complete results were obtained from the 128 wrists of 64 participants (30 men and 34 women). The presence of PLM according to gender and lateralization is summarized in Table 1. For the male group, the muscle strength of wrist flexion for the right side was 36.03±13.92 N, while it was 34.24±12.23 N for the left side. There was no significant statistical difference between both groups with and without PLM ($p>0.05$). For the female group, the muscle strengths of wrist flexion for the right and left sides were 16.20±7.29 N and 15.26±6.79 N, respectively. There was no significant statistical difference between two groups with and without PLM ($p>0.05$). Also, there was no significant difference in agonist/antagonist ratio of the wrist between two groups with and without PLM as to both genders and sides (Table 2).

Conclusion: Based on the results of this study, although PLM is a fusiform-shaped muscle arranged in superficial flexor compartment of the forearm, it has no significant effect on the wrist flexion or extension strengths.

P349

CORRELATION OF DISTAL RADIUS BONE DENSITY WITH FRACTURE RISK DETERMINED BY WHO FRACTURE RISK ASSESSMENT MODEL (FRAX)

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Bone mineral density (BMD) evaluation by dual-energy x-ray absorptiometry (DXA) is a mainstay of osteoporosis diagnosis. Lumbar spine and hip are compulsory, while distal radius (DR) DXA is optional. Yet, most fractures occur among patients with osteopenia. To overcome this gap, FRAX was developed. It combines clinical risk factors with BMD and calculates fracture probability. The implementation of FRAX was meant to improve decision making but the model is underused. Occasionally, an osteoporosis is observed only at the DR, resulting in a misdiagnosis when only hip and spine scans are performed. Its incorporation into BMD measurements may guide the physician to initiate pharmacotherapy for fracture prevention.

Objective: To analyze the predictive value of DR BMD and its correlation with FRAX score.

Methods: Patients undergoing routine BMD measurements were enrolled. Spine, hip and DR were measured. The patients completed a questionnaire regarding risk factors relevant to the FRAX. The FRAX scores for hip and major osteoporotic fractures (MOF) were calculated. Correlation of DR bone density with FRAX scores was tested.

Results: 208 patients (27% men) were included (mean age 66+11 years). Hip fracture and MOF FRAX scores correlated with DR bone density with Pearson coefficients -0.46 and -0.51, respectively. FRAX hip scores in the lowest vs. the highest quartile of DR BMD were 7.7+6.7 and 2.0+3.6, respectively ($p < 0.01$). In a subgroup of patients with osteopenia of the spine or hip and osteoporosis in DR, mean FRAX score for hip fracture was 6.9%.

Conclusions: DR bone density correlates well with FRAX osteoporotic fracture risk. In a subgroup of osteopenic patients by traditional measurements and osteoporotic by DR scan the FRAX score for hip fractures was impressively high. This subgroup may benefit from DR measurement thus increasing the likelihood of referring physicians to prescribe and the regulatory body to approve an anti-osteoporosis medication. These results are especially important in view of the decline trend in osteoporosis treatment.

P350

DECREASE BONE DENSITY IN RHEUMATOID ARTHRITIS PATIENTS; DATA FROM RHEUMATOID ARTHRITIS REGISTRY IN QATAR

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Background: Decrease bone density has been observed in Rheumatoid arthritis (RA) patients. Chronic inflammatory stat, immobility and steroid use are important factors, which contribute to bone loss in RA patients.

We study the pattern of bone loss (osteoporosis and osteopenia) in our RA cohort of patients.

Data was taken from RA registry in QATAR. All patients fulfilling 2010 ACR/EULAR criteria for RA were included from period of June 2013 to November 2015.

Objective: To describe pattern of bone loss (osteoporosis and osteopenia) in patients with RA living in Qatar.

Methods: All those rheumatoid arthritis patients from registry, who underwent DXA scan for estimation of bone mineral density, were included in this observational study. Patients were categorized according to value of T score at L1-L4 vertebral, femoral neck and total femur. (T-score less than -2.5 at any of the above site were categorized as osteoporosis and between -1 and -2.5 as osteopenia).

Results: Data of 276 patients were analyzed who had DXA scan; 79.7% female, 55.1% Arabs, 73.6% were rheumatoid factor positive, 77.5% anti CCP positive and 33.7% have erosive disease. Mean age of the patients was 51.9+11.8; 55.8% of patients were above the age of 50. Decrease bone density was observed in 48.6% of the patients. Osteoporosis was present in 11.6% (1.6% younger than 50, 9.8% older than 50) and osteopenia in 37% (11.6% younger than 50, 25.4% older than 50). In patients younger than 50 years of age 32% were having osteopenia and 4% were having osteoporosis. Around 26.8% patients were receiving medication for prevention of fracture (18.8% alendronate, 6.9% zoledronic acid, 0.7% Teriparatide, 0.4% denosumab). Concomitant steroid was used in 34.1% of patients. Fourteen patients (5.1%) had fragility fracture. Steroid use was significantly associated with osteoporosis, osteopenia and fracture.

Conclusion: Bone density was decreased in almost half of our RA cohort patients, which is observed in both groups of patients (younger and older than 50 years of age).

Steroid use is significantly associated with decrease bone density.

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OSTEOSARCOPENIA IS MORE ASSOCIATED WITH DISABILITY COMPARED TO SARCOPENIA OR OSTEOPOROSIS ALONE, IN OLDER ADULTS WITH CARDIOVASCULAR DISEASE: DATA FROM SARCOS STUDY

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Objective: Disability is associated with higher hospitalization and mortality. Loss of muscle mass and muscle function has been identified like etiology factors of disability. Osteoporosis is an important risk factor for fractures, and consequently

disability. However, it is unclear, whether the association of osteoporosis with sarcopenia modify the functional status, compared to sarcopenia alone. We hypothesized that the addition of osteoporosis with sarcopenia, by Baumgartner, presents higher association with disability, than sarcopenia and osteoporosis alone.

Methods: Cross-sectional analyses of data from SARCOS study, an observational study of the epidemiology of Sarcopenia and Osteoporosis in older outpatients from Cardiology Division of Federal University of Sao Paulo-Brazil. All subjects were underwent DXA of total body and bone sites. Sarcopenia was defined by Baumgartner method (appendicular muscle mass/height² <5,45kg/m² women and 7,27kg/m² men). Osteoporosis was diagnosed by WHO criteria. We defined Osteosarcopenia by the presence of Osteoporosis plus Sarcopenia. Osteoporosis and Sarcopenia were analyzed in an isolated way. Disability was defined when the subjects presented score of IADL <24 and or ADL<5. Logistic regression, models adjusted for age, previous fracture and gender. SPSS 17 performed statistical analyses.

Results: In 342 subjects, 56.14% were women with mean age 78.88±7.4 yo and 77.86±6.7 yo for men. Osteosarcopenia occurred in 16.1% (n=55), Sarcopenia alone in 20.5%(n=70) and Osteoporosis alone in 19.9%(n=68) of the sample. Among subjects with osteosarcopenia, 67.3% (n=37) presented disability, compared to 44.3% (n=31) in sarcopenia group and 47.1%(n=32) osteoporosis group. The presence of osteoporosis in subjects with sarcopenia modified significantly the relationship of sarcopenia with disability. Specifically, osteosarcopenia showed higher and statistical significant association with disability (OR: 2.86; 95%CI 1.42-5.75; p=0.003) compared to sarcopenia alone (OR: 1.69 95% CI: 0.90-3.17; 0.105) and osteoporosis alone (OR: 1.31, 95% CI: 0.70-2.45; 0.383).

Conclusion: Disability was very prevalent in older adults with osteosarcopenia, sarcopenia and osteoporosis alone, however; only osteosarcopenia presented a strong and significant association with disability.

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EFFECTIVENESS OF THE INTRA-ARTICULAR INJECTION OF PLATELET RICH PLASMA VS. HYALURONIC ACID IN THE TREATMENT OF PATIENTS WITH PRIMARY KNEE OSTEO-ARTHRITIS: A COMPARATIVE STUDY

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Background: Osteoarthritis (OA) is a common and debilitating condition associated with pain and the loss of mobility that

undermines quality of life. New options are currently being proposed to treat earlier stages. Among these, platelet-rich plasma (PRP), has been introduced into clinical practice as a minimally invasive solution to improve the status of the joint surface.

Purpose: The purpose of this study was to compare the effectiveness of intra-articular injection of platelet rich plasma and hyaluronic acid in patients with primary knee osteoarthritis.

Methods: This study was carried out on sixty patients of primary knee osteoarthritis with Grade 1, 2, or 3 osteoarthritis according to the Kellgren-Lawrence grading scale. In the PRP group (n=30), three weekly intra-articular injection of PRP was applied and in the HA group (n=30), three weekly doses of intra-articular injection of HA were applied. Patients were evaluated at baseline and then at 3 and 6 months of follow-up using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), visual pain scale.(VAS) and Doppler ultrasonography of the injected knees.

Results: Eight patients developed pain and mild swelling after PRP injection, while no major complications were observed. Statistically significant better results were observed in the WOMAC and VAS scores in PRP and HA group at 3 and 6 months: at the PRP group the WOMAC score improved from 35.13±7.75 to 16.67±11.69, VAS score improved from 5.87 ±1.30 to 2.91±2.14 at 6 months, in the HA group the WOMAC score improved from 39.07±9.12 to 23.1±7.07 and VAS score improved from 6.1±1.09 to 4.1±1.12 at 6 months. A significant improvement in Doppler activity (p=0.04) was observed in PRP while there is no improvement were observed in HA group. The comparative analysis of the 2 treatments showed statistically significant better results in PRP group than in HA group according previous scales.

Conclusion: The results of this study have shown that the administration of PRP in OA treatment is a cheap and effective method which was more effective than HA injection in reducing pain and providing better functional results especially in younger patients and mild to moderate degrees of knee OA.

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INCIDENCE, RISK FACTORS AND FRACTURE HEALING OF ATYPICAL FEMORAL FRACTURES IN POSTMENAUPOSAI WOMEN: A MUTICENTER CASE CONTROL STUDY

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Objectives: To determine the incidence and risk factors of atypical femoral fracture (AFF) in menopausal women, we performed a multicenter retrospective case-control study. We also investigated the effect of bisphosphonate (BP) use on fracture healing of AFF.

Material and Methods: We retrospectively reviewed the medical records and radiographs of 6,644 patients who experienced a hip or femoral fracture at 8 tertiary referral hospitals from January 2010 to December 2014. Of these, 290 females over 50 years of age who had a low-energy trauma, subtrochanteric or femoral shaft fractures without underlying disease were identified. All the radiographs were reviewed to distinguish AFF from typical femoral fracture (TFF). An AFF was defined by the 2013 American Society of Bone and Mineral Research Task Force criteria. Univariate and multivariate logistic regression analyses were performed to identify risk factors for AFF, and subgroup analyses were performed according to the fracture site and BP use. The effect of BP use on fracture healing of AFF was also assessed.

Results: Among 6,644 patients, 196 had an AFF (58 subtrochanteric and 73 femoral shaft AFFs). The incidence of AFF was 3.05% of 6,644 patients and 3.93% in female patients over 50 years old. Of the 196 AFFs, 131 patients (66.8%) were exposed to BP with a mean duration of 5.7 years. For patients who have been exposed BPs, increased cortical thickness at the thickest lateral cortex of femur was associated with the development of AFFs ($p=0.0319$). And AFFs with increased coronal femoral curvature tended to occur more at the femoral shaft site ($p=0.0134$). Subgroup analysis showed that BP users were less likely to achieve bone union without problems ($p=0.0059$).

Conclusions: This study provided important evidence for previous claims that BP is highly related to the development of AFF. We demonstrated that increased femoral cortical thickness and increased coronal femoral curvature is risk factors for AFF. We also found that BP use delayed the fracture healing of AFFs regardless of the duration.

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EFFECT OF OSTEOPOROSIS MEDICATIONS ON REFRACTURE AND MORTALITY FOLLOWING HIP FRACTURE SURGERY IN POSTMENOPAUSAL WOMEN: A PROSPECTIVE RANDOMIZED TRIAL
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Objective: We conducted a prospective, open label, randomized trial to report the effect of osteoporosis medications with re-fracture and mortality in postmenopausal women who had experienced a hip fracture.

Materials and Methods: A total of 1165 women 50 or older with acute, first-time, and lower-energy trauma hip fracture were contacted, 494 consented to screening, and 281 received osteoporosis medication. They were randomly assigned to receive 17 β -estradiol gel 1.5g daily (Estrogen group, n=140) or risedronate 35mg weekly (Risedronate group, n=141). We also used 134 patients eligible for the study who refused to give informed consent for randomization (eligible refusers) as control group. The primary outcome was new clinical fracture, and the secondary outcome was mortality.

Results: The overall new clinical fracture rate was 14.2% (40/281). There were no significant differences in the rate of new clinical fracture among all the three groups (Estrogen group; 12.8%, Risedronate group; 15.6%, Control group; 11.2%, $p=0.234$). The overall mortality rate was 13.5% (38/281). Although mortality rates were similar between the two medications in the study group, the randomized patient group showed significantly lower mortality than the eligible refuser group (Estrogen group; 11.4%, Risedronate group; 15.6%, Control group; 34.3%, $p=0.017$).

Conclusions: Although no significant differences were found in new clinical fracture rates among the three groups, this prospective study demonstrated the use of estrogen as well as bisphosphonate reduced mortality rate following hip fracture surgery in postmenopausal women.

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PREPATELLAR SUBCUTANEOUS CALCIFICATIONS IN SCLERODERMA

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16-year-old girl with limited cutaneous systemic sclerosis (lcSSC) presented with painful hard cutaneous calcified plaques over the extensor surface of the right knees more prominent in right knee. She had been diagnosed as having lcSSC 3 years previously on the basis of calcinosis, Raynaud phenomenon, sclerodactyly, telangiectases, and positive anti-nuclear antibodies with a centromere pattern. Lateral view of the right-knee x-ray demonstrated subcutaneous calcifications anterior to the patella and also calcification of the patellar tendon. (Figure 1)

These radiological findings were consistent with prepatellar bursitis as a result of the lcSSC.

Figure 2: Skin hyperpigmentation and ulceration over the patella.



Subcutaneous calcinosis, composed of deposits of calcium hydroxyapatite, occurs in about 25% of patients with longstanding limited scleroderma, particularly in patients with anticentromere antibodies, and less frequently in diffuse disease.

Sites of repeated microtrauma such as fingers, forearms, olecranon, and prepatellar bursae are the most typical locations. These calcifications may ulcerate, become infected, resemble an infectious process, extrude calcified material, or remain subcutaneous causing, rarely, recurrent local inflammation due to the release of calcium hydroxyapatite crystals into the surrounding tissue. There is no standard pharmacological treatment for calcifications in scleroderma. Various drugs have been reported with variable success including warfarin, colchicine, probenecid, bisphosphonates, diltiazem, intralesional corticosteroids, and minocycline. Our patient had purulent discharge from skin ulcer over the calcification, so we started antibiotic for treatment of skin infection, along with intravenous pamidronate 60 mg. This treatment resulted in significant improvement after one week, and we planned to repeat pamidronate 3 months later.

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ASSOCIATION OF THE BALTIC SEA AND MEDITERRANEAN DIETS WITH INDICES OF SARCOPENIA IN ELDERLY WOMEN

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Objective: To evaluate the associations of Baltic Sea diet (BSD) and Mediterranean diet (MED) with sarcopenia indices in elderly women.

Methods: In total 554 women, (age 65–72 years) belonging to Kuopio osteoporosis risk factor and prevention (OSTPRE) study filled a questionnaire on lifestyle factors and 3-day food record at the baseline. The positive components of BSD (fruits and berries, vegetables, fiber from cereal products, fish, low-fat milk, and ratio of polyunsaturated fatty acids (PUFA) to saturated FA) received score 0 for lowest quartile and 3 for the highest quartile; for negative components (sausage and total fat intake (E%)) the order was reversed. For each MED score positive component (legumes, nuts and vegetables (potato excluded), fruits, cereals and potatoes, fish, ratio of PUFA+ monounsaturated FA: saturated FA, and moderate alcohol intake of 5 to 25 g/d) a value of 1 was given if a persons' intake was \geq median, and otherwise 0 was given; two negative components were dairy products, and total meat (including sausage and eggs). Participants underwent full body composition dual-energy X-ray absorptiometry, walking speed 10 m, and squat tests at the baseline and 3 years after. Relative skeletal muscle index (RSMI) was calculated as skeletal muscle in arms and legs divided by the square of height (m^2). Short physical performance battery (SPPB) score and sarcopenia were defined per European working

group on sarcopenia criteria. Leg muscle quality (LMQ) was calculated as walking speed 10m/s divided by leg muscle mass.

Results: Women in the higher quartiles of BSD and MED scores lost less RSMI and total body muscle mass (MM) over 3-year follow-up ($P_{trend} \leq 0.034$). At the baseline, women in the higher BSD score quartiles had greater MM, faster walking speed 10m, greater LMQ, higher SPPB score ($P_{trend} \leq 0.034$), and lower proportion of squat test failures. Similarly, women in the higher quartiles of MED score had significantly faster walking speed 10m, greater LMQ ($P_{trend} \leq 0.041$) and higher proportion of squat test completion.

Conclusions: Higher BSD and MED scores as indicator of a healthy diet might reduce the risk of sarcopenia in elderly women.

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RELATIONSHIP BETWEEN THE INTENSITY OF MUSCULOSKELETAL PAIN SYNDROME AND NEUROTIC DISORDERS IN PATIENTS WITH FIBROMYALGIA

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Objective: To study the relationship of musculoskeletal pain syndrome and neurotic disorders in patients with fibromyalgia (FM).

Materials and methods: We observed 100 women with primary fibromyalgia. The average age of the subjects was 43,85 ±0,79 years, and the mean duration of the disease was 7,23 ±0,47 years. The diagnosis of the disease was set in accordance to the criteria proposed by the American College of Rheumatology (1990). The neurotic symptoms were assessed using the “Level of Neuroticism and Psychopathy” scale (Dmitrieva LL, 1990), pain intensity was determined using a visual analog scale (VAS). The diagnosis was established according to the American Rheumatism Association diagnostic criteria (1987). Moderate, recurring muscle pain was observed in 57 patients, resulting in an average score of 4,97±0,31; strong, almost constant muscular pain was seen in 43 patients, accounting for 8,84±0,27 points.

Results: The scores obtained for intensity of pain was 7,20 ±0,14, that of fatigue - 7,14±0,14, stiffness - 4,8±0,23, headaches - 6,82±0,23, and the number of diagnostic painful points, came averaging at a score of 14, 27±0,25. The average scores for neurotic disorders in patients with FM were

compiled up to, depression - 6,46±0,15, anxiety - 6,8±0,98, asthenia - 6,72±0,17 and hypochondria - 5,53±0, 18. According to the data obtained from correlation analysis, musculoskeletal pain and the number of painful points in patients with FM were directly related to depression, fatigue, and hypochondria ($p < 0.05$). Fatigue and stiffness were found to have a direct correlation with asthenia ($p < 0.05$). When the duration of musculoskeletal pain is <5 years, anxiety was notably seen to be higher (7,06±0,6 points, $p < 0.01$). There was a significant correlation with depression ($r = -0.34$ $p = 0.021$; 7.45±0.38), asthenia ($r = 0.38$ $p = 0.01$; 7.71±0.38) and hypochondriasis ($r = 0.65$ $p = 0.005$; 6.52±0.49), when the duration of pain is > 10 years ($p < 0.05$). The age of patients with FM, is a strong factor that was directly correlated with the levels of depression ($r = 0.3$ $p = 0.03$) and anxiety ($r = 0.57$ $p = 0.019$) in the subjects.

Results discussion: The results of this study enable us to point out at the fact that there is the existence of a correlation between the major clinical manifestations of FM and neurotic symptoms, which are part of its clinical picture. Pain felt in the body is a significant source of stress that contributes to an accelerated cascade of actions to eliminate that particular source of danger (pain). The emotional equivalent of such a reaction constitutes to a state of anxiety. A prolonged state of exposure to chronic pain syndrome contributes to the development of asthenic and depressive disorders, increased pain, and insomnia, which all eventually results in the formation of a vicious circle system. The duration of the disease in FM patients may also have a particular role in the development of neurotic disorders.

Conclusion: The presence of the identified psychological particulars may well be of a hinder to the efficacy of therapeutic and rehabilitation measures undertaken. Effective treatment of FM patients comprises in, making the patients actively take part in the process of the therapy, bringing changes in their overall attitudes and their lifestyle, and hence it is possible to make recommendations to courses of certain kinds of psychotherapeutic care, such as group and behavioral therapy.

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LOW VITAMIN D LINKED TO HIGH-DENSITY LIPOPROTEIN AND BONE LOSS IN POSTMENOPAUSAL WOMEN

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Objective: The aim of the present paper was to review the most important mechanisms explaining the negative association of high-density lipoprotein levels and bone status in postmenopausal women.

Material and methods: A total of 488 postmenopausal women participated in this cross-sectional study who did not use osteoporosis medications and did not have any chronic disorder. Dual X-ray absorptiometry (DXA) densitometer (Lunar 7164) was used to assess bone mineral density (BMD) of three skeletal sites (total hip, femoral-neck, and lumbar spine (L2-L4)). Each person was categorized based on the WHO osteoporosis criteria; osteoporosis (T score \leq -2.5), osteopenia (-2.5 < T score < -1) and normal (T score \geq -1) in at least one skeletal site. Lipid profile and vitamin D levels were measured in all subjects. Vitamin D deficiency or insufficiency was defined as a 25(OH)D level less than 30 ng/mL.

Results: Among all subjects, 27.9% had osteoporosis. Osteoporotic subjects were tended to be older with a higher serum high-density lipoprotein (HDL) levels ($p < 0.001$). There were not significant differences in low-density lipoprotein, triglyceride and total cholesterol levels among subjects with osteoporosis, osteopenia, and normal subjects ($p > 0.05$). In univariate model, after adjusting for age, menopause age, obesity and taking lipid-lowering drugs, there were significant negative associations between HDL levels and BMD values and T-score at the three skeletal sites ($p < 0.004$). Interestingly after classification subjects based on vitamin D levels; only in subjects with vitamin D deficiency or insufficiency, there were significant negative associations between HDL levels and BMD values and T-score at the three skeletal sites, which remained after adjustment for confounding factors ($p < 0.008$).

Conclusion: As vitamin D status is an important mechanism for bone health, our results may explain, in part, the puzzle of the association between HDL levels and bone loss by low levels of vitamin D.

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VITAMIN D STATUS AND ASSOCIATED FACTORS AMONG PORTUGUESE OLDER ADULTS: RESULTS FROM THE NUTRITION UP 65 STUDY

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Objectives: To evaluate vitamin D status in Portuguese older adults from the Nutrition UP 65 study and its associated factors.

Material and Methods: The Nutrition UP 65 study was a cross-sectional observational study conducted in a nationwide cluster sample of 1 500 Portuguese subjects, ≥ 65 years old. Participants were classified as presenting normal vitamin D levels (≥ 50.0 nmol/L), at risk of inadequacy (30.0-49.9 nmol/L) or at risk of deficiency (< 30 nmol/L) [1]. The association between individuals' characteristics and vitamin D levels was analyzed through multinomial logistic regression (model A) and multivariable linear regression (Model B) analysis.

Results: Median Vitamin D plasmatic value was 36.1 (IQR: 35.5) nmol/l, 39.6% of participants were at risk of vitamin D deficiency and 29.4% were at risk of vitamin D inadequacy. In the adjusted Model A having higher skin pigmentation and waist circumference ≥ 88 cm for women (W) and ≥ 102 cm for men (M) were associated with being at risk of vitamin D deficiency. Otherwise, living in Madeira, 1-12 years of schooling, married or in a common-law marriage, monthly income ≥ 1000 €, alcohol consumption, medication or vitamin D supplement use, blood samples collected in Spring or Summer were associated with lower odds of being at risk of vitamin D deficiency. In this model, season of blood sample collection, use of medication or supplements with vitamin D and waist circumference were the factors more strongly associated with vitamin D levels. In Model B, living in the Lisbon area, 5-12 years of education, married or in a common law marriage, monthly income ≥ 1000 €, alcohol consumption, medication or vitamin D supplement use and blood samples collected in Spring or Summer were positively associated with vitamin D levels, whereas being institutionalized, low levels of physical activity and a waist circumference ≥ 88 cm for W and ≥ 102 cm for M were negatively associated with vitamin D levels.

Conclusions: A high proportion of Portuguese older adults are at risk of vitamin D inadequacy or deficiency warranting the implementation of corrective measures.

[1] - Institute of Medicine, Food and Nutrition Board. DRI for Calcium and Vitamin D. National Academy Press, 2010.

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GIANT CELL TUMOR: RESULTS AFTER SURGICAL TREATMENT

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Introduction: Giant cell is a tumor that appears in young adults, requiring surgical treatment due to its

metastatic capacity, but the recurrence rates makes no consensus about therapeutic management.

Methods: 23 patients were operated between 1996-2012 at Miguel Servet hospital, performing a mean of 8.9 years follow-up.

Results: The functional result was satisfactory in all cases, being able to perform normal physical activity. Six recurrences were detected, which required surgical treatment, showing complete recovery at the end of the follow-up. One patient died by pulmonary metastasis.

Conclusion: Surgery is the most appropriate treatment in giant cell tumors, having shown good results both in the treatment of primary tumor and recurrences.

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PROFILE OF OSTEOARTHRITIC PATIENTS UNDERGOING TOTAL HIP AND KNEE ARTHROPLASTY.

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Objective: The objective of this study is to characterize, based on clinical, radiographic, health-related quality of life and demographic variables, the profile of a large, homogeneous cohort of osteoarthritic patients undergoing TKA or THA, in a public (academic) hospital.

Methods: 626 consecutive patients who underwent primary total knee arthroplasty (TKA) or total hip arthroplasty (THA) between December 2008 and February 2013, in an academic hospital, and who were diagnosed with hip or knee osteoarthritis (OA) (ACR criteria). Data collected at baseline included demographic and clinical data; Kellgren-Lawrence (KL) radiological grading; Western Ontario and Mc Master Universities Arthritis Index (WOMAC); EuroQol five dimensions questionnaire (EQ-5D) and EuroQol visual analogue scale (EQ-VAS); 36-item Short Form Health Survey (SF-36).

Results: 346 subjects were diagnosed with hip OA and 280 with knee OA. Significant differences between subjects in need of a THA or of a TKA were seen in terms of age, duration of complaints, BMI, radiological status, comorbidities, traumatic of surgical history, health-related quality of life (HRQoL) and function.

Conclusion: Significant differences were observed between patients undergoing TKA and THA. Better characterization of the “need for surgery” in lower limbs osteoarthritis may lead to a new definition of responders and failures to pharmacological treatment of OA.

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MICROARCHITECTURE AND BONE MINERAL DENSITY IN FEMURS AND MAXILLAE OF OVARIECTOMIZED RATS SUBJECTED OR NOT TO TREATMENT WITH BISPHOSPHONATE OR A CATHEPSIN K INHIBITOR

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Objective: The aim of the present study was to evaluate the microarchitecture and bone mineral density (BMD) in femurs and maxillae of ovariectomized rats subjected or not to treatment with bisphosphonate or a cathepsin K inhibitor to prevent osteoporosis.

Material and Methods: Twenty rats, approximately 12 weeks of age, were randomly divided into 4 groups: SHAM, animals subjected to sham surgery; OVX, animals subjected to ovariectomy; and OVX/BF and OVX/CK, animals subjected to ovariectomy and treatment with bisphosphonate and cathepsin K inhibitor, respectively, starting 1 day after surgery and administered via gavage. After 12 weeks, the animals were euthanized, and the femurs and maxillae were removed and analyzed by microcomputed tomography (micro-CT) for analysis of bone microarchitecture and BMD. The results were submitted to statistical analysis, with significance level of 5%.

Results: OVX decreased the BMD of the maxilla and altered femoral microarchitecture ($p < 0.05$). The administration of the drugs increased the BMD of both bones, but only bisphosphonate was able to reestablish the phenotypes ($p < 0.05$). The action of the drugs was limited to the femoral Tb.Sp parameter, but only bisphosphonate was able to reestablish the phenotype ($p < 0.05$). In addition, the OVX and the drugs showed no effect on the microarchitecture of the maxilla ($p > 0.05$).

Conclusions: The OVX-induced reduction of estrogen levels was able to decrease the BMD of the femur and maxilla and altered the microarchitecture of the femur. It was thus inferred that long bone responds more rapidly to the effects of estrogen deficiency than the maxilla. The treatment with bisphosphonate or cathepsin K inhibitor increased the BMD of the evaluated bones, but only bisphosphonate was able to reestablish the phenotype.

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HYALURONIC ACID INTRAARTICULAR TREATMENT: A BIBLIOMETRIC ANALYSISV. Lopez-Fernandez¹¹Universidad de Santiago de Compostela, Facultad de Medicina, Santiago de Compostela, Spain

Objective: To perform a Bibliometric Analysis for the quantitative study of publications on the use of hyaluronic acid (HA) as an intraarticular treatment for different pathologies.

Material and methods: The study is based on a PubMed search for articles that investigated the use of HA between 2000 and 2016. The keywords were "hyaluronic acid", "intraarticular" and "treatment". Of the 180 publications found, 162 articles met the inclusion criteria. We examined whether the study was: a) a review; B) in humans, animals or both; C) clinical, histological, arthroscopic, biochemical or genetic; D) if the study examined the synovial fluid; And e) whether hyaluronic acid might be helpful, it was not recommended, had adverse effects or if there were any doubts / more studies were needed.

Results: More than 72% of the 162 studies were in humans, approximately 25% in experimental animals and only 2.5% in both. Of the humans, approximately 75% estimated only the clinical efficacy of HA, almost 10% analysed the synovial fluid and the remaining 17 evaluated the cartilage and the synovial membrane by imaging test, histology, arthroscopy or genetics. Regarding animal studies, around 50% were based only on the histology, 39% determined the biochemical response and the 5 studies left were clinical, arthroscopic or used imaging techniques or synovial fluid analysis. Having found 24 reviews, a high percentage (more than 70%) of the total of 162 articles recommended the use of intraarticular HA, while 12.34% discouraged or referred to the appearance of inflammatory, granulomatous, or infectious arthritis. 1.85% focused on minor adverse effects and 11.11% said that further studies were needed.

Conclusion: According to recent literature, HA may be useful for some joint diseases, but at the same time may have some adverse effects that must be taken into account. Making a final recommendation for or against intraarticular HA treatment remains a challenge today.

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HEALING OF RECURRENT OSTEOPOROTIC FRACTURES IN CHILDREN AND ADOLESCENTS DEPENDING ON THE METHOD OF TREATMENTV. S. Strukov¹, A. K. Kislov², D. E. Elistratov³, O. J. Jones⁴, J. Z. Zherbakova², T. K. Kuptsova²

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Increased incidence of osteoporotic bone fractures is noted worldwide, even in children and adolescents. Thus, there is currently a high level of interest for new treatment approaches.

Objective: Determination of rate of fibrocartilage callus formation after bone fractures depending on the treatment method.

Patients and methods: 58 patients, between the ages of 9-17 years old, with recurrent long bones fractures with bone mineral density (BMD) less than -2.0, were examined. Depending on the treatment method, patients were divided into 2 groups: group one (30 patients) received preparation №1 (calcium citrate 500 mg, vitamin D3 500 IU, drone brood 100 mg per tablet) – 1 tablet 2 times per day during 12 months. Group two (28 patients) received preparation №2 (calcium carbonate 500 mg, vitamin D3 500 IU per tablet, without drone brood) by the same procedure. All patients had blood and urine tests of total calcium, phosphorus, alkaline phosphatase, and 25(OH)D levels. DXA and bone radiography were done prior to the application of plaster and in dynamics.

Results and discussion. 21 of the patients suffered 2 fractures of long bones (35±6%), 15 patients (26±6%) – 3 fractures, 14 patients (24±6%) – 4 fractures, the rest 8 patients (15±4%) – 5 fractures. Blood chemistry showed a moderate decrease of total calcium and phosphorus levels in 29 patients (50±6%). 38 of the patients (66±6%) had low serum 25(OH)D (from 29 to 10 ng/ml). Efficiency of the treatment was evaluated according to the rate of fibrocartilage callus formation and the increase of BMD during 3-7 weeks after the fracture. In group one, consolidation of the fractures was observed on average from the 4th week. After 10 months, BMD increased from -2.8±0.2 CO to -1.7±0.15 CO (p<0.005) that is important for prevention of subsequent fractures. In group two, consolidation of fractures was observed from the 5th week. Increase of BMD was with less certainty, from -2.9±0.3 to -2.1±0.6 CO, p>0.05. In group one, consolidation of fractures occurred 7 days earlier than group two. The patients of the group one could start their rehabilitation in just 3 weeks after the fracture.

Conclusion: The preparation №1 showed stronger stimulant effect on fibrocartilage callus formation and recovery of BMD. It is explained by the successful combination of anabolic and osteoprotective effects of drone brood hormones, vitamin D, and calcium citrate.

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VALIDATION OF GARVAN SCALE IN A SPANISH POPULATIONM. Sosa-Henríquez¹, A.-I. Reyes-Domínguez², N. Sosa-Cabrera³, D. Hernández-Hernández², M. Diaz-Curiel⁴, M. J. Gómez de Tejada⁵

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Background: Several scales have been described to assess the risk of fracture by fragility in the long run. Garvan scale has not been previously validated in the Spanish population.

Objective: To study the predictive capacity of the scale Garvan, explore the predictive capacity to a large sample of the Canarian population and therefore, Spanish.

Material and methods: 400 patients of both sexes. To all is applied the scale of risk Garvan, accessing to the calculator of risk available on the website: <https://www.garvan.org.au/promotions/bone-fracture-risk/calculator/>

Results: The median of follow-up of the patients was of 15.8 years. Those fractured at the start of the study had values of risk of any fracture fragility of 27, while those who did not suffer a fracture had a value of 13 ($p < 0.001$). We obtained similar for the hip fracture, because those patients that sustained a fracture during the follow-up showed an initial value of 8 vs. 3 in those not fractured. The area under the corresponding ROC curve was 0,718 (- 95% CI=0,613; 0,824) and the optimal cut-off point was 18.5. This value is a sensitivity of 0.67 (CI - 95%=0.47; 0.83), specificity of 0.67 (- 95% CI=0.56; 0.77), a negative predictive value of 0.86 (- 95% CI=0.76; 0.93) and positive predictive value of the 0.40 (- 95% CI=0.26; 0.55).

Conclusion: We have validated the Garvan scale for a Spanish population. In accordance with them results of our study, it real utility of this scale is it of screening, because a value lower to 18.5, allows establish a risk very low of fracture by fragility in the next 10 years.

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EFFECT OF SARCOPENIA, SUBCUTANEOUS ADIPOSE TISSUE AND ABDOMINAL VISCERAL FAT ON MORTALITY RISK OF COMMUNITY-DWELLING OLDER ADULTS: A POPULATION-BASED PROSPECTIVE COHORT STUDY IN BRAZIL– THE SÃO PAULO AGEING and HEALTH STUDY

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Objective: Current studies on body composition changes evaluated by dual-energy X-ray absorptiometry (DXA) and mortality risk in elderly have some limitations, such as analysis not stratified by sex and not compartmentalized (subcutaneous and visceral tissues) assessment of body fat. Thus, we sought to investigate the association between body composition by DXA (including visceral fat measurement) and mortality in a longitudinal, prospective, population-based cohort of elderly subjects.

Methods: 839 community-dwelling subjects (516 women, 323 men), ≥ 65 years, were assessed by questionnaire on clinical data, laboratory exams and body composition by DXA. DXA APEX software computes visceral adipose tissue (VAT) by subtracting the subcutaneous adipose tissue from the total android fat, which was automatically set to 20% of the distance from the iliac crest to the base of the skull. All analyses were performed at baseline. Total body fat was expressed by fat mass index (FMI) [(total body fat (kg) / height² (m)]. Sarcopenia was defined as low appendicular muscle mass adjusted for fat. Mortality was recorded during 4 year-follow-up. Multivariate logistic regression was used to compute odds ratios for all-cause and cardiovascular mortality.

Results: Over a mean 4.06 \pm 1.07 years of follow-up, there were 132(15.7%) deaths. In men, after adjustment for age, BMI, smoking, physical activity, alcohol, diabetes, dyslipidemia, cardiovascular event, recurrent falls, 25OHD and PTH, the presence of sarcopenia(OR 11.36, 95% CI: 2.21-58.37, $p=0.004$) and visceral fat mass(OR 1.99 95%CI: 1.38-2.87, $p < 0.001$, for each 100g-increase) significantly increased all-cause mortality risk, while total body fat (FMI) was associated with decreased mortality risk (OR 0.48, 95% CI: 0.33-0.71, $p < 0.001$). Similar results were observed for cardiovascular mortality in men: sarcopenia(OR 14.84, 95%CI: 5.15-47.72, $p < 0.001$), visceral fat mass(OR 1.66, 95% CI: 1.31-2.10, $p < 0.001$) and total body fat(OR 0.57,95% CI: 0.43-0.76, $p < 0.001$). In women, only sarcopenia was predictor of all-cause(OR 62.88, 95% CI: 22.59-175.0, $p < 0.001$) and cardiovascular death(OR 74.54, 95% CI: 9.72-571.46, $p < 0.001$).

Conclusions: Sarcopenia and fat distribution are associated with all cause and cardiovascular mortality risk in elderly, and they are different according to sex. Visceral fat and subcutaneous fat have opposite roles on mortality risk in elderly men, and this is distinct from what is observed in young adults. These findings point to the risk of encouraging weight loss in the elderly aiming young adult goals. Furthermore, DXA seems to be a promising tool for evaluation risk of mortality in elderly, since it is easily applicable in clinical practice.

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STAND STRONG: CYCLIC YOGA FOR MUSCULO-SKELETAL HEALTH

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Objective: This study examined the effects of 5 years continuous Cyclic Yoga training on bone density, bone formation marker, muscle mass, muscular strength, gait speed and SARC-F scale in postmenopausal women.

Methods: The style of Yoga used was Cyclic Yoga that is a new style in Hatha Yoga. In a case control study 36 postmenopausal women recruited in two groups that included 17 women in Yoga and 19 controls. The Yoga group participated in Cyclic Yoga training classes for > 5 years, 60 min per week and the age matched control group did not participate in any regular exercise programs. Any chronic illness like autoimmune disorders, cancers, neurological diseases and any conditions that under treatment with corticosteroids were excluded. A whole body dual energy X-ray absorptiometry scan was performed. The appendicular skeletal mass (ASM) was calculated and skeletal muscle index (SMI) was obtained as ASM/height². Grip strength using a hand dynamometer and 6-meter gait speed evaluated. Also, the SARC-F scale translated to Persian was applied to evaluate sarcopenia.

Results: There was not significant group difference in age (56 ±3.8 vs. 56.6±4.7), BMI and SMI. BMD of all sites in Yoga group was higher than controls, although the differences did not reach statistical significance. Handgrip strength in Yoga group was significantly higher than controls. (23.3±2.8 kg vs. 20.4 ±3.3 kg, p=0.01). Likewise, gait speed in Yoga was faster than controls and PINP in Yoga was higher than controls. SARC-F scale in Yoga was significantly lower than controls. In multivariate analysis of variance after adjustment for age and BMI, Cyclic Yoga training directly associated with muscular strength (p=0.003), speed gait (p=0.001) and SARC-F scale (p=0.006).

Conclusions: Cyclic Yoga is a new style in Hatha Yoga that has been providing harmony of streaming cycle of poses to fortify the positive effects of each asana on muscular strength and flexibility. The results showed that regular long-term Cyclic Yoga program improved muscular strength, gait speed and SARC-F scale as well as bone formation marker. Cyclic yoga may recommend for the prevention of age related sarcopenia and osteoporosis in postmenopausal women.

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THE QUALITY OF LIFE IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

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Introduction: Postmenopausal osteoporosis is associated with an increased risk of fragility fractures and secondary morbidity, which can significantly impair the quality of life (QoL).

Objective: To analyse the QoL in a group of postmenopausal women with osteoporosis compared to an age-matched group of women without osteoporosis and the impact of falling and fragility fractures on QoL.

Methods: The study group consisted of 72 women with postmenopausal osteoporosis-35 were under stable antiosteoporotic treatment with oral bisphosphonates at the time of the study, while 37 were naïve to antiosteoporotic treatment. The control group consisted of 78 age-matched women without osteoporosis. The QoL was evaluated by means of a generic (EQ-5D) and a disease-specific [the osteoporosis assessment questionnaire (OPAQ)] QoL instrument.

Results: The patients with osteoporosis had significantly worse scores on body image and pain (OPAQ) (p=0.006 and 0.029 respectively) compared to control. In the study group patients with falling episodes in the previous year had worse scores for the fear of falling, body image and global QoL (OPAQ) (p=0.024, 0.048 and 0.041, respectively). If corrected for the falls number, the number of prevalent fractures was not significantly correlated to any of the QoL items.

Conclusions: Women with postmenopausal osteoporosis have impaired QoL compared to age-matched women. A positive falling history is particularly associated with affected QoL subscores.

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OUTCOMES AND COMPLICATIONS OF TOTAL ANKLE ARTHROPLASTY AMONGST OBESE PATIENTS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objectives: Over recent years, there has been an increased interest in total ankle arthroplasty (TAA) for the management of end-stage ankle arthritis. However, complication rates for TAA remain high. In this study, we aimed to review the outcomes and complications of obese patients, as compared to non-obese patients, who undergo TAAs.

Methods: We searched MEDLINE, Scopus and Web of Science for 355 unique articles. We eventually included 9 articles within our systematic review and meta-analysis based on our selection criteria. Data was analysed via Review Manager 5.3, using Mantel-Haenszel statistics and random effect models.

Results: Based on our meta-analysis, we revealed that obese patients were at a 1.53 times higher odds of undergoing some form of revision of their TAA within a given period of time (95% CI=1.15-2.03, $Z=2.90$, $I^2=0$, $p=0.00375$). Obese patients were also at a 2.04 times higher odds of sustaining infections (95% CI=1.47-2.85, $Z=4.21$, $I^2=42.4$, $p<0.001$). Our systematic review showed that obese patients were also more prone to deep vein thrombosis (DVTs) (OR=8.03, 95% CI=2.95-21.9), venous thromboembolic complications (OR=3.57, 95% CI=2.04-6.24), wound complications (MD=3.07, 95% CI=0.255-5.89), local complications (OR=2.11, 95% CI=1.50-2.98), systemic complications (OR=3.44, 95% CI=2.66-4.46), and medical complications (OR=3.39, 95% CI=2.56-4.48).

Conclusion: Our meta-analysis showed that obese patients are more prone to complications such as revisions of their TAAs and infective complications. Individual studies have also identified DVT and thromboembolic complications as well as wound, local, systemic and medical complications as being higher amongst obese patients. We postulate that these findings are a result of the pro-inflammatory state in obese patients. Further studies should focus on providing pathophysiological explanations to the increased complication rates found in this review.

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CALCIUM SUPPLEMENTATION IS NOT ASSOCIATED WITH ISCHAEMIC HEART DISEASE REGARDLESS OF CARDIAC RISK FACTORS: THE UK BIOBANK COHORT

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Objective: We investigated whether use of calcium supplements interacted with cardiovascular risk factors as predictors of incident ischaemic heart disease events in the UK Biobank population-based cohort.

Methods: 502,664 men and women aged 40-69 years underwent detailed characterisation at baseline. Use of calcium supplements was self-reported; information on incident hospital admission (ICD-10) for ischaemic heart disease (IHD) events was available through linkage to UK Hospital Episode Statistics with up to 7 years follow-up. We investigated the prospective associations between use of calcium supplements and IHD amongst men and women separately,

using Cox Proportional Hazards models, controlling for age, BMI, smoking, alcohol, educational level, vigorous physical activity, systolic blood pressure, diabetes/cholesterol medication, HRT use (in women). Potential interactions between supplementation and cardiovascular risk factors were also examined.

Results: 486,522 participants (median age of 58 years, 54.5% women) had complete data on calcium supplementation. 34,082 participants reported taking calcium supplements. In both unadjusted and adjusted analyses, there were no associations between use of calcium supplements and risk of incident IHD amongst men or women. The p-value for interactions with age (years), smoking (yes/no/ex), dietary calcium intake (mg per day), alcohol intake (≥ 3 times per week), medication for cholesterol/diabetes hypertension (yes/no each) and blood pressure (mmHg) were all ≥ 0.1 . Only the interaction between calcium supplementation and BMI amongst females was significant ($p=0.01$), but with the only significant association between calcium documentation and IHD observed in the highest fifth of BMI [HR=0.51 (95% CI: 0.28, 0.94), $p=0.03$].

Conclusion: Use of calcium supplements was not associated with increased risk of ischaemic cardiovascular, and this was not modified by a wide range of cardiovascular risk factors. This research has been conducted using the UK Biobank Resource.

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SUBCLINICAL ARTICULAR INFLAMMATION IN ADULT CELIAC PATIENTS: AN ULTRASOUND STUDY

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Objective: Celiac disease (CD) is an immune-mediated systemic disorder elicited by gluten and related prolamines in genetically predisposed individuals. Rheumatic involvement is frequent in CD but often underdiagnosed. Considering the superiority of Musculoskeletal Ultrasound (MSUS) over clinical examination and conventional radiology in the detection of joint inflammatory alterations, we performed MSUS in newly diagnosed CD patients on a gluten-containing diet (GCD) and compared the results with those obtained in

healthy controls (HC) and CD patients in serological and clinical remission, on a gluten-free diet (GFD) for at least one year.

Material and Methods: CD patients were diagnosed following standardized diagnostic criteria. CD patients and HC underwent a MSUS of the radiocarpal, elbow, knee, I – V MTP, II – V MCP joints performed by two rheumatologists with experience in rheumatologic ultrasound, in order to detect the presence of joint effusion or synovial hypertrophy, as defined by OMERACT guidelines.

Results: We enrolled 24 new celiac patients, 18 remission celiac patients in GFD and 15 healthy controls. We evaluated 798 articulations; interobserver agreement resulted excellent ($k=0.91$). In CD patients still exposed to gluten, joints were more frequently altered (14,5% GCD vs. 6,3% GFD vs. 5,7% HC $p=0,0003$). Considering as a *cut-off* the finding of at least 2 joints altered (twice the standard deviation of the HC) CD patients on GCD were more frequently involved (54% GCD vs. 16% GFD vs. 20% HC $p=0,017$). Furthermore a logistic regression analysis showed that CD patients still on GCD have a seven-fold risk of presenting 2 or more joints altered compared to HC (OR 7,20; p 0,02; CI 95% 1,353 – 38,326); conversely inactive CD patients on GFD resulted to be protected compared to CD patients on GCD (OR 0,07; p 0,005; CI 95% 0,012 – 0,465). No difference was observed between CD patients on GFD and HC (OR 0,533; p 0,52; CI 95% 0,076 – 3,725).

Conclusions: Taken together, our results confirm that joints are frequently altered in adult CD patients still exposed to gluten and suggest that GFD may reduce the risk of rheumatic manifestations.

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PRIOR FALLS PREDICT INCIDENT FRACTURES INDEPENDENTLY OF FRAX: THE OSTEOPOROTIC FRACTURES IN MEN (MROS) STUDY

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Objective: Fracture is a key consequence of falls. We investigated, across the 3 Osteoporotic Fractures in Men (MrOS) Study cohorts, whether prior falls predicted incident fracture independently of FRAX probability, and whether these associations varied by age and follow-up time.

Methods: We studied older men participating in MrOS Sweden, Hong Kong and USA. Available baseline information included falls history (in previous year), clinical risk factors, BMD at femoral neck and calculated FRAX probabilities. An extension of Poisson regression was used to investigate the relationship between falls, FRAX probability [major osteoporotic fracture (MOF) with BMD], and incident fracture. All associations were adjusted for age, time since baseline and cohort in base models; additionally further models were used to investigate interactions with age and follow-up time.

Results: Information on falls and FRAX probability was available for: 4365 men in USA (mean age 73.5 years); 1852 men in Sweden (mean age 75.4 years); and 1669 men in Hong Kong (mean age 72.4 years). Rates of prior falls were similar at 20%, 16%, and 15% respectively. Mean follow-up time ranged from 8.7 to 10.8 years. Across all cohorts, prior falls predicted incident fracture at any site [HR: 1.68 (95%CI: 1.49, 1.89)], MOF [HR: 1.56 (95%CI: 1.33, 1.83)] and hip fracture [HR: 1.61 (95%CI: 1.27, 2.04)]. Relationships between prior falls and incident fracture remained robust after adjustment for FRAX probability: adjusted HR (95%CI) any fracture: 1.63 (1.45, 1.84); MOF: 1.50 (1.28, 1.76); and hip fracture: 1.53 (1.21, 1.94). In the combined cohort HR for any fracture associated with prior falls tended to reduce with increasing follow-up time ($p=0.057$).

Conclusions: Prior falls predicted incident fracture independently of FRAX probability, confirming the potential value of falls history in fracture risk assessment, although the ability of therapeutic interventions to reverse this risk needs further investigation. The prior falls/follow-up time interaction is intriguing, but requires replication.

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MUSCLE PAIN CAUSED BY UNCONSCIOUS PSYCHOLOGICAL PROBLEMS: CASE REPORT PRESENTATION

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Introduction: Often numerous of diseases are caused by psychosomatic problems that remain without medical attention. Therefore, it is important to take into account the psychological status of our patients, as it helps in determining the causes and treatment strategies, including musculoskeletal diseases.

Materials and Methods: We present a clinical case examination and treatment of pain and rigor in a hand of the patient, the cause of which were unconscious psychological problems.

Case report: We discuss the case of a 30-year-old female who initially presented with quite often complaints such as irritability, anxiety, rigor and pain in the hand (7 out of 10 on the Visual Analogue Scale). During the examination by a neurologist and trauma (including neuromyography, MRI of the brain and spinal cord etc.) the organic causes of the complaints were not found. In this connection, the doctors suspected psychosomatic disorders. The patient was sent to the appointment to the psychotherapist, where woman's everyday problems were discovered, so the therapy was started.

Results: During the therapy, it was found out that the unconscious irritation was in relation to the employer, the unwillingness to come to her job and this collective and do unloved business were cause of pain and rigor, which appear in defined moments and situations.

Just full consciousness of this problem has led to the removal of anxiety in the patient, reduction of pain in the hand to 3 points, and advance in the direction of treatment. So, after three months of the therapy the patient got rid of the pain (0 out of 10), rigor and irritability disappeared. Complaints are not coming back anymore.

Conclusion: Despite numerous guidelines in diagnosis and treatment of musculoskeletal diseases, there are still diagnosis and treatment mistakes due to the psychological component is not taken into account and is not perceived as a cause of disease. So, we need to improve the guidelines for diagnosis and treatment of musculoskeletal diseases, taking into account the patient's psychological status.

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EFFECT OF TWO DIFFERENT THERAPEUTIC REGIMENS OF CLODRONATE ON BONE MINERAL DENSITY IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS: A 2-YEAR RANDOMIZED TRIAL

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Objective: To compare the effect on Bone Mineral Density (BMD) of two therapeutic regimens of intravenous and intramuscular clodronate (CLD) in women with postmenopausal osteoporosis.

Patients and Methods: Postmenopausal women aged between 50 and 75 years old presenting with a lumbar spine BMD T-score <-2.5 and without prevalent fractures were randomized (2:1) to receive once-monthly intravenous CLD 600 mg (CLD600) or once-weekly intramuscular CLD 100 mg (CLD100). All patients received calcium and cholecalciferol supplements. BMD was measured at the lumbar spine (LS-BMD), femoral neck (FN-BMD) and total hip (TH-BMD) at 12 and 24 months. Blood cell counts, serum creatinine, calcium, phosphate, AST and ALT were assessed every four months. The primary endpoint was the mean% change of the LS-BMD, FN-BMD and TH-BMD from baseline at the times of follow-up. Secondary endpoints included the occurrence of new clinical fractures and clinical/laboratory adverse events.

Results: Seventy-two women were enrolled and randomized to intravenous CLD600 (n=45; mean age±SD, 65±6 years) or intramuscular CLD100 (n=27; mean age±SD, 67±7 years). The two groups were comparable with regard to baseline characteristics (including alkaline phosphatase and weight). LS-BMD showed a significant increase from baseline after one and two years in both groups. After two years, patients in the intravenous CLD600 group (4.0±5.7%) demonstrated a significantly greater mean% change of LS-BMD compared to those in the intramuscular CLD100 group (2.6±3.6%, p <.05). FN-BMD and TH-BMD did not significantly change from baseline after one or two years. Mean% change of FN-BMD after two years was 1.6±5.2% in the CLD600 group and 0.8±3.5% in the CLD100 group. The corresponding figures for TH-BMD were respectively 1.8±5.0% for the CLD600 group and 0.9±4.5% for the CLD100 group. No clinical or laboratory relevant adverse event was recorded during the study period. Two patients in the CLD600 group and one in the CLD100 group presented with a new non-vertebral fracture after two years.

Conclusions: Our results confirmed previous findings on BMD with intramuscular/intravenous clodronate, suggesting that an increase in the weekly/monthly doses may potentially produce greater improvements of BMD.

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RELATIONSHIPS BETWEEN MARKERS OF INFLAMMAGING AND BONE MICROARCHITECTURE: FINDINGS FROM THE HERTFORDSHIRE COHORT STUDY

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Objectives: It has been suggested that low grade inflammation may impact musculoskeletal health in older adults. The aim of this study was to examine the association between indices of inflammaging and bone mineral density (BMD) in a population-based cohort of older adults in the United Kingdom.

Materials and Methods: A sample of 365 participants of the Hertfordshire Cohort Study (free-living, older adults) were recruited. Dual energy X-ray absorptiometry (DXA) was performed at the lumbar spine and proximal femur at baseline and repeated at a median of 4.5 years (interquartile range 3.6 to 5.2). DXA outcomes included both level and change in both total lumbar spine and total femoral neck BMD. Inflammaging markers were ascertained at baseline using enzyme-linked immunosorbent assay (ELISA) techniques and Bio-Plex Pro Assays. Gender-adjusted linear regression was used to examine the associations between inflammaging markers and outcomes with and without adjustment for anthropometric and lifestyle factors.

Results: The mean (SD) ages at baseline were 64.4 (2.5) and 66.5 (2.7) years for men and women respectively. Lumbar spine BMD increased over follow up in men and women; with a mean (SD) annual change of 0.007 (0.009) and 0.003 (0.014) g/cm² respectively. Women experienced a mean annual decrease in femoral neck BMD of 0.005 (0.01) g/cm², however, no decrease was observed in men. Higher levels of IL-1 β and adiponectin:leptin ratios were each associated with lower baseline lumbar spine and femoral neck BMD in gender-adjusted ($p < 0.04$) and fully-adjusted ($p < 0.05$) analyses. Higher levels of IL-8 and lower levels of TNF α were each associated with accelerated decline in lumbar spine BMD in both gender-adjusted ($p < 0.02$) and fully-adjusted ($p < 0.05$) analyses.

Conclusions: In a cohort of older adults, high levels of the pro-inflammatory mediator IL-1 β and raised adiponectin:leptin ratio are both associated with lower BMD at the lumbar spine and femoral neck at baseline, and high IL-8 and low TNF α were associated with accelerated decline in BMD at the lumbar spine. This adds weight to the theory that bone health can be influenced by both immune activation and alterations in adipokine homeostasis. These findings offer avenues for future research to further investigate these relationships.

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PREVALENCE OF PRIOR MAJOR OSTEOPOROTIC FRACTURES (MOF) IN ADULTS PRESENTING WITH HIP FRACTURE – LIMITATIONS AND SCOPE FOR FRACTURE LIAISON SERVICES (FLS) IN PREVENTION OF HIP FRACTURE

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Objective: To examine the prevalence of prior MOF in the past ten years preceding hip fracture in order to provide information about the potential for prevention of future hip fractures by FLS initiatives.

Methods: We included Danes aged 50+ with surgically treated hip fracture in 2010 (N=8,158) using the Danish Hospital Discharge Register. The prevalence of prior fractures was determined by using data for in- and out-patient treatment with a look-back of ten years. A prior hip fracture was only included as a prior fracture if occurring more than 6 months before the present fracture.

Results: A total of 30% of hip fracture patients (33% of women and 22.8% of men) had at least one MOF in the preceding 10 years. Colles- and humerus fractures constituted >70% of prior MOF.

Men were less likely than women to have experienced a prior MOF in the last ten years prior to their hip fracture, chiefly due to a lower prevalence of prior Colles and humerus fractures.

| | Total | Women | Men |
|---------------|---------------|---------------|---------------|
| Colles | 13.5 % | 16.6 % | 6 % |
| Spine | 2.6 % | 2.7 % | 2.4 % |
| Humerus | 9.1 % | 10.4 % | 5.7 % |
| Hip | 8.4 % | 19.8 % | 16.7 % |
| M.O.F. | 30.0 % | 33.0 % | 22.8 % |

Summary and conclusions: Despite the clear importance of FLS, clinicians should be aware that the majority of hip fractures in women, and in particular men, occur without a prior MOF that could have resulted in early detection and treatment of osteoporosis, hence other means of case finding remain very important. With current treatment modalities a maximum of one in six hip fractures in Denmark can be prevented through FLS initiatives.

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RISK OF FALL IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objectives: The aims of this study were to assess the prevalence of falls in patients with knee osteoarthritis (KOA), to evaluate balance and risk of fall in these individuals and the impact of pain and body mass index (BMI) on their stability.

Material and Methods: 34 subjects mean ages 62.35 ± 7.25 included in this study (all over the age of 50). Gender distribution- male 7 and female 27. Risk of fall was assessed using Tinetti Falls Efficacy Scale (TFES) and Five Times Sit to Stand Test (FTSST), intensity of pain by Visual Analogue Scale (VAS). TFES assesses perception of balance and stability during activities of daily living and fear of falling in the elderly population. Total scores can range from 10 to 100, lower scores indicate more confidence and higher scores indicate lack of confidence and greater fear of falling. The interpretation of FTSST: time ≥ 12 sec need of further assessment for fall risk, time > 15 sec is the optimal cutoff time in predicting recurrent fallers.

Results: 11 (32.35%) patients had falls in previous 3 years. Mean value of TFES 27.50 ± 12.42 , mean values of VAS 5.29 ± 1.73 , median of FTSST is 20.4 (13-52.68). There is a significant moderate positive correlation between TFES and FTSST ($S=2295.9$, Spearman's rank correlation coeff= 0.649 , $p < 0.001$), moderate positive correlation between TFES and VAS by Test for Pearson's correlation ($t=3.8143$, $df=32$, $p < 0.001$, correlation coeff= 0.559) and moderate positive correlation between FTSST and VAS ($S=3362$, Spearman's rank correlation coeff= 0.486 , $p < 0.001$). Median of BMI 29.395 ($20.88-43.23$) which classifies these patients as overweight. There is a significant moderate positive correlation between FTSST and BMI ($S=3586.5$, Spearman's rank correlation coeff= 0.452 , $p=0.007$).

Conclusions: Patients with KOA belong to group of patients with risk of recurrent falls by FTSST. Pain and higher BMI are predictor of poorer stability in these patients.

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1 AND 2-YEAR PERSISTENCE WITH DIFFERENT ANTI-OSTEOPOROSIS MEDICATIONS PER PREVIOUS USE AND SETTING OF THERAPY INITIATION: A POPULATION-BASED COHORT STUDY

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Objective: To study the association between setting of therapy initiation, previous treatment history the 1 and 2-year drug persistence of anti-osteoporosis drugs (AOD) in primary care.

Material and Methods: Cohort study using the SIDIAP database (www.sidiap.org). Inclusions: women aged ≥ 50 years, incident users of any anti-osteoporosis medication (2012) with data available for at least 12 months prior to therapy initiation. Exclusions: bone diseases/treatments (other than osteoporosis), drugs with < 100 users. Follow up: from 1st pharmacy dispensation until end of follow-up (death, moving out or data extraction date, switching or treatment cessation, whichever came first). Persistence definition: concatenated pharmacy dispensations of index drug (90 days permissible gap). Users of alendronate were compared to other oral bisphosphonates, strontium ranelate, SERMs, teriparatide and denosumab. Multivariable Cox regression models were used to estimate Hazard Ratios of therapy cessation according to drug used.

Results: A total of 19,267 women were identified as incident users of anti-osteoporosis medication in 2012. Previous drug use history did not affect 1 or 2-year persistence: HR of 1.00, 95% CI 0.96-1.06 and 1.02, 95% CI 0.98-1.07 respectively. Compared to primary care, treatment initiation in secondary care was associated with a higher risk of 1 and 2-year cessation (HR 1.30, 95%CI 1.22-1.39 and 1.15, 95%CI 1.08-1.23 respectively).

Conclusions: Persistence with anti-osteoporosis medications was not influenced by previous treatment, whilst setting of therapy initiation seemed to be important: those initiating therapy in primary care had a 30% and 15% improved 1 and 2-year persistence respectively.

Disclosure: Amgen S.A provided funding for this study. Amgen provided comments on the design of the study protocol and the analysis plan. The final protocol and analysis plan were mutually agreed by SIDIAP and Amgen, based on the principle of the "best science known in the research field". Amgen also provided comments on the abstract prior to its submission. However, SIDIAP alone decided whether to incorporate Amgen's comments.

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CALLUS EXTRACT FROM RESVERATROL-ENRICHED SYNTHETIC RICE INDUCES DEDIFFERENTIATION THROUGH THE ERK-1/2 PATHWAY AND INFLAMMATION THROUGH THE MAPK AND PI3K/AKT PATHWAYS IN RABBIT ARTICULAR CHONDROCYTES

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Purpose: Resveratrol has antioxidant property, anti-inflammatory effect, and prevents cardiovascular disease in

human body. Resveratrol transgenic rice line Iksan526 was identified as one intergenic insertion locus by two copies with inverted repeats conjunction structure and expected mRNA expression and resveratrol production. However, the effects of IS526, an extract of resveratrol-enriched rice, on differentiation and inflammatory response in normal cells, including chondrocytes, and the mechanism underlying these effects are not clearly understood. In this study, we investigated the molecular mechanisms of IS526 in chondrocytes.

Methods: Rabbit articular chondrocytes were prepared from cartilage slices of 2-week-old New Zealand white rabbits. Primary chondrocytes were treated with various concentration of IS526 (50–300 $\mu\text{g}/\text{mL}$) for 24 h or with 175 $\mu\text{g}/\text{mL}$ IS526 for the indicated time periods. The type II collagen and COX-2, p38, pERK expression levels were determined by western blot analysis and reduction of sulfated proteoglycan synthesis detected by Alcian blue staining.

Results: IS526-induced a loss of type II collagen and decreased sulfate proteoglycan levels in a dose- and time-dependent manner. In addition, IS526 caused an inflammatory response by inducing the expression of cyclooxygenase-2 (COX-2). Furthermore, after treatment with IS526, phosphorylation of mitogen-activated protein kinase proteins (ERK and p38) and Akt in rabbit articular chondrocytes. The inhibition of ERK, p38 and PI3K/Akt with PD98059, SB203580, LY294002, suppressed IS526-induced decrease in type II collagen and COX-2 expression.

Conclusions: The results suggest that the IS526 stimulates differentiation via the ERK-1/2 pathway and inflammation via the ERK, p38, and Akt signaling pathways in rabbit articular chondrocytes.

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CORRELATIONS BETWEEN CALCIUM, MAGNESIUM AND POTASSIUM DEFICIENCY AND OSTEOPOROTIC STATUS IN PATIENTS WITH LIVER CIRRHOSIS

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Objective: To evaluate the correlation between magnesium (Mg), calcium (Ca), potassium (K) deficiencies and clinical, electromyographic, electroencephalographic or DXA test changes observed at the patients with liver cirrhosis.

Material and methods: We studied 30 patients with liver cirrhosis. Mg, Ca and K deficiency were evaluated by serum and tissue (erythrocyte) levels. All the patients were assessed clinically, with biochemical analysis, ultrasonography and

elastography for the diagnosis of cirrhosis, computer model analysis of joint synovial and DXA test for the evidence of osteoporosis [1, 2, 3].

Results: Although we found low levels of serum Mg at 14 patients and erythrocyte Mg at 28 patients, there was a positive correlation between serum and erythrocyte levels ($r=0,51$). Potassium had a different tendency since 12 patients had low levels of serum K and 15 patients of erythrocyte K, with a high positive correlation between serum and erythrocyte values ($r=0,89$). We also found a positive correlation between erythrocyte levels of Mg and K ($r=0,66$). Ca serum levels were low at 10 patients and erythrocyte levels in 15 patients with positive correlation between serum and erythrocyte levels ($r=0,65$).

Characteristic symptoms of magnesium deficit were only observed at 7 patients. Further 17 patients had clinical signs of latent tetany and also 23 patients had electromyographic changes, both spontaneous and after the Trousseau test, even though most patients were normocalcemic [4, 5, 6, 7]. The computer analysis of electromyographic changes indicated a positive correlation between the duration and the number of multiplets and erythrocyte Mg levels. We also found a positive correlation between the latency time of evoked potentials recorded on electroencephalography and erythrocyte Mg levels at the patients with normal blood ammonia levels. In our study we performed DXA tests and we encountered a number of 16 patients with different stages of osteoporosis [8].

Conclusion: Cirrhosis-related osteoporosis is a condition that needs to be treated and studies so far admit that Calcium and Vitamin D supplementation are insufficient to contrast the bone loss whereas administration of bisphosphonates are safe and sufficient for cirrhosis-related osteoporosis.

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P381

SERUM AND SYNOVIAL FLUID LEVELS OF THE ALTERNATIVE MACROPHAGE ACTIVATION PATHWAY REGULATORS (CHIT 1/CCL18) AS EARLY BIOMARKERS OF PERIPROSTHETIC OSTEOLYSIS

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Objective: Periprosthetic osteolysis (PPO) is the most frequent cause for total hip replacement (THR) failure. Currently, PPO diagnosis occurs in advanced stages, often necessitating complex revisions due to extensive bone loss. PPO biomarkers could facilitate earlier diagnosis. Alternative macrophage activation pathway regulators, CHIT1 and CCL18, have increased expression in patients undergoing revision THR for osteolysis. We hypothesized that synovial fluid and serum levels of CHIT1 and CCL18 would be increased in patients undergoing revision THR for PPO vs. controls without osteolysis.

Material and Methods: All revision metal-on-polyethylene THR patients were screened pre-operatively. Patients with active/prior infection, previous revision(s), metabolic/rheumatologic conditions and/or medications affecting bone metabolism, were excluded. According to a priori power analysis, 30 patients were enrolled. Twenty “osteolysis” patients underwent revision for PPO (based on imaging and operative reports). Ten “controls” had stable implants and revision for instability (9) or mechanical symptoms (1). Pre-operative serum and intra-operative synovial fluid samples were collected. CHIT1, CCL18, RANKL and OPG were quantified via ELISA. Significance was assessed via two-tailed Fisher’s Exact test.

Results: Among osteolysis and control patients, 11/20 and 4/10 were male, average age was 68 and 63 years, 9/20 and 3/10 had cemented femoral components, and average implant longevity was 15 and 5 years, respectively. CHIT1 was significantly increased in the osteolysis vs. control patients’ synovial fluid (3,727 vs. 731 nM, $p < 0.01$) and serum (98 vs. 39 nM, $p < 0.01$). CCL18 levels were significantly increased in osteolysis vs. control patients’ synovial fluid (425 vs. 180 nM, $p < 0.01$), but not serum. There were no significant differences in RANKL or OPG serum concentrations between groups.

Conclusions: In this prospective case-control study, CHIT1 was identified as a novel synovial fluid and serum biomarker of PPO. CHIT1 expression is induced during macrophage activation in response to wear debris. CHIT1 monitoring may facilitate early diagnosis of THR PPO and consequent avoidance of complex revisions due to implant loosening and/or bone loss. Furthermore, CHIT1 may represent a novel therapeutic target for PPO.

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HUMERAL FRACTURES ASSOCIATED WITH OSTEOPOROSIS

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Objective: To assess osteoporosis in patients with humeral fractures by using DXA tests during recovery. Humeral fractures have increasing frequency mainly due to domestic accidents and road vehicles accidents with side impact.

Material and Methods: The study included a total of 136 patients hospitalized in Orthopedics Clinic at Emergency County Hospital Craiova, Romania between 2012-2016 and who benefited rehabilitation treatment after orthopedic treatment in the Medical Clinic of Rehabilitation and Physical Medicine of the same hospital or in ambulatory specialization. Most patients were of older age, which correlated with a number of predisposing factors.

Results: The analysis of the humeral fracture type revealed in preponderance surgical neck fractures followed by fractures of the humeral head. In 84 cases (61.7%) we found the existence of fracture displacement and in 22 cases (16.2%) we discovered open fractures with extensive skin lesions [1]. Neurological lesions were relatively rare (11 cases - 8.1%) and were due to lesions of the circumflex nerve in the fracture path or vicious callus formation that sometimes required the differential diagnosis with upper limb bone tumors [2].

All patients followed DXA test which was performed during initiation of the recovery therapy at 6 and 12 weeks. A total of 71 patients had changes which consisted of various stages of osteoporosis prior to the start physical recovery program. All patients received massage and electrotherapy with analgesic and muscle relaxant effect to whom we associated Codman exercises [3, 4]. Rehabilitation included kinetotherapy for the recovery of movements in neighboring joints fracture, restoration of muscle tonicity and trophicity, as well as ability stability and muscle control. We also administrated calcium, vitamin D and bisphosphonates [5, 6, 7]. Rehabilitation program revealed very good recovery without sequelae in 128 patients (94.1%) and with remission of prior osteoporosis changes in 58 of 71 patients (81.6%) [8, 9].

Conclusion: Pairing a complex program of rehabilitation with physical therapy which includes therapy containing calcium, vitamin D and bisphosphonates allows recovery of mobility and regression osteoporotic changes in most patients with fractures of the humerus.

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RISK ASSESSMENT FOR THE FALL IN THE PREVENTION OF OSTEOPOROTIC FRACTURES IN RELATION TO THE PHYSICAL ACTIVITY OF THE ELDERLY

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Objective: In the elderly the common causes of disability, morbidity and mortality are falls and osteoporotic fractures. Since osteoporotic fractures often require ongoing medical care and expensive treatment, and given that their incidence is increasing by 2% per year, falls are a significant public health problem. The aim of this study was to evaluate by the means of co-ordination and balance assessment whether physical activity has an impact on the prevention of falls and osteoporotic fracture occurrence.

Material and Methods: The study included 50 patients, 12 men and 38 women aged from 65 to 87 years; divided into two groups. The experimental group consisted of 25 elderly participants who were active on a daily basis for more than 60 minutes, while the control group was made of 25 participants who were active less than 60 minutes per day. Groups were age and sex matched. To assess balance and co-ordination and fall risk we used Get up and go test, Timed get up and go test, Morse scale of risk for a fall, Chair Rising test as well as the Berg Balance Scale. The study was anonymous.

Results: The results showed a statistically significant difference between the experimental and control group for almost all tests. The average value of the Get up and go test, was significantly higher in the experimental group (3.0 vs. 1.48 t-test <0.001). The average value of Timed up and go test, in the experimental group was 11.64 and 8.64 in the control group, t-test <0.001. The average value of Chair Rising test in the experimental group was 11.2 and in the control 15.28, t-test <0.001. The average value of Morse scale of risk for a fall in the experimental group was 22.0 and 34.2 in the control group, t-test <0.01. The average value on Berg Balance Scale in the experimental

group was 42.16 and 51.96 in the control group, t-test <0.001.

Conclusion: Based on the obtained results, we concluded that daily physical activity lasting more than sixty minutes has a very significant impact on the prevention of falls and osteoporotic fractures.

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DENOSUMAB DISCONTINUATION AND REBOUND-ASSOCIATED VERTEBRAL FRACTURES: CLINICAL CHARACTERISTICS IN 24 PATIENTS

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Objective: To study the clinical and imaging characteristics of patients sustaining vertebral fractures after denosumab discontinuation.

Methods: Computerized advanced literature search identified 13 cases. Another 11 new cases are reported from our centers.

Results: Twenty-four postmenopausal women with vertebral fracture(s) following denosumab discontinuation, experiencing 112 fractures in total, were analyzed. The mean number of fractures per patient was 4.7. The most commonly affected vertebrae were T12 and L1. All fractures occurred 2 to 10 months after the last denosumab injection effect was depleted. 83% of the patients were treatment naïve, while 33% had prevalent vertebral fractures. Five (23%) patients were on concurrent aromatase inhibitor treatment. When patients were divided according to treatment duration with an arbitrary cut-off of two years, those with ≤ 2 years of denosumab treatment had less fractures compared with those with > 2 years (mean ± SEM fractures 3.2±0.7 vs. 5.2±1.4, p=0.055). Vertebroplasty was used in five patients, resulting in additional clinical vertebral fractures in all cases.

Conclusions: Vertebral fracture(s) following denosumab discontinuation are in the majority of the patients multiple and they occur a few months after the effect of the last dose was depleted. Therefore, patients should not delay or omit denosumab doses. Fractures are typically osteoporotic, located at the lower thoracic and the upper lumbar spine. Vertebroplasty is an unsuccessful treatment strategy for such patients.

Disclosures: A. D. Anastasilakis has received lecture fees from Amgen, Eli-Lilly, ITF Hellas, ELPEN, VIANEX. P. Makras has received lecture fees and research grants from Amgen; lecture fees from Glaxo, Lilly, Pfizer, Leo, Genesis, ELPEN, VIANEX. S. A. Polyzos has received lecture fee from Amgen. O. Lamy has received research grants and lecture fees from Amgen, Eli-Lilly and Takeda

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EFFECTIVENESS OF DENOSUMAB IN REDUCING BACK PAIN AND IN IMPROVING BONE MINERAL DENSITY AND HEALTH RELATED QUALITY OF LIFE: 1-YEAR FOLLOW-UP PROSPECTIVE STUDY IN POSTMENOPAUSAL WOMEN WITH VERTEBRAL FRAGILITY FRACTURES

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Objective: To assess the effectiveness of denosumab in reducing back pain related disability and in improving bone mineral density (BMD) and Health Related Quality of Life (HRQoL) in osteoporotic postmenopausal women with vertebral fractures.

Material and Methods: We enrolled women aged ≥ 50 years with a diagnosis of postmenopausal osteoporosis that had experienced at least one vertebral fragility fracture. We administered subcutaneous denosumab (60 mg/every 6 months) and a supplementation of calcium carbonate (500-1000 mg/day) and cholecalciferol (800 IU/day) for 1 year. We assessed at the baseline (T0), after 6 months (T1), and after 12 months (T2) of treatment the following outcomes: back pain related disability, assessed by Spine Pain Index (SPI), and HRQoL, using the 12-Item Short Form Health Survey (SF-12), with Physical (PCS) and Mental Health Composite Scores (MCS) and the European Quality of Life - 5 Dimensions - 3 Levels (EuroQoL-5D-3L) index (EQ-5D-3L index) and the EuroQoL-Visual Analogue Scale scores (EQ VAS). Moreover, we evaluated lumbar spine (LS) and femoral neck (FN) BMD at T0 and T2.

Results: We assessed 140 women, mean aged 74.9 ± 8.8 years, with a mean BMI of 26.1 ± 3.9 kg/m². Results are reported in Table 1.

| | T0 | T1 | T2 | P values |
|-----------------------------|----------------------|---------------------|----------------------|--------------|
| SPI | 58.49 \pm 19.94 | 45.03 \pm 21.97 | 40.38 \pm 21.21 | P < 0.001* |
| SF-12 PCS | 29.5 (24.6 - 34.1) | 35.4 (29 - 40.9) | 35.7 (29.3 - 42.95) | P < 0.001** |
| SF-12 MCS | 37.0 (29.55 - 44.72) | 44.6 (35.5 - 53.85) | 45.9 (36.92 - 55.17) | P < 0.001** |
| EQ-5D-3L index | 0.60 (0.32 - 0.76) | 0.69 (0.6 - 0.81) | 0.69 (0.6 - 0.82) | P < 0.001** |
| EQ VAS | 4.67 \pm 1.86 | 5.68 \pm 1.50 | 6.20 \pm 1.63 | P < 0.001*** |
| LS BMD (g/cm ³) | 0.819 \pm 0.191 | - | 0.875 \pm 0.173 | P < 0.001*** |
| LS T _s (SD) | -2.72 \pm 1.32 | - | -2.37 \pm 1.33 | P < 0.001*** |
| FN BMD (g/cm ³) | 0.692 \pm 0.081 | - | 0.742 \pm 0.107 | P < 0.001*** |
| FN T _s (SD) | -2.42 \pm 0.70 | - | -1.95 \pm 1.02 | P < 0.001*** |

Continuous variables are expressed as means \pm standard deviations. Categorical variables are expressed as median values (interquartile interval). ** = Friedman test; *** = ANOVA for repeated measures; *** = Wilcoxon signed-rank test.

Conclusions: Our data analysis demonstrated that 1-year treatment with denosumab was significantly effective in reducing back pain related disability and in improving BMD and HRQoL in a cohort of postmenopausal women with at least one vertebral fracture.

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RELATIONSHIP AMONG VISCERAL ADIPOSE TISSUE, SERUM LEVELS OF 25-HYDROXYVITAMIN D3, MUSCLE MASS AND FUNCTION: A RETROSPECTIVE STUDY

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Objective: To assess the relationship among visceral adipose tissue (VAT), serum levels of 25-hydroxyvitamin D3 [25(OH)D3], and muscle function in a cohort of postmenopausal women.

Material and Methods: In this retrospective case-control study, we analyzed data of a cohort of postmenopausal women referring to an outpatient clinic for the management of osteoporosis and sarcopenia. In absence of cut-off of VAT mass recognized by international guidelines, we divided the population according to the median value in two groups (VAT mass ≥ 814 g vs. VAT mass < 814 g). We assessed serum levels of 25(OH)D3, appendicular lean mass (ALM), muscle strength, using Hand Grip Strength (HGS) and Knee Extension Strength (KES), and physical performance, with the Short Physical Performance Battery (SPPB) and 4-meter-gait speed (4MGS).

Results: Of the 368 women (mean aged 67.23 ± 7.73 years), 180 (mean aged 64.39 ± 7.59 years) had a VAT mass < 814 g and 188 (mean aged 69.88 ± 6.77 years) had a VAT mass ≥ 814 g. Differences in outcome measures between groups are showed in Table 1.

| | VAT mass <814 g (n=180) | VAT mass ≥814 g (n=188) | P values |
|--------------------------|----------------------------|----------------------------|-----------|
| 25(OH)D3 (ng/ml) | 33.34 ± 12.94 | 25.97 ± 11.80 | <0.001* |
| 25(OH)D3 <20 ng/ml (n,%) | 36 (20.0) | 67 (35.6) | <0.001** |
| 25(OH)D3 <30 ng/ml (n,%) | 25 (13.9) | 63 (33.5) | <0.001** |
| ALM (kg) | 13.87 ± 2.77 | 14.36 ± 2.89 | 0.013* |
| ALM/BMI <0.512 | 19 (10.5) | 32 (17.0) | 0.096** |
| HGS (kg) | 17.09 ± 5.86 | 13.34 ± 4.71 | <0.001* |
| HGS <16 kg (n, %) | 53 (29.4) | 117 (62.2) | <0.001*** |
| KES (kg) | 14.50 ± 4.62 | 11.95 ± 5.16 | <0.001* |
| KES/body weight <0.31 | 135 (75.0) | 172 (91.4) | <0.001*** |
| SPPB | 9.25 ± 2.87 | 7.49 ± 2.84 | <0.001* |
| SPPB ≤8 (n,%) | 71 (39.4) | 126 (67.0) | <0.001*** |
| 4MGS <0.8 m/s (n,%) | 88 (48.9) | 139 (73.9) | <0.001*** |

*: ANCOVA age adjusted; **Pearson Chi-square test; ***: Fisher exact test.

Conclusion: In our cohort of postmenopausal women, higher values of VAT mass were significantly associated with lower levels of 25(OH)D3, a reduced muscle strength, and a reduced physical performance. In conclusion, VAT seems to be a parameter that should be assessed in order to better define bone and muscular health in postmenopausal women.

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COULD THE COEXISTENCE OF VITAMIN D DEFICIENCY AND OVERWEIGHT HAVE AN ADDITIVE NEGATIVE EFFECT ON MUSCLE MASS AND FUNCTION? A RETROSPECTIVE ANALYSIS IN A COHORT OF POSTMENOPAUSAL WOMEN

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Objective: To prove if the association of hypovitaminosis D and overweight could exert an additive effect on muscle mass and function in postmenopausal women.

Methods: In this retrospective study, we analyzed data from postmenopausal women, defining as hypovitaminosis D serum levels of 25(OH)D3 <30 ng/ml and as overweight women with a BMI of 25-29.9 kg/m². We divided the population into 4 groups: 1) normal weight with hypovitaminosis D; 2) overweight with normal levels of 25(OH)D3; 3) overweight with hypovitaminosis D; 4) normoweight with normal levels of 25(OH)D3, considered as controls. We assessed: muscle mass, with the appendicular lean mass-to-BMI ratio (ALM/BMI); muscle strength, using Hand Grip Strength (HGS); physical performance, with the Short Physical Performance Battery (SPPB).

Results: We divided 368 women of 67.2±7.7 years in 4 groups: 95 normoweight with hypovitaminosis D; 90 overweight with normal levels of 25(OH)D3; 96 overweight with hypovitaminosis D; 87 normoweight with normal levels of 25(OH)D3. Overweight women with hypovitaminosis D had a significantly increased risk of a muscle mass deficit (ALM/BMI<0.512) (OR 4.16; p<0.001), strength (HGS<16kg) (OR

6.56; p<0.001), and performance (SPPB≤8) (OR 5.58; p<0.001) compared to controls. The normoweight women with hypovitaminosis D had only a greater risk of an impairment of muscle strength (OR 6.68; p<0.001) and performance (OR 3.90; p<0.001). Overweight with normal levels of 25(OH)D3 had not significant impairments.

Conclusions: In our cohort, separately considering the conditions, only the hypovitaminosis D is associated with a higher risk of a muscle function deficit, but the association of hypovitaminosis D and overweight leads to a significant risk of having an impairment of both muscle mass and function in postmenopausal women.

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MUSCULOSKELETAL IMPAIRMENT IN A PATIENT AFFECTED BY A MUTATION OF THE HUMAN LAMININ ALFA5-CHAIN GENE: CASE REPORT

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Objective: To evaluate the musculoskeletal health status of a woman affected by a mutation of the human laminin alfa5-chain(LAMA5) gene, based on an evaluation protocol for primitive muscle diseases.

Material and Methods: We evaluated the patient using a protocol for neuromuscular diseases, including: passive range of motion (pROM) of all involved joints; Manual Muscle Testing (MMT); North Star Ambulatory Assessment (NSAA); Functional Ambulation Categories (FAC); Tinetti Performance Oriented Mobility Assessment (POMA); Functional Independence Measure (FIM); Fatigue Severity Scale (FSS); laboratory exams specific for bone metabolism; assessment of bone mineral density (BMD) by Dual-energy X-ray Absorptiometry (DXA); the Vertebral Fracture Assessment (VFA); Trabecular Bone Score (TBS); Hip Structural Analysis (HSA).

Results: The woman, aged 59 years, with a body mass index of 25.7 kg/m², was affected by a disease of connective tissue with a heterogeneous clinical picture. After the administration of our specific protocol for neuromuscular diseases, the scores obtained in the individual scales were: NSAA=12; FAC=3; FIM=96; POMA=11; FSS=54. The bone metabolism laboratory exams were: PTH=33.7 pg/ml, serum calcium=9.4 mg/dl, urinary calcium=143.5 mg/24h, 25-hydroxyvitamin D3=22.1 ng/ml, and alkaline phosphatase=87 U/l. The DXA examination showed: lumbar spine BMD=0.812 g/cm³, Ts=-3.1 SD, Zs=-2.2 SD; femoral neck BMD=0.692 g/cm³, Ts=-2.4 SD,

Zs=-1.5 SD. The VFA showed: mild wedges in T8 and T9, moderate wedges in T10 and T11. The TBS was 1,119; from the HSA we obtained the following parameters: Hip Axis Length: 108.4 mm, Femoral Strength Index: 0.9, Cross Sectional Moment of Inertia: 7,469 mm⁴, Cross-Sectional Area: 104 mm², Section Modulus: 450, Buckling Ratio: 20,40, and the Neck Shaft Angle=57°. This patient showed a difficulty in balance and gait, a moderate perception of the sensation of fatigue, hypovitaminosis D, severe osteoporosis with multiple fragility fractures, and an altered bone microarchitecture.

Conclusions: This complex patient had a heterogeneous clinical picture and an adequate management of the musculoskeletal health status is mandatory in rare primitive muscle diseases, such as the mutation of the LAMA5.

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HYDROLYSED COLLAGEN PROMOTES BONE HEALTH IN OVARIECTOMIZED MICE THROUGH THE MODULATION OF BOTH THE OSTEOBLAST AND OSTEOCLAST ACTIVITIES

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Objectives: Since collagen proteins are a crucial component of bone matrix and collagen-derived products are widely used in food industry, one may raise the question whether collagen-enriched diets may provide benefits for the skeleton.

Material and methods: In this study we designed an innovative approach taking into account the metabolites produced by the digestive tract. Mice serum enriched in hydrolysed-collagen metabolites were collected and cell culture models were set up to perform ex-vivo experiments.

Results: This original methodology led us to conclude that hydrolysed collagen (HC - Peptan©) contributes to limit bone loss induced by ovariectomy when mice were supplemented with 2.5% (HC/diet) (+3.8%). Limitation of bone loss in this model was not related to protein content but to a hydrolysed collagen specific effect and occurred, at least partly, through

the modulation of the RANKL circulating levels. Accordingly, ex vivo, HC was found to stimulate osteoblast activity (+300% mineralised area) while repressing osteoclast formation (-60%).

Conclusion: HC may stand as a relevant nutritional opportunity in the design of innovative strategies to manage bone health conditions.

Keywords: Metabolites; Bone; Hydrolysed Collagen; Nutrition; Osteoporosis

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NEGLECTED FRAGILITY HIP FRACTURE IN CEREBRAL PALSY

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Objective: To improve the knowledge about hip fragility fracture in cerebral palsy (CP) presenting a clinical case of a neglected femoral neck fracture occurred in a 15 years old hemiplegic boy.

Materials and methods: A 15 years old hemiplegic boy with CP (Gross Motor Function Classification System – GMFCS - level II), falling from a standing position sustained a femoral neck fracture initially misdiagnosed as hip bruise. An increasing hip pain over the next three months forced the patient on a wheelchair. The patient was referred to our institution due to persistence of hip pain and flexion contracture. At that time, the hip standard radiograph showed a neglected femoral neck fracture classified as Sandhu type 2. We performed an antero-lateral hip approach with muscles preservation and a T shape capsulotomy with postero-lateral flap preservation, in order to open and freshening the fracture. The fractures was fixed using three cannulated screw with a transverse one in the calcar. After fracture fixation autologous stem cell concentrate was injected in femoral head and applied in fracture gap as a gelled membrane.

Results: Six months after surgery a complete fracture healing without any complications. An improvement in hip function and pain was clinically evident.

Conclusions: CP is the most prevalent childhood condition associated with low bone mineral density. Hip fractures occur more frequently in this population than in non-disabled children. Their identification could be difficult in disabled patients, therefore it is mandatory to perform a comprehensive evaluation of CP patients with persistent hip pain, also performing second level imaging (i.e. MRI). Neglected hip fracture are challenging

for the orthopaedic surgeon and in patients with CP the appropriate treatment should be identified considering also GMFCS. The use of stem cells is an important augmentation technique for hip preservation surgery in neglected femoral neck fracture.

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BILATERAL ACUTE ANTERIOR UVEITIS AFTER ORAL RISEDRONATE ADMINISTRATION

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Background: Rare but serious side effects are described with widespread use of bisphosphonates for osteoporosis treatment. Surveillance data identified a link between this drugs and some inflammatory ocular disease. This include mainly uveitis and scleritis but there were also described cases of conjunctivitis, episcleritis or keratitis.

Case Report: A 59 year old woman received her first dose of Risedronate treatment for the management of postmenopausal osteoporosis and forty-eight hours later, bilateral eye irritations, periorbital swelling, blurred vision were presented. The diagnosis of bilateral acute uveitis was established in an Ophthalmological Hospital. The patient received topical steroids after witch ocular symptoms improved. Bisphosphonates therapy was not restarted even if there is not a contraindication in this aspect. Treatment with the same or other bisphosphonates may not induce additional ocular side effects.

Comment: The mechanism by which bisphosphonates cause ocular inflammatory adverse effects is not clear yet but is related with acute phase reactions such as elevation of C reactive protein, interleukin 1 or 6. Cessation of antiosteoporotic drugs may be efficient in some cases but steroids, topical, iv or oral administration, are necessary for many patients. The ophthalmologist and the prescribing doctors should be aware of this side effects of bisphosphonates which can occur between 2 to 30 days after medicine administration as we find in medical literature.

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SCLEROSTIN AND DICKKOPF-1 IN PREGNANT WOMEN WITH GESTATIONAL DIABETES

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Objective: In animal models, Wnt/ β -catenin signaling pathway has been shown to contribute to the modulation of insulin secretion, β -cell function and insulin signaling in skeletal muscle. Sclerostin and Dkk-1 are soluble antagonists of Wnt signaling, and sclerostin has been associated with an adverse metabolic profile. No data exist on the association between sclerostin and Dkk-1 with the main clinical features in pregnant women with gestational diabetes (GDM). Our aim was to investigate the possible role of sclerostin and Dkk-1 in pregnant women with GDM.

Materials and Methods: We recruited thirty-five consecutive women with GDM, identified between the 24th and 28th week of gestation by the 75 g oral glucose tolerance test (OGTT), according to International Association of Diabetes and Pregnancy Study Groups criteria; a group of normal glucose tolerance (NGT) (n=36) pregnant women were considered as healthy controls. For each women, levels of sclerostin and Dkk-1 were assessed the same day of OGTT. All the participants were followed until delivery, and several maternal and newborn's features were recorded.

Results: No significant differences were detected for age, height, family history of diabetes, history of previous GDM, sclerostin and Dkk-1 levels when women affected by GDM were compared with NGT women. Moreover, no significant differences were observed between GDM and NGT women as for pregnancy outcomes, i.e. gestational week at delivery, cesarean section rate, newborns' gender, neonatal weight and APGAR scores at 1 and at 5 minutes. Finally, at a multiple regression analysis, sclerostin (OR 0.98, CI 95% 0.87-1.10) and Dkk-1 (OR 1.73, CI 95% 0.91-3.30) were not associated with GDM onset.

Conclusions: Sclerostin and Dkk-1 levels were not associated with an adverse metabolic control in pregnant women and probably do not play a significant role in the pathophysiology of GDM.

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ALTERED IMMUNOBIOLOGY AND REDOX STATUS OF NATURAL KILLER CELLS IN RHEUMATOID ARTHRITIS

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Introduction: Rheumatoid Arthritis (RA) is an autoimmune disease with uncertain pathophysiology which involves interlocked signaling cascades. Redox status and immunobiology of natural killer (NK) cells might influence

the disease severity of RA patients. There is insufficient evidence in support of this hypothesis.

Objectives: In this study, the role of oxidative stress (pro and anti-oxidants) and the immune status of NK cell subsets in peripheral blood in the disease pathogenesis of RA have been investigated.

Patients and Methods: The study included 100 patients with RA, attending the out-patient department of Internal medicine, PGIMER Chandigarh. Age and sex-matched healthy volunteers were included. The state of oxidative stress in peripheral blood fractions, NK cells and their altered apoptotic signaling pathways involving mitochondrial membrane potential, FAS-associated death domain (FADD) mediated pathways and DNA damage were studied.

Results: There is an acute state of oxidative stress in peripheral blood of RA patients. NK cell subsets were found to be diminished though there are elevated expressions of ROS, depolarized mitochondrial membrane potential, FAS, FASL and active caspase-3 in NK cells of RA patients as compared to healthy controls. Moreover, the DNA damage, assessed as a percentage of DNA in comet tail, was significantly elevated.

Conclusions: The protective role of NK cells cannot be denied in RA pathophysiology. Findings of the present work indicate increased cellular apoptosis of peripheral NK cells in the diseased condition. PBMC and RBC are the major sites of enhanced oxidative stress. The state of oxidative stress and altered immunobiology of NK cells were strongly correlated with the DAS28 score.

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BODY COMPOSITION: BONE AND MUSCULAR VARIATION IN SPANISH MIDDLE AGE WOMEN

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Introduction: The relationship between reduced muscle mass and bone status is unclear. This study aim to know the relationship between body composition, muscle mass and bony mineral density in middle age women.

Methods: 1034 women are studied, aged between 40-80 years. Women are resident in Madrid (Spain). Project management are made by the FJD and the Department of Biology (UAM). Women were invited to participate in order to obtain assessment in Anthropometry and Body Composition. Study include: dual-energy X-ray (DXA) in Lumbar spine and hip,

Calcaneus Ultrasound (Sahara Hologic), Tetra polar Bio impedance to determine: Lean mass (LM), Fat mass (FM) and Water (WM). Skeletal muscle mass (MME) are: LM x 0.566 (Bahat et al, 2016). Relative appendicular skeletal muscle mass (MMAE) was determinate as 0.75 x MME (Iannuzzi-Sucisch et al.2012). Sarcopenia are defined according with index NHANES III (Janssen et al.2004) as IMMAE <6.76 kg/m². Bone density followed OMS classification: (DMO between -1 and -2.5, osteopenia and <- 2.5 T score, osteoporosis). Menopause status was defined after 9 month of continued amenorrhea. Discriminant analysis was used to determine the canonical functions to made associations between LM, FM and BMD. Factorial analysis was made to study the potential relevance of environmental factors.

Results: Women` age is 65.8±10.08. Actual BMI is 26,64 ±4,37. From 30` a loss of height (4,6±6,5cm) and an increase of weight (9.6±9,32 kg) has been detected. LM (%) is 59, 90 ±6, 33, MME:21.88±2.44, MMAE: 16,41±1,83. IMMAE index is 6, 92±0,67. Sarcopenia risk affected 40,07% of sample. T-score at lumbar spine and at hip are -2,39±1,14 (border osteoporosis) and -1,91±0,94 (osteopenia). After adjustment for age, discriminant analysis shows that bought degenerative process are related. The best canonical function to evaluate LM was L2-L4 (0.811), BMI (0.532) and% Fat (0.294). Factorial analysis shows that 60% of total variance is explain by the three firth factors. The firth, in which all variables contribute positively, is related to global body composition. Second one shows menopause as indicative of modification in fat body mass and loss of lean mass. Health habits (smoke and practice of exercise) referee the three factor in opposition of LM loss.

Conclusions: Sarcopenia is associated with osteoporosis in middle-aged and elderly women. But the present study shows that preventive modifications of life habits must modified bought degenerative process.

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CLINICAL CASES OF WORSENING OR NEWLY DEVELOPED PUSTULOSE PSORIASIS IN PATIENTS TREATED WITH ADALIMUMAB AND LEFLUNOMIDE

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Introduction: The mechanism causing worsening of the present psoriasis vulgaris and development of pustulose psoriasis is unclear. We had 3 clinical cases with peripheral psoriatic arthritis, psoriasis vulgaris and one case with newly developed pustulose psoriasis in patient with seropositive rheumatoid arthritis. All of them are treated with Adalimumab and Leflunomide.

Materials and methods: Three patients with psoriasis vulgaris, with starting therapy with Methotrexate 20mg/weekly and Adalimumab 40 mg every other week s.c. and one patient with RA. We used disease indexes- PASI, SDAI, DAS 28, CDAI. Histological proof of skin. At certain time point switch of MTX with Leflunomide 20mg/daily.

Results: Due to side effects against MTX it is switched with leflunomide respectively at 12 month, 5,6,9 months. In patients there is no worsening of the joint syndrome- no change in the disease activity indexes and the laboratory tests. In all patients pustulose psoriasis was proven histologically. The case of a female patient is interesting as at the 5th month after the start of the therapy and good initial response- reduction of the inflammatory markers, generalized erythrodermia developed, after which pustulose psoriasis developed, the whole condition of the patient worsened – Diabetes with ketoacidosis, while coping with the skin symptoms and transient acute renal failure. After this we switched the patient diagnose from RA to pustulose psoriasis.

Conclusion: The mechanisms of the clinical worsening of the patients are unknown, although the fact that Leflunomide elicits those processes despite the combination with anti TNF alpha. Probably it changes the synthesis of interferon alpha from the dermal plasmatic dendrite cells.

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EARLY DROP-OFF THERAPY WITH DAILY TERIPARATIDE FOR SEVERE OSTEOPOROSIS

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Introduction: Daily teriparatide (TPT) injections of 20 µg represent a single life-time option for severe osteoporosis as primary or glucocorticoid-related. Specific protocols are for each European country.

Objective: To introduce the panel of cases study regarding TPT early drop-off - within first 12 months.

Material and Method: This is TPT Romanian experience (prescribers are endocrinologists), according to a national protocol. This is an observational study - the decision of TPT stop was based on protocol criteria. Subjects were included in groups: A –TPT was stopped due to lack of compliance, B –TPT was stopped due to drug effects (and lack of signs and symptoms if the medication was stopped), and C – patients with a prior condition not remitted when TPT was no longer offered. All the patients received vitamin D±calcium. Fragility fracture (FF) during the first year were registered. All patients agreed to anonymously use their medical records.

Results: Out of 35 patients (32 menopausal women older than 55 years and 2 men), all confirmed with fragility fractures and associated therapy with TPT, 4 patients met the inclusion criteria. No patient was registered in group A, three patients were included in group 3: 63-year old male with a 4-year history of idiopathic osteoporosis with 2 prior FF who developed vertigo, dizziness and nausea after 2 months of TPT; an 83-year old female with a 7-year history of menopausal osteoporosis with vertebral fractures developed supra-ventricular extrasystoles after 3 months of TPT, an 82-year old woman with 4-year history of osteoporosis and previous forearm FF developed vertigo after one month. Group C included one female of 55 years with corticoid osteoporosis and scleroderma who developed complications of the rheumatologic condition including thickening of the skin at the level of subcutaneous injections (after 11 months). No FF was registered during the first year of TPT to any of 35 patients.

Conclusion: A rate of 11% early drop off was registered when TPT was offered based on national specific criteria for severe osteoporosis. Potential linked side effects should be considered for group B.

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CARDIOVASCULAR RISK SCORE IN PATIENTS WITH OSTEOPOROSIS IN ALBANIA

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Introduction: Cardiovascular disease (CVD) and osteoporosis are common age-related conditions associated with significant morbidity, mortality, and disability. Even though they have not been associated to each other, there have been discovered some evidences which may be very interesting in general approach to these diseases.

Objectives: To evaluate the Cardiovascular Risk Score in patients suffering from Osteoporosis in comparison to normal people and to assess if there is any significant relationship between Osteoporosis and Cardiovascular Risk factors.

Methods: This is a case-control study involving 305 patients. Two hundred patients not suffering from osteoporosis and 105 patients with osteoporosis were evaluated according to SCORE risk (Cardiovascular risk score- European Society of Cardiology). The assessment of cardiovascular risk score was realized according to ESC guidelines for Cardiovascular Risk. Age, Smoking status, Sex, Total Cholesterol Level, HDL-Cholesterol level and Systolic Blood Pressure were evaluated and cardiovascular status was compared among the two groups.

Results: After analyzing the results, it was found that patients with osteoporosis had a mean cardiovascular risk score of 5.3% (intermediate cardiovascular risk) and those who did not suffer from osteoporosis had a mean risk score of 2.8%. Patients with osteoporosis resulted with a cardiovascular risk 1.89 times more elevated than the normal group. This relationship was found to be statistically significant ($p < 0.05$).

Conclusions: This study shows that patients with osteoporosis have a more elevated risk to develop cardiovascular diseases in the future. Evaluating cardiovascular risk in patients with osteoporosis may be helpful in their general approach, follow-up and treatment.

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THE RELATIONSHIP BETWEEN OSTEOPENIA AND HEIGHT IN ALBANIAN MALES

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Introduction: Osteopenia is known to be related to a genetic and constitutional component, which is important in their development and course. Body height, being a distinctive constitutional component, can be an interesting feature in suspecting and diagnosing mineral bone diseases.

Objectives: To evaluate the relationship between height and osteopenia in Albanian males, presented at Rheumatology Clinic in UHC “Mother Teresa”, Tirana, Albania, and Pegasus Med- Laboratories, Tirana, Albania.

Methods: This is an observational study including 414 male Albanian patients presented at our Rheumatology Clinic between 2010-2016. Height and DXA was measured in every patient. All the data obtained were evaluated statistically in order to achieve reliable results.

Results: It was found that of 414 patients, 121 (29.3%) were diagnosed with osteopenia and the rest was found to be normal (293 patients-70.7%). The number of patients taller than 156 cm with Osteopenia was 113 and shorter than 155 cm was 8. After statistically calculating our data, it was found that

there is a strong relationship between height and osteopenia in Albanian males ($p < 0.005$).

Conclusions: Osteopenia was found to be more frequent in patients taller than 156cm. Height seems to be strongly related to Osteopenia in male Albanian patients.

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PERSISTENT KNEE PAIN AFTER TOTAL KNEE REPLACEMENT: PATIENT-REPORTED OUTCOMES FROM A DUAL-CENTRE ENGLISH COHORT STUDY

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Objective: We aimed to compare patient-reported outcomes measures (PROMs) between individuals with and without persistent pain (PP) one year after total knee replacement (TKR).

Methods: Data from a cohort of patients receiving TKRs at hospitals in Oxford and Southampton between 2010 and 2014 were analysed. Patients completed pre-operative and one-year follow-up questionnaires, and those with PP were identified by a score ≤ 14 in the 7-item pain component subscale of the Oxford Knee Score (OKS). PROMs analysed were the complete OKS, which measures pain and function and is scored from 0-48, and the EQ-5D, which combines five dimensions of health-related quality of life (QoL) that can be summarised in a score anchored at 0 (death) and 1 (perfect health). Comparisons of mean values were tested using the t-test for normally distributed variables, or the Mann-Whitney test otherwise.

Results: Of the sample of 567 patients who returned the follow-up OKS questionnaire, 73(13%) had PP. Whereas 56% of the sample were women, 70% of those with PP were women (OR 1.9, $p < 0.05$). There was no statistically significant difference in age at operation (mean of 70 years) or BMI (means of 30 and 32) between the groups.

Out of a maximum of 48, mean pre-operative OKS score was 20.1 for patients without PP and 14.1 for those with PP ($p < 0.001$). After the operation, mean scores increased to 38.8 and 16.9 ($p < 0.001$), respectively. Patients with PP reported more problems in all EQ-5D dimensions both before and after surgery. Their pre-op EQ-5D summary score was 0.27,

lower ($p < 0.01$) than that of patients without PP (0.48). After surgery mean scores were 0.39 and 0.79, respectively ($p < 0.001$).

Conclusion: Patients with knee pain at 12 months after TKR reported worse function, pain and QoL not only after surgery but also before, when compared with patients without PP. Differences between the groups increased after surgery as those with PP reported minor improvements after surgery whilst those without PP improved significantly in pain, function and QoL.

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EVALUATION OF SERUM LEVELS OF RANKL AND THE MEASUREMENT OF CIMT IN HIGH CARDIOVASCULAR RISK PATIENTS WITH INFLAMMATORY JOINT DISEASES

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Introduction: Atherosclerosis is inflammatory disease of the vessels. The pathogenic role of RANKL is crucial for the calcification of the plaque but is it the same for its stability?

Materials and methods: We evaluated 23 patients with acute coronary syndrome, with cardiac surgery intervention and inflammatory joint diseases (PsA, RA) we evaluated the cardiovascular risk with EURO SCORE II, serum levels of RANKL ($N < 4.25$ pg/ml with Human ELISA kits eBioscience, CIMT-assessment with US machine Aloka Prosound alpha 7.

Results: 13 of them with high vascular risk- Euro SCORE II above 20%, in 10 patients - Euro SCORE II is 10%. Serum

levels of RANKL- are as follows: In 8 patients, 5 of which are at high cardiovascular risk - 40.2 ± 3.2 pg / ml / $p < 0.005$ and for the other 15 patients 7.2 ± 1.2 pg / ml / $p < 0.005$ /, of which 8 are in the group over 20% risk. CIMT- over 1.1 mm in all 8 patients with high serum levels of RANKL and under 1.0 mm at rest, while the group at high serum levels of RANKL in 75% of subjects experienced varying degrees of stenosis of the common carotid artery and at 87% was observed plaque calcification.

Conclusion: Cannot say that the serum levels of RANKL is directly related to plaque instability and the manifestation of acute coronary syndrome. Its involvement in the pathogenesis of calcification of atherosclerotic plaques in itself could not serve as serum marker in these patients. Perhaps the studies in larger cohorts and more extensive studies could shed light on these questions.

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P401

HEALTHCARE RESOURCE USE BY PATIENTS WITH AND WITHOUT PERSISTENT PAIN AFTER TOTAL KNEE REPLACEMENT: FINDINGS FROM A DUAL-CENTRE ENGLISH COHORT STUDY

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Objective: To compare healthcare resource use by people with and without persistent pain (PP) in the operated knee at 12 months after total knee replacement (TKR).

Methods: We analysed data from people receiving TKR at hospitals in Oxford and Southampton between 2010 and 2014. Patients completed a pre-op and one-year follow-up questionnaire, and those with PP were identified by a score ≤ 14 in the 7-item pain component subscale of the Oxford Knee Score. Resource use was measured based on follow-up questions about visits to healthcare professionals for problems related to their operated knee. Comparisons of mean values were tested using the t-test for normally distributed variables, or the Mann-Whitney test otherwise.

Results: The sample included 567 people (56% women). Of these, 73(13%) had PP one year after TKR (70% women). There was no difference in age at operation or BMI between groups, but mean length of hospital stay for people with PP was 7.2 days compared to 6.1 for those without PP ($p<0.01$). A year after surgery, 28% of people without PP and 62% of those with PP visited their GP because of problems with their knee. This was reflected in a mean number of NHS GP visits of 0.6 and 2.6, respectively ($p<0.01$). People with PP (25%) were more likely to visit Nurse Practitioners than those without PP (17%), with an average number of visits of 2.3 and 0.5 respectively ($p<0.05$). Whilst 45% of those without PP visited a Physiotherapist, 60% of people with PP did. Average number of visits to NHS physiotherapists was 4.1 for people with PP and 2.3 for those without PP. Half (51%) of people with PP consulted with hospital doctors, compared with 22% of those without PP.

Conclusion: Based on a sample of 567 TKR patients, those with PP after surgery are more likely to visit healthcare professionals at primary and secondary levels of care during the first year, in particular GPs, for problems with their operated knee. This is the first study to explore resource use related to PP after TKR, with clear implications for service planning.

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A CUT-OFF POINT IN THE OXFORD KNEE SCORE TO IDENTIFY PATIENTS WITH CHRONIC PAIN AFTER KNEE REPLACEMENT

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Objective: To identify a cut-off point in the pain component subscale of the Oxford Knee Score (OKS) that could be used to identify patients with chronic pain 6 months after primary total knee replacement (TKR).

Material and Methods: We used data from the English NHS Patient Reported Outcome Measures between 2012/13 and 2014/15. Data from 126,064 knee replacement patients who responded to all 7 pain component questions of the 6 month post-operative OKS questionnaire were included. Questions captured self-reported pain severity, night pain, pain while

walking, standing up, limping, interference with work, and confidence. The pain component subscale pools these into a single score ranging from 0 (most pain) to 28 (no pain).

We adopted a data-driven approach to derive groups with different levels of pain using hierarchical clustering. ‘Similar’ observations were grouped in clusters and these were split based on inter-observation distance until no further splits could be made, or until the maximum number of clusters ($k=2, 3, \dots, 9, 10$) was reached. Clusters were examined based on distribution of their pain component subscale scores to identify if the cluster with the lowest scores (highest pain) was stable as the number of clusters increased. The highest value of a stable cluster would be the cut-off point.

Results: The distribution of clusters over the pain component subscale showed a changing shape for the highest pain group when the maximum number of clusters was set to two or three, but a consistent distribution was observed when this number was 4 or higher. The highest pain component score for the high-pain cluster was 24 for two or three clusters, but it converged to 14 for four clusters and above.

Conclusion: Our study identified a high-pain group scoring ≤ 14 in the OKS pain component subscale. This cut-off point can be used to identify patients with chronic pain after TKR. Further work to understand uncertainty around and potential relevance of this cut-off point to clinical practice is recommended.

Acknowledgements: This abstract presents independent research funded by the National Institute for Health Research (NIHR) under its Programme Grants for Applied Research programme (RP-PG-0613-20001). The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.

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BONE INVOLVEMENT IN DUCHENNE MUSCULAR DYSTROPHY

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Objective: Duchenne muscular dystrophy (DMD) is a rare X-linked recessive neuromuscular disorder caused by mutations in the dystrophin gene. Low bone mineral density (BMD) and increased fracture risk are often observed in subjects suffering from DMD. Our aim was to determine BMD, history of prevalent fractures, bone turn over and to look for possible determinants of BMD in this particular population.

Materials and Methods: Thirty-one DMD subjects were consecutively evaluated [median age 14 (12 to 21.5) yr.].

BMD was measured by DXA scan at lumbar spine; C-terminal telopeptide of procollagen type I (CTX) and osteocalcin (BGP), as bone resorption and formation markers respectively, and sclerostin were assessed. Left ventricular ejection fraction (LVEF%) and forced vital capacity (FVC%) were evaluated as possible determinants of BMD.

Results: The median Z-score values were -2 (-3.6 to -0.8) SD. Ambulant subjects showed significantly higher lumbar spine Z-score values in comparison with not ambulant ones, and subjects with prevalent clinical fractures had significantly lower Z-score values in comparison with subjects without prevalent fractures. Z-score values were positively correlated with FVC ($r=0.50$; $p=0.01$) and FVC was associated with BGP ($r=0.55$; $p=0.02$). GC exposure were not associated with poorer BMD. In not ambulant subjects, Z-score values were associated with BMI ($r=0.54$; $p=0.02$) and sclerostin was associated with age ($r=0.44$; $p=0.05$). At a stepwise multiple regression analysis, age, BMI, FVC and sclerostin levels were retained in the model as independent predictors of BMD.

Conclusions: In DMD, we observed low BMD especially in not ambulant subjects, irrespective of the use of GC, and identified FVC and sclerostin as determinants of BMD, suggesting further insights in the pathogenesis of bone involvement in this cohort.

Because of improved life expectancy, preventing osteoporosis and related fractures should be considered in DMD patients.

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THE STATUS OF BONE MINERAL DENSITY IN WOMEN WITH SURGICALLY INDUCED PREMATURE MENOPAUSE

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Introduction: Premature menopause is defined by the loss of ovarian function at or before the age of 40 years old. Postmenopausal osteoporosis is associated with microarchitectural modifications of the bone and consequently a low bone mineral mass. Surgically induced premature menopause is characterized by a sudden and dramatic drop in estrogen levels causing a rapid decline in bone mineral mass.

Objectives: This study aims to study the effect of an abruptly fall in estrogen levels in surgically induced premature menopause (bilateral ovariectomy with or without total hysterectomy) comparative with premature ovarian failure (non-surgical premature menopause) and their correlation with bone mineral density (BMD).

Material and Methods: We conducted a retrospective study, collecting data from patients hospitalized in our clinic. We analyzed the statistical correlations between a study group of 40 women diagnosed with premature menopause, divided into

two subgroups based on surgical and non-surgical causes of premature menopause. The measurement of femoral and spinal bone mineral density (BMD) were done using dual energy X-ray absorptiometry (DXA), the gold standard for the diagnosis of osteoporosis.

Results: In the study group, 60% (n=24) of patients had surgically induced premature menopause due to bilateral ovariectomy with or without total hysterectomy before the age of 40 years and 40% (n=16) of patients presented a non surgical cause of premature menopause (unknown cause 50%, 25% secondary to radiotherapy, 13% autoimmune ovarian failure, 12% secondary to chemotherapy). The median±SD of femoral BMD T-score in the surgically induced premature menopause subgroup was significantly lower (0.609 ± 0.14 g/cm²) comparative to non-surgical premature menopause subgroup (0.902 ± 0.12 g/cm², $p<0.005$). Moreover, the median±SD of spinal BMD T-score was also lower in the surgically induced menopause subgroup (0.758 ± 0.12 g/cm²) comparative to non-surgical menopause subgroup (0.998 ± 0.17 g/cm², $p<0.005$).

Conclusions: The etiology of premature menopause influence the rate of BMD decreasing. Surgically induced premature menopause is associated with a sudden drop in estrogen levels and consequently with a more important decrease in bone mineral mass compared to non-surgical causes of premature menopause.

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EFFECTS OF DENOSUMAB ON QUANTITATIVE ULTRASOUND AND DXA MEASUREMENTS IN AROMATASE INHIBITOR-TREATED BREAST CANCER WOMEN

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Objective: Bone loss has been reported in postmenopausal women receiving aromatase inhibitors (AIs) for the management of breast cancer (BC), and denosumab has been shown to prevent fractures in these subjects. We recently observed phalangeal quantitative ultrasound (QUS) to be associated with dual energy X-ray absorptiometry (DXA) measurements in BC women receiving AIs. Aim of this research was to evaluate bone status by QUS and DXA in women taking denosumab to prevent AIs associated bone loss.

Materials and Methods: 35 postmenopausal BC women, with at least one mild vertebral fractures, who started adjuvant treatment with AIs (i.e. anastrozole, letrozole, exemestane) were enrolled (mean age 61.2±4.5 yr.) and received subcutaneous denosumab (60 mg every 6 months) and oral cholecalciferol (25000 IU bimonthly). Phalangeal QUS parameters [Amplitude Dependent Speed of Sound (AD-SoS), Ultrasound Bone Profile Index (UBPI), Bone Transmission Time (BTT)] and DXA at lumbar spine and femoral neck were performed at baseline and after 24 months. At baseline, 12 and 24 months, C-telopeptide of type 1 collagen (CTX) and bone specific alkaline phosphatase (BSAP) were measured. The main outcomes were compared with a control group not receiving denosumab (n=39).

Results: Differently from controls, women receiving denosumab had a significant improvement of lumbar spine and femoral neck BMD and a significant improvement of all the QUS parameters. The % changes (Δ) of QUS measurements were significantly associated with Δ BMD at femoral neck. A significant reduction of CTX and BSAP values was detected and Δ CTX and Δ BSAP were associated with Δ BMD at lumbar spine ($r=-0.39$, $P=0.02$; $r=-0.49$, $P=0.01$, respectively).

Conclusions: This is the first time phalangeal QUS has been used in the follow-up of bone health in a set of AIs treated BC women receiving denosumab. Beyond DXA, phalangeal QUS may also provide additional information on the physical properties of bone tissue (e.g. structure and elasticity) that contribute to bone strength.

P406

THE "EPIGENETIC CLOCK" IN MESENCHYMAL STEM CELLS AND BONE TISSUE OF PATIENTS WITH OSTEOPOROSIS AND OSTEOARTHRITIS

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Objectives: To study and compare the DNA methylation age in Mesenchymal stem cells (MSCs) and bone tissue obtained from osteoporotic patients and controls with osteoarthritis.

Materials and methods: MSCs were grown from the bone marrow of the femoral head of patients undergoing hip replacement due to osteoporotic fractures or osteoarthritis

(n=40). DNA from first passage MSCs was extracted and converted with bisulfite to study DNA methylation with the HumanMethylation450k array. The epigenetic age was estimated from the analysis of a set of cytokines that show age-related changes in methylation by using Horvath's software (Horvath S, Genome Biology 2013). The same strategy was applied to trabecular bone fragments from 51 patients. The relative telomere length was also analyzed in MSCs and bone fragments by qPCR (Cawthon RM, Nucleic Acid Res. 2002).

Results: For MSCs we observed an overall correlation between the chronologic age and the epigenetic age estimated from the methylation of DNA ($r=0.64$). However, there were differences between the two groups. Thus, the residuals to the global regression line tended to be positive in the group of patients with osteoporotic fractures and negative in the group with osteoarthritis, with an average difference of 5.9 years ($p=0.007$). In bone tissue there also was a good correlation between the chronologic and the epigenetic ages ($r=0.67$), but in this case there were not significant differences between both groups ($p=0.114$). The measurement of the relative telomere length did not show differences between the fracture and osteoarthritis groups, in either the bone tissue sample (-0.5 ± 1.7 vs. -0.6 ± 2.0 relative units) or in cultured MSCs.

Conclusions: MSCs, obtained from osteoporotic patients, exhibit an accelerated epigenetic aging when compared with control individuals with osteoarthritis. This could restrict their capacity to differentiate into osteoblasts and, consequently, bone formation. However, such an accelerated aging is not observed in DNA extracted from whole bone tissue. Differences in bone turnover and the mean age of osteocytes, the most abundant cells in bone samples, could help to explain these apparently controversial results.

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SARCOPENIC OBESITY IS ASSOCIATED WITH LOWER PROXIMAL TIBIAL CORTICAL BONE QUALITY, INCREASED INTERMUSCULAR ADIPOSE TISSUE AND POOR PHYSICAL FUNCTION IN COMMUNITY-DWELLING OLDER ADULTS

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Objectives: We previously reported increased incident fracture risk in sarcopenic obese compared with obese alone older

adults, but no differences in falls risk. We aimed to determine whether bone quality is compromised in sarcopenic obesity, and which components of sarcopenic obesity contribute to poor bone quality in older adults.

Materials and Methods: 83 community-dwelling older adults (mean age 72.8 ± 5.4 years; 53% women) underwent whole-body dual-energy X-ray absorptiometry to assess appendicular lean mass (ALM), body fat percentage, bone mineral content (BMC) and density (BMD). Peripheral quantitative computed tomography assessed mid-calf muscle and inter-muscular adipose tissue (IMAT) cross-sectional areas (CSA), muscle density and proximal tibial (66%) cortical volumetric BMD, area and thickness. Physical function assessments including muscle strength (dynamometry) and postural sway (computerised posturography) were performed. Sarcopenia was defined as either low relative ALM or hand grip strength according to the Foundation for the National Institutes of Health Biomarkers Consortium Sarcopenia Project definition; obesity was defined as high body fat percentage.

Results: Seventeen (20.5%) participants were sarcopenic obese. Obese alone and non-sarcopenic non-obese demonstrated better knee extension strength and postural sway than sarcopenic obese (all $P < 0.05$). Non-sarcopenic non-obese and sarcopenic alone (both $P < 0.05$) had significantly lower mid-calf IMAT (relative to muscle CSA) compared with sarcopenic obese, and obese alone also tended to have lower relative IMAT ($B = -1.8\%$; 95% CI $-3.7, 0.1$; $P = 0.06$). Non-sarcopenic non-obese had significantly greater proximal tibia cortical volumetric BMD (26.3 mg/cm^3 ; 3.0, 49.5), and obese alone had greater whole-body BMC (222.8 g ; 32.3, 413.3) and proximal tibial cortical area (32.6 mm^2 ; 5.0, 60.2) and thickness (0.5 mm ; 0.1, 0.9), than sarcopenic obese. Amongst components of sarcopenic obesity, only ALM was independently and positively associated with proximal tibial cortical area (8.8 mm^2 ; 4.6, 13.0) and thickness (0.07 mm ; 0.01, 0.14). Mid-calf IMAT was the only independent predictor of cortical volumetric BMD (-0.5 mg/cm^3 ; $-1.04, -0.03$).

Conclusions: Sarcopenic obesity is associated with lower proximal tibial cortical volumetric BMD, area and thickness, as well as poor muscle strength and balance. Higher amounts of IMAT may contribute to the poorer bone quality and physical performance of sarcopenic obese older adults, increasing their risk for falls and fractures.

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HOW TO OPTIMIZE WAITING TIME AND IMAGING OPTIONS IN MANAGEMENT OF OCCULT HIP FRACTURES: EXPERIENCE FROM A UK DISTRICT HOSPITAL

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Background: Hip fracture is a major public health issue due to an increasing elderly population. X rays are the initial radiological investigation for suspected hip fracture. However, when x-rays are inconclusive, further imaging is required to ensure early diagnosis of hip fracture to prevent delays to theatre. According to the UK NICE guideline CG124, magnetic resonance imaging (MRI) should be offered if hip fracture is suspected despite negative X rays of the hip of an adequate standard. If MRI is not available within 24 hours or is contraindicated, consider computerised tomography (CT). The aim of this audit is to compare the current standard of management of occult hip fractures at Darent Valley hospital to the NICE guideline.

Methods: A retrospective study was performed over a 6-month period from May 2014 to November 2014 at Darent Valley Hospital. All patients received hip imaging including MRI or CT for occult fractures were included. The time of imaging requests and the time scans carried out and reported were collected through PACS system and electronic patient trauma database. After implementation of new recommendations following the discussion in audit meeting, second cycle of audit was performed from April 2016 to September 2016.

Results: First cycle of audit identified 49 patients while second audit identified 31 patients. The first audit showed that 81% of MRI (14/18) and 84% of CT (24/31) requests occurred and were reported within 24 hours. After implementation of new practice, 100% of hip imaging occurred and were reported within 24 hours. In addition, new practice improves the result of patients receiving appropriate scans from 52% (19/35) to 71% (21/31).

Conclusion(s): Implementation of new practice significantly improves the achievement of the target scanning time of 24 hours with appropriate imaging investigation of occult hip fractures. The new practice can help to meet the standards of NICE guideline by preventing delay of the diagnosis and achieving the 36-hour target for operating on patients with occult hip fractures.

P409

CARTILAGE PROPERTY AFFECT THE FOOT BONE STRESS AND STRAIN: A FE MODELLING ANALYSIS

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Objective: Cartilage was previously reported to work as impact cushioning between segments. However, the property of cartilage changed due to arthritis or other pathologies. This study was aimed to investigate the foot bone stress and strain characteristics under static and dynamic conditions during the alteration of foot cartilage mechanical property.

Material and Methods: A foot model was rebuilt with MIMICS from CT sliced medical images. SOLIDWORKS

was used to reprocess the 3D geometric foot model before import into the ANSYS software. Foot cartilage and ligament was built. The mechanical property of cartilage was adjusted to analyse the bone stress and strain relationship.

Results: The stress and strain under the static loading situation showed that the heel maximum stress was 3.135MPa and maximal deformation was 14.662mm. Under a dynamic loading condition, foot bone presented a similar stress and strain relationship compared with static situation. Within the cartilage elasticity limits, the foot overall strain presented a linear relationship with cartilage elastic modulus.

Conclusion: In this study, the foot bone stress and strain relation under static and dynamic conditions were simulated. The cartilage mechanical property was proven to influence the changes. Understanding the stress and strain relationship would be beneficial for foot arthritis pathological mechanism. This would provide implications for the treatment and rehabilitation of foot disorders.

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USING HYALURONIC ACID INTER-ARTICULAR INJECTION IN GRADE 4 OSTEOARTHRITIS OF THE KNEE FOR PATIENTS REFUSING OR UNFIT FOR TOTAL KNEE REPLACEMENT SURGERY

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Objectives: To measure the efficacy and benefits of Hyaluronic acid injection in sever osteoarthritis (OA) of the knee for patients refusing or unfit for Total Knee Replacement (TKR).

Methods and Materials: In King Faisal Medical Complex, during the period of 26 months (from October 2014 to December 2016) we conducted a case-series study of 114 knees (66 patients; 48 patients with bilateral knee OA and 18 patient with unilateral knee OA. All knees were classified as grade 4 osteoarthritis with sever narrowing of the joint space, multiple osteophytes, bone scoliosis and deformity. All these knees were candidate for TKR. However, TKR was not carried out for these patients due to either patients refusal or due to patients being unfit for TKR due to the presence of severe general illness. Patients were using NSAIDs and physiotherapy in the course of the disease. Three consecutive local injections of low-molecular weight Hyaluronic acid were given to all the patients with 2 weeks interval between each injection. Initial knee society score was recorded before the starting of the injection. Follow-up with measuring knee society score after 3, 6 and 12 months was done. Follow-up x-ray were done after 12 months.

Results: Improvement of the knee society score was significant in 102 knees (58 patients) with mean value improvement

of +13.6. Maximum improvement was evident after 3 months of the injection. Pain score, walking distance and upstairs mobilization were the most items increasing the knee society scoring system. However, range of motion improvement was minimal. No significant radiological differences were elicited in our study with slight insignificant decrease in joint space.

Conclusion: Although Hyaluronic acid inter-articular injection is not a recommended line in the standard treatment of grade 4 osteoarthritis, where patients are candidate for THR to gain the best prognosis. However, significant symptomatic improvement was evident in our study for patients refusing or unfit for TKR, when consecutive Hyaluronic inter-articular injection was used. Nevertheless, no evidence that inter-articular injection modify or stop the progress of the disease.

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SYSTEMATIC REVIEW AND META-ANALYSIS OF PREVALENCE OF SARCOPENIA IN POST ACUTE INPATIENT REHABILITATION

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Objective: To conduct a systematic review of reported prevalence of sarcopenia in post acute inpatient rehabilitation (IPR) setting.

Methods: The systematic review was conducted according to PRISMA guidelines (PROSPERO registration number CRD42016054135). Databases searched: MEDLINE, EMBASE Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Methodology Register, CINAHL. Search strategy: published between January 1988 and October 2016; key terms: 'sarcopenia' AND 'inpatient rehabilitation' OR 'rehabilitation' AND/OR 'prevalence'; abstracts available in English. Abstracts and subsequently selected full studies reporting the prevalence of sarcopenia in adults admitted to IPR reviewed irrespective of design, as long as the diagnosis of sarcopenia included assessments of both muscle mass and either muscle strength or function. Random effect meta-analysis was conducted. Methodological quality was assessed using MORE tool (Agency for Healthcare Research and Quality, US Department of Health and Human Services, 2011) and Joanna Briggs Institute Prevalence Critical Appraisal Tool (Munn et al, 2014).

Results: Identified 490 studies, 465 excluded after reviewing titles and abstracts, 25 full text articles reviewed. Three original research studies met inclusion criteria. Patient populations

included those after hip fracture in one study and with general deconditioning in two. Identified prevalence of sarcopenia in individual studies ranged from 46% to 58%. Pooled prevalence of sarcopenia obtained with random effect meta-analysis: 51% (95%CI 34-59%), heterogeneity $I^2=52\%$. Main quality shortcomings: lack of reporting of inter- and intra-rater reliability, generalizability to other IPR populations.

Conclusions: Original research examining the prevalence of sarcopenia in IPR is scarce. The majority of studies did not use accepted definition of sarcopenia where both muscle mass and strength or function are considered in diagnosis. Sarcopenia may be present in approximately half of IPR patients and its prevalence may vary according to the admission diagnosis.

References : Di Monaco et al, *Aging Clin Ext Res* 2015;27:465; Sanchez-Rodriguez et al, *Arch Geront Ger* 2015;61:176; Sanchez-Rodriguez et al, *Arch Geront Ger* 2014;59:39

P412

MUSCULOSKELETAL PAIN AND HEALTH-RELATED QUALITY OF LIFE AMONG BREAST CANCER PATIENTS: EVIDENCE FROM SOUTH INDIA

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Introduction: The musculoskeletal pain is one of the leading health problems among women. This study aims to examine the associations between musculoskeletal pain and health-related quality of life (HR-QOL) among breast cancer patients and women without a history of breast cancer.

Methods: A cross-sectional study was conducted among 68 breast cancer patients for an average of 3.5 years and 137 postmenopausal women without a history of cancer. Musculoskeletal pain was assessed using a 10-cm visual analog scale; HR-QOL was examined using the Medical Outcomes Study Short Form (SF-36) health survey. Linear regression was used to estimate the associations between pain and HR-QOL in both groups.

Results: Approximately 64% of the breast cancer patients and women in the comparison group reported musculoskeletal pain. Among women with breast cancer, those with pain had significantly lower HR-QOL scores in the physical (52.2 vs. 42.6; $p<0.001$) and mental (52.7 vs. 45.5; $p=0.01$) component summary scores compared with those without pain. In the comparison group, pain was associated with significantly lower scores in the physical (55.4 vs. 46.0; $p<0.001$), but not the mental, component summary score (52.1 vs. 52.4; $p=0.82$). The significant associations between pain and HR-QOL persisted after confounder adjustment in both groups. Among women with similar severity of pain, breast cancer patients reported significantly lower HR-QOL in the mental

summary component compared with the women in the comparison group.

Conclusions: Among breast cancer patients, musculoskeletal pain adversely affects both mental and physical components of HR-QOL. Preventing or treating musculoskeletal pain may improve overall HR-QOL among breast cancer patients.

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EFFECTS OF TWO EXERCISE PROGRAMS ON POSTURE AND BACK PAIN IN COMMUNITY-DWELLING ELDERLY WITH HIGH FRAGILITY FRACTURE RISKS

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Background/Purpose: Long-term improper posture may increase spine loading and lead to kyphosis, compression fracture and pain. We aim to examine the effects of 2 exercise interventions on spine curvature, low back pain and other associated indices in community-dwelling older adults with high fragility fracture risks.

Methods: Subjects previously enrolled in 2015 Wang Jhan Yang Charitable Trust Fund (WJYCTF) community based exercise program were invited for the 2016 program and were assigned to two groups. Integrated care (IC, $n=56$) group subjects received weekly 1-hour program led by an exercise specialist and muscle training (MT, $n=54$) group subjects received twice weekly 30-min machine based training. Each program was re-designed with special emphasis on central trunk muscle. Assessments were done at baseline and 12-weeks. Other than frailty and sarcopenia indices collected from 2015, major outcomes in 2016

included lower back pain score, back-to-wall test, balance test, and kyphosis/lordosis scores at 30, 45, and 60 degrees. Comparisons were made between baseline and 12-weeks and between 2 groups.

Results: Mean age was 72.6 ± 7.6 years with 68.2% female. For the entire cohort, after 12 weeks of intervention, there were significant improvements on back-to-wall test passing rate (85.6% to 95.5%, $p < 0.05$), balance score (1.78 ± 0.95 to 1.65 ± 0.83 , $p < 0.05$), and lordosis score at 30 (905.49 ± 507.83 to 1277.82 ± 1932.23 , $p < 0.05$) and 45 degree (1117.06 ± 1169.63 to 1322.97 ± 1371.78 , $p < 0.05$). However, there is no difference on low back pain scores. Also, between groups differences were not significant.

Conclusions: Two exercise interventions with emphasis on central trunk muscle training improved several indices on balance, and back posture among community older adults with high osteoporotic fracture risks.

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BONE HEALTH STATUS IN TYPE 2 DIABETES MELLITUS

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Objectives: This study is aimed to assess the prevalence of low bone mineral density (LBMD, i.e., osteopenia and osteoporosis) in type 2 diabetes mellitus (T2DM) patients using quantitative ultrasound scan (QUS). In addition, to assess the association between QUS score (normal BMD, osteopenia and osteoporosis) and demographic characteristics and diabetes-related data.

Methods: an observational, cross-sectional study was undertaken with 500 T2DM outpatients over a period of seven months in 2012 at Hospital Pulau Pinang in Malaysia. In this study, data were collected using a self-reported structured questionnaire about the socio-demographic data and osteoporosis risk factor and also retrospective collection of clinical data from patients' medical records. The skeletal health status was evaluated using QUS measurements to determine the prevalence of LBMD at the heel bone (calcaneus) using SONOST 3000.

Results: Out of 500, only 450 T2DM patients were screened for BMD using QUS measurement. The mean value of T-score for the total sample was (-1.67 ± 0.83) (median: -1.65) (range: -3.4 to 1.2) (CI 95%: -1.75 to -1.59). The mean value of T-score for normal BMD, osteopenic and osteoporotic patients' were (-0.41 ± 0.44) , (-1.65 ± 0.39) and (-2.76 ± 0.27) , respectively. According to QUS, the prevalence of normal BMD (T-scores greater than -1 SD) in this sample population was 18% ($n=81$), while the prevalence of osteopenia (T-scores between -1 and -2.5 SD) and

osteoporosis (T-scores less than -2.5 SD) were considered as 59.8% ($n=269$) and 22.2% ($n=100$), respectively. In this study, positive correlations were found between QUS parameters and weight, body mass index, waist circumference, hip circumference and waist to hip ratio (all $P_s < 0.01$). On the other hand, significant negative correlations were found between QUS parameters and age in years, menopause duration, HbA1c, duration of diabetes as well as systolic blood pressure (SBP) (all $P_s < 0.01$).

Conclusion: This study showed that T2DM patients had high prevalence of osteopenia and osteoporosis. In addition, good correlations were found between QUS and socio-demographic data. As a conclusion, low bone mineral density in T2DM patients is a noteworthy problem in Malaysia and it appears to be underdiagnosed, undertreated and overlooked until now.

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FRACTURE RISK ASSESSMENT ON JAPANESE PATIENTS WITH CARDIOVASCULAR DISEASES: COMPARISON WITH PATIENTS WITH ORTHOPEDIC DISEASES

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Objective: Fracture Liaison Service (FLS) is now considered to be effective to prevent next fracture. International Osteoporosis Foundation (IOF) provided The Capture the Fracture Best Practice Framework (BPF) for improving and standardizing FLS in each institute, which recommends fracture risk assessment to reduce future fracture. In orthopedic department, medical staffs routinely checked fracture risk, but it is not always the case in other departments. In the present study, we performed risk assessment for osteoporotic fracture of inpatients with cardiovascular diseases, to explore if fracture risk assessment should be extended to non-orthopedic patients in super-aging society.

Methods: We assessed the risk of future fracture using FRAX in 713 patients (aged from 50 below 90 years old) who admitted to cardiovascular ward ($n=424$) and orthopedic ward ($n=289$) in Fujita Health University Hospital. Mean age of the subjects was 71 ± 8 years old. We defined high risk (HR) group of future fracture when FRAX major fracture probability was above or equal to 15%.

Results: In total, 25.7% of patients were defined as HR group. Female patients admitted to orthopedic ward showed higher

prevalence of HR group in 70s (70.5%) and 80s (100%) than those in cardiovascular ward (61.5% in 70s, 71.0% in 80s). In orthopedic ward, 70 patients out of 289 was admitted to hospital because of clinical fracture. Among them, only 10 subjects were treated for osteoporosis on admission. Patients with prevalent osteoporotic fracture was found in 35 cases, only 3 of which were treated for osteoporosis on admission. In cardiovascular ward, there were 16 patients with the history of osteoporotic fracture, and 75% of them were not treated for osteoporosis.

Conclusion: Our findings suggest that it seems worthwhile to assessing fracture risk of inpatients outside orthopedic ward.

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PHOSPHATE OVERLOAD KEEPS MESENCHYMAL STEM CELLS IMMATURE AND DOES NOT INDUCE THEIR APOPTOSIS IN VITRO

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Objective: Inorganic phosphate (Pi) uptake at the cellular membrane is essential for the maintenance of cell viability because Pi is required for ATP synthesis. In addition, Pi uptake *via* Pi transporter is required for osteochondrogenic phenotypic changes of immature osteoblastic lineage and for both physiological and pathological mineralization. However, accumulating evidence suggests that Pi overload from the extracellular milieu causes cell stress. In the present study, we explored whether or not high Pi affect growth and differentiation of mesenchymal stem cells *in vitro*.

Methods: Adipose-tissue derived mesenchymal stem cells were obtained from 8 weeks CH3 mice. The cells were incubated with various concentration of phosphate for 7 days. Cell growth was examined by using MTT assay. Fluorescence-activated cell sorting (FACS) was performed to detect MSC-associated surface markers. Expression of phenotype-dependent transcriptional factors such as PPAR γ and Runx2 was quantified by qRT-PCR. Apoptosis was detected by caspase3/7 activity.

Results: ADMSC maintained MSC-associated surface markers CD90 and CD105 in high Pi buffer and the results of MTT assay revealed that the growth of ADMSC was not affected by 3 mM Pi buffer. High Pi (3 mM) decreased the expression of PPAR γ , RUNX2 and ALP in ADMSC, suggesting that high Pi slows down both adipogenic and osteoblastic differentiation of ADMSC. However, high Pi did not induce apoptosis of ADMSC.

Conclusion: These results suggest that high extracellular Pi could keep MSC in immature status without affecting survival of the cells.

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CHANGE OF BONE MINERAL DENSITY DURING WAITING PERIOD FOR PANCREAS-KIDNEY TRANSPLANTATION IN TYPE 1 DIABETES

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Objective: Both type 1 diabetes mellitus (T1DM) and end-stage renal diseases (ESRD) could be cause of secondary osteoporosis. The aim of this study was to assess the change of bone mineral density (BMD) in T1DM patients during waiting period for simultaneous pancreas-kidney transplantation (SPK).

Subjects and Methods: Post-SPK T1DM patients (n=9, M/F=3/6, age 40.2 \pm 5.4 years old) were recruited. They had T1DM for 24.4 \pm 5.5 years in average, and their mean duration of waiting for SPK was 844 \pm 517 days. Eight of 9 patients were on hemodialysis (HD) at the time of transplantation (mean duration of HD: 61.5 \pm 45.9 months). BMD at the lumbar spine and at the femoral neck were measured by using dual-energy X-ray absorptiometry (DXA), when they were registered to waiting list and were performed SPK (mean duration after transplantation 26.1 \pm 3.9 days). We also measured serum bone-specific alkaline phosphatase (BAP), osteocalcin, intact parathyroid hormone (PTH) and tartrate-resistant acid phosphatase 5b (TRAcP5b).

Results: The mean femoral neck BMD at SPK were significantly lower than that at the registration (Z-scores -1.9 vs. -1.5) (p<0.05). The mean lumbar spine BMD were also lower (Z-scores -1.0 vs. -0.9) (p<0.05) at SPK. Femoral neck BMD decreased more in lower intact PTH and BAP at SPK (p<0.05). On the other hand, the rate of changes in lumbar spine BMD were not correlated with bone turn over markers. The duration of waiting for SPK was not related to the changes of BMD at any site.

Conclusion: In T1DM patients with ESRD, BMD further decreased during their waiting for transplantation. The decrease at femoral neck BMD seems to be associated with low bone turn over at the transplantation.

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PERIPROSTHETIC BONE MINERAL DENSITY: DECISIVE FACTOR IN THE RECOVERY OF PATIENTS WITH TOTAL HIP REPLACEMENT

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Introduction: Periprosthetic bone mineral density is correlated with bone mineral density of the entire skeleton, being influenced by a number of factors represented by type of the disease that had imposed the hip replacement, as well as type of arthroplasty (with or without biocement). The objective of the study is to evidence the role of periprosthetic bone mineral density (BMD) in the rehabilitation of patients with total hip arthroplasty.

Material and method: The study, a representative sample analysis, was carried out at the Department of Medical Rehabilitation of the "Iuliu Hațieganu" UMPH Cluj-Napoca, in the period June-December 2009. The study inclusion criteria were met by a number of 58 patients aged between 30-83 years with uni- and bilateral cemented and uncemented total hip endoprostheses. A standard study protocol was elaborated, which included the measurement of BMD in the spine and both hips, using dual X-ray absorptiometry (DXA), with the Lunar Prodigy Advance osteodensitometer, the software for orthopedic prostheses being available. The device allows to determine the bone mineral content BMC (grams) and bone mineral density (BMD) (grams/cm²), in seven different areas around the endoprosthesis, known as Gruen zones. The patients were clinically evaluated using two scales: the Oxford Hip Score and the Quality of Life Questionnaire of the European Foundation of Osteoporosis QUALEFFO-41.

Results: The two scores were significantly correlated ($p < 0.005$) with the diagnosis made based on DXA examination and with the type of hip endoprosthesis (cemented or uncemented); they were higher in the case of low BMD (osteopenia/osteoporosis) and cemented endoprostheses.

Conclusions: Low periprosthetic BMD values delay the rehabilitation of patients with total hip endoprostheses și and significantly reduce the quality of life of these patients.

References: Vissers MM et al, Phys Ther 2011;91:615. Singh J et al, J Am Acad Orthop Surg 2010;18:72.

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IDENTIFICATION OF VERTEBRAL FRACTURES IN FRACTURE LIAISON SERVICES ACROSS THE UK

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Objective: To evaluate provision for systematic identification of newly reported vertebral Fractures in patients aged over 50 at Fracture Liaison Services (FLS) across the UK.

Material and Methods: A gap analysis tool was used to measure service provision against Standard one of the

National Osteoporosis Society clinical standards for FLS, relating to the systematic and proactive identification of vertebral fractures (NOS 2015).¹ Data was collected at 78 sites across the UK.

Results: 63% (49) of sites had *no* systematic process in place to identify vertebral fractures. Only 10% (8) sites identified all newly reported vertebral fractures. 27% (21) had procedures in place to identify *some* vertebral fractures, i.e. those within certain cohorts. There was considerable disparity across the UK. Sites in Scotland were significantly more likely to have a comprehensive process in place (38%, 6/16 than the rest of the UK (37, 2/62)

Discussion: Systematic identification of vertebral fractures poses a particular challenge to services due to a number of factors. Vertebral fractures are difficult to identify as they tend not to present or be admitted in acute settings where FLS are primarily based. In addition, services require support from radiology, including a commitment to avoid ambiguous terminology when reporting vertebral fractures. Furthermore, as a category, vertebral fractures fall between departments (Rheumatology, Orthopaedic, fracture clinic, AandE, spinal services)making systematic identification even more challenging. In the FLS database facilities audit(May 2016), the most frequently cited barrier to the identification of vertebral fractures was the lack of a patient pathway.²

Conclusion : Gap analysis shows a paucity of provision in the identification of vertebral fractures. This is a key driver for work underway in the NOS to develop a patient pathway for vertebral fractures, in conjunction with clinical experts, to promote best practice and best patient care.

References:

¹ <https://www.nos.org.uk/health-professionals/fracture-liaison-services>

² <https://www.rcplondon.ac.uk/projects/outputs/fls-db-facilities-audit-fls-breakpoint-opportunities-improving-patient-care>

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CONGENITAL ADRENAL HYPERPLASIA AND OSTEOPOROSIS: A REALITY? CASE REPORT AND REVIEW OF LITERATURE

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Background: Congenital adrenal hyperplasia (CAH) is a rare autosomal recessive disorder caused by defective steroidogenesis resulting in glucocorticoid deficiency; the patients assume a lifelong glucocorticoid (GC) therapy. It is thought that

excessive GC treatment, in CAH patients, increases the risk of osteoporosis and bone fractures.

Case presentation: We report the case of a 37-year old, female, smoker, normoponderal, diagnosed at birth with P450c21 hydroxylase deficiency simple virializing form, karyotype 46 XX, treated with glucocorticoids since early childhood. Menarche at 8 years old, no pregnancies and normal menstrual cycle in the last year. She associated long periods of secondary amenorrhea inconstantly treated with oral estroprogestatives. Biochemistry in normal ranges. Hormonal tests revealed: ACTH=66.66 pg/ml (5-46), testosterone=164.5 ng/dl, DHEA-S=278.9 µg/dl (60.9-337), 17 OH progesterone=69.5 ng/ml, estradiol=91,16 pg/ml, FSH=7.4 mUI/ml, LH=4.46 mUI/ml, 25 OH vitamin D=18.1 ng/ml, PTH=43.8 pg/ml (10-65). Spine DXA revealed a Z score of -2DS. Given the normal menstrual cycles we continued substitution only with Prednisone 5 -7.5 mg/day. We associated supplementation with Calcium 1000 mg/day and vitamin D3 1000 UI/day.

Conclusion: Some studies suggest that overtreatment with glucocorticoid leads to low BMD in CAH patients, resulting from the increased steroid effect on bone and, to a lesser degree, to an over suppression of androgens that have an anabolic bone effect. Other studies found no association between BMD and duration of steroid treatment at standard doses. Furthermore, BMD in CAH women under estrogen therapy is similar with those not taking exogenous estrogens. Lower values of femur BMD in CAH patients were described and considered a consequence of the pathology itself, and for this reason BMD measurement is probably justified in patients with CAH. Even there are no interventional therapeutic studies in CAH patients, preventive measures such as physical activities, calcium and vitamin D supplementation should be implemented.

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IN VITRO CHARACTERIZATION OF OSTEOBLASTS HOMEOSTASIS UPON EXPOSURE TO SERA OF OBESE WOMEN AFTER PHYSICAL ACTIVITY AND HYPOCALORIC DIET PROTOCOL

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Objective: Obesity is a multifactorial disease linked to metabolic chronic disorders. Recently it has also been associated

with mineral metabolism derangement and low bone mineral density. We previously demonstrated that exposure of osteoblasts (OBS) to sera of sedentary subjects affected by abdominal obesity alters cell homeostasis *in vitro*, leading to disruption of intracellular differentiation pathways and cellular activity. Thus, aim of present study was to investigate whether sera of subjects, before and after physical activity (PA) and hypocaloric diet (HD) could affect OBS activity *in vitro*.

Methods: Obese women were evaluated at time 0 and after 4, 6, 12 months of individualized prescribed PA and HD. Dual-Energy-X-Ray Absorptiometry measurements and blood collections were performed at each time point. OBS were exposed to sera of subjects as follow: 1) obese (OB T0) 2) obese after for 4 months (OB T4); 3) obese after 6 months (OBT6); 4) obese after 12 months (OB T12) of PA and HD.

Results: OBS exposed to sera of patients, who displayed increased lean and decreased fat mass (from 55.5±6.5 to 57.1 ±5.6*% and from 44.5±1.1 to 40.9±2.6**%, respectively), showed a time-dependent increase of Wnt/β-catenin signaling vs. cells with sera of obese women before PA and HD, suggesting recovery of this specific intracellular signaling. An increase of β-catenin nuclear accumulation, was also associated to an increase in Adiponectin receptor-1 (AdipoR1) protein expression, suggesting a positive effect on cell differentiation program. Moreover, a significant decrease in sclerostin amount and an increase of PINP were depicted vs. baseline suggesting a recovery of bone remodeling modulation induced by improved body composition.

Conclusion: Our results show for the first time that sera of obese sedentary women who increased lean mass and decreased fat mass, by a controlled PA and HD protocol, rescue OBS differentiation and activity, likely due to a reactivation of Wnt/β-catenin-pathway, suggesting that a correct life style can improve skeletal metabolic alteration induced by obesity.

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FRAILITY, SARCOPENIA, AND OSTEOPOROSIS: THE ROAD STUDY

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Purpose: The present study was performed to investigate the prevalence of frailty, as well as the proportion of cases of sarcopenia (SP) and osteoporosis (OP) coexisting with frailty.

Methods: The second survey of the Research on Osteoarthritis/Osteoporosis Against Disability (ROAD) study, a large-scale population-based cohort study, was conducted between 2008 and 2010. We enrolled 1,083 participants (aged ≥ 60 years; 372 men and 711 women) of the second survey of the ROAD study whose unintentional weight loss, self-reported exhaustion, and low physical activity had been assessed by using a self-administered questionnaire. Furthermore, they had completed assessments for handgrip strength, gait speed, skeletal muscle mass by bioimpedance analysis, and bone mineral density by dual X-ray absorptiometry. We defined frailty in accordance with Fried's definition. SP was defined as per the algorithm of the Asian Working Group for Sarcopenia, while OP was defined based on the World Health Organization criteria.

Results: The prevalence of frailty was found to be 5.6% (men, 3.8%; women, 6.6%). Among the individuals with frailty, 44.3% (men, 57.1%; women, 40.4%) were diagnosed as having SP and 50.8% (men, 21.9%; women, 59.6%) were diagnosed as having OP. After adjustment for age, sex, regional differences, and emaciation, a logistic regression analysis was performed using the presence of frailty as the objective variable and the presence of SP and OP as the explanatory variables. The presence of SP was significantly associated with the presence of frailty (odds ratio [OR], 4.59; 95% confidence interval [CI], 2.31–9.13; $p < 0.001$). By contrast, the presence of OP was not significantly associated with frailty (OR, 1.12; 95% CI, 0.58–2.16; $p = 0.74$).

Conclusions: This study suggests that the presence of SP, and not OP, could predict the presence of frailty.

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FRAX PREDICTS FRACTURE RISK IN PATIENTS WITH NON-DIALYSIS CHRONIC KIDNEY DISEASE

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Objective: FRAX[®] was developed to predict fracture risk in the general population but its applicability to patients with chronic kidney disease (CKD) is unknown.

Materials and Methods: Using the Manitoba Bone Mineral Density (BMD) Database we identified adults not receiving dialysis services with recent serum creatinine measurements (Diagnostic Services of Manitoba laboratory database), both measured within 1 y in 2005–2010. Estimated glomerular filtration rate (eGFR) was obtained from the CKD-EPI equation. Incident major osteoporotic fractures (MOF) and hip fractures were

ascertained from population-based healthcare databases. The performance of FRAX, derived without and with BMD (Canadian FRAX tool version 3.11), was studied in relation to CKD stage.

Results: The cohort comprised N=10,128 subjects (mean age 64 ± 13 y), including N=2184 with GFR 30–60 mL/min/1.73 m² (moderate CKD stage 3) and N=617 with GFR < 30 mL/min/1.73 m² (severe CKD stages 4–5). During 5 y observation there were 585 with incident MOFs (226 with hip fractures). In Cox proportional hazards models, FRAX stratified MOF and hip fracture risk regardless of CKD stage (TABLE); gradient of risk was slightly greater for MOF in those with moderate and severe reductions in eGFR (FRAX*eGFR interaction $P < 0.004$) and was unaffected by eGFR for hip fractures (interaction $P > 0.1$). eGFR was not an independent risk factor for fracture in the CKD population when adjusted for FRAX risk factors. Observed and predicted cumulative MOF and hip fracture probabilities (adjusted for competing mortality) were concordant for all eGFR categories, implying satisfactory FRAX calibration.

Conclusions: FRAX accurately predicts fracture risk in patients with moderate and severe CKD. Clinicians can use the same fracture risk assessment strategies in CKD patients as in the general population.

| | eGFR ≥ 60 (N = 7327) | eGFR 30–60 (N = 2184) | eGFR < 30 (N = 617) | Interaction eGFR*FRAX |
|------------------------|------------------------------|--------------------------|--------------------------|--------------------------|
| Incident MOF: | N = 406 | N = 138 | N = 41 | |
| FRAX without BMD | 2.56 (1.93–3.39) | 5.10 (2.85–9.11) | 3.56 (1.48–8.55) | P=0.004 |
| FRAX with BMD | 3.37 (2.51–4.51) | 6.04 (3.43–10.66) | 5.25 (2.13–12.93) | P=0.001 |
| Incident Hip Fracture: | N = 122 | N = 80 | N = 24 | |
| FRAX without BMD | 3.92 (3.05–5.04) | 4.89 (3.18–7.52) | 1.89 (1.14–3.16) | P=0.12 |
| FRAX with BMD | 4.01 (3.20–5.03) | 3.96 (2.82–5.56) | 2.85 (1.66–4.89) | P=0.41 |

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HIGH CARDIOVASCULAR RISK IN OLDER MEN WITH LOW TRABECULAR BONE SCORE: THE PROSPECTIVE STRAMBO STUDY

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Objective: Many studies show associations between cardiovascular diseases and fragility fracture. By contrast, data on the link between pre-fracture bone deterioration and cardiovascular risk are limited. Therefore, our aim was to assess the association between trabecular bone score (TBS) and the cardiovascular risk in older men.

Material and Methods: In 779 men aged 60–87 having BMI < 35 kg/m² TBS was assessed using a HOLOGIC Discovery A device (TBS iNsight 1.3). During an 8-year prospective follow-up, 49 men had acute coronary syndrome (e.g. myocardial infarction, unstable angina) and 162 men died (including 51 CV deaths). The analyses were adjusted for age, lifestyle, co-

morbidities, treatments, body composition and serum levels of testosterone, osteoprotegerin and C-reactive protein.

Results: Low TBS was associated with higher risk of acute coronary syndrome (HR=1.65 per SD decrease, 95%CI: 1.23-2.22, $p<0.001$) and was higher in the lowest TBS quartile (<1.142) vs. the highest (≥ 1.290) one (HR=2.95, 95%CI: 1.18-7.34, $p<0.05$). The associations remained significant after accounting for competing risk of death, e.g. HR=1.55 per SD decrease, 95%CI: 1.16-2.06, $p<0.005$. Furthermore, low TBS was associated with higher risk of cardiovascular death (HR=1.64 per SD decrease, 95%CI: 1.19-2.28, $p<0.005$). The risk of cardiovascular death increased across decreasing TBS quartiles (p for trend=0.01) and was higher in the lowest quartile (HR=3.56, 95%CI: 1.17-10.81, $p<0.05$) vs. the highest quartile. These associations remained significant after accounting for competing risk of non-cardiovascular death, e.g. HR=1.47 per SD decrease, 95%CI: 1.08-1.99, $p<0.05$.

Conclusion: Our data confirm the association between osteoporosis and cardiovascular disease and show that older men with low TBS have significantly higher risk of adverse cardiovascular outcome.

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INSTANT BIOMECHANICS RESPONSE OF WEARING TOES ROCKER SHOES FOR BUNION

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Objective: Human foot is the direct link between the internal locomotion kinetic chains with the external ambulatory surroundings. However, long term wearing ill-fitted shoes have degenerated foot functions, even deformed foot shape, thus forming bunion and hallux. This study aimed to analyse the instant biomechanics response of wearing toe rocker shoes, which was designed to practice toes functions.

Material and Methods: Twenty-five male subjects joined the jogging test, without history of wearing any rocker or unstable shoes. Normal flat shoes were chosen as control shoes, and experimental shoes (H-Hard and S-Soft) were formed with unstable hemisphere to the hallux region based on material properties. Plantar pressure measurement were conducted with Novel Pedar insole system, with frequency at 50Hz. The repeated measures ANOVA with post hoc Bonferroni test from SPSS 17.0 were taken to analyse the significance among control shoes, shoes-H and shoes-S, with significance level at 0.05.

Results: While jogging with shoe-H, the peak pressure and force-time integral in the lateral forefoot and other toes regions were obviously greater than those of control shoes ($p=0.016$ and 0.018) and shoes-S ($p=0.015$ and 0.005). On the contrary, the plantar pressure in the medial forefoot and central forefoot showed significant reduction ($p=0.008$, 0.015 and 0.038 , 0.027), and a greater increase in the hallux region ($p=0.000$, 0.003 and 0.000 , 0.000) with shoes-S.

Conclusion: Shoes-H with stronger rocker stimuli increased loading to lateral forefoot and other toes. Shoes-S presented obviously stimuli to the toes' gripping function, with illustration of reduced forefoot loading (medial and central forefoot). Based on the stimuli effect of shoes-S, future studies shall conduct longitudinal study and analyse the performance of a certain period training, which would provide reliable and comprehensive implications and instructions for toes function training.

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MUSCULOSKELETAL DISORDERS AND PERCEIVED WORK DEMANDS AMONG NURSES: EVIDENCE FROM INDIA

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Introduction: Musculoskeletal disorders (MSD) are common among nurses and can affect patient outcomes. The study objective was to measure prevalence of MSD and their association with perceived work demands and sociodemographic variables among female nurses at a tertiary care hospital in rural India.

Methods: A cross-sectional study was undertaken in 2015 through interviewer administered questionnaires which comprised three parts: sociodemographic data, modified Nordic questionnaire, and perceived physical and psychological work demands.

Results: 355 nurses with a mean age of 30.4 years participated. Prevalence of any MSD in the last seven days was 60.5% with low back pain being the most common and elbow pain the least common. Occurrence of any MSD was associated with age, number of children, working hours at home, BMI, and total work experience. High perceived physical demands score was associated with lower back (OR: 3.06) and knee pain (OR: 7.73).

Conclusion: Prevalence of MSD was high and occurrence of lower back and knee MSD was associated with perceived physical demands. This information should be used as a benchmark and guiding tool for designing work place interventions to improve working conditions and health of nurses.

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REVERSE TOTAL SHOULDER ARTHROPLASTY IN PATIENTS WITH OSTEOARTHRITIS

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Introduction: The Reverse Total Shoulder Arthroplasty, initially emerged as an alternative for the treatment of Osteoarthritis, and could not benefit from the anatomical glenohumeral arthroplasty. Over time current indications have been extended to other pathologies.

Objective: To evaluate clinical and radiographic short-medium term results.

Materials and Methods: A retrospective study was performed at the HUMS on 22 patients undergoing reverse total shoulder arthroplasty from 2004-2013. The indications for surgical intervention were Osteoarthritis, and patients who had the diagnosis of a pseudoparalytic shoulder in the setting of a Osteoarthritis. A pseudoparalytic shoulder was defined as 60 degrees or less of forward elevation with associated anterior and superior shoulder instability.

Patient-oriented outcomes were obtained using the Constant Score, preoperatively and postoperatively at 3, 6, 12, 24 months. In addition, functional ranges of motion were measured in forward elevation and internal and external rotation. Preoperative and postoperative Visual Analog Scale (VAS) were recorded.

Results: The mean patient age was 72,6 years (range, 51-75 years). The mean follow-up was 5,3 years (range, 6 months-11 years). 87% of the patients were women. 63% were right shoulders and 37% left shoulders. The main complaint was pain and loss of function for daily living activities. The average preoperative pain score was 7, with a range from 5 to 9. Preoperative Constant score averaged 23,9, with a range from 16 to 31. Postoperatively, all scores improved with a mean pain score noted at 1, range 0 to 6; mean Constant 69,2, with a range 23 to 74; Mean Abduction was 110, forward elevation was 120 degrees, external rotation of 62 degrees. Internal rotation 63 degrees.

Conclusions: Reverse arthroplasty is an excellent therapeutic option for the treatment of degenerative disease of the shoulder, but their long-term results are not entirely satisfactory than expected, design improvements are necessary in order to obtain better results.

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INFLUENCE BISPHOSPHONATES AND STATINS TO INCREASE BONE DENSITY IN POSTMENOPAUSAL OSTEOPOROSIS

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Introduction: bisphosphonates inhibit osteoclasts effect - blocking the farnesyl pirofat FPP synthase - a key enzyme of the mevalonate way, intermediate in the biosynthesis of cholesterol - which acts as a glucocorticoid receptor agonist. This has led to the analogy to the positive effect on the inhibition of bone resorption may be expected and the effects of statins.

Aim: to determine whether statins in conjunction with bisphosphonates increase bone density in postmenopausal osteoporosis

Methodology: we measured the bone density of the lumbar spine by DXA before and 27 months after the application therapy. First group of 30 patients were treated with ibandronate - 150mg in a slow i.v. infusion every III month and simvastatin - 40mg/day and control group, 30 patients - only by ibandronate. In both groups applied supplementation - calcium 1000 mg/day and Vitamin D3 880 IU / day. Inclusion criteria: postmenopausal women and hypercholesterolemia - total cholesterol > 5.4 mmol / l and diagnosed with osteoporosis T-score of <-2.5).

Results: From 20.09.2014 - 29.12.2016 in the Institute Niska Banja, ibandronate and simvastatin, were treated and followed 30 women, the average age **63.4±5.6**. Values T- score at the beginning of treatment was -2.71SD and BMD=0.674 g/cm². Women had hypercholesterolemia with average value of 7.96 ±2.35 mmol / l. Control the group of 30 women without hypercholesterolemia, average age 62.8±6.2 years, treated only by ibandronate T- score in this group at the beginning was -2.58 SD and BMD=0.718 g/cm². After 27 months of treatment, the bone density of the spine increased in the first group by 8.2% (p <0.0001) and in the second by 5.8% (p <0.0001). Statistical significant difference (p <0.05) increase in bone density was in the first group of patients, treated with simvastatin and ibandronate.

Conclusion: In association with statins and ibandronate seems to be the effect of osteoporosis treatment significantly improved

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FRAGILITY FRACTURE REGISTRY IN HONG KONG

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Background: Hip fractures are common among frail elderly populations and often have serious consequences on function, mobility and mortality. International studies have shown that interdisciplinary, multidirectional and systemic assessment for fragility fracture in elderly is beneficial to patients. However, in Hong Kong previously, there was no systemic management until the setup of Key Performance Index (KPI) for hip fractures in elderly in Hospital Authority (HA).

Methods: A working group on Fragility Fracture Registry (FFR) has been set up since early 2013, followed by a formal FFR subcommittee. The mission is to promote integrated clinical care in terms of holistic management journey from admission, operation to rehabilitation, until the patients return to community. Prevention of secondary fracture is also important. A pilot study was started in 6 HA (public) hospitals to capture the essential data (acute management, rehabilitation and 1 year follow-up) for managing fragility fracture patients. Data in 2012 of these 6 hospitals were collected and analyzed. A unified multi-disciplinary Fragility Hip Fracture Pathway (FHFP), starting from admission to rehabilitation and back to community, was established in 2015. This pathway was put into pilot in one of the HA hospitals.

Results: One-year outcome evaluation has been performed and the results was convincing (In terms of increase in KPI performance, decrease in acute length of stay and mortality).

Conclusions: The FHFP has been shown to have better functional outcome, and shorter length of stay. Further integration such as, orthogeriatric collaboration, 7-day rehabilitation, fracture liaison service, community programme, bone-health and sarcopenia management are all crucial to optimize the FHF care in the near future.

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BETA-THALASSEMIA MAJOR EXOSOMES MIGHT PROMOTE OSTEOCLAST DIFFERENTIATION THROUGH LNCRNA UPREGULATION

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Objective: Thalassemia Major (TM) is highly linked in development of osteoporosis. However, the molecular mechanism of β -TM-induced osteoclast differentiation is not known. Exosomes mediate cell-cell communication and LncRNAs are known to mediate important regulatory roles in human diseases. We aimed at identifying whether β -TM exosomes and LncRNAs play key role in osteoclast differentiation.

Materials and Methods: Plasma exosomes (n=30) were isolated from β -TM patients and healthy donor (HD) ranging in age ranging from 12 to 41 years. RAW264.7 cells were stimulated with receptor activator for nuclear factor- κ B ligand (RANKL) 100 ng/ml and macrophage-colony stimulating factor (M-CSF) 50 ng/ml for osteoclast differentiation in the presence of HD/ β -TM exosomes. The osteoclasts formation and osteoclast-mediated bone resorption were visualized

using TRAP staining and osteo assay kit respectively. Expressions of osteoclast markers were determined by RT-qPCR. Further, LncRNA expressions were determined through LncProfiler qPCR array and their interaction with OC markers was identified through bioinformatic analysis (RNA hybrid).

Results: Compared to the HD exosomes, β -TM exosomes promoted osteoclast differentiation in RAW264.7 cells stimulated with RANKL and M-CSF. β -TM exosomes significantly upregulated osteoclast specific markers (*Nfatc1*, *Traf6*, *Ctsk*, *cFos*, *Mmp9* and *Trap*) on day 3 and day 5 compared to day 0. We also identified significant increase in the formation of multinucleated osteoclast-like cells and pit formation by β -TM exosomes on day 5. Importantly, β -TM exosomes deregulated LncRNAs expressions in RAW264.7 cells during osteoclast differentiation. Further, bioinformatic analysis showed specific LncRNA-mRNA interaction between upregulated LncRNAs (AK082072, *Dlx1as* and *SNHG5*) and osteoclast proteins, Cathepsin K and DC-STAMP.

Conclusion: The present study for the first time shows important evidence that exosomes from β -TM patients promote osteoclast differentiation. Thus, upregulated LncRNAs by β -TM exosomes might specifically interact with osteoclast related proteins to regulate osteoclast differentiation.

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PERSISTENCE AND ADHERENCE TO DENOSUMAB FOR THE TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS

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Objectives: Osteoporosis is an asymptomatic systemic skeletal disease. Antiresorptive agents are useful, but their effectiveness is limited by the worst adherence and inadequate long-term persistence. The aim of this study is to demonstrate how the better adherence and the persistence of the treatment with Denosumab, a fully human monoclonal antibody with high affinity and specificity for RANKL, could decrease the risk of fractures in postmenopausal osteoporosis. In fact, a greater persistence and a good adherence to treatment for osteoporosis is associated with a reduced risk of fractures.

Materials and Methods: One-hundred-sixty-eight patients (166 women and 2 men) were recruited (mean age 77.1 years) in our Department between November 2013 and November 2016. Of these patients, nine were also in treatment with

adjuvant aromatase inhibitors for breast cancer. 60 mg of Denosumab were administered every 6 months. Two patients died during follow-up and were excluded from the study. Thirty-one patients have taken Denosumab for 3 years, seventy-one for 2 years, thirty-six for 1 year, fifteen within a range between 6 and 8 months and the last fifteen for 6 months. Adherence was defined as receiving a subcutaneous injections of denosumab every 6 months (± 2 week). Persistence was defined as continuation of treatment without a >60 -day gap. Through the use of an appropriate educational program and follow-up at 30 days it was improved patient awareness and empowerment. We have discussed with the patients about their preferences (oral bisphosphonates or subcutaneous denosumab), the role in fragility fractures risk reduction, side effects and the efficacy of the treatment despite the lack of any tangible “symptom” benefit.

Results: Adherence and persistence rate was 100%. None of the patients have had fractures in the period of observation.

Conclusions: These data suggest how effective communication and empowerment of the patients can improve adherence and persistence rate.

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INTRAVENOUS NERIDRONATE FOR THE TREATMENT OF PAGET'S DISEASES OF BONE: CORRELATION BETWEEN ALP LEVELS AND QUALITY OF LIFE AT 3, 6 AND 12 MONTHS OF FOLLOW-UP

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Objectives: To evaluate the correlation at 3, 6 and 12 months from the beginning of pharmacological treatment, among the reduction of serum ALP (alkaline phosphatase) levels and improvement of quality of life, especially with regards to the pain in patients with Paget's disease of the bone.

Materials and Methods: Eight Women (mean age 69.5 years) and seven men (mean age 59.7 years) with polyostotic Paget's disease of the bone and back and knee pain were recruited in the last year. Diagnosis was performed using bone scan and measurement of serum ALP levels. 25-OH-D levels were also measured. Quality of life and pain were evaluated using SF-36 questionnaire and NRS (numerical rating scale) respectively. 100 mg of neridronate were administered by intravenous infusion for 2 consecutive days. 50.000 units of cholecalciferol were administered weekly, if baseline serum levels of 25-OH-

D were between 5 and 20 ng/ml, or monthly if serum levels of 25-OH-D were between 21 and 31 ng/ml. Follow up was performed at 3, 6 and 12 months.

Results: After 3 months from the beginning of the therapy eight women and four men had achieved normalization of ALP levels and response rate were maintained at 6 and 12 months. Two men had achieved only a partial reduction of serum ALP level at 3 months, whereas at 12 months ALP levels had decreased to the normal range. These patients had lower levels of 25-OH-D. Afterwards to supplementation at 6 months they had achieved target values at 12 months. One man maintained high levels of serum ALP and continued to report pain at follow-up. All patients who had achieved normal range values of ALP levels had showed higher quality of life as assessed by SF-36 as well as reduction of pain on NRS at 3, 6, and 12 months.

Conclusions: These data suggest a clear correlation between bone turnover suppression and improvement of quality of life and pain after only 3 months since the beginning of the study.

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HYALURONIC ACID/SORBITOL COMPLEX IMPROVES CARTILAGE MATERIAL PROPERTIES

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Visco-supplementation is known to influence positively pain and mobility of patient suffering from osteoarthritis. The rapid and early reduction of pain was related to improvement of joint rheology and in relation with sorbitol acting as free radical scavenger that interferes with the Hyaluronic acid (HA) degradation and inflammation. Thus long acting effect on pain and mobility even after disappearance of the molecule from the joint cavity is poorly understood but a clinical reality. A physicochemical effect of HA/sorbitol complex (*SynolisVA*[®]) on articular cartilage micromechanical properties could be one of the mechanisms implicated. Indeed the main function of cartilage (shock absorption and force transmission) is influenced by its biomechanical characteristics.

To verify this hypothesis, distal femurs were harvested from 12 11-month-old rats. Bio-indentations (Piuma, Optics 11, Netherland) were performed at the level of the medial condyle at three different area submitted physiologically to different mechanical loading, before and after an overnight incubation in *SynolisVA*[®]. Controls were incubated in PBS. To investigate the persistence of the effect, all samples were than tested after a second overnight in PBS. Elastic modulus (MPa) and maximal force (N) were recorded. Indentation depths were located in the upper part of the hyaline cartilage. Thus cartilage thickness was evaluated by contrast

enhanced computed tomography with ionic contrast agent using (Hexabrix[®]) at the site of indentation. A mean modulus increment by $19.9 \pm 3.4\%$ ($p=0.001$) was observed in samples incubated with *SynolisVA*[®] and by $2.6 \pm 3.0\%$ (ns) in the control incubated in PBS. The difference between the two groups was significant ($p<0.001$). This modification of modulus was associated with a significant increment of maximal force by 7.3% . These positive effects were observed in all the 3 regions investigated. After a second incubation of all samples with PBS the positive significant effect was maintained $16.4.0 \pm 2.9\%$, the value remaining stable in controls. This study represents a proof-of-concept demonstrating a physicochemical effect of HA/sorbitol complex on cartilage material level properties. It also demonstrates the persistence of the effect even after removal of *SynolisVA*[®] from the incubation bath; suggesting a penetration and fixation of HA and/or sorbitol in the cartilage. This phenomenon could also account for the rapid clearance of HA generally observed after injection in the joint cavity. These results indicate that physicochemical improvement of cartilage material properties by *SynolisVA*[®] (HA/sorbitol complex) could represent a major mechanism explaining its long term efficacy.

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VITAMIN D DEFICIENCY AS THE CAUSE OF A VERY LATE HYPERPARATHYROIDISM DIAGNOSIS

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Hyperparathyroidism is our days a pretty rare cause of kidney failure. The picture of “stones, bones and groans” has become now history due to the new modern technics that allow us to analyze the phosphor-calcic balance easily along with the imaging devices that can localize parathyroid glands.

We present the case of a 71 years old man with 12 years of renal failure history, apparently idiopathic. Two years before the patient addressed us he was proposed for dialysis, which he refused.

At the present moment he presented with clear hypercalcemia with hypophosphatemia, a very high PTH and right Para tracheal mass that we thought was responsible for all of it. This intrigued us so we had this patient’s lab history which apparently did not show hypercalcemia or hypophosphatemia over years.

Our patient had at the time all the complications of hyperparathyroidism, he had severe nephrocalcinosis, high bone demineralization, nausea, myalgia, meaning we were in front of a long history of hyperparathyroidism.

The cause proved to be a vitamin D deficit, which is rare in hyperparathyroidism because usually high PTH stimulates the 1-alpha hydroxylase to activate vitamin D. This masked the hypercalcemia over years but could not prevent the consequences of high PTH.

After our patient had the surgery he developed “hungry bone syndrome” which aggravated the kidney disease so he had three dialysis sessions with good evolution afterwards but at the present time he is still slightly hypo calcemic and we are treating him with calcium supplements and active-vitamin D. I still remains a question whether to treat or not the complications especially osteoporosis in this case

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MONITORING STATUS OF VITAMIN D 25(OH)D3, 1,25-(OH)2D3, OF POLYMORPHISMS VDR AND VARIATIONS OF DBP (VITAMIN D BINDING PROTEIN) IN THE PRAXIS AREA OF THE OSTEOLOGY ACADEMY ZLÍN, CZECH REPUBLIC

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Aims: The research reports on monitoring the status of vitamin D (complex measuring of 25(OH)D3, 1.25(OH)2D3, polymorphisms VDR and variations of Protein binding) in the eastern area of the Czech Republic (2.5 mill patients) which is under the care of the Osteology Academy Zlín.

Methods: Vitamin 25(OH)D3, Vitamin 1.25(OH)2D3 by using a DiaSorin company’s method. Polymorphisms of vitamin D (FokI, ApaI, BsmI and TagI) and variations of DBP (rs7041 and rs4588): DNA was isolated by kit MagNa Pure Compact Nucleic Acid Isolation Kit I using automated isolator MagNa Pure Compact from 400 µl non-coagulable blood samples. Detection of all polymorphisms was carried out by a method of real time PCR with the use of hydrolysis and FRET probes on LC 480 II (Roche). Correctness of the molecular examination results was randomly checked by sequencing on a sequenator ABI 3100 AVANT (Applied Biosystem).

Results: Since the year 2007 we have carried out $n=130\ 485$ measurements of vitamin 25(OH)D3. The average reading was 70.3 nmol/L. Winter readings ($n=33\ 849$, $r=65.93$ nmol/L) differed from summer readings ($n=29\ 465$, $r=79.38$ nmol/L). The total number of measuring 1.25(OH)2D3 during the last two years was 14 084. The average value is 119.60 pmol/L. Changes in the individual seasons of the years are not significant. The following polymorphisms: FokI, ApaI, TagI, BsmI, were determined from polymorphisms VDR receptor. In total, these were stated with 2 127 patients. The most frequent mutations were determined in BsmI (rs1544410, G>A substitution) 45.1%. This was also significant in oncological diseases of the alimentary tract. Variants DBP rs4588 (mutation 12.0%) and DBP rs7041

(mutation 21.6%) n=489 patients, were determined in DBP. Total average reading for those patients was 343.3 mg/L.

Conclusion: Due to the high percentage occurrence of mutations in VDR or DBP in our population, we can observe a proven insufficiency of mono monitoring 25(OH)D in complicated cases. In the discussion we show a possibility for computerised interpretation of vitamin D status designed here for the clinical use.

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GLUCOCORTICOID-INDUCED OSTEOPOROSIS (GIO): 45 YEAR OLD MALE TREATED WITH TERIPARATIDE

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Introduction: GIO is the most common cause of secondary osteoporosis. It occurs early, with rapid bone loss in the first few weeks after initiation of the treatment, with a rate that is dependent mainly on the daily dose. Glucocorticoids induce fragility fractures, especially in spine, generating functional disability.

Objective: to describe the case of a male patient with GIO treated with Teriparatide.

Case Report: a 45 year old male with diagnosis of Autoimmune Hemolytic Anemia and Ulcerative Colitis was referred as he reported a chronic history of prednisone treatment with doses up to 100 mg a day for over more than 5 years. The current prednisone dose was 4 mg/day at the time of the medical consult. Baseline DXA was performed showing: (08/30/13) L1-L4 Z score -3, 0 CFI Z score -0, 8. Complete blood work, evaluating causes of secondary osteoporosis and spine X-Ray were normal. At that time prednisone was switched to hydrocortisone 30 mg/day and suspended once adrenal function was evaluated as normal. Therapy with Calcium, Vitamin D and Teriparatide was initiated. Control laboratory showed: calcium 9, 4 mg/dl PTH 28, 7 pg/ml VD 32 ng/ml. A new DXA to evaluate treatment response revealed: (03/20/14) L1-L4 Z score -1, 7 CFI Z score -0, 5 with a bone mass win of 13, 8% in spine. Due to the therapy success, Teriparatide was suspended. The patient received Teriparatide from October 2013 until July 2014, having had only 9 months of treatment in total. No bone fractures or adverse effects were reported during this period of time. The last control was carried out in May 2016 (iDXA): L1-L4 Z score -1, 9 TBS L1-L4 1,326 CFI Z score -0, 2 showing no significant bone mineral loss.

Results: Our patient responded successfully with an anabolic treatment improving his osteoporosis status and preventing fractures in a short period of time.

Conclusion: The Risk of fragility fractures is significantly increased in glucocorticoid treated patients. Fractures can occur with minimum doses such as 2, 5 mg of prednisone/day

and the risk goes up 5 times with doses of 7, 5 mg/day or more in the first 3 to 6 months of treatment. For this reason we consider that clinical evaluation and therapy to prevent osteoporosis should be initiated early once glucocorticoids are included as regular medication to prevent added morbidity to baseline disease.

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ASSOCIATION OF DYSMOBILITY SYNDROME WITH FRACTURE RISK IN THE MROS COHORT

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Introduction: Osteoporosis, obesity and sarcopenia are risk factors for fractures and their combination has a negative effect on musculoskeletal health (MSKH). We proposed a score-based approach to define this combination as “dysmobility syndrome” (DS). DS increases mortality in the NHANES cohort but no data exist on fracture risk. The most widely used fracture risk calculator, the WHO FRAX[®] tool, does not include several measures of MSKH such as physical function, muscle mass or falls. In this analysis of the Osteoporotic Fractures in Men (MrOS) cohort, we examine whether individuals with DS have a higher incidence of fragility fractures and whether this composite score confers additional risk for fracture, beyond risk estimates provided by FRAX.

Methods: The MrOS cohort was utilized in this study. The score-based approach to define DS includes six factors with one point assigned to each: appendicular lean mass/height² <7.26 kg/m², body fat >30%, T-score ≤-2.5, grip strength <30 kg, gait speed <1.0 m/s, and falls in last 12 months. A score ≥ 3 indicated DS. We used odds ratios and cox proportional hazard models to analyze risks of major osteoporotic fracture (MOF). Men were censored at the time of fracture or last follow up. We determined the hazards of fracture using presence of DS, the FRAX score, and the FRAX score in quartiles. We used the program R (www.r-project.org) to perform all analyses.

Results: 5827 men ages 74±6 years with a mean BMI of 27.4 ±3.8 kg/m² had complete data necessary for this analysis. 391 males (6.7%) met criteria for DS. 571 (10%) experienced a MOF including 245 (4%) hip fractures. DS increased the hazards of major osteoporotic (HR 3.31, 95% CI, 2.58, 4.23) and

hip (HR 3.48, 95% CI 2.41, 5.03) fractures. In adjusted models, DS and elevated FRAX risk each increased the hazards of major osteoporotic and hip fracture. Interaction models showed no significant interaction between the presence of DS and FRAX score for major osteoporotic ($p=0.184$) or hip ($p=0.177$) fractures.

Conclusion: DS was associated with increased MOF fracture incidence even after adjusting for quartiles of FRAX risk in this cohort of older men. Our study suggests that using a composite assessment of MSKH in addition to already available tools such as FRAX may improve identification of individuals at high fracture risk. Additional analyses are necessary to examine whether this approach can better distinguish between those who will fracture and who will not and whether the results can be reproduced in women.

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SUCCESSFUL IMPLEMENTATION OF A PHARMACIST-LED FRACTURE LIAISON SERVICE AT A US VETERAN AFFAIRS (VA) HOSPITAL

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Worldwide, an osteoporosis (OP) care gap exists for individuals with a fragility fracture (FF). US veterans are no exception. To address this OP care gap, fracture liaison services (FLS) are being implemented with the goal to prevent FF. Here we report the patient outcomes after initiating a FLS at a US Veterans Affairs (VA) health care system.

We identified veterans with a pelvic, hip and/or femur shaft fracture by querying a central database. We reviewed the circumstances related to each fracture; veterans with traumatic fractures, OP medication and/or recent dual-energy X-ray absorptiometry (DXA) were excluded. Veterans with a FF were contacted via letter and the responsible primary health care team was sent a template letter with OP management recommendations via the electronic medical record. Recommendations included DXA, laboratory evaluation, and pharmacologic and non-pharmacologic interventions. In most cases, trained clinical pharmacists serving as FLS coordinators performed all tasks with an expert physician available for questions. Presented data are based on a review 4 months after recommendations were sent.

The initial query revealed 149 veterans with pelvic, femoral, and/or hip fractures without a recent DXA and/or active OP therapy. Of those, 32 (31 males, 1 female) patients suffered a FF and qualified for the FLS intervention. 59% of patients had a DXA scan, 35% had their calcium/vitamin D intake reviewed, and 40% had started OP therapy or were referred to an OP specialist. When the primary care team's clinical pharmacist instead of the primary care provider implemented the FLS recommendations (10/32 veterans), 100% of the recommendations were addressed. Furthermore, 70% of patients had a bisphosphonate ordered, whereas it was 9% when no pharmacist was involved ($p=0.0004$).

Our study suggests that a pharmacist-led FLS can improve post-FF care in US veterans. We found a high percentage of OP care goals met when patients interacted with clinical pharmacists. This observation might be due to the fact that most pharmacists had dedicated training in OP management and their interaction with the patient focused on their FF. In summary, our data suggests that clinical pharmacists trained in OP management can very effectively implement a FLS intervention.

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THE IMPACT OF EARLY MENOPAUSE ON BONE MINERALIZATION

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Introduction: Osteoporosis is a skeletal disease characterized by impaired strength of bones causing an increased risk of fractures. Beside local factors, the bone homeostasis depends on many systemic regulatory mechanisms, many hormones, including the great role of the female sex hormone - estrogen. Estrogen exerts a direct or indirect effect on osteoblasts, osteoclasts, and bone marrow cells, which results the prevention of bone resorption.

Objective: To check how the early menopause, as one of the factors for osteoporosis, affects bone mineralization.

Materials and methods: This study included 120 postmenopausal women who had osteodensitometry measured in Specialized Hospital for Rehabilitation Banja Koviljaca at the DXA machine type LUNAR. The criteria for inclusion in the study were: that all subjects had menopause before the age of 45 and had none of the other risk factors of importance for osteoporosis. We made a questionnaire in which we recorded data of age, BMI (Body Mass Index) and the values of DXA findings: T score and BMD at the lumbar spine and femur. For better analysis, respondents were divided into three groups depending on the length of menopause, i.e. of age. The first group includes women with the shortest period of

menopause i.e. those to 60 years old, and there were 51 women. The second group includes women from 61 to 70 years old and there were 50 women. The third group includes women older than 70 years, 19 of them. Student t-test was used for statistical analysis as a method of testing hypothesis.

Results: The average age of respondents was about 63 (62.73). The youngest was 45 and the oldest was 78 years old. The average value of BMI was 28.06. The average value of BMD at the hip was 0.842 and at lumbosacral spine 0.904. The average age of entering menopause was 42.62 years. We registered: normal results in 11 respondents, findings on the level of osteopenia in 45 respondents, and osteoporosis in 64 respondents.

In all three groups of respondents, pathological findings were more statistically significant than normal findings. Among respondents from the first group, 86% had pathological findings, in the second group 94% and in the third 95%. In all three groups there was the least DXA findings. In the first group 7 respondents (13%), in the second group 3 (6%), and in the third group 1 (5%) had normal finding. Findings on the level of osteopenia was registered in 20 respondents (39%) from the first group, in 19 (38%) from the second group, and in 6 (31%) from the third group. The most common finding in all three groups of respondents was at the level of osteoporosis: 24 women (47%) from the first group, 28 women (56%) from the second group, and 12 women (63%) from the third group. Worse finding was more statistically significant among older respondents.

Conclusion:

- Early menopause is a major risk for osteoporosis.
- With the duration of menopause increases the percentage distribution of pathological findings.
- Early menopause requires mandatory screening for osteoporosis and possibly timely initiation of treatment.

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FUNCTIONAL BLOCK OF IL-17 CYTOKINE PROMOTES BONE HEALING BY AUGMENTING FOXO1 AND ATF4 ACTIVITY IN CORTICAL BONE DEFECT MODEL

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Introduction: The immune system plays very important role in the fracture healing process. However fracture healing is prolonged in disorders associated with systemic inflammation. Fracture healing is also decelerated in osteoporosis, a condition linked with systemic inflammation. Bone regeneration therapies like recombinant human BMP2 are associated with serious side effects. Studies have been carried out where agents like Denosumab and Infliximab enhance bone

regeneration in osteoporotic conditions. Our previous studies show the osteoprotective and immunoprotective effects of neutralizing IL17 antibody. Here, we determine the effect of IL17 neutralizing antibody on new bone regeneration and compare its efficacy with known osteoporotic therapies.

Methods: For the study, female BALB/c mice were ovariectomized or sham operated and left for a month followed by a 0.6 mm drill hole injury in femur mid diaphysis. The treatment was commenced next day onwards with anti-IL17, anti RANKL, PTH or Alendronate for a period of 3, 10 or 21 days. Animals were then autopsied and femur bones were dissected out for microCT scanning, confocal microscopy, and gene and protein expression studies.

Results: MicroCT analysis showed that anti-IL17 antibody promoted bone healing at days 10 and 21 and the healing effect observed was significantly better than Ovx, anti-RANKL antibody and ALN; and equal to PTH. Anti-IL17 also enhanced new bone regeneration as assessed by calcein labeling studies. Additionally, anti-IL17 therapy enhanced expression of osteogenic markers and decreased oxidative stress at the injury site.

Conclusion: Anti-IL17 antibody promoted new bone regeneration in a cortical bone defect model by augmenting FOXO1 and ATF4 Activity thereby decreasing oxidative stress. Overall, our study demonstrates bone healing and regeneration potential of neutralizing IL-17 antibody in osteoporotic fractures.

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VITAMIN D LEVELS IN PATIENTS WITH RHEUMATOID ARTHRITIS COMPARED WITH HEALTHY CONTROLS

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Objective: To evaluate the levels of vitamin D in patients with rheumatoid arthritis undergoing concomitant therapy with corticosteroids and DMARDs and healthy controls.

Material and Methods: In the present study we have selected 35 patients with rheumatoid arthritis (RA) and 10 healthy controls tested for the levels of vitamin D in the period January 2016. The age of patients with RA is between 20 - 65 years. The control group corresponds by gender and age of patients. The group with RA were diagnosed at least 12 months prior to this study (according to the criteria of the ACR/EULAR 2010). All of the patients with RA are on stable dose DMARD at least 12 weeks prior participation in the study, corticosteroids at a stable dose of less than 7.5 mg / day prednisone (or equivalent) at least four weeks prior to the enrollment. The healthy controls are without clinical and immunological data for RA, no corticosteroids and/or

NSAIDs therapy. All of the patients have never received biological treatment, nor supplemental therapy with vitamin D. Patients were tested for serum levels of 25(OH)D (ELISA).

Results: The age of patients with RA is between 20 and 65 years (mean age 51). Three (9%) of the patients are men and 32 (91%) are women. The disease duration is between 1 - 20 years (mean 6.06 years). The mean serum vitamin D in patients with RA is 11.43 ng/ml. Deficiency of vitamin D (values below 10 ng/ml) was found in 19 of 35 patients (54%). The mean value of vitamin D in healthy controls is 14.24 ng/ml. No statistically significant difference was found between both groups $p < 0.222$ ($p < 0.05$). In addition, we compare the level of 25(OH)D in RA patients with disease duration to 5 years and over 5 years. In 13 (37%) of the patients with disease duration above 5 years we found vitamin D level of 11.33 ng/ml which is not statistically different from the rest of 22 (63%), diagnosed in less than 5 years (25(OH)D - 11.63ng/ml) $p < 0.246$.

Conclusions: No significant difference was found between the levels of 25(OH)D in healthy controls and patients with RA in our study.

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ATYPICAL FEMORAL FRACTURE AFTER 2 YEARS OF ANTIRESORPTIVE THERAPY

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Background: Atypical femoral fractures are described as adverse reactions to long term antiresorptive therapy. The risk rises with the duration of the therapy and the patients described in case reports presented in specialty literature went through at least five years of antiresorptive therapy. It is reported that in the first two years of therapy, the risk is about 1.8 cases per 100,000 patients.

Case report: We present the case of a female patient treated with bisphosphonates (alendronate) for 18 months for severe osteoporosis, with left peritrochanteric fracture in her history, which developed atypical femoral fracture two months after she was switched to denosumab. The treating endocrinologist at that time decided to continue antiresorptive therapy with alendronate, but no significant rise in bone mineral density was noted after another 2 years of therapy. For this reason, we decided to start osteoanabolic therapy with teriparatide, and after 12 months of treatment, we noticed a significant increase in bone mineral density at lumbar spine of 8.2%, with no response in bone mineral density at right femur.

Comments: Use of bisphosphonates in treatment of osteoporosis is associated with a risk of atypical femoral fracture, probably due to suppression of bone turnover, including the suppression of “targeted remodeling” - a process by which microscopic cracks appeared in bone structure are resolved by osteoclast resorption and new bone formation. Denosumab therapy also associates this risk, as a consequence of its mechanism of action - blocking the RANKL interaction with its receptor on osteoclast, and, thus, blocking osteoclast-mediated bone resorption, including “targeted remodeling”. There are several cases of atypical femoral fracture described in literature in patients switched from bisphosphonates to denosumab, with no clear conclusion at this time whether this treatment strategy associates a higher atypical femoral fracture risk than bisphosphonates or denosumab treatment alone.

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REHABILITATION TREATMENT EFFICACY IN A WOMAN PACIENT WITH OSTEOPOROTIC FRACTURES AFTER VERTEBROBLASTY: A CASE REPORT

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Introduction: Osteoporosis is a skeleton disease characterized by low bone mineral density and deterioration of bone tissue, resulting in an increased risk of fragility fracture. Osteoporotic vertebral fractures are recognized as a significant health problem particularly in older people with an impact on the quality of life, mobility and mortality. Objectives: To examine the effectiveness of exercise interventions in pain relief and improving quality of life in a patient with osteoporotic vertebral fractures.

Case report: A 65-year-old woman with primary osteoporosis presented two vertebral fractures (D7 and D8) after a fall. She was subjected to vertebroplasty on D7-D8. She has come to our attention to the multidisciplinary outpatient clinic for diagnosis, therapy and rehabilitation of patients with vertebral fracture of Cluj-Napoca Rehabilitation Hospital after 6 months from vertebroplasty. She still presented pain in particular in dorsal spine. She was affected by hypothyroidism and she has a positive family history for osteoporosis (mother with femoral fracture). At physical examination she showed pain on spinous processes D7 and D8. She has an increased thoracic kyphosis and loss of lumbar

lordosis, a limited spinal flexion, only slight limitation on hip internal rotation and ankle flexion. Height and weight was measured for calculation of Body Mass Index (BMI) that was 25,8. The patient was treated with alendronate, cholecalciferol and calcium to decreased risk of new fractures that is present also in patients treated with percutaneous vertebroplasty. The patient started a specific rehabilitation program for fragility vertebral fractures (12 daily sessions, each of 30 minutes). The protocol was composed of spine extension exercises, progressive resistance exercises, isometric exercises for toning the abdominal muscles, exercises in sitting position and exercises in standing against the wall. The pain in dorsal spine was quantified with Visual Analog Scale (VAS). The health outcome was measured with the Quality of Life Questionnaire of the European Foundation for Osteoporosis (QUALEFFO-41).

Results: Both the score used to assess the pain and the quality of life were significantly improved ($p < 0,05$).

Conclusions: In conclusion the specific rehabilitation program proposed to this patient has showed good results about pain and health outcome.

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P444

EVALUATION OF THE DISEASE ACTIVITY (ASSESSED BY DAS 28) AND THE LEVELS OF VITAMIN D IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: To evaluate the levels of vitamin D in patients with rheumatoid arthritis undergoing concomitant therapy with corticosteroids and DMARDs and the correlation with RA disease activity.

Material and Methods: In the present study we have selected 35 patients with rheumatoid arthritis (RA) tested for the levels of vitamin D in the period January 2016. The age of patients is between 20 and 65 years. They are diagnosed with rheumatoid arthritis at least 12 months prior to this study (according to the criteria of the ACR / EULAR 2010). All of the patients are on stable dose DMARD at least 12 weeks prior participation in the study, corticosteroids at a stable dose of less than 7.5 mg / day prednisone (or equivalent) at least four weeks prior to the enrollment. Patients have never received biological treatment, nor supplemental therapy with vitamin D. Patients were tested for serum levels of 25(OH)D (ELISA method). The disease activity was

measured by visual analogue scale (VAS), ESR, CRP, joint assessment, DAS 28. Pearson correlation analysis is used for statistical analysis.

Results: The age of patients is between 20 and 65 years (mean age 51). Three (9%) of the patients are men and 32 (91%) are women. The disease duration is between 1 and 20 years (mean 6.06 years). 35 (100%) of the patients are positive for rheumatoid factor and 33 (94.3%) are positive for anti-CCP. The mean serum vitamin D in patients with RA is 11.43 ng/ml. Deficiency of vitamin D (values below 10ng/ml) was found in 19 of 35 patients with RA (54%). Pearson correlation analysis was used to assess the relationship between the levels of vitamin D and the disease activity of RA. No statistically significant difference was found $p < 0.388$ ($p < 0.05$).

Conclusion: Although more than half of the patients with rheumatoid arthritis have a deficiency of vitamin D has not shown statistically significant correlation with disease activity observed in these patients.

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INVERSE RELATIONSHIP BETWEEN BONE MINERAL DENSITY AND ADIPONECTIN IN MAINTENANCE HEMODIALYSIS PATIENTS

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Objective: Adiponectin (APN), secreted by adipose tissues, played an important role on energy homeostasis and antiinflammation. Few studies showed the association between APN and bone mineral density (BMD) in hemodialysis (HD) patients. We conducted this study to investigate the relationship between APN and BMD in HD patients.

Material and Methods: From Sep 2013 to Apr 2014, sixty-four HD patients were included in this study. APN was measured by Enzyme-Linked ImmunoSorbent Assay. BMD was measured by dual energy X-ray absorptiometry. Patients was classified as normal group (T-score > -1.0) or low bone mass group (T-score < -1.0) by WHO osteoporosis definition. The association between covariates and BMD were analyzed by multivariate regression analysis.

Results: Of these 64 patients, 41 patients (64.1%) had normal bone mass, 15 (23.4%) had osteopenia and 8 (12.5%) had osteoporosis. More diabetic patients distributed in the normal bone mass group, but not significant ($p = 0.065$). There were also no statistically significant differences in gender, age, dialysis duration and underlying diseases between two groups.

Among these HD patients with low bone mass, they had lower body mass index (20.9 ± 1.8 vs. 23.9 ± 3.9 kg/m², $p=0.036$), lower lumbar BMD (0.761 ± 0.087 vs. 1.073 ± 0.132 , $p < 0.001$) and lower lumbar T-score (-1.1 ± 0.6 vs. 0.74 ± 1.0 , $p < 0.001$). Instead of these findings, patients with low bone mass had higher serum adiponectin (16.05 ± 8.73 vs. 9.74 ± 3.63 µg/ml, $p < 0.001$). Univariate logistic regression analysis showed gender, body weight, white blood cell counts, hemoglobin, albumin, alkaline phosphatase and APN were significantly different between two groups. After stepwise multivariate logistic correlation analysis, BMD was inversely related to APN ($r = -0.268$, $p = 0.030$) in HD patients.

Conclusion: APN may affect bone metabolism in HD patients.

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DENOSUMAB VS. ZOLEDRONIC ACID IN TREATMENT OF OSTEOPOROSIS IN POSTMENO-PAUSAL WOMEN

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Objective: Low BMD is an important risk factor for the fractures in postmenopausal osteoporotic women. Fractures caused by osteoporosis can be life-threatening and a major cause of pain and long-term disability. Osteoporosis medicines can increase bone density and while the increases may appear small this can have a very positive effect on reducing fracture rates. We have proposed to compare the effect on the change of BMD during treatment with two powerful, parenteral antiresorptive therapies: Denosumab (DMAb) and Zoledronic Acid (ZOL).

Material And Methods: A randomized study, open-label in which 62 postmenopausal women with osteoporosis were randomized 1:1 to DMAb 60 mg subcutaneously every 6 months or ZOL 5mg IV once yearly for 2 years. Thirty-two osteoporotic women received DMAb and thirty received ZOL. All patients have received supplement of 1000 mg calcium and 1 mcg alfacalcidol/day. BMD was measured by DXA at baseline and to one and two years. The diagnosis of osteoporosis was confirmed using BMD-WHO criteria. We analyzed also: changes in serum calcium, 25-OHD, PTH and bone alkaline phosphatase (PAB) at baseline and at one and two years of treatment.

Results: At baseline mean BMD at LS was 0.727 g/cm² and increased at 0.811 g/cm² after 2 years, at women treated with

DMAb, a total of +5.4%. For the women treated with ZOL the baseline was 0.673 g/cm² and increased at 0.689 g/cm² a total of +2.4%. At TH the increase of BMD was +4.0% for DMAb and 1.8% for ZOL after 2 years. For FN the change in BMD was +2, 5% for DNAb and +0.9% for ZOL. No adverse events or new fractures under the therapy. No significant change in serum calcium, 25-OHD3, PTH

Conclusion: DMAb treatment increased more BMD at LS, TH and FN by comparing with ZOL in patients with postmenopausal osteoporosis. Both drugs were effective at 2 years of treatment. The difference, greater increases in bone density may be attributable to access to the cortical compartment of bone with DMAb not ZOL.

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DETERMINATION OF TRPV1+/T LYMPHOCYTES IN INFLAMMATORY ARTHRITIS AND THEIR CORRELATION WITH ULTRASOUND FINDINGS

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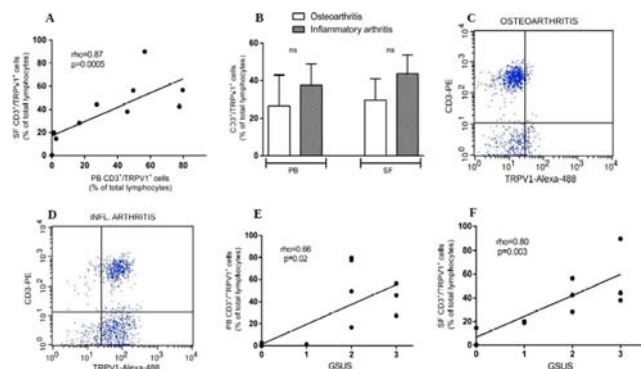
Objectives: The vanilloid receptor type 1 (TRPV1) is mainly expressed by the nervous system where is involved in the transmission of painful stimuli and neurogenic inflammation. TRPV1 expression has also been demonstrated in other cell types including the synoviocytes, where, TRPV1 activation, induces the production of pro-inflammatory cytokines such as IL-6 and IL-8. Recently the presence of TRPV1 was also demonstrated at the level of CD4 + T lymphocytes where it seems to play a key role in the activation of the T cell receptor (TCR). The aim of the study was to evaluate the presence of TRPV1 + T cells in peripheral blood (PB) and synovial fluid (SF) of patients with inflammatory joint disease and osteoarthritis and to correlate the concentration of TRPV1 + T cells with ultrasound variables of illness.

Materials and methods: 6 patients with known gonarthrosis secondary to chronic inflammatory disease (4 psoriatic arthritis, 1 rheumatoid arthritis, 1 ankylosing spondylitis HLA B27+) and 5 with knee osteoarthritis associated with joint effusion were enrolled in the study. The subjects underwent to ultrasound evaluation of gray-scale synovitis (GSUS), to ultrasound evaluation of PowerDoppler signal (PDUS) (0-3 definition OMERACT), to joint aspiration and blood sampling. Mononuclear cells of PB and SF were isolated second gradient (Lympholyte, Cedarlane). The phenotypic characteristics of such isolated cells were assessed by flow

cytometry after staining with anti-CD3-PE and anti-TRPV1-AlexaFluor488. It was performed statistical analysis by the Mann-Whitney test and calculation of the Spearman rank correlation coefficient.

Results: The T lymphocyte expression of TRPV1 in circulating cells significantly correlated with the T cell expression of TRPV1 in the joints ($p=0.0005$) (A). However, the percentage of T lymphocytes / TRPV1 + did not differ in patients with inflammatory joint disease than patients with osteoarthritis (B - D). Levels of T lymphocytes / TRPV1 +, both circulating and articular, significantly correlated with ultrasound degree of synovitis (GSUS) ($p=0.02$ and $p=0.003$ respectively) (E and F).

Conclusions: Our study demonstrates for the first time the presence of T lymphocytes / TRPV1 + in the joints in subjects with osteoarthritis and inflammatory joint disease. The correlation between the presence of synovial T lymphocytes / TRPV1 + and ultrasound score, expression of the degree of synovial proliferation, might suggest the hypothesis that T / TRPV1 + lymphocytes are involved in the inflammatory articular process. Moreover, the presence of T lymphocytes / TRPV1 + at the peripheral level, directly related to the concentration of the same synovial lymphocyte population, would be considered an indirect marker of inflammatory joint involvement.



P448 FEMORAL CARTILAGE THICKNESS IN PATIENTS WITH SYSTEMIC SCLEROSIS: IT IS RELATION TO VITAMIN D

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Background: Systemic sclerosis (SSc) is a chronic autoimmune and progressive connective tissue characterized by widespread vascular, immune and fibrotic changes of the skin and internal organs. Articular cartilage thickness has been previously investigated in few. Lower levels of vitamin D have been demonstrated in SSc patients and may be related to more

sever disease of longer duration and extensive skin involvement.

Aim: To compare the levels of vitamin D and femoral cartilage thickness (FCT) in patients with SSc with that of controls who were matched for age and sex and to analyze the associations between the (FCT), vitamin D levels and disease activity, severity scores, and quality of life.

Material and Methods: Twenty five SSc patients diagnosed according to ACR/EULAR- 2013 classification criteria and twenty five controls; apparently healthy age and sex matched were studied. Serum levels of 25-hydroxyvitamin D (25[OH] D) were assessed by (ELISA), levels less than ≤ 10 ng/mL are defined as deficiency, while > 10 ng/mL is defined as insufficiency. The thickness of femoral articular cartilage was measured by ultrasonography (MSU) in patients and controls. Three midpoint measurements were taken from each knee: lateral femoral condyle (LFC), femoral intercondylar area and medial femoral condyle (MFC).

Result: We concluded that SSc patients seem to have thinner femoral cartilage values at all studied sites than that of control. A significant difference was found in measurement of right inter condylar area ($p=0.029$), right medial condyles ($p=0.022$), left inter condylar area ($p=0.036$), left lateral condyle and left medial condyle ($p=0.001$) between patients and control. Lower levels of vitamin D was significantly found in SSc patients than controls and that was more predominantly among females ($p=0.009$) with longer disease duration ($p=0.03$) and sever skin involvement ($p=0.0001$). Vitamin D was correlated with SSc severity scale as well as thinner femoral cartilage sites studied by MSU, while some sites shown correlation with disease activity parameters.

P449 COMBINED ADIPOSE TISSUE-DERIVED MESENCHYMAL STEM CELLS (AT-MSCS) INTERVENTION IN SUPRASPINATUS PARTIAL THICKNESS TEAR AND LUMBER INTERSPINOUS LIGAMENT TEAR: EXPERIENCE OF 2 CASES

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Introduction: Mesenchymal Stem Cells (MSCs) repair muscle, bone, cartilage, or tendons. MSCs are commonly

found in the bone marrow, fat cells, circulating blood and in the joint. Adipose stem cells are the richest source of stem cells in the body. The adipose stem cell has the ability to differentiate into chondrocytes, fibroblasts, and other musculoskeletal tissue. The use of fat stem cells is a unique and promising approach and it holds key advantages over stem and regenerative cells from other sources. Stem cells in adipose tissue are 500 to 2,500 times more than that of bone marrow. Here we discussed two cases of Supraspinatus partial thickness tear and Lumber interspinous ligament tear confirmed by USG and MRI.

Case-1: Mr. X, 48 years, normotensive, nondiabetic, non-smoker, amateur golfer clinically diagnosed as case of supraspinatus tendinopathy. In USG scan, there was linear articular partial thickness tear in supraspinatus tendon in longitudinal view measuring about 0.5cm (1.21 cm proximal to insertion). Partial thickness tear was also found in MRI. Single dose autologous Adipose Tissue-Derived mesenchymal stem cells (AT-MSCs) with PRP were given. After 2 weeks, graded exercise was initiated. After 3 months active and passive ROM found Full and pain free in all axis. USG scan showed nearly filling of gap by regeneration of muscle.

Case-2: Mr. Y, a 72 years, old, hypertensive, diabetic, non-smoker, obese, businessman clinically diagnosed as a case of Mechanical Back Pain. USG scan showed tear of interspinous ligament measuring L:0.35x0.62cm, T:0.72x0.76cm; L:0.61x0.42cm, T:0.59x0.47cm and L:0.43x0.35cm, T:0.32x0.37cm at L2/3; L4/5 and L5/S1 level respectively. Then, single dose autologous Adipose Tissue-Derived Mesenchymal Stem Cells (AT-MSCs) with PRP (Platelet rich plasma) in each tear was given. After 2 weeks, surprisingly patient was found pain free and was advised to start isometric back muscle strengthening exercise and after 4 weeks, stretching and strengthening of paraspinal muscles was started. After 3 months, USG scan shows full of interspinous space by interspinous ligament.

Conclusion: Tissue regeneration by AT-MSCs is promising in our very limited experience.

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FEMORAL CORTICAL BONE THICKNESS IN PATIENTS WITH HIP FRACTURE: RELATIONSHIP WITH FRACTURE TYPE, BIOMARKERS OF BONE AND MINERAL METABOLISM, SOCIO-DEMOGRAPHIC AND CLINICAL CHARACTERISTICS

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Objectives: To evaluate femoral cortical bone thickness in patients with hip fracture (HF) and its association with fracture type, biomarkers of bone-mineral metabolism and clinical characteristics.

Materials and Methods: In 367 (267 females) patients (mean age 82.9±8.5 years) admitted in 2012 - 2014 with HF (191 cervical, 176 trochanteric) we measured on plain X-rays of the fractured and opposite side the femoral cortical thickness index (FCTI): the mean ratio of the diameter of the shaft minus the diameter of the medullary canal to the diameter of the shaft at 9, 10 and 11cm distal to the centre of the lesser trochanter. Associations between FCTI and clinical characteristics, serum biomarkers of bone turnover and mineral metabolism (PTH, 25(OH)-vitamin D, calcium, phosphate, magnesium), albumin and haemoglobin were analysed.

Results: On the fractured side, in both females and males the mean FCTI was significantly lower in trochanteric compared to cervical HF (0.397±0.081 vs. 0.437±0.082, p=0.000). On the non fractured side, the mean FCTI was significantly higher than that on the fractured one in both cervical (0.479±0.078, p=0.000) and trochanteric (0.455±0.077, p=0.000) groups. Among patients with cervical HF, FCTI was lower in females than in males on both the fractured (0.426±0.081 vs. 0.467±0.078, p=0.001) and opposite side (0.467±0.075 vs. 0.505±0.078, p=0.003). FCTI was significantly and negatively associated with age, female sex, dementia, congestive cardiac failure, use of walking aids, as well as with biomarkers of bone formation (osteocalcin, P1NP) and bone resorption (βCTx) and transferrin saturation, and positively with haemoglobin and albumin levels. Multivariate regression revealed as significant independent determinants of FCTI age (p=0.000), female sex (p=0.006), βCTx (p=0.010) [all three negative] and albumin (p=0.022) [positive].

Conclusions: Femoral cortical bone thickness is significantly lower on the fractured compared to the opposite side, in patients with trochanteric compared to cervical HF, and in females compared to males. Lower FCTI, which is independently determined by advanced age, female sex, higher levels of bone resorption and hypoalbuminaemia, appears as a promising risk factor for fragility and fractures.

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REHABILITATION AND QUALITY OF LIFE IN FEMALES WITH RHEUMATOID ARTHRITIS AND OSTEOPOROSIS

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Objectives: Chronic low back pain (LBP) is one of the most common symptom in osteoporosis rheumatoid arthritis females, leading to complex disability. Various rehabilitation programs have been proposed for chronic low back pain in

females with rheumatoid arthritis and osteoporosis. We assessed the effects of a 6 week complex rehabilitation program (pharmacotherapy, educational sessions, multi-modal exercise training and psychological support) on quality of life and self-control of the complex disorders, in females with rheumatoid arthritis and symptomatic osteoporosis.

Materials and Methods: 67 females (43,5 years mean age) with rheumatoid arthritis (mean disease duration 8.6 years) and osteoporosis (mean disease duration 2,5 years), were randomly assigned to a rehabilitation group – RG (n=35) and a pharmacotherapy (bisphosphonates) group – PG (n=32). Clinical evaluation, lab tests, exercise tolerance tests (six minute walking distance - 6MWD), HAQ score and Arthritis Self-Efficacy Scale (ASES). BMD was measured by dual X-ray absorptiometry in lumbar spine. Statistical analysis and correlation between data were done with the ANOVA and chi-square tests.

Results: We found no significant correlation between the mean of T-score and DAS28 value, but a significant correlation between the mean of T-score and pain. Both groups showed clinically and statistically significant improvements in HAQ and ASES scores at 6 weeks; ASES scores had improved by 41% in the RG and by 23% in the PG. The RG females were more satisfied with the overall outcome compared with PG subjects.

Conclusions: Osteoporosis rheumatoid arthritis females with chronic low back pain benefit from strategies to improve their quality of life. Multi-modal exercise (based on the coordination aerobic exercise and strengthening lower limb exercises) represents the adequate mode of physical training and is more effective in improving psychological status. Type and duration of physical training must be individualized to each patient, in accordance with severity of rheumatoid arthritis.

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THE ROLE OF REHABILITATION IN SYMPTOMATIC LUMBOSACRAL FACET SYNDROME

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Objectives: Facet syndrome (FS) is a condition of the small joints in the spine (called facets) characterized by pain and inflammation around the joint. FS generates complex disability, which can be controlled with adequate rehabilitation program. The aim of our single blind, randomized controlled study was to determine the importance of complete assessment and to assess the efficacy of comprehensive rehabilitation program in the patient with clinical and dysfunctional status caused by lumbosacral FS.

Patients and Methods: 46 patients with chronic lumbosacral FS were studied (21 men and 25 females, mean age 42,35 years). Establishing a diagnosis of FS is based on a detailed

history, physical and functional examination (functional muscular Krauss-Weber and Sorensen tests) and imagistic tests (X-rays and sonography). All subjects completed the package of questionnaires (VAS scale and LBP Module) at entry into the study (Time 1), after 2 weeks (Time 2) and after 6 week home training (Time 3). The initial treatment plan is focused on education, relative rest, pain relief, maintenance of positions that provide comfort, exercises supported by thermo-electrotherapy and massage. Once the painful symptoms are controlled, stretching and strengthening exercises of the lumbar spine and associated muscles were initiated. Eccentric muscle-strengthening exercises, including more dynamic conditioning exercises were performed to the home-training program.

Results and discussions: 13 patients were diagnosed with postural type of facet syndrome and 33 patients with pathologic type of facet syndrome (the Kleynhans classifying). The global painful status was monitored with VAS scale; its mean score increased with 47%. The global functional status was assessed by LBP questionnaire; its mean score increased with 62%.

Conclusions: The complete assessment of the patient with pain and dysfunctional lumbar status is necessary for positive diagnosis. Conservative treatment is most effective for relieving the FS: medications - help to relieve the pain and inflammation; physiotherapy helps to relieve the pain syndrome and modifying activity; exercises – permit to strength back and abdominal muscles, and to restore spinal flexibility. Dynamic lumbar control is necessary to protect the spine from biomechanical stresses, including tension, compression, torsion, and shear.

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2-YEAR PERSISTENCE WITH DIFFERENT ANTI-OSTEOPOROSIS MEDICATIONS: A POPULATION-BASED COHORT STUDY

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Objective: To estimate the 2-year persistence amongst incident users of different anti-osteoporosis medications.

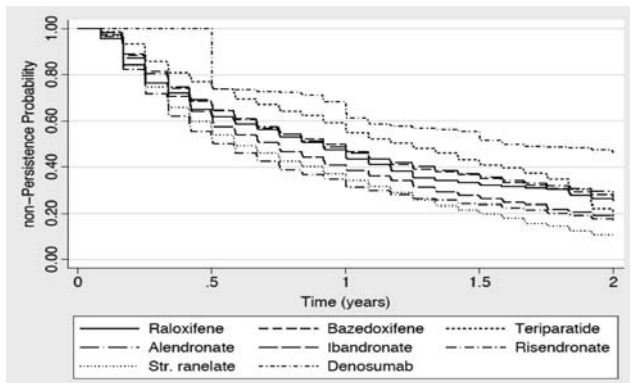
Material and methods: Cohort study based on the SIDIAP database (www.sidiap.org). Inclusions: women aged ≥ 50 years, incident users of any anti-osteoporosis medication (2012) and with data available for at least 12 months prior to therapy initiation. Exclusions: those with bone diseases/treatments (other than osteoporosis) and drugs with <100 users. Follow up: from 1st

pharmacy dispensation until end of follow-up (death, moving out or data extraction date, switching or treatment cessation, whichever came first). Persistence definition: concatenated pharmacy dispensations of index drug (90 days permissible gap). Users of alendronate were compared to other oral bisphosphonates, strontium ranelate, SERMs, teriparatide and denosumab. Multivariable Cox regression models were used to estimate hazard ratios of therapy cessation according to drug used.

Results: 19,267 women were included. Unadjusted 2-year persistence [95%CI] ranged from 10.3%[9.1%-11.6%] for strontium ranelate to 45.4%[43.1%-47.8%] for denosumab (Figure 1). After multivariable adjustment, only denosumab users had a reduced cessation risk at the end of the 2nd year (HR of 0.60, 95% CI 0.56-0.64). Conversely, ibandronate, risedronate and strontium ranelate users had an increased risk of discontinuation. All other drugs had persistence similar to that of alendronate users.

Conclusions: Unadjusted 2-year persistence ranged from 10% (strontium ranelate) to 45% (denosumab users). Only denosumab users had an improved 2-year persistence. Unresolved confounding by indication (i.e., imbalanced disease severity) might partially explain our findings.

Disclosure: Amgen S.A provided funding for this study. Amgen provided comments on the design of the study protocol and the analysis plan. The final protocol and analysis plan were mutually agreed by SIDIAP and Amgen, based on the principle of the “best science known in the research field”. Amgen also provided comments on the abstract prior to its submission. However, SIDIAP alone decided whether to incorporate Amgen’s comments.



P454

RELATIONSHIP BETWEEN OSTEOARTHRITIS AND OSTEOPOROSIS IN OVARIECTOMIZED OSTEOARTHRITIS RAT MODEL TREATED WITH MISTLETOE FIG LEAF EXTRACT

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Objective: Osteoarthritis (OA) and osteoporosis (OP) are two common postmenopausal musculoskeletal disorders. The relationship between OA and OP remains debated with contrary results reported. The non-steroidal anti-inflammatory drugs (NSAIDs) are the most frequently used agents to prevent pain from the diseases. However, the negative side effects of the NSAIDs have attracted considerable attention for the use of medicinal plants. *Ficus deltoidea* (FD) or known as mistletoe fig, is planted as an ornamental shrub in various parts of the world while it has been used traditionally as herbal medicine in tropical countries including Malaysia and Indonesia. In this report, we aim to evaluate bone alterations related to OA and risk of OP in ovariectomized OA rat model administered with FD leaf extract.

Material and Methods: Thirty twelfth-week-old Sprague Dawley female rats were randomized into five groups (n=6). The rats were undergoing bilateral ovariectomy (OVX) and OA was induced by intra-articular injection of monosodium iodoacetate (MIA) (60 mg/mL) into right knee joints, excluding healthy group. Healthy and OVX-OA non-treated groups were given deionized water while treatment groups were orally administered with FD leaf extract (200, 400 mg/kg) or diclofenac (NSAID) (5 mg/kg) once a day for 28 days. We determined bone mass density using Archimedes’ principle method. We utilized bone mechanical testing and micro-computerized tomography (micro-CT), in order to analyze the general strength of the bone cortical and the microstructure of the trabecular bones, respectively. Serum levels of osteocalcin, osteoprotegerin, and CTX-I were assessed by enzyme-linked immunosorbent assay (ELISA).

Results: We found that non-treated OVX-OA rat predominantly exhibit OA with inverse relationship with OP, which showed by increased in bone mass density and bone mechanical strength ($p<0.05$), while these changes were significantly decreased by FD leaf extract treatments ($p<0.05$). Conversely, when we zoomed in to the microstructure of trabecular bones (common fracture sites), we demonstrated that the OVX-OA model has developed risk to OP with reduction in total bone volume and increase in total porosity ($p<0.05$) at metaphyseal region (not significant at subchondral region). These findings were supported by bone turnover markers; with non-treated OVX-OA group has significant reduction of osteocalcin and osteoprotegerin (bone formation markers); and increase in CTX-I (bone resorption marker) ($p<0.05$). Groups treated with FD leaf extract showed reduced risk to OP ($p<0.05$).

Conclusions: This study demonstrated evidence of both inverse and direct relationships between OA and OP in OVX-OA rat, which may provide insight into the debatable topic of OA vs. OP. Contradictory results among different assessments of bone fracture risk on OVX-OA rat may due to active remodeling of bone in order to compensate the loss of cartilage, before further detrimental bone loss takes place in trabecular regions. FD leaf extract was presented as a potent agent

mitigating bone loss in postmenopausal (OVX) OA. There is need for further longitudinal study of the relationship between OA and OP in postmenopausal OA model.

P455

BONE MATERIAL STRENGTH INDEX BY MICROINDENTATION CORRELATES WITH CHITOTRIOSIDASE LEVELS IN PATIENTS WITH TYPE 1 GAUCHER DISEASE

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Objective: Gaucher disease type 1 (GD1) is a lysosomal disorder caused by a deficiency of beta-glucocerebrosidase, treated by enzyme replacement therapy although diffuse osteoporosis remains as a concern. We explored the bone tissue properties by microindentation analyzing the correlation of the biomechanical parameter with the most used marker of disease activity, chitotriosidase levels.

Methods: Cross-sectional study of 16 patients with type 1 Gaucher disease (GD1) from the Catalan Study Group on GD and 29 age and gender matched controls. Clinical data, laboratory workup and densitometry were performed. Bone Material Strength index (BMSi) was measured by bone impact microindentation using an Osteoprobe instrument, after checking for absence of bone infarcts or any other focal lesion in the area of indentation.

Results: As already reported (1), GD1 patients after multivariate adjustment, showed significantly lower BMSi compared to controls. Importantly, chitotriosidase levels were negatively correlated with BMSi (linear $R^2=51.6\%$, $p=0.004$) (Figure 1).

Conclusion: Bone tissue mechanical characteristics are deteriorated in patients with GD. BMSi correlates with chitotriosidase, the marker of GD activity.

References: (1) Herrera S et al. ASBMR 2016. MO0327

Acknowledgments: CIBERER, ISCIII and Shire Pharm

Figure 1. Scatterplot (and fitted –unadjusted- linear regression line) of Chitotriosidase and BMSi

P456

LOW FREQUENCY VIBRATION IMPROVES BALANCE AND BONE MINERAL DENSITY

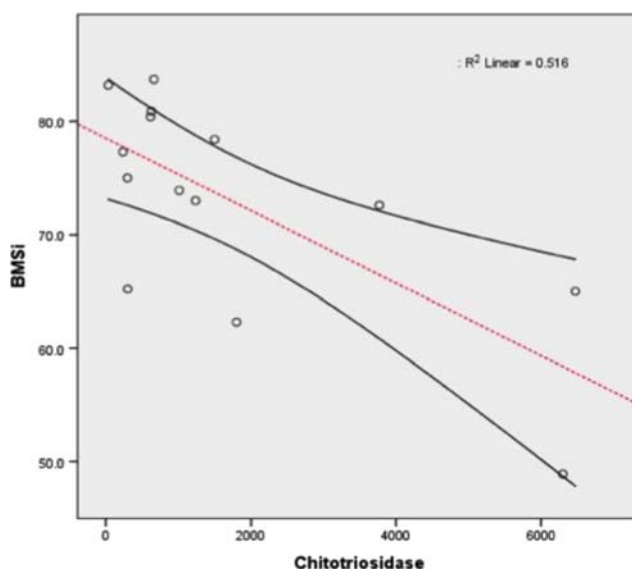
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Objectives: Low intensity mechanical vibration has been shown to improve musculoskeletal parameters and can be a useful tool as part of the prevention and treatment protocol for osteoporosis. The purpose of this study is to determine whether 6 months of low frequency vibratory exercise at 15 Hz using a reciprocating plate is effective for improving bone mineral density (BMD) and balance in postmenopausal women.

Material and Methods: The study included 15 postmenopausal women who followed a vibratory exercise programme consisted of 3 sessions per week, 6 sets of 1 minute, (3 mm in amplitude, with 60° of knee flexion, with 1 minute rest between sets). The duration of the vibration programme was about 25 minutes, which included 10 minutes warm-up. Hip and lumbar BMD were measured using dual-energy X-ray absorptiometry and balance was assessed by the blind flamingo test, at the beginning of the trial and after 6 months of training.

Results: After 6 months, the hip BMD was increased 3.2% ($P=0.011$), lumbar BMD was slightly increased (only 1.7%, $p=0.05$) and balance was improved by 25%.

Conclusion: The vibratory exercise programme was more effective for improving balance and BMD at the femoral neck than lumbar BMD, with a high frequency of attendance at sessions (92% of the participants completed the programme).



References:

1. Torvinen S et al. *J Bone Miner Res* 2003;18:876.
2. Gusi N et al. *BMC Musculoskeletal Disorders* 2006;7:92.

P457**EFFECTS OF TAI CHI EXERCISE ON MUSCLE STRENGTH AND BALANCE IN POSTMENOPAUSAL WOMEN WITH OSTEOPAENIA**

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Objectives: In the elderly, reducing risk factors for falls may be more important than improving the bone mass density, because falling presents a much more pressing threat compared with the slow response to bone strength therapy. To reduce risk factors for falls, older adults are recommended to perform exercises that maintain or improve balance and especially lower extremity strength. This study tried to investigate the effects of 12 weeks of tai chi intervention on risk factors for falls in postmenopausal women with osteopenia, measuring knee extensor muscle strength and balance, baseline and at the end of the trial.

Material and Methods: 30 females aged 65 years and older with osteopenia were recruited and randomly assigned to 12 weeks of tai chi (50 minutes/session, three sessions/week, n=15) or a control group (did not perform any physical activities, n=15).

Results: The knee extensor muscle strength increased by 15.64% (p<0.001) only for the interventional group, and the period of maintaining balance in the unipodal position showed an increase of 22.73% for the tai chi group and a decrease of 2.18% for the control group.

Conclusions: Tai chi improves the strength of the inferior member and general balance, thus helping in the prevention of falls and has the advantages of a low cost and easy training activity for elderly people.

References:

1. Wolfson L et al. *J Am Geriatr Soc* 1996;44:498
2. Hong Y et al. *Br J Sports Med* 2000;34:29

P458**EFFECTS OF PILATES EXERCISES ON PHYSICAL FUNCTIONING IN POSTMENOPAUSAL OSTEOPOROSIS WOMEN**

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Objectives: Pilates is a physical method that combines muscle strengthening, lengthening and breathing to develop trunk muscles and restore balance. Due to the

modifiable nature of the movements, Pilates exercises are suitable for all ages, and some studies reported the effectiveness of these exercises on improving physical functioning among older adults. The objectives of this study were to investigate the efficacy of a specific-exercise intervention based on the Pilates Method on balance, muscle strength, physical performance and quality of life (QOL) in postmenopausal osteoporosis women.

Material and Methods: Fifty postmenopausal osteoporosis women were randomly allocated into two groups: control- home exercise program and Pilates- 1-hour exercise sessions, 3 times per week, 12-weeks. Patients were evaluated at baseline and at after completion the exercise programs using: the flamingo test, muscular testing for hip stabilization muscles, physical performance level and the Short Form-36 (SF-36) for quality of life.

Results: Balance and muscle strength improved (p <0.05) in the Pilates group compared to the Home group. Also physical performance test showed significant increases in the Pilates group (p<0.05) whereas there were no changes in the control group (p> 0.05). There were significant increases in all parameters of QOL in the Pilates group.

Conclusion: Pilates exercises may be a safe and an effective treatment alternative for elderly patients with postmenopausal osteoporosis.

References:

1. Bergamin M et al. *Age (Dordr)* 2015;37:118
2. Kloubec JA. *J Strength Cond Res* 2010;24:661

P459**OSTEOPROTEGRIN INTERACTS WITH BIOMARKERS AND CYTOKINES THAT HAVE ROLES IN OSTEOPOROSIS, SKIN FIBROSIS, AND VASCULOPATHY IN SYSTEMIC SCLEROSIS: THE MULTIFACETED RELATIONSHIP BETWEEN OPG/RANKL/TRAIL AND WNT INHIBITORS**

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Objectives: We investigated the interactions of osteoprotegerin (OPG) with biomarkers of bone turnover and cytokines, including soluble receptor activator for nuclear factor kappa beta ligand (sRANKL), tumor necrosis factor-related apoptosis-induced ligand (TRAIL), and Wnt inhibitors, and we evaluated its relationship with osteoporosis, fibrosis, and vasculopathy in systemic sclerosis (SSc).

Methods: The study included 52 SSc patients and 30 healthy controls. Skin thickness, pulmonary fibrosis

and/or hypertension, digital ulcers, and calcinosis were assessed. We determined bone mineral density (BMD) and the levels of OPG, sRANKL, TRAIL, secreted frizzled-related protein 1 (sFRP-1), Dickkopf-related protein 1 (DKK-1), and sclerostin.

Results: OPG, sRANKL, sclerostin, and sFRP-1 levels were similar between patients and controls ($P>0.05$). Femoral neck and lumbar spine BMD and vitamin D levels were lower, and the OC, NTX, DKK1 and TRAIL levels were significantly higher, in patients than in controls ($P<0.05$). In subgroup analysis, patients with higher mRodnan skin scores had significantly higher DKK1, sclerostin, and TRAIL levels ($P<0.05$); those with diffuse SSc subtype had lower BMD values than those with limited SSc ($P>0.05$). Correlation analysis showed that calcinosis and pulmonary fibrosis correlated negatively with BMD measures.

Conclusions: This cross-sectional study showed that sRANKL levels were correlated with bone turnover markers and may be related to osteoporosis in SSc. The OPG level was unaltered in SSc patients. Higher TRAIL levels associated with skin thickness may indicate vascular dysfunction or injury. Higher DKK-1 and sclerostin levels may be related to a reactive increase in intrinsic defects due to epigenetic modifications and be prominently linked to fibrosis and osteoporosis in SSc. Patients with diffuse SSc had a higher risk for osteoporosis and hypovitaminosis D.

P460

SECONDARY FRACTURE PREVENTION IN SOUTH-EASTERN FINLAND: ANALYSIS OF ANTI-OSTEOPOROTIC TREATMENT AFTER FRAGILITY FRACTURES AND COSTS FOR ORGANIZATION IN CHARGE

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Objectives: Our aim was to analyze the one-year number and secondary prevention of low-energy fractures and to evaluate the costs of these actions.

Material and Methods: We report the data and treatment of all low-energy fractures in women aged over 45 years

and men over 60 years treated in North Kymi Hospital, Kouvola (86 000 inhabitants), Finland in 2015. Patients were selected by the ICD-10 codes from the electronic patient records. All patients received a questionnaire on clinical risk factors. Laboratory testing and DXA scans were performed. FRAX was used for major fractures (FRAXMajor) and for hip fracture (FRAXHip). Costs: DXA scans; laboratory tests; salary for fracture nurse and physician.

Results: There were 548 patients (78% women) with 570 fractures. The mean age of women was 73.5 y (SD 12) and of men 77.5 y (SD 10.5). 31% had a wrist fracture; 21% hip; 12% proximal humerus; 10% ankle; 10% vertebral and 16% other fracture. The response rate for the questionnaire was 73% (400/548). S-25(OH)D was measured in 67% after on average 109 days after the injury. Mean S-25(OH)D level of women was 94 nmol/L and that of men 93 nmol/L. DXA measurements were assessed in 256 patients. Osteoporosis (T-score of ≤ -2.5 SD) was found in 34%. FRAXMajor was $\geq 20\%$ in 30% of women and $\geq 10\%$ in 26% of men. FRAXHip was ≤ 7.5 in 63% of women and in 41% of men; > 7.5 in 37% of women and 59% of men; > 10 in 27% of women and in 11% of men; and > 20 in 11% of women. 83% (333/400) used calcium plus vitamin D supplements; and 37% anti-osteoporotic medication. Of hip fracture patients 28% used anti-osteoporotic drugs and 40% calcium plus vitamin D supplements. The total cost was 87 560 e, corresponding to the yearly treatment cost of three hip fracture patients in 2013 in Finland.

Conclusions: According to the Finnish hip fracture guidelines all hip fracture patients who are not bedridden and regain their independence in mobility should use calcium plus vitamin D and anti-osteoporotic treatment. This was not achieved.

P461

DEMOGRAPHIC AND CLINICAL FACTORS ASSOCIATED WITH BONE MINERAL DENSITY IN PATIENTS WITH SPINAL CORD INJURY

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Objective: Loss of motor ability after spinal cord injury is an important cause of immobilization that result in osteoporosis. The objective of this study is to investigate

the factors associated with bone mineral density in patients with spinal cord injury.

Material and Methods: A total of 58 patients with spinal cord injury who had undergone DXA during inpatient rehabilitation were reviewed. Demographic and clinical factors including age, time since injury, level of spinal injury, ISCOS-ASIA impairment scale were analyzed using multiple linear regression analysis to find out predictors for bone mineral density and T score of the femoral neck and total hip.

Results: 45 male (mean age, 40.0±14.3) and 13 female (mean age, 46.8±17.7) patients were included in the study. 25 (55.6%) male and 3 (23.1%) female patients had osteoporosis; 11 (24.4%) male and 7 (53.8%) female patients had osteopenia. Osteoporosis in male patients was found more frequent than that in female patients ($p=0.039$). Bone mineral density and T score of the femoral neck were significantly associated with time since injury ($p=0.019$, $\beta=0.002$; $p=0.017$, $\beta=0.012$, respectively) and suffering from cervical spinal injury ($p=0.042$, $\beta=0.159$; $p=0.047$, $\beta=0.194$, respectively) in male patients only.

Conclusion: The findings suggest that male patients after spinal cord injury had more frequent osteoporosis in comparison with premenopausal female patients. The results for postmenopausal female patients needs further research. Time since injury and cervical spinal injury are predictors for bone mineral density in male patients with spinal cord injury.

P462

THE EFFECTS ON DISEASE ACTIVITY AND BONE TURN-OVER MARKERS OF THREE MONTHS TREATMENT WITH ALFACALCIDOL OR PREDNISONE IN ACTIVE RHEUMATOID ARTHRITIS FEMALE PATIENTS

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Background: Rheumatoid arthritis (RA) is the risk factor for osteoporosis (OP) and fractures in both men and women. Alfacalcidol (vitamin D analogue - 1 α D3) prevents bone loss and improves bone mineral density in glucocorticoid induced OP 1,2, also exerts anti-inflammatory activity.

Objective: To assess changes in disease activity and bone turnover markers (BTMs) in active RA female patients, treated with high doses of alfacalcidol or prednisone.

Material and methods: The study included 46 postmenopausal female RA patients with active disease (DAS28 3,2) on the stable highest tolerable dose of methotrexate (MTX) therapy during three months prior inclusion. No one had OP or glucocorticoid (GC) treatment at the study entry. Five out of 46 pts have had low trauma fractures in the past. No other risk factors for OP, except RA, were recorded. Patients were randomly assigned to one of four treatment groups during 3 months: 1 α D3 1 μ g (11/46), 1 α D3 2 μ g (12/46) and 1 α D3 3 μ g (11/46) daily, or prednisone 20 mg daily, for the first month and 10 mg afterwards (12/46), in addition to MTX. Data collected were: disease activity (DAS 28 score), fasting serum levels of carboxyterminal telopeptide of collagen type I - sCTX and osteocalcin - OCN (ECLIA Roche diagnostics) at the baseline and at the end of treatment period.

Results: Patients age was 54,8±12,03 years, average disease duration 7,6±6,85 years and methotrexate dose 15 ±3,31mg weekly. Average DAS28 was 5,29±0,914 and 25OHD3 level 30,18±12,468ng/ml. Baseline mean sCTX 780±402,7 pg/ml, OCN 19,1±8,78 ng/ml. After the end of treatment period, we found highly significantly reduced disease activity in all four treatment arms ($p 0,01$). Regardless of alfacalcidol dose, sCTX significantly decreased (mean change in all three treatment groups 32-40%, $p 0,05$) in contrast to prednisone use, where sCTX increased, while OCN decreased. Serum levels of 25(OH)D3 in prednisone users significantly decreased ($p 0,01$). There was no alfacalcidol dose dependent difference in BTMs changes, nor sCTX, nor OCN. Urinary calcium increased significantly during treatment in 1 α D users, but variations were within the reference ranges (0,16±0,069 vs. 0,26±0,150g/24h).

Conclusions: Three months of prednisone or high dose 1 α D3 treatment in postmenopausal women with active RA, significantly reduced disease activity, while vitamin D analogue also significantly corrected bone metabolism, as by BTMs assessment, with acceptable safety profile.

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P463

INFORMATIVE ASSESSMENT HORMONAL AND DENSITOMETRY FOR THE DIAGNOSIS OF OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN

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Objective: To evaluate the level of hormones regulate bone metabolism and some bone turnover markers, as well as the values of the densitometry indicators in osteoporotic women.

Materials and methods: Russian women were examined (48-60 ages): Group 1 – 15 conditionally healthy women, Group 2 – with osteopenia, Group 3 – 15 with osteoporosis. Bone mineral density was revealed by X-ray densitometry by T-test. The concentration of parathyroid hormone (PTG), calcitriol, Estradiol (E2), cortisol, triiodothyronine levels of Beta-Crosslaps and piridonolona were testified by ELISA. The statistical analysis of the data obtained was processed by the software Statistica 6.1 (StatSoft).

Results: Densitometry data differed significantly in groups 2 and 3 compared to control ($p < 0.001$) and were equal in the T-test of the femoral neck: 0,90, -1,65, -1,80 SD; on the T-spine criterion: 0,35, -1,95, -1,15 SD 1, 2 or 3 groups, respectively. The greatest hormonal changes were recorded in the group with osteopenia (all $p < 0.05$). The content of E2 in patients with osteopenia was lower than in the control group (15%) and in the group with osteoporosis – 8.4%. Calcitriol levels in Group 2 was higher at 107%, in the group 3 – 43% compared with the control. Concentration of PTG in the group with osteopenia was 51% higher than in the control. Calculated the ratio of the hormones involved in bone remodeling. The most significant differences were found in numbers E2/PTG: in the group with osteopenia the ratio was 46% lower than in the control one, and in the group with osteoporosis – 41%. Multifactorial statistical analysis showed a strong connection E2/PTG with a change in spine bone mineral density in different groups.

Conclusions: It is advisable to use as early biochemical markers of osteoporosis in women the level of PTG, E2 and the ratio of E2/PTG. Densitometry indicators both in the T-test of the femoral neck, and in the T-spine test are equally informative.

P464

MECHANICAL PROPERTIES AND STRUCTURE OF BONE TISSUE ARE CHANGED AFTER UNLOADING HANDIG

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Studies performed in conditions of a microgravity models the hypothesis that influence of gravitational load on a various parts of the musculoskeletal system can be a consequence of evolution of biomechanical structures. It was shown previously that in the conditions of a microgravity, postural muscles have the greatest loss in weight and the changes in muscular force can be observed without increase in muscle mass. All tests were conducted on nonlinear laboratory rats (180-200 g). As a model of gravitational unloading we used antiortostatic support model. All experiments were performed according to bioethical standards and were approved by local ethical committee of the Kazan Federal University. Chloral hydrat was used for anesthesia (5mg/kg, intraperitoneal, Sigma-Aldrich).

The femoral bones were dissected from all tested rats with following weight measurement, density evaluation, and measurement of geometrical parameters. At the end, the stress tests with a three-points bending were performed. After testing Jung's module and limits of tension was calculated. Furthermore bones was scanned on micro-CT in diaphysis, metaphysis and epiphysis regions. After scanning porosity was calculated. The structure of porosity was analyzed (in terms of fabric tensor). It was investigated different groups: control and "hypo gravitational" on different time of unloading handig (7, 14, 21, 30 and 40 days).

It was mentioned that bone extends in the transverse direction and articular surface increases in "hypogravitational" models. Jung's module decreased slightly, but limits of tension decreased significantly. Porosity decreased significantly up to 30 days of unloading handig. Anisotropy direction changed in all regions (diaphysis, metaphysis and epiphysis) of the bone in "hypogravitational" models on different period of unloading handig. These results emphasize that the muscle atrophy precedes the change in a bone tissue after unloading handig and testify that the muscle atrophy can promote the subsequent deterioration of a bone structure. This emphasize that the rehabilitation strategy directed on preservation of a muscle also helps to support bone structure during gravitational unloading handig.

P465

EFFECT OF PHYSICAL THERAPY AFTER SURGERY INTERSECTION SYNDROME

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Introduction: Intersection syndrome (IS) presents with pain and swelling localized to the dorsum of the distal forearm, approximately 4 to 6cm proximal to the wrist. In this area, the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) intersect the extensor carpi radialis brevis (ECRB) and longus (ECRL). The basic pathology is thought to result from friction at this intersection point between the muscle bellies and tendons, leading to tendinopathy and/or bursitis.

Purpose: Show the effects of physical therapy (FT) after surgical treatment of patients with the IS

Method: The patient D.M. age 49 years, housewife, comes physiatrist Health Centre Nis because of pain in his left wrist and part above the wrist, as well as minor swelling in the area of the styloid process of radius and aggravated abduction and extension of thumb, crepitus in the movements of the wrist. Guided the diagnosis of styloiditis radii and treated with physical therapy (IMP, electrotherapy), without clinical improvement. After the completed CTG and echo the findings, and suspected IS is being sent in the overview plastic surgeon. After surgery, the person is sent back physiatrist. The following treatment was conducted: IMP, DD, individual kinesiotherapy in the period of 10 days. Monitor the effects of the FT was assessed by VAS pain scale, measuring the range of motion in the wrist and thumb, MMT.

Results: 4FT performed after surgery, for a period of two weeks, has provided a statistically significant reduction of pain: before therapy VAS=4, and after treatment VAS=0 specified. Increased abduction thumb injury from 30° to 60°, which is a normal finding and strengthened GMS left hand, score the fifth.

Discussion and Conclusions: Physical therapy is given, in addition to surgery, a complete functional recovery of patients, with this not so frequent syndrome.

P466

BARRIERS AND ENABLERS TO PROPER DIABETIC FOOTCARE AMONGST COMMUNITY DWELLERS IN AN ASIAN POPULATION: A QUALITATIVE STUDY

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Introduction: Diabetic foot complications are common with in Asian populations. They arise due to poor diabetic control and footcare. Studies have shown that proper diabetic control and proper foot care are vital for the overall prevention of

diabetic foot conditions, such as foot ulcers. Improper prevention of diabetic foot conditions can result in decreased function and quality of life and even amputations of the affected limb. In fact, the prominence of self-care behaviors and practices being at the core of diabetic foot management was reinforced in a consensus statement issued by a multi-disciplinary panel in 2011. In this study, we aimed to identify the causes for proper and improper diabetic footcare.

Materials and Methods: A qualitative study consisting of key informant interviews with 17 healthcare professionals, including doctors and various allied health workers, was conducted. Participants included had at least 5 years of caring for diabetic foot patients either in public institutions or private clinics. Data collected was analysed via thematic analysis.

Results: Diabetic patients were generally observed to have a mixture of proper and improper information and beliefs which eventually influenced the extent of proper footcare. Factors which influenced the extent of proper and improper state of information and beliefs were classified into predisposing and precipitating factors. Predisposing factors were further categorised into modifiable factors (e.g. education level, socioeconomic status, social support) and non-modifiable factors (e.g. age, presence and severity of co-morbidities restricting ability to self-care, past experiences). Precipitating factors were categorized into patient factors (e.g. degree of reception of information, presence of psychological barriers), provider factors (presence and degree of multi-disciplinary approach to care, presence of administrative inconveniences) and disease factors (presence of diabetic sensory neuropathy, complexity of disease process).

Conclusions: The extent of proper footcare amongst diabetic patients is influenced by numerous predisposing and precipitating factors. Further studies can look at further development of the described structure as well as quantitatively defining the various components and factors which make up the described system.

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TEN-YEAR PROBABILITY OF FRAGILITY FRACTURES IN PERI AND POSTMENOPAUSAL SAUDI WOMEN ACCORDING TO WHO FRACTURE RISK ASSESSMENT TOOL (FRAX)

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Objective: For the last 20 years, osteoporosis has been a major global health concern. Saudi Arabia is not far from

the epidemic of osteoporosis. According to a 2012-systemic review, the prevalence of osteoporosis among Saudi population was estimated to be 34%. In Saudi women, the prevalence was found to be 23%. There are several factors contributing to the high prevalence of osteoporosis among Saudi females, the most important one is vitamin D deficiency. A study was conducted with 200 Saudi females, 100 of which were above 50 years of age, showed that nearly 50% of them have low levels of vitamin D. The same study claims that only 10% of those women are having sufficient exposure to sunlight, and only 36% are consuming dairy products (250ml/day). Besides other effects of osteoporosis, it is the fragility fractures which is one of the most debilitating entity. The best way to treat such fractures is to prevent them from happening. Hence it is essential to quantify the fracture risk based on modifiable and non-modifiable factors affecting it. The aim of our study was to determine the 10-year probability of fragility fractures in peri-and postmenopausal Saudi Females with the help of WHO's Fracture Risk Assessment Tool (FRAX).

Material and Methods: A prospective cross sectional study, conducted in one year recruiting 1539 cases from different geographical regions of Saudi Arabia including Riyadh (Central), Jeddah (Western), Al Ahsa and Dammam (Eastern). They were asked to fill FRAX questionnaire. The fracture risk assessment was done and compared with other laboratory tests for calcium metabolism and BMD.

Results: The ten-year probability of fragility fractures according to FRAX is higher in Saudi peri-menopausal women as compared to that of western population. However, among postmenopausal and elderly females the risk is almost equal or a few fractions less when we compare it with western population.

Conclusion: Fragility fractures in postmenopausal Saudi women are one of the leading causes of disability and socioeconomic loss. The extent of problem is higher in Saudi population as compared to Western Countries. With the help of FRAX we can estimate the probability of such fractures and can take preventive measures to avoid them.

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CHARACTERIZATION OF AND RISK FACTORS FOR THE ACUTE-PHASE RESPONSE AFTER INTRAVENOUS NITROGEN-CONTAINING BISPHOSPHONATES

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Objectives: To determine the frequency of the acute-phase response (APR) after a single intravenous infusion of a nitrogen-containing bisphosphonate (N-BP) and to identify the risk factors for its development.

Patients and Methods: We considered 206 patients (men and women) consecutively treated with intravenous N-BPs (zoledronic acid, ibandronate or neridronate) for osteoporosis or other metabolic bone diseases (Paget, complex regional pain syndrome type I or fibrous dysplasia) since January 2015. Subjects aged <18 years old or previously exposed to an intravenous N-BP were excluded. All patients underwent a comprehensive clinical and pharmacological assessment. Weight and BMI were measured. Serum calcium, PTH, 25-hydroxy-vitamin D, creatinine, CTX and bALP were assessed at baseline. Bone mineral density was measured at the lumbar spine, femoral neck and total hip. The occurrence of any adverse event falling within these five symptom clusters within 3 days from N-BP infusion was defined as constituting an APR: fever; musculoskeletal (pain and joint swelling); gastrointestinal (abdominal pain, vomiting, diarrhea); eye inflammation; and other (including fatigue, nasopharyngitis, edema, headache and skin disorders). The relationship between the occurrence of APR and potential risk factors was explored using logistic regression models.

Results: Overall 105 out of 206 patients (51%) presented an APR (APR+) after intravenous N-BP. The most common events were acute musculoskeletal symptoms (46%) and fever (29%). Overall, the other symptom clusters represented less than the 8% of the events. Mean age±SD was 67±12 years in APR+ subjects and 70±10 years in patients who did not present an APR (APR-). Clinical and laboratory characteristics significantly associated (bivariate analyses) with APR were: a lower number of vertebral fractures (mean number±SD: APR+ 1.3±1.5 vs. APR- 1.8±1.7, P=.014), no long-term use of statins (APR+ 88% vs. APR- 71%, P=.004), having a metabolic bone disorder other than osteoporosis (APR+ 9% vs. APR- 2%, P=.035), and presenting with secondary hyperparathyroidism (sHPTH) due to vitamin D deficiency (APR+ 26% vs. APR- 14%, P=.033). In the multivariate logistic regression model sHPTH was significantly associated with APR (OR 2.3, 95%CI 1.1-5.1, P=.033), while long-term use of statins (OR 0.3, 95%CI 0.1-0.7, P=.005) and previous exposure to oral N-BPs (OR 0.5, 95%CI 0.3-0.9, P=.042) were protective. **Conclusions:** The preliminary analysis of our ongoing study identified a number of risk factors for the development of APR.

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128 PATIENTS WITH SUBACUTE SYMPTOMATIC FRAGILITY VERTEBRAL COMPRESSION FRACTURES-HIGH INCIDENCE OF MORTALITY, FALLING, MONOCLONAL GAMMOPATHY OF UNCERTAIN SIGNIFICANCE AND MYELOMA, PERNICIOUS ANEMIA AND VITAMIN B-12 DEFICIENCY: IS THIS A PROFILE OF AN OSTEOPOROTIC OR AN AGED POPULATION?

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Objective: To study factors contributing to both osteoporosis and falling in a cohort of patients with symptomatic subacute fragility vertebral compression fractures (VCF).

Methods: We saw 128 patients with symptomatic subacute fragility VCF in our community based outpatient fracture clinic over a two year period. We performed a complete history and physical, review of past medical records and radiographs, complete blood count, sedimentation rate, chemistry profile, TSH, urinalysis, vitamin B-12, PTH, 25-OH vitamin D, and serum protein electrophoresis (SPE). We performed testosterone level, methylmalonic acid, antiparietal cell antibody and intrinsic factor antibody in select cases. We recorded diseases including diabetes, COPD, cardiac, neurological for each patient.

Results: There were 92 females aged 45-98 years (mean 77.7), 36 males aged 39-94 years (mean 77.6). Factors contributing to falling included peripheral neuropathy-61, use of sedatives-43, blindness-12, foot drop-6, dementia-3, Parkinsons-3, and hyponatremia-2. VCF were precipitated by falls in 94 patients, of which 87 occurred at home. VCF occurred with lifting in 8 patients, bending in 3, and were spontaneous in 23. Steroid use was reported in 18 patients. Age correlated with the number of diseases ($p < 0.0001$). Diagnosis based on laboratory studies included vitamin D insufficiency-29 and deficiency-12, vitamin B-12 deficiency-8, pernicious anemia-6, monoclonal gammopathy of uncertain significance (MGUS)-10, myeloma -2, hypogonadism-12, and iatrogenic hyperthyroidism-3. Ankylosing spondylitis and lymphoma were diagnosed in one patient each. The average age of those that died was 83.9 years compared to 76.8 of the remaining group ($p = 0.033$).

Conclusion: Conditions that increase with age and are associated with an increased risk of fracture include falling, MGUS, myeloma, pernicious anemia and vitamin

B-12 and D deficiencies. These were common in our cohort with subacute symptomatic fragility VCF. Accordingly we recommend vitamin B-12 levels and SPE in the evaluation of all patients with VCF. These findings support the emphasis on interventions to reduce the risk of falling in the elderly and to recognize and treat these age related conditions in an attempt to mitigate the risk of VCF.

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OSTEOPOROSIS IN DIABETIC ALBANIAN WOMEN

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Introduction: Osteoporosis (OP) and Diabetes Mellitus (DM) are two of the most prevalent diseases worldwide. Diabetes Mellitus has microvascular consequences which can cause bone loss and eventually, Osteoporosis in Diabetic patients.

Objectives: To evaluate the association between type 2 Diabetes Mellitus and Osteoporosis in Albanian women presented at Rheumatology Clinic near UHC "Nene Teresa" Tirana, Albania.

Methods: This is a case-control study including 670 Albanian patients which were divided into 4 groups: patients with DM and OP (7 patients-14.3%), patients with OP and without DM (57-9.2%), patients with DM and without OP (42- 85.7%) and patients neither with DM nor OP (564- 90.8%). Results of DXA were obtained for Osteoporosis evaluation and results of Glycaemia and HbA1c were obtained according to American Diabetes Association guidelines. All the results were analyzed and statistically evaluated.

Results: After analyzing the obtained data, it was found that there is a strong and statistically significant relationship between Diabetes Mellitus and Osteoporosis ($p < 0.005$). So, women with Diabetes Mellitus are at a higher risk to suffer from Osteoporosis.

Conclusion: Our study shows that Diabetic Albanian females are more at risk to develop Osteoporosis than normal females. Thus, it is of great importance to evaluate bone metabolic status in diabetic women in order to prevent Osteoporosis and its consequences.

| | Diabetes Mellitus | Without Diabetes | Total |
|--------------|-------------------|------------------|-------|
| Osteoporosis | 7 (14.3%) | 57 (9.2%) | 64 |
| Normal | 42 (85.7%) | 564 (90.8%) | 606 |
| Total | 49 (100%) | 621 (100%) | 670 |

$P < 0.005$ odds ratio 95% CI 1.6 (0.7-3.8)

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TENOFOVIR INDUCED OSTEOMALACIA: A PROFILE OF THREE PATIENTS WITH PAINFUL FRACTURES WITH LOW PHOSPHORUS AND NORMAL LEVELS OF VITAMIN D AND PARATHYROID HORMONE

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Objective: To describe the clinical presentation and course of three patients with tenofovir induced hypophosphatemic osteomalacia.

Methods: The clinical, laboratory, and radiologic features of three patients referred for evaluation of pain and/or osteoporosis were reviewed.

Results: All three patients were male, had diffuse pain, suffered multiple clinical fractures, and were on combination long and short acting opioids at the time of presentation. Two were in wheelchairs and two had neuropathy.

Table.

| Case | Age | HIV.Y | T.N.Y | Sx | VAS | BMI | alkphos | PO4 | Creatinine | K+ | NTX | FemN | LS |
|------|-----|-------|-------|----|-----|------|---------|-----|------------|-----|-----|------|------|
| 1 | 49 | 10 | 4 | 8 | 80 | 20.4 | 309 | 2.2 | 1.80 | 2.9 | 128 | -3.5 | -4.2 |
| 2 | 69 | 32 | 10 | 8 | 70 | 18.0 | 245 | 1.5 | 1.33 | 4.2 | 57 | -2.6 | -2.3 |
| 3 | 61 | 30 | 7 | 36 | 84 | 20.0 | 576 | 1.2 | 1.18 | 3.3 | 98 | -3.2 | -3.8 |

Y=years, Sx=symptoms in months, VAS=visual analogue scale, alkphos=alkaline phosphatase (39-117 IU/L), PO4=phosphorus (2.5-4.5mg/dL), K+=potassium (3.5-5.2mmol/L), FemN=femoral neck T-score, LS=lumbar spine T-score.

Y=years, Sx=symptoms in months, VAS=visual analogue scale, alkphos=alkaline phosphatase (39-117 IU/L), PO4=phosphorus (2.5-4.5mg/dL), K+=potassium (3.5-5.2mmol/L), FemN=femoral neck T-score, LS=lumbar spine T-score.

All patients had hypogonadism and proteinuria and case 1 had glycosuria. All patients had normal 25-OH vitamin D, vitamin B12, PTH, serum protein electrophoresis, magnesium, CBC, calcium, CPK, sedimentation rate, TSH. Case 1 had fractures of the hip, sacrum, and humerus; case 2 hip and ribs; and case 3 ribs, pelvis and knee. The technetium bone scan showed a similar pattern of increased uptake in multiple ribs, calcaneus, metatarsal bones, knees, and sacrum in all three patients. A MRI of the knee showed bone marrow edema in case 2 and an atypical longitudinal fracture of the femur in case 3. Tenofovir was withdrawn, oral phosphates given, and resolution of pain and biochemical changes occurred in 4-8 months. Bone mineral density in case 1 repeated 1 year after presentation increased 16% in the femoral neck and 19% in the lumbar spine.

Conclusion: Long term tenofovir therapy in HIV patients can induce a devastating disabling osteomalacia caused by hypophosphatemia with features of Fanconi's syndrome. A low BMI, hypogonadism, and neuropathy may predispose or be associated with this complication. A serum phosphorus and urinalysis should be included in the work up of all tenofovir treated HIV patients with diffuse pain, fracture, or osteoporosis.

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INSOMNIA IN PATIENTS WITH CHRONIC LOW BACK PAIN

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Background: A sleep disorder is a medical disorder of the sleep patterns of a person. Sleep disorders are serious enough to interfere with normal physical, mental, social and emotional functioning. When a person suffers from difficulty falling asleep and/or staying asleep with no obvious cause, it is referred to as insomnia. The relationship between insomnia and depressive illness is complex – depression may cause sleep problems and sleep problems may cause or contribute to depressive disorders. For some people, symptoms of depression occur before the onset of sleep problems. Sleep problems are also associated with more severe depressive illness.

Objectives: The aim of the study was to assess insomnia in patients with low back pain and to identify factors associated with this insomnia.

Methods: The study included 80 patients suffering from low back pain (55 females and 25 males, mean age: 61.15±8.1 years). Low back pain, sleep characteristics, types and consequences of insomnia were collected. Insomnia severity was assessed using index of severity of insomnia with a global score going from 0 (the best situation) to 28 (the worst situation). Relationship between insomnia and low back pain characteristics was analyzed.

Results: Insomnia was reported by 43% of patients and was caused by pain in 79% of them. Insomnia was early, middle and late in respectively 55, 32 and 13% of all insomniac patients. The mean of index of severity of insomnia score was 14.06±2.9. Consequences of insomnia were followed by daily activities disturbance (65%), tiredness (65%) and mood disorders (21%). Significant correlations were found between index of severity of insomnia and pain (VAS mm) ($r=0.620$; $p<0.001$), fatigue ($r=0.510$; $p<0.001$) and body mass index ($r=-0.440$; $p=0.02$). Multiple logistic regression models have shown that only pain (OR=1.421; IC 95% (1.232- 1.833); $p=0.01$) and body mass index >35 (OR=1.055; IC 95% (1.024- 1.116; $p=0.01$) were the significant independent factors related to insomnia severity. 25% of the patients with insomnia and low back pain were with clinical features of depression and they needed treatment.

Conclusions: Insomnia prevalence seems to be important in patients with low back pain. The severity of insomnia was related to pain and body mass index >35. Assessment of insomnia should be integrated to low back pain management and so the depression can be protected.

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P473**ROLE OF PHARMACOGENOMICS IN EFFECTIVENESS OF BISPHOSPHONATES IN TREATMENT OF OSTEOPOROTIC PATIENTS**

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Objective: Genetics of osteoporosis consists of two fields, namely genetics of the disease and pharmacogenetics of the drug response. Various investigated candidate genes have been reported to be involved in the pathogenesis of osteoporosis.

Material and Method: The present study was included 21 female patients with postmenopausal osteoporosis whom were treated with bisphosphonates for one year. Pre and post treatment L1-L4 BMD, femoral neck BMD and osteocalcin levels were measured. Patients with a reduction of 2% or less in BMD were accepted as unresponsive to treatment. The relationship between effectiveness of treatment and VDR, BsmI, Col1A1 Sp1, ER α Pvu II and Xba I receptors was investigated.

Results: The genotypic distributions of VDR BsmI, Col1A1 Sp1, ER Pvu II and Xba I polymorphisms were in agreement with that of Hardy-Weinberg. In the Col1A1 Sp1 polymorphism, the mean age of Ss genotype was significantly lower compared to the SS group. No significant difference was found between the other genotypes in age, BMI, calcium, parathormone, vitamin D, basal L1-L4 BMD, femoral neck BMD and osteocalcin levels. In the VDR BsmI polymorphism, percentage changes of femoral neck and L1-L4 BMD were higher in the Bb group compared to the BB and bb groups; however the difference between the groups was not statistically significant (Femoral neck: BB (-0.7%), Bb (7.0%) and bb (-3.0%), $p=0.614$; L1-L4: BB (-0.8%), Bb (4.5%) and bb (1.5%), $p=0.169$). In the Col1A1 Sp1 polymorphism, percentage changes of femoral neck and L1-L4 BMD were higher in the SS group compared to the Ss group; again the difference between the groups was not statistically significant (Femoral neck: SS (2.4%), Ss (-1.4%), $p=0.307$; L1-L4: SS (3.0%), Ss (0.0%), $p=0.221$). No percentage changes were found in the ER α Pvu II and XbaI polymorphisms.

Conclusion: The results of the present study did not support the potential role of VDR BsmI, COL1A1 Sp1, ER α PvuII and XbaI polymorphisms in the effectiveness of bisphosphonates in treatment of postmenopausal osteoporotic women. In order to generalize these results multicenter randomized prospective studies with larger sample sizes are required.

P474**RISKS FACTORS FOR HAND OSTEOARTHRITIS IN PATIENTS WITH DIABETES MELLITUS TYPE 2**

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Background: Type 2 diabetes mellitus (DM) consists of an array of dysfunctions characterized by hyperglycemia and resulting from the combination of resistance to insulin action, inadequate insulin secretion, and excessive or inappropriate glucagon secretion. Osteoarthritis (OA) is characterized by cartilage degeneration or degradation of one or more joints. Risk factors for hand osteoarthritis are hand trauma, malalignment of a joints, repetitive movements, female gender and advanced age, family history, obesity. **Diabetes mellitus** is regularly considered a risk factor for osteoarthritis in weight-bearing joints, such as hips and knees, but not for the hands.

Objective: To evaluate the association of hand osteoarthritis and diabetes mellitus.

Methods A study was performed in 64 patients (33 adult diabetes mellitus patients (Group A) and 31 non-diabetic subjects (Group B) with hand osteoarthritis. OA of hand was ascertained using the American College of Rheumatology classification criteria. Multivariable logistic regression was used to evaluate the association of DM with hand OA, and to evaluate factors associated with hand OA among DM patients. Odds ratios (OR) with 95% confidence intervals (CI) were calculated to associate BMI, glucose, HbA1c, C-peptide with hand OA using logistic regression analyses per standard deviation, stratified for sex and adjusted for age.

Results: BMI >27 was associated with hand OA in both groups, OR 1.26 (95% CI 1.12-1.53), glucose and C-peptide were associated with hand OA in group A OR 1.24 (95% CI 1.18-1.41) and OR 2.03 (95% CI 1.94-2.18). HbA1c showed an OR of 1.57 (95% CI 1.44-1.91) for hand OA in group A. The associations of glucose, HbA1c and C-peptide with hand OA remained significant after adjustment for fat mass.

Conclusions: BMI was associated with clinical hand OA in both groups - adult diabetes mellitus patients and non-diabetic subjects. In patients with DM glucose, HbA1 and C-peptide were associated with hand OA, suggesting involvement of non-enzymatic glycation in the development of hand OA. Strict glucose control might therefore have a beneficial effect on the incidence of hand OA.

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ROLE OF ENDOGENOUS GLUCAGON-LIKE PEPTIDES 1 AND 2 IN OSTEOPOROSIS

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Objective: Recent studies have shown that bone turnover markers undergo a circadian rhythm, being the intake of food a cause of acute reduction of resorption markers during daytime, which is followed by an increase of them by fast at night. Main effectors of this response in bone turnover markers may be gastrointestinal peptides. Our objective is to determine if both Glucagon-like peptide 1 (GLP1) and 2 (GLP2) plasma levels are related with the incidence of osteoporosis.

Methods: One hundred and eighteen volunteers were included in a case-control study: 60 cases and 58 controls, matched by age and sex. Inclusion criteria were for Cases: T-score ≤ -2.5 and below and for Controls: normal Bone Mineral Density (BMD). Exclusion criteria were secondary osteoporosis, diabetes mellitus, cancer, hospitalization in the last 6 months and current treatment with antidiabetic and anti-osteoporotic drugs. As variables we determined food intake; BMD measured by Dual-energy X-ray absorptiometry (DXA) in the posteroanterior spine and hip; bone turnover markers and plasma levels of GLP1 and GLP2, using Luminex x-MAP technology. Statistical analysis: Student's t-test for continuous variables, χ^2 test for categorical variables, and logistic regression analysis for the calculation of the Odds Ratio (OR) and its Confidence Interval (CI).

Results: Women were 98% of the sample. Mean age was 59.25 for Cases and 59.01 for Controls ($p=0.78$). In the t-test, statistically significant differences for GLP1 and GLP2 were not found although GLP1 was lower in Cases ($\mu \pm SD=118.38 \pm 3.24$) than in Controls ($\mu \pm SD=126.26 \pm 3.73$), $p=0.11$. In the multiple logistic regression analysis, the OR for plasma GLP1 in Cases was 0.89 (0.81-0.98, 95% CI), $p=0.021$, compared to Controls, adjusted by C-telopeptide of type I collagen, calorie and protein intake and spine Z-score.

Conclusions: Plasma levels of GLP1 are associated with a significant decrease in the risk of osteoporosis. More studies are necessary to confirm our results.

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COMPARASION OF EFFICACY OF INTRA ARTICULAR STEROID INJECTIONS IN THE PATIENTS WITH KNEE OSTEOARTHRITIS WITH OR WITHOUT EFFUSION

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Background: While knee osteoarthritis is often a progressive and irreversible degenerative process, functional improvement and pain control are reasonable treatment goals. In the knee, injections of corticosteroids into the joint may relieve inflammation, and reduce pain and disability.

Objectives: The present study aims to compare efficiency of intraarticular steroid injection administered on knee osteoarthritis (OA) patients between conditions whether effusion exists or not.

Methods: The study included totally 46 patients (36 women and 10 men, ages 56 ± 5.23) who applied to the knee pain symptom and were diagnosed with knee OA KL-scale ≥ 2 . Based on the existence of effusion determined clinically, patients were subclassified in 2 groups. Whereas the 1st group was including the patients with clinical effusion; the 2nd group was including without effusion. Group 1 and 2 patients were administered intraarticular steroid injection (Diprophos 7 mg/ml suspension for injection betamethasone) on 1 and 7 days. Before the treatment, patients were evaluated in terms WOMAC pain score, physical function score and visual analog scale. In the post-injection period, patients invited for control at the 2nd and 8th weeks were evaluated based on the same parameters.

Results: In group A and B a statistically significant recovery was observed in terms of pain, physical activity, and morning stiffness values at the end of both the 2nd and the 8th weeks compared to the initial period ($p < 0.05$). The recovery in the injection group A was statistically more significant compared to the group B ($p < 0.001$). There was no statistically significant all parameters difference between the group A and group B based on the controls at the 2nd and the 8th weeks ($p > 0.05$)

Conclusions: It was observed that intraarticular steroid injection reduced pain and stiffness related scores whether patients diagnosed with knee OA have effusion, or not; and developed the functionality. However, these effects were observed only for limited period.

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WNT16 ALLELES ARE ASSOCIATED WITH DIFFERENT OSTEOARTHRITIS PHENOTYPES

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Objectives: Genetic factors account for about 40-60% of the variance in hip and knee osteoarthritis (OA) risk and bone mineral density (BMD). The Wnt pathway is involved in bone and cartilage homeostasis. Polymorphisms of the Wnt ligand WNT16 have been associated with BMD. There is a complex relationship between BMD and OA, which may vary with the type of OA. Hence, we hypothesized that allelic variations of WNT16 could influence the OA phenotype.

Patients and methods: We studied 509 Caucasian patients, 363 with hip OA and 146 with knee OA, undergoing joint replacement due to severe primary OA. Radiographs were used to classify the OA as atrophic or hypertrophic, by two trained observers. DNA was extracted from peripheral blood or buccal swabs and two polymorphisms of WNT16 (rs2707466 and rs2908004), previously associated with BMD, were analyzed by a mass-array Sequenom platform or by using Taqman assays. The association between the genotypes and the OA phenotype was analyzed by logistic regression and adjusted for age and body mass index (BMI).

Results: In the global analysis, there was no significant relationship between either rs2707466 or rs2908004 genotypes and the OA phenotype ($p = 0.14$ and $p = 0.19$ respectively in hip OA, and $p = 0.41$ and $p = 0.16$ respectively in knee OA). However, a genotype-phenotype association was found in the sex-stratified analysis. Thus, there was a significant difference in the genotypic frequencies of rs2707466 between hypertrophic and atrophic hip OA in males ($p = 0.003$), with overrepresentation of G alleles in the hypertrophic phenotype (OR 2.08; CI 1.28-3.38). An association in the same direction was observed between these alleles and the type of knee OA, with G alleles being more common in the hypertrophic than in atrophic knee phenotypes ($p = 0.008$; OR 1.956, CI 1.19-3.19). Similar associations were found for the rs2908004 SNP although it only reached statistical significance for knee OA ($p = 0.017$; OR 0.92, CI 0.86-0.989). All these associations were maintained in models adjusted by age and BMI.

Conclusions: WNT16 alleles are associated with the hip and knee OA phenotype in a sex-dependent manner. To our knowledge, this is the first study attempting to explore the association of genetic variants with the OA phenotype. These data bring forward the need to consider the OA phenotype in future genetic association studies of OA.

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IMPROVING OSTEOPOROSIS MANAGEMENT THROUGH SIMPLE RADIOLOGY REPORTING CHANGES

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Objectives: International Osteoporosis Foundation (IOF) recommends the use of clear, unambiguous terminology using the word 'fracture', and grading the fracture from mild to severe in reporting, and terms such as collapse, wedging to be avoided. We aimed to assess vertebral fracture reporting of spinal plain films at our teaching hospital in United Kingdom.

Method: This was a retrospective observational study. 100 plain spine X-rays (50 thoracic and 50 lumbar) from hospital PACS system for patients aged above 50 years were analysed over a period of 4 months. We studied the concordance of reports done by local Radiologists comparing with the IOF guidelines which required use of the word 'fracture' and avoidance of ambiguous words.

Results: Amongst Thoracic spine x-ray reports (N=50), Mean age (71), No of fractures noted (14)- Ambiguous terms used (4), Appropriate Grading of fracture used (9/14) Amongst

Lumbar spine films- (N=50)-Mean age (72), No of fractures noted (14), Ambiguous terms used (0), Grading of fracture used (9/14).

Conclusions: Our study confirms that Radiology reporting is using ambiguous term such as wedging without mentioning fracture in some reports. Grading of vertebral fracture was used only in 64% of fracture reports by Radiologists. Accurate, clear, unambiguous reporting is essential for accurate identification of vertebral fractures. The results of our study were disseminated to Radiologists and regular educational updates to doctors, radiologists and radiographers is ongoing. Early and accurate diagnosis of vertebral fractures is an important step in optimizing the clinical management of patients with osteoporosis.

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THE IMPACT OF TYPE 1 DIABETES IN THE SPECIFICITY OF LOSS THE BONE MINERAL DENSITY OF THE AXIAL SKELETON

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Background and aims: To date, there is convincing evidence of the development of diabetic osteopathy, the specificity of changes in in patients with type 1 diabetes (T1DM) is debatable and requires further study. Therefore, the aim was detailed study of the state of the bone mineral density (BMD) of the axial skeleton in T1DM patients.

Materials and methods: 95 patients with T1DM (60 women, 35 males) (mean age: 30,6 (24,9–37,5) yrs, duration of DM: 13 (7–20) yrs, age of manifestation: 17 (12–23) yrs, BMI: 22,86 (21,09–25,16) kg/m²; HbA1c: 8,2 (7,6–8,9)%) and 55 (31 women, 24 men) controls, comparable in sex, age and anthropometric data. The research involved general clinic examination, dual energy X-ray absorptiometry (DXA). Z-score of –2.0 or less was regarded as a low bone mineral density.

Results: Low BMD was detected in 15.8% of the surveyed patients with T1DM and 3.6% of control. There were revealed increases in 4.97 times likelihood of developing low BMD in some of the surveyed areas of the axial skeleton (OR=4.97; 1.18–20.91; F=0,034; p=0,031) and in spine – in 7.81 times (OR=7.81; 1.04–58.41; F=0,034; p=0,032) in T1DM patients. Detailed assessment of BMD in lumbar spine showed the largest decline in the first lumbar vertebra as in patients with diabetes mellitus (cr²=90.15; p<0.001) and in a control group (cr²=37.18; p<0.001). However, more pronounced reduction of BMD was proved in diabetes mellitus – (Z-score: –0.80 (–1.80 – (–0.20)) vs. 0.00 (–0.60–0.60);

U=1448; p<0.001; and BMD 1.05 (0.95–1.14) vs. 1.12 (1.05–1.23) g/cm²; U=1524; p<0.001).

Conclusions: In the lumbar spine it is characterized by the decrease of bone mineral density in the first vertebra, but in patients with type 1 diabetes, this trend is most pronounced.

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THE STATE OF THE BONE MINERAL CONTENT AND SERUM CALCIUM IN ADULTS WITH TYPE 1 DIABETES

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Background and aims: Bone mineral content (BMC) is a parameter that determine the state of the bones mineralization, which allows evaluating the use of the DXA with «body composition». Therefore, the aim of study was to assess the possible association between BMC and serum calcium in adults with diabetes type 1 (T1DM).

Materials and methods: 95 patients with T1DM (mean age: 30,6 (24,9–37,5) yrs, duration of DM: 13 (7–20) yrs, age of manifestation: 17 (12–23) yrs, BMI: 22,86 (21,09–25,16) kg/m²; HbA1c: 8,2 (7,6–8,9)%) and 55 controls, comparable in sex, age and anthropometric data. The research involved general clinic examination, dual energy X-ray absorptiometry (DXA) using a program “Body composition”.

Results: BMC was lower in T1DM patients as total: 2552 (2267–2955) vs. 2845 (2485–3339)g; U=1783; p=0,003) and in the next region: BMC Arms (331 (290–394) vs. 371 (303–467)g; U=1942,5; p=0,019), BMC Legs (969 (839–1124,5) vs 1025 (943–1290)g; U=1802; p=0,004), BMC Trunk (790 (668–931) vs. 877 (733–1037)g; U=1830,5; p=0,005), BMC Gynoid (262 (218–313) vs. 295 (256–350)g; U=1796,5; p=0,003). Marked decrease in total (2.35 (2.19–2.56) vs. 2.52 (2.45–2.57) mmol/L; U=764; p=0,001) and ionized calcium (1.15 (1.12–1.25) vs. 1.29 (1.23–1.30) mmol/l; U=584,5; p<0,001) in the blood serum in patients with T1DM compared to the control. There were no differences in the prevalence of hypocalcemia as in terms of total (F=0.027; p=0.168), and ionized calcium (F=0.035; p=0.086). Was not established significant correlation in parameters of BMC with the content of total and ionized serum calcium blood in patients with diabetes type 1 (p>0.05 for all comparison pairs).

Conclusions: Was not determined significant association by the state of the BMC with a decrease in serum calcium in patients with T1DM, which may be due to other mechanisms of bone loss due to diabetes, to fully understanding further research is needed.

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TRABECULAR BONE SCORE IN MEN WITH DYSGLYCAEMIA AND DIABETES

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Objectives: Diabetes is associated with increased skeletal fragility, despite increased BMD. Increased fractures in diabetes could be a result of poorer bone quality, such as microarchitecture which can be assessed using trabecular bone score (TBS). The aim of this study was to describe the relationship between TBS and normoglycaemia, impaired fasting glucose (IFG) and diabetes in men.

Methods: This study included 555 men, age 68.7±12.2 years, enrolled in the Geelong Osteoporosis Study. IFG was considered as fasting plasma glucose (FPG) ≥5.5mmol/L and diabetes as FPG≥7.0mmol/L, use of antihyperglycaemic medication or self-report. TBS was determined retrospectively using TBS iN-sight software (Version 2.1) from lumbar spine DXA scans (Lunar Prodigy). Using multivariable regression techniques the relationship between dysglycaemia and TBS was assessed, adjusting for age, weight, lumbar spine BMD, diabetes medications and those affecting bone (glucocorticoids), alcohol intake, smoking, physical activity and socioeconomic status. No interaction terms were identified.

Results: There were 318 men with normoglycaemia, 172 with IFG and 65 with diabetes. Mean unadjusted TBS for normoglycaemia, IFG and diabetes were 1.299 (95%CI 1.287-1.311), 1.274 (1.257-1.290) and 1.246 (1.219-1.273), respectively (p=0.001).

Compared to men with normoglycemia, diabetics had lower age-, weight- and lumbar spine BMD-adjusted TBS (p=0.022), however the association was attenuated for IFG (p=0.233). Mean adjusted TBS were 1.293 (95%CI 1.281-1.304); 1.280 (1.263-1.295) and 1.260 (1.235-1.286) for normoglycemia, IFG and diabetes, respectively. Adjustment for all other variables did not affect these relationships between dysglycaemia and TBS.

Conclusions: There was no difference in TBS scores between normoglycaemic and IGF men, however, those with diabetes had lower TBS. Thus, the increased fracture risk in diabetic men may be a result of degraded microarchitecture, independent of BMD.

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ZOLEDRONIC ACID IN PATIENTS AT IMMINENT RISK OF FRACTURES IN A FLS IN RIO DE JANEIRO

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Prevrefrat is a FLS, already active 6 years in Rio de Janeiro, Brazil. We provide services in a federal hospital and two HMO. We assessed the ability of our FLS to directly reduce re-fracture rate in patients at imminent risk of osteoporotic fracture, using an annual infusion of zoledronic acid 5 mg. 196 men and women older than 60 years with proximal femoral fracture, two or more vertebral fractures and one vertebral fracture plus another fracture (wrist, shoulder or ankle) were evaluated. All patients were supplemented with calcium and vitamin D treated with annual infusion of zoledronic acid 5 mg. The option for the mentioned drug was in order to facilitate adherence to treatment. Note that these scenarios the incident and prevalent cost of an osteoporotic fracture is on average \$ 20,000, justifying the cost effectiveness of these drug. 22 new fractures after a minimal trauma in 21 patients were found (4 proximal femur, 4 distal radius, 3 pelvis, 3 vertebral, 2 patella, 2 proximal humerus, 2 periprosthetic proximal femur, 1 ankle and 1 clavicle). We describe the profile of these patients for age, sex, initial fractures, new fractures, clinical risk factors, BMD values and vitamin D levels.

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HEALTH BEHAVIOURS ASSOCIATED WITH SARCOPENIC OBESITY

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Objectives: There has been little focus on obesity in the elderly, particularly when it occurs in the face of sarcopenia. We aimed to investigate the relationship between sarcopenic obesity (SO), and its components, with poor health behaviours.

Methods: 353 men and 245 women aged 65-98yr had body composition assessed by DXA (Lunar) as part of the Geelong Osteoporosis Study. Body fat mass was expressed as a percentage of weight (%BF) and obesity defined as %BF >25% for men and >35% for women. Low relative appendicular lean mass (rALM, kg/m²) was T-score<-1. Poor muscle function was defined as timed up-and-go >10s for 3m (TUG>10). Self-reported poor health behaviours included smoking (current), alcohol (>20g/d) and sedentary-behaviour. Associations between SO (and its components) and health behaviours were determined using logistic regression after age adjustment.

Results: 466 were obese, 219 had low-rALM, 205 had TUG>10s, and 69 had all three thereby meeting criteria for SO. Age-specific prevalence for SO was 65-74yr 6.1%, 75-84yr 13.2%, 85+ 29.7%. Each SO component had the following associations with health behaviours:

- OBESITY and smoking (OR=0.57, 95%CI 0.25-1.30), alcohol (1.13, 0.71-1.79), sedentary-behaviour (2.24, 1.44-3.49)
- LOW-rALM and smoking (1.71, 0.77-3.79), alcohol (1.12, 0.75-1.68), sedentary-behaviour (0.83, 0.57-1.19)
- TUG>10 and smoking (1.84, 0.81-4.18), alcohol (0.71, 0.45-1.10), sedentary-behaviour (4.95, 3.36-7.31).

SO was associated with sedentary-behaviour (2.45, 1.40-4.30), but the relationship with smoking (1.36, 0.38-4.88) and alcohol (0.94, 0.49-1.79) were not significant.

Conclusions: SO was associated with sedentary behaviour, apparently driven by obesity and TUG>10s. Poor muscle performance rather than low muscle mass appears to be associated with poor health behaviours. We speculate that the apparent, but non-significant, relationship between TUG>10s and high alcohol may suggest alcohol avoidance because of physical limitations.

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THE ETIOLOGY OF VERTEBRAL FRACTURE MIGHT BE DIFFERENT FROM NON-VERTEBRAL ONES IN PATIENTS WITH RHEUMATOID ARTHRITIS: TOMORROW STUDY

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Objective: To prospectively determine the incidence of fractures and associated predictors in patients with rheumatoid arthritis (RA).

Materials and Methods: We started a cohort study named TOMORROW (UMIN3876) that included 208 patients with RA and 205 age- and sex-matched healthy volunteers in 2010. We had observed the incidence of clinical non-vertebral fractures (non-VFs) and falls every year. Furthermore, VFs were evaluated by thoracolumbar spine X-rays in 2011 and 2015. At baseline, we measured several confounders for fractures such as anthropometric parameters, whole body bone mineral density (BMD), and medication.

Results: By the end of the fifth year, 182 RA patients (87.5%, mean age; 58.6 years old, disease duration; 14 years) and 189 controls (92.2%, mean age; 57.4) had completed observation. Although the incidence rate of falls significantly differed (RA; 0.39, control; 0.21 person-year; py, $p=0.002$), there was no significant difference in the incidence of non-VFs between RA patients (0.042/py) and controls (0.034/py) during 5 years ($p=0.35$). Cox proportional hazard regression analysis adjusted for confounding factors revealed that low BMD at the thoracic vertebrae and the use of glucocorticoid (GC) at baseline were significant risk factors for non-VF (HR, 2.63; 95% CI, 1.49 to 4.66; $p=0.001$, 2.14; 95% CI, 1.24 to 3.68; $p=0.006$, respectively). Surprisingly, RA morbidity per se was not a risk factor for non-VF ($p=0.437$). On the other hand, more new VFs were found in RA patients than in the controls (14.3 vs. 7.4%; $p=0.033$) and they were likely to be more severe in the patients. Logistic regression analysis selected previous VF (OR, 3.71; 95% CI, 2.00 to 31.0), persistent low BMD (OR, 5.11; 95% CI, 1.13 to 23.1), GC use (OR, 3.71; 95% CI, 1.14 to 12.0) as significant risk factors for new VFs in the patients.

Conclusion: There was not more non-VF incidence than controls, but VF occurred more frequently in RA patients.

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PREDICTORS AND MRI-DETECTED STRUCTURAL PATHOLOGY WITH TRAJECTORIES OF PAIN SEVERITY: A 10.7-YEAR FOLLOW-UP STUDY

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Objectives: To identify distinct trajectories of knee pain over 10.7 years in an older population, to describe risk factors with identified trajectories, and to explore MRI-detected structural pathology with the trajectories.

Material and Methods: 1,099 participants (mean age 63 years) were recruited at baseline. 875, 768 and 563 participants attended years 2.6, 5.1 and 10.7 follow-up, respectively. Demographic, psychological, lifestyle and comorbidities data were obtained at baseline. T1-weighted or T2-weighted MRI of the right knee was performed to measure knee structural pathology. Knee radiographic osteoarthritis was assessed by X-ray. Group-based trajectory modelling was applied to identify pain trajectories. Multi-nominal logistic regression was used for the analyses.

Results: Three distinct pain trajectories were defined. Participants in Group 1 ('Mild pain', $n=568$, 51.7%) had

relatively stable mild pain over time. Participants in Group 2 ('Moderate pain', n=366, 33.2%) had moderate pain over time. Participants in Group 3 ('Severe pain', n=165, 15.1%) developed or displayed fluctuated severe pain over time. Compared with the 'Mild pain', higher BMI, emotional problems, and musculoskeletal diseases were significantly associated with both 'Moderate pain' and 'Severe pain' trajectories. Younger age, lower education level and unemployment status were also associated with 'Severe pain' trajectory. Presence of cartilage defects and bone marrow lesions were associated with increased risk of 'Moderate pain' and 'Severe pain' trajectories before or after adjustment for confounders. Effusion-synovitis was not statistically associated with 'Moderate pain' (P=0.082), but associated with 'Severe pain' trajectory. Furthermore, a significant dose-response relationship was observed between number of structural abnormalities, and 'Moderate pain' and 'Severe pain' trajectories.

Conclusions: This first long-term study identified three distinct pain trajectory groups, suggesting that homogeneous subgroups exist and follow a specific trajectory over time despite large individual variation of pain course. Significant associations between structural pathology and pain trajectories suggest that peripheral stimuli may play a role in the development and maintenance of pain severity.

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THE ASSOCIATION BETWEEN BONE MINERAL DENSITY AND LIPID PROFILE

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Aims: Due to its prevalence worldwide, osteoporosis is considered as a serious public health concern. In order to prevent osteoporosis, it is important to assess and treat the risk factors associated with bone mineral density. In recent studies, blood lipid profiles have been suggested to be a risk factor for osteoporosis. So, we examined the relationships between the BMD score and lipid profiles.

Method: A total of 1174 Korean, who had undergone comprehensive routine health examinations at the Daegu Fatima Hospital were included in the present study. The BMDs of lumbar spines (L1 to L4) were measured by dual-energy X-ray absorptiometry (DXA), and biochemical markers including lipid profiles were measured for each patient.

Result: The mean age of total patients was 52.77±13.29. In univariate analysis, the BMD of lumbar spines (L1 to L4) was not associated with total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), and high density lipoprotein cholesterol (HDL-C). The level of triglyceride (TG)

was related with the BMD of L3 and L4 (r=0.073, P=0.044 and r=0.225, P=0.015 respectively). After adjusted for age, sex, body mass index and smoking status, TC, LDL-C and HDL-C were not related with the BMD of lumbar spines. The level of TG was significantly negative related with BMD of L1, L2, L3 and L4 (r=-0.111, P=0.001 and r=-0.122, P<0.001 and r=-0.124, P<0.001 and r=-0.127, P<0.001 respectively).

Conclusion: In the present study, we found that there was significant association between TG level and the BMD of lumbar spines.

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COMPARISON OF TWO AUTOMATED ASSAYS OF BTM (CTX-I AND P1NP) AND REFERENCE INTERVALS IN A DANISH POPULATION

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Objectives: Two reference markers for bone turnover have been proposed; CTX-I bone resorption and P1NP for bone formation. The purpose of the current study was to establish reference intervals for the two markers in a Danish cohort and to determine the agreement on the two platforms.

Material and Methods: Fasting sera from 2308 individuals (1250 males and 1058 females, age range 24-76 years) participating in the Health2006 study were analyzed for CTX-I and P1NP using the automated IDS-iSYS analyzer and the automated Cobas e411 analyzer.

Results: There was significant disagreement between both the two P1NP assays with a mean difference of -2.786 µg/L (LoA -19.209 – 13.637) (p<0.001) and the two CTX-I assays with a mean difference of 0.013 µg/L (LoA -0.187 – 0.214) (p<0.001). For CTX-I there was a systematic bias: at low values Cobas measured a higher value than iSYS and at higher concentrations iSYS measured increasingly higher values than Cobas. Based on the results, we propose three reference intervals for each sex: 20-29 years, 30-39 years and 40-80 years for men, and 20-29 years, >30 years (pre-menopausal) and >30 years (postmenopausal) for women.

Conclusions: There is significant disagreement between the IDS-iSYS and Roche Cobas assays for both reference markers. Consequently the reference intervals for an adult, healthy population are different depending on the analysis method used. Therefore, repeated measurements of patient samples used for monitoring of treatment should be done on the same assay. Moreover, assay-specific reference intervals

should be used. Harmonization of assays for BTM is highly warranted.

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MICROSTRUCTURAL DECAY IN SPINAL CORD INJURY

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Background: Spinal cord injury (SCI) causes rapid bone loss due to a reduction in bone formation at the basic cellular unit (BMU) level and increased rate of bone remodelling at the surface level, changes that result in microstructural deterioration and increased fracture risk. There is lack of information concerning the effects of paralysis on bone microstructure. We hypothesised that SCI individuals have i) a severe trabecular bone microstructural deterioration ii) higher cortical porosity in comparison to controls.

Methods: We studied 31 men with chronic complete SCI (age 43.5±14.2 yrs, duration of paralysis of 1.7-22 yrs), and 90 age and sex-matched healthy ambulatory controls, recruited at Austin Health, University of Melbourne. Images of the non-dominant distal tibia were obtained using high-resolution quantitative computed tomography (HR-pQCT, Scanco, 82 micron isotropic voxel size). Manufacturer's and StrAx1.0 (StraxCorp, Melbourne, Australia) software were used to quantify trabecular and cortical compartments indices.

Results: Compared with controls, SCI cases had 2.3, 1.8, 1.7 and 2.5 SD higher porosity in the total cortex, compact cortex, inner and outer transitional zones and 1.7SD lower matrix mineralisation density. Total and cortical vBMD were reduced by 2.4 and 1.7 SD, respectively (all p<0.01). Trabecular bone volume fraction was 2.4SD lower in cases due to 1.4 SD lower number of trabeculae and 6 SD higher separation. Trabecular bone surface and connectivity density were decreased by 0.9 and 1.4 SD, respectively (all p<0.01).

Conclusion: We infer that spinal paralysis produces profound and rapid loss of cortical and trabecular bone suggesting antiresorptive therapy should be commenced at the time of presentation.

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BISPHOSPHONATE DRUG HOLIDAYS IN POSTMENOPAUSAL OSTEOPOROSIS: EFFECT ON CLINICAL FRACTURE RISK

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Objectives: Bisphosphonates (BP) are the most widely used treatment for postmenopausal osteoporosis. The optimal treatment duration, however, remains unclear. The purpose of this study was to evaluate the fracture risk in postmenopausal women with osteoporosis after discontinuing BP treatment (BP 'drug holiday').

Patients and methods: A retrospective analysis was performed at Lille University Hospital (LUH) on postmenopausal women with osteoporosis who had taken a 'drug holiday' or continued treatment after first-line BP therapy (3 to 5 years). All of the patients had been received in the LUH Bone Clinic between January 1st, 2008 and December 31st, 2014. After careful evaluation of their medical records, 183 of the patients were included in our study and 166 of them were followed up for 6 to 36 months. The occurrence of new clinical fractures during follow-up was also explored. Cox Proportional Hazards models were used to investigate the relationships between BP 'drug holiday' and the occurrence of clinical fractures, while controlling for confounding factors. Survival without new clinical fractures was analyzed using Kaplan-Meier curves and log-rank tests. Predictors of new clinical fractures in both 'drug holiday' and continuous-treatment patients were also evaluated.

Results: The patient charts of 1,894 patients were retrieved from the LUH Health Informatics department. Among these, 898 patients with postmenopausal osteoporosis were identified. Considering our inclusion and exclusion criteria, 183 women (mean age: 61.8 years; SD: 8.7) who had previously undergone BP treatment for 3 to 5 years were enrolled in our study. The patients had received alendronate (n=81), risedronate (n=73), zoledronic acid (n=20) and ibandronate (n=9). In 166 patients ('drug holiday' group: n=31; continuous-treatment group: n=135), follow-up ranged from 6 to 36 months (mean duration: 31.8 months; SD: 8.2). The incidence of new clinical fractures during follow-up was respectively 16.1% (5/31) and 11.9% (16/135). After full adjustment, the hazard ratio of new clinical fractures among 'drug holiday' patients was 1.40 [95% CI: 1.12-1.60; p=0.0095]. For the whole cohort, the only risk factor of new clinical fractures after first-line BP therapy was older age (71.2 (±7.1) years vs. 65.7 (±8.4) years; p=0.002).

Conclusion: After first-line BP therapy in postmenopausal women with osteoporosis, the risk of new clinical fractures was 40% higher in subjects who took a bisphosphonate drug holiday.

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PERSIAN VERSION OF THE SARC-F: VALIDATION AND CULTURAL ADAPTATION TO EVALUATE SARCOPENIA IN IRAN

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Objectives: To validate the Persian version of the SARC-F questionnaire and to test its sarcopenia screening efficacy in postmenopausal women.

Material and methods: In a cross-sectional study, the SARC-F scale was translated to Persian and applied to evaluate sarcopenia. Muscle mass was estimated by bioelectrical impedance analysis (BIA). Appendicular muscle mass was used to calculate skeletal muscle index (SMI). Grip strength measured by using a dynamometer and also the gait speed was assessed at six-meter.

Results: Totally, 409 postmenopausal Iranian women with mean age 56.47±5.17 (SD) years old (44-66 years) were assessed by the SARC-F scale. The Persian language version of the SARC-F scale showed reliability (Cronbach, s Alpha=0.70). Women were classified as sarcopenic if they had SMI values below the 25th percentile of the sample studied (<6.64 kg / m²). Sarcopenia was identified in 25.2% of study population.

There were significant correlations between SARC-F scale with time of 6-meter gait (r=0.41, p=0.0001), and average two hands muscle strength (r=-0.135, p=0.04), but not with SMI (p=0.1). Women with SARC.F scale ≥4 had week muscle strength and low average of walking speed (m/s). The sensitivity and specificity of SARC-F scale for grip strength (<20kg) were 47.22%, and 68.42%; respectively, and for gait speed (≤ 0.8 m/s) were 53.06% and 60.93%; respectively.

Conclusion: Our study shows the SARC-F questionnaire successfully adopted in Persian with suitable reliability. Although sensitivity and specificity of SARC-F scale in the postmenopausal women aged ≤ 66 years were questionable for screening of sarcopenia, its correlations

with muscle strength and gait speed might be considerable. Further studies in older adults (>66 years) will be recommended.

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ALENDRONATE SODIUM IN OSTEOARTHRITIS: EFFECTS ON ANABOLIC, CARTILAGE DEGRADATIVE MARKERS, CIRCULATING LEPTIN AND THE CLINICAL ACTIVITY

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Objective: Osteoarthritis(OA) is a common arthritic disorder and responsible for 2% of disability of people in all world. OA is affects all joint structure including cartilage, bone and synovium which characterized by degradation of cartilage, subchondral bone turn over and osteophytes formation.

Aim: To evaluate the effect of alendronate sodium (ALN) on disease activity and physical function, evaluate the biochemical parameters that are related to OA, as well as study the impact of ALN on bone anabolic markers, degradative markers, MPO and leptin, and to determine its effectiveness in slowing progression of disease.

Patients and methods: 116 OA patients over 45 years old with Kellgren and Lawrence X-ray grade II and more were enrolled. Baseline assessment was done, WOMAC scoring, body mass index and the biochemical parameters with enzyme-linked immunosorbent assay (ELISA) analysis of serum TGF (transforming growth factor) beta 1, C-terminal cross linked -telopeptide of type II collagen (CTXII), Myloperoxidase (MPO) and Leptin). They were instructed to take alendronate sodium (ALN) 10 mg daily for 3 months. Reassessment was done after 3 months.

Results: A significant symptomatic improvement in WOMAC scoring regarding pain, stiffness and function were observed, with significant reduction in serum CTXII, Leptin and TGF beta 1. A nonsignificant reduction in serum calcium, associated with no significant changes in serum Alkaline phosphatase, MPO joint space width were also reported.

Conclusion: Alendronate in patients with osteoarthritis has clinical efficacy in reducing symptoms especially pain probably through inhibition of leptin and TGF beta 1 with no significant structural improvement, despite reduction of CTXii. ALN was safe in old patients with dyslipidemia since there is no associated lipid disturbances with its use.

P492

SELECTIVE INHIBITION OF SRC FAMILY KINASES UNCOUPLES BONE FORMATION FROM RESORPTION THROUGH DIRECT EFFECTS ON OSTEOCLASTS AND OSTEOBLASTS

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Objectives: Mice deficient in the non-receptor tyrosine kinase Src exhibit high bone mass due to impaired bone resorption and increased bone formation. Although several Src family kinase inhibitors inhibit bone resorption *in vivo*, they display variable effects on bone formation. SU6656 is a selective Src family kinase inhibitor with weaker activity towards the non-receptor tyrosine kinase Abl and receptor tyrosine kinases which are required for appropriate osteoblast proliferation, differentiation and function. Therefore, we sought to determine whether SU6656 could increase bone mass by inhibiting bone resorption and by strongly stimulating bone formation, and to explore its mechanisms of action.

Methods: Four-month-old female C57Bl/6J mice received intraperitoneal injections of either 25 mg/kg SU6656 or its vehicle every other day for 12 weeks. Bone phenotypes were assessed by DXA, microCT, histomorphometry and gene expression analyses. Effects of SU6656 were also tested in primary osteoclast and osteoblast cultures.

Results: In comparison to vehicle-treated mice, SU6656-treated mice exhibited higher bone mineral density (+4.6%, $p < 0.02$), tibial cortical thickness (+9.7%, $p < 0.05$), tibial cancellous bone volume (+40.9%, $p < 0.01$) and trabecular thickness (+17.6%, $p < 0.01$). SU6656 inhibited bone resorption in mice as shown by reduced osteoclast number, and diminished expressions of *Oscar*, *Trap5b* and *CtsK*. SU6656 did not affect *Rankl* or *Opg* expressions *in vivo* or in osteoblast cultures. However, it blocked RANKL-induced osteoclastogenesis, *Nfatc1* expression and matrix resorption *in vitro*. In addition, SU6656 stimulated bone formation rates at trabecular, endosteal and periosteal bone envelopes, and increased osteoblast number in trabecular bone. SU6656 did not affect expressions of clastokines favoring bone formation in mice. However, it stimulated osteoblast differentiation and matrix mineralization by specifically facilitating BMP-SMAD signaling pathway *in vitro*.

Conclusion: SU6656 uncouples bone formation from resorption by inhibiting RANKL-induced osteoclast development and function, and by enhancing BMP-mediated osteoblast differentiation.

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IMPACT OF ANXIETY AND/OR DEPRESSION ON PAIN, STIFFNESS, AND PHYSICAL FUNCTION IN A SAMPLE OF PATIENTS WITH PRIMARY OSTEOARTHRITIS OF THE KNEE: A CROSS SECTIONAL STUDY

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Introduction: Osteoarthritis (OA) is the most common articular disease of the developed countries and a cause of varying degree of unrelenting pain and of chronic disability. It is not clear in many cases, why many people with osteoarthritis experience more pain than one would expect based on the extent of their bony pathology or their radiographs.

Aim: To examine the effect of anxiety and/or depression on pain, stiffness, and physical function in patients with knee osteoarthritis.

Patients and Method: A cross-sectional study on a total of 101 patients with diagnosis of primary knee osteoarthritis (KOA), according to the American College of Rheumatology criteria. Each patient completed questionnaires including the Western Ontario and McMaster Universities Osteoarthritis (WOMAC) Index and the Hopkins Symptoms Checklist-25 for anxiety and depression (HSCL-25). The presence of anxiety and/or depression symptoms was determined, and their effects on the WOMAC scores were assessed.

Results: In KOA patients 83.2% of were found to have anxiety and/or depression. Patients with anxiety only or depression only had higher pain scores (11.5, 11) respectively than those free of these two disorders (8) ($P < 0.05$). The mean pain score of patients who had both anxiety and depression (13.4) and that of the total number of patients who have anxiety and/or depression (13) was significantly higher than that of patients with none ($P < 0.001$). The mean Physical function score of patients with depression (40.8) and those with both anxiety and depression (41.3) was significantly higher than that of the patients with none (28.8), ($P = 0.021$). The mean physical function score of patients with anxiety only (36.8) was not significantly higher than that of patients with none (28.8), ($p = 0.18$). The Stiffness score in patients with both anxiety and depression (3.5), patients with anxiety only (3.8) or depression only (3.6) were insignificantly higher than the score of those who had no anxiety or depression (2), ($P > 0.05$). The mean total WOMAC score was significantly higher in patients with depression (55.3), both anxiety and depression (58.2), and those with anxiety and/or depression (57.5) were more significantly higher than

that of patients with none (38.8), ($P=0.001$, $P<0.001$) respectively.

Conclusions: The presence of anxiety and/or depression in patients with osteoarthritis of the knee directly and negatively affect pain, stiffness, and total WOMAC scores. While their negative effect on the physical function is indirect. It may be important to screen for the presence of these in order to arrange for proper management.

P494

ENZYME REPLACEMENT THERAPY IN A PATIENT AFFECTED BY ADULT FORM OF HYPOPHOSPHATASIA (HPP)

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Objective: The aim of this report is to describe the use and benefits of enzyme replacement therapy in an adult HPP patient.

Methods: Here we describe the case of an adult patient with a delayed diagnosis of HPP, treated with asfotase alfa for 12 months. Biochemicals, radiological and clinical parameters were tested before and after treatment initiation.

Results: A 48-years-old Caucasian woman referred to our clinic for delayed healing of bilateral proximal femoral pseudofractures, pelvic and ankle pain resistant to analgesic/anti-inflammatory drugs. In clinical interview the patient reported a previous treatment with clodronate for her first femoral fracture and since childhood premature teeth loss/abnormalities, muscle pain with reduced strength, recurrent metatarsal stress fractures, recurrent enthesopathy. The patient presented with an abnormal device-assisted gait, with a poor performance at 6MWT. Blood analysis showed very low levels of plasmatic and bone alkaline phosphatase (ALP). The levels of pyridoxal phosphate (PLP) were very high and phosphate levels were slightly high. Clinical diagnosis of HPP was done, later confirmed by genetic analysis of the TNSALP gene.

During follow-up, she presented a new cortical fracture of the right femoral neck and for this reason the option of enzyme replacement therapy was considered. Asfotase alfa was initiated with a dose of 1 mg/kg/day s.c. for 6 days/week. Beside a mild local reaction at the injection site, that lasted the first month only, no other minor or major adverse events

were documented. The biochemical analysis performed after 3 and 12 months from treatment's initiation showed a persistent reduction of PLP within normal values. Bone and muscle pain decreased, improvement of gait and 6MWT were documented. Radiological images after 12 months of treatment showed the complete healing of the femoral neck cortical fracture.

Conclusions: This case report highlights the benefits of asfotase alfa treatment in adult form of HPP. The enzyme replacement therapy should be a worth possibility to be considered for adults affected by severe forms of HPP with multiple and recurrent fractures.

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PREVALENCE OF SARCOPENIA ACCORDING TO 10 DIFFERENT OPERATIONAL DEFINITIONS OF FRAILITY

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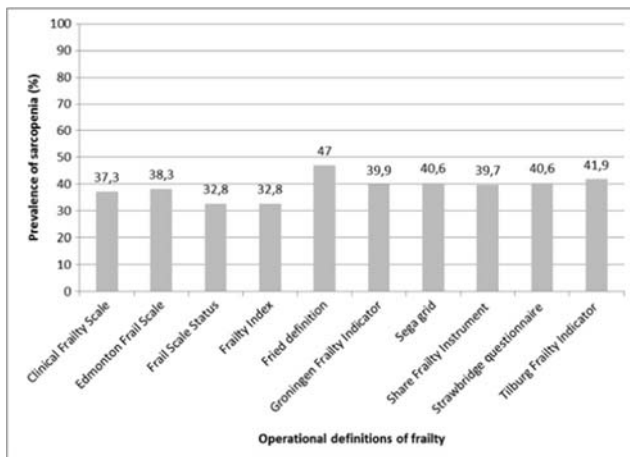
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Objective: The aim of this study was to compare the prevalence of sarcopenia among frail nursing home residents, diagnosed according to 10 different operational definitions.

Methods: This is an analysis of data collected at baseline in the SENIOR (Sample of Elderly Nursing home Individuals: an Observational Research) cohort. All subjects received a diagnosis of sarcopenia, based on the definition proposed by the European Working Group on Sarcopenia in Older People (EWGSOP). The frailty evaluation was based on 10 different operational definitions and the prevalence of sarcopenia was assessed for each of them.

Results: A total of 662 subjects from 28 nursing homes aged 83.2 ± 8.99 years (73.1% of women) were included in this study. In this population, prevalence of sarcopenia was 38.1% and prevalence of frailty varied from 1.70% (Frailty Index) to 76.3% (Groningen Frailty Indicator and Segal Grid), depending on the definition used. When regarding the prevalence of sarcopenia among frail subjects, it was ranged between 32.8% (i.e. Frail scale Status and Frailty Index) and 47% (i.e. Fried definition).

Figure 1. prevalence of sarcopenia according to 10 different operational definitions of frailty



Conclusion: This study highlighted that, among frail nursing home residents, prevalence of sarcopenia varied from 32.8% to 47%, according to the operational definition of frailty used.

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RELATIONSHIP BETWEEN OXIDATIVE STRESS AND TRABECULAR BONE MICROSTRUCTURE IN OSTEOPOROTIC PATIENTS

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Experimental studies have suggested that oxidative stress is an important factor in the regulation of bone remodeling. Thus, low antioxidant levels are associated with a reduced bone mineral density and increased risk of osteoporotic fracture. Whether oxidative stress is related to fracture risk is poorly understood.

Material and Methods: Cross-sectional study in 21 subjects divided into 3 groups: 7 osteoporotic hip fracture (age: 75±5) (OP); 8 osteoarthritis, undergoing hip replacement, (71±4) (OA) and 6 OA ≤ 55 years old. We carried out total hip and femoral neck BMD (DXA-Hologic Discovery), microstructural and biomechanical characteristics of trabecular bone from femoral head (Micro-CT-Scan Sky 1172). In macerated trabecular bone, we quantified gene expression of catalase, GADD45 (oxidative stress genes), Runx2 and osteoprotegerin (OPG) by qPCR. The results are statistically analyzed with the Kruskal-Wallis and Dunn's post-hoc and correlations by Pearson coefficient (SPSS 22.0), $p \leq 0.05$.

Results: Osteoporotic subjects have an increased expression of catalase and GADD45, suggesting increased oxidative stress in osteoporotic trabecular bone regardless of age and sex. We also observed a significant increase in the expression of Runx2 and OPG in OP group. As expected, BMD values are statistically lower in the OP subjects and they have a worse biomechanic and microstructure bone.

Conclusion: These results suggest that osteoporotic patients have an increase of the oxidative stress and bone activity with alterations in the osteogenic genes.

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EFFECTS OF A GIANT EXERCISING BOARD GAME INTERVENTION ON AMBULATORY PHYSICAL ACTIVITY AMONG NURSING HOME RESIDENTS: A PRELIMINARY STUDY

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Objective: The aim of this study was to assess the effects of a giant exercising board game intervention on ambulatory physical activity among nursing home residents.

Methods: This is a 3-month longitudinal study (one month of intervention and 2 months post-intervention follow-up), performed in 2 similar nursing homes. The first nursing home has been designated as the intervention group while the second one was the control group. Voluntary, mobile, and oriented subjects (MMSE > 18 points), living in the nursing homes enrolled in this study were included. The intervention was carried out using a giant game board measuring 4 meters long by 3 meters wide, composed of 24 cells, divided into 4 components (strength, balance, flexibility, endurance). It was supervised by a specialist in physical activity during one month. Daily ambulatory physical activity (i.e. the number of steps per day) were measured using Actigraph GT3X + for a period of 3 consecutive days at the beginning of the study, after the intervention (1 month) and at the end of the post-intervention follow-up (3 months).

Results: The intervention and control groups consisted of 10 and 11 subjects, respectively. The mean age was 82.5 (79-89) years in the first group and 89.9 (87-91) years in the second group ($p=0.08$). The percentage of women in these groups was 60% and 72.7% ($p=0.54$). At baseline, the number of steps per day was comparable in the two groups (2920.9 ± 1351.5 vs. 3386.8 ± 730.7, $p=0.19$). At the end of the intervention, the number of steps was increased on average by 79.59 ± 1311.63 in the intervention group whereas it was decreased by -855.48 ± 994.13 in the control group. The difference between the 2 groups was not significant ($p=0.24$). The same observation was made at the end of the 3-month follow-up period as we observed an average increase of +754.33 ± 1706.83 steps in the intervention group and an average decrease of -38.72 ± 1004.94 in the control group ($p=0.21$), compared to the results obtained at the end of the intervention. The increase observed in the intervention group was not significant ($p=0.10$). On the other hand, the evolution observed in the control group was significant ($p=0.02$).

Conclusions: The implementation of a physical activity board game in nursing homes does not seem to increase the number of steps per day taken by the residents. However, the subjects benefiting from this intervention seemed to maintain their

level of ambulatory physical activity during the period studied whereas the subjects not benefiting from the intervention have decreased their ambulatory physical activity.

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PREDICTING THE INTERVENTION THRESHOLD FOR TREATING OSTEOPOROSIS AMONG POSTMENOPAUSAL WOMEN IN CHINA: A COST-EFFECTIVENESS ANALYSIS BASED ON FRAX

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Objectives: Fracture risk assessment tool (FRAX) is popular worldwide to determine the 10-year probability of major osteoporotic fracture or hip fracture [1]. We predicted the disease burden of osteoporotic fractures in Chinese postmenopausal women and evaluate the cost-effectiveness of treatment with 3 anti-osteoporosis drugs. We also estimated the intervention threshold of FRAX in Mainland China, at which treatment with alendronate or zoledronate could be cost-effective.

Methods: We developed a micro-simulation Markov model in NetLogo 5.3.1 (Evanston, IL) to capture osteoporosis states and relevant morbidities including hip fracture, vertebral fracture, and wrist fracture, and death. Baseline characteristics including age-specific prevalences, incidences of osteoporosis and osteoporotic fractures and the distribution of risk factors were derived from the Peking Vertebral Fracture (PK-VF) study, the largest prospective cohort study of postmenopausal women in Mainland China. We projected incidences of hip fracture, vertebra fracture, wrist fracture and deaths by age groups under four treatment scenarios: 1) no treatment, 2) standard calcium plus vitamin D, 3) treatment with alendronate, or 4) zoledronate. We also projected total quality-adjusted life-years (QALY) and total costs including both fracture management and osteoporosis drugs for cost-effectiveness analysis. The model was validated by the cumulative incidences of fractures and the distribution of fractures by age groups.

Results: Treatment with calcium plus vitamin D or with alendronate were dominated by zoledronate, which results in an incremental cost-effectiveness ratio equals to \$16,680 per QALY gained in comparison to no treatment. Treatment with zoledronate could reduce 9.8% of the overall fracture. Treatment with zoledronate for patients with FRAX score > 0.07 is cost-effective in comparison with no treatment.

Conclusions: Our study indicates widespread use of zoledronate is of both clinical and economic benefit among Chinese postmenopausal women with their FRAX score over 0.07.

Reference: 1. Kanis JA et al. Arch Osteoporos. 2016;11:25.

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ATYPICAL FRACTURES OF THE FEMUR AND BIPHOSPHONATE THERAPY IN PATIENTS WITH BETA-THALASSEMIA-ASSOCIATED OSTEOPOROSIS: REPORT OF THREE CASES

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Objectives: To describe the clinical presentation and course of atypical subtrochanteric/femoral shaft (ST/FS) fractures in patients with beta-thalassemia-associated osteoporosis.

Patients and Methods: Patients referred and followed by the Center of Microcitemia and Congenital Anemias of the Galliera Hospital (Genova, Italy) were assessed and evaluated. All subjects underwent a bilateral x-ray of the femoral diaphysis including the area comprised from just distal to the lesser trochanter to just proximal to the supracondylar flare. Clinical and pharmacological characteristics of the patients, as well as laboratory tests results (including serum calcium, PTH, 25-hydroxy-vitamin D, creatinine, CTX and bALP) and bone mineral density (BMD) measurements were retrieved from the hospital database. All patients underwent a comprehensive clinical evaluation, and weight and height were measured. An atypical ST/FS fracture was defined if two independent reviewers agreed on at least four of five major features defined by the 2013 American Society for Bone and Mineral Research criteria.

Results: We identified three women (age range 36-37 years old), out of 36 patients evaluated, who sustained bilateral spontaneous atypical ST/FS incomplete fractures. All three subjects have been treated with bisphosphonates (BPs) (alendronate or pamidronate), with two of them having discontinued the treatment one and four years before the occurrence of pain of the thighs (probably indicating the development of the atypical fracture). One patient presented also with an insufficiency metatarsal fracture. The clinical and radiological presentation, and the course of fracture healing (delayed) of these atypical fractures were similar to that described in the literature. A number of features distinguished these fractures from those described in postmenopausal women receiving BPs: the duration of BPs therapy in two women was relatively shorter (4-6 years) compared to what reported in observational studies; in two cases the fractures became clinically symptomatic or developed after the discontinuation of the BP; the BMD T-scores were below the diagnostic threshold for osteoporosis (-2,5) defined by the WHO, indicating the presence of osteoporosis; the markers of bone turnover at the time of fracture were within the reference range, indicating no suppression of bone turnover.

Conclusions: This is the third and greatest report of atypical ST/FS fractures in patients receiving BPs for beta-thalassemia-associated osteoporosis. Our observations emphasize the need for a better definition of the optimal treatment duration of BP therapy in patients with beta-thalassemia-associated osteoporosis.

P500

DOWN AT HEEL: THE UTILITY OF QUANTITATIVE ULTRASOUND IN DIAGNOSING OSTEOPOROSIS

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Objectives: Quantitative heel ultrasound (QUS) is an alternative to DXA in osteoporosis (OP) screening. However, its correlation with DXA is ill-defined. We examined relationships of QUS with DXA, biochemical bone markers and fracture history in patients attending our OP clinic.

Materials and Method: We identified patients with contemporaneous QUS and DXA. We compared QUS T-scores, Broadband Ultrasonic Attenuation (BUA) and Speed of Sound (SOS) with DXA results, fracture history and biochemical bone turnover markers.

Results: 2294 patients; 83% female; mean age 67.1 yrs (SD 13.9). Mean BMD total hip 0.767g/cm² (SD 0.152); mean BMD spine 0.898g/cm² (SD 0.194). Both SOS and BUA significantly correlated positively with BMD hip and spine in linear regression analysis; strongest association was at the hip, where BUA accounted for 35.71% BMD variation (R-square adjusted, p<0.0001). For those with QUS T-score ≤-2.5 (osteoporotic), odds ratio (adj. for age, sex, BMI) for hip fracture was 2.17 (95% CI 1.66-2.88, p<0.0001); odds ratio for vertebral fracture 1.83 (95% CI 1.44-2.30, p<0.001). QUS sensitivity and specificity for diagnosing OP by T-score varied by site. When compared with DXA, a QUS heel T-score of ≤-2.5 had 71.21% sensitivity and 69.78% specificity for diagnosis of hip OP; for spine OP, QUS sensitivity was 58.9%; specificity was 73.04%. However, we found that a QUS T-score >-1.1 had 90% sensitivity for OP at any site; a QUS T-score ≤-3.0 had 89% specificity for OP. No significant correlation of SOS and BUA to bone turnover markers.

Conclusions: QUS heel is strongly predictive of BMD at hip and also hip fracture and has high sensitivity for diagnosis of OP of hip. But for the spine it is less predictive of OP, BMD and fractures; nor did it predict increased markers of bone turnover. We found that the same T-score cut-off points as used to diagnose OP by DXA, are not equally applicable to QUS, and propose that new T-score cut-off points for QUS should be considered.

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HALF HIP FRACTURE PATIENTS ARE REPORTEDLY 'WORSE' THAN DEAD AS BASED ON HEALTH-RELATED QUALITY OF LIFE AT THE TIME OF ADMISSION, WITH PARTIAL RECOVERY AT 1 AND 4-MONTHS FOLLOW-UP: THE SPARE-HIP PROSPECTIVE COHORT

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Objective: To estimate the impact of hip fracture on health-related quality of life (HRQoL) up to 4 months post-fracture.

Material and Methods: The SPARE-HIP (Spanish Registry of Hip and Proximal Femur Fractures) cohort includes a consecutive sample of hip/proximal femur fracture patients recruited from a representative 45 Spanish hospitals. Patients were consented and recruited at the time of admission for a hip fracture, and followed at 1 and 4 months. Euro-QoL 5 Dimensions (EQ5D) was used to measure baseline and over-time HRQoL. National preferences (Spain) were used to calculate EQ5D utility indices, which range from 0 (worst) to 1 (best), with negative values allowed and equivalent to “worse than dead”. Global health visual analogic scales (VAS) were also measured. HRQoL over time is reported as median (interquartile range) and plotted using Kernel Density plots.

Results: A total of 696/852 participants with EQ5D data (594 (85.3%) and 513 (73.7%) with 1 and 4-month follow-up respectively) were included. Baseline (pre-fracture) median EQ5D was 0.72 (0.40 to 0.91), dropping to -0.01 (-0.31 to 0.51) at the time of fracture. Partial recovery was seen at months 1 and 4, with median EQ5D 0.34 (-0.08 to 0.67) and 0.58 (0.08 to 0.77) respectively. Similar results were seen in global health VAS, with median 69/100 (50 to 80), 40 (30 to 56), 54 (40 to 66), and 60 (50 to 75, respectively at each time point.

Conclusions: Hip fracture has a deep impact on patients’ quality of life, taking their HRQoL from a median of 72% “best possible quality” to 0% at the time of admission, with half of them reportedly “worse than dead” at that time. Partial recovery is seen during follow-up to 4 months. More research is needed on patient-centered outcomes following a hip fracture.

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GAP IN SECONDARY FRACTURE PREVENTION (BUT NOT IN PRIMARY PREVENTION OF INFECTION AND THROMBOSIS) FOLLOWING A HIP FRACTURE: THE SPARE-HIP PROSPECTIVE COHORT

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Objectives: We assessed the proportion of patients on anti-osteoporosis treatment/s during a hospital admission for a hip fracture, and at 1- and 4-month follow-up. For comparison, we also report on anti-thrombotic and antibiotic therapies at these same times.

Material and Methods: The SPARE-HIP (Spanish Registry of Hip and Proximal Femur Fractures) cohort includes a consecutive sample of hip/proximal femur fracture patients recruited from a representative 45 Spanish hospitals. Patients were recruited at the time of admission for a hip fracture, and followed at 1 and 4 months. Local investigators reported on whether patients were on treatment or started anti-osteoporosis, anti-thrombotic and antibiotic therapy during admission; and whether patients were on anti-osteoporosis agents at 1 and 4-month follow-up. Number and% of patients on the above treatments were reported with 95% confidence intervals assuming a binomial distribution.

Results: A total of 852 participants were recruited. Although 329 (38.6%) had a history of previous osteoporotic fracture, only 67 (7.9% [6.1% to 9.7%]) were on anti-osteoporosis therapy at admission. This increased only to 19.8% [17.2% to 22.5%] at discharge, 213/741 (28.7% [25.5% to 32.0%]) at 1- and 211/580 (36.4% [32.5% to 40.3%]) at 4-months. In contrast, anti-thrombotic and anti-biotic therapies were almost universally prescribed (95.2% [93.7% to 96.6%] and 96.4% [95.1% to 97.6%] respectively).

Conclusions: There is an unresolved treatment gap in the secondary prevention of fractures, both before and after a hip/proximal femur fracture. Interestingly, anti-thrombotic and anti-biotic prophylaxis are much more widely implemented and close to universal implementation. There is a need for improvement in the delivery of secondary fracture prevention amongst hip fracture patients.

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DEFERASIROX INHIBIT DIFFERENTIATION OF MOUSE RAW264.7 MONOCYTES INTO OSTEOCLASTS THROUGH NF-KB SIGNAL

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Objective: To investigate the effects of deferasirox (DFS) on differentiation of mouse RAW264.7 monocytes into osteoclasts and related mechanism.

Methods: RAW264.7 cells were treated with DFS in the presence of receptor activator of NF-κB ligand (RANKL). Cell viability were assessed by CCK-8. The number of tartrate-resistant acid phosphatase (TRAP)-positive cells were counted under light microscopy. The levels of transcription factor c-Fos, nuclear factor of activated T cell c1 (NFATc-1) and cathepsin K (CTK) mRNA were analyzed by Real-Time PCR. The levels of reporter gene of Nuclear transcription factor kappa B (NF-κB) was examined by luciferase reporter assay. NF-κB P65 were detected by Western Blot.

Results: DFS could significantly decrease the number of TRAP-positive MNCs, and down-regulate mRNA expression of c-Fos, NFATc-1, and CTK, and suppress expression of NF-κB reporter gene, and hinder translocation of NF-κB P65 to cell nucleus in RAW264.7 cells.

Conclusion: DFS can significantly inhibit differentiation of RAW264.7 cells into osteoblast, and the mechanism behind inhibition may involve suppressed NF-κB activity.

P504

OCCURRENCE OF BONE FRACTURE IN THE 2 YEARS FOLLOWING A PROLONGED ICU STAY: A RETROSPECTIVE STUDY INCLUDING A CONTROL GROUP

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Objective: Clinical consequences of critical illness and critical care (CC) on bone health remain largely unexplored. The present retrospective study aimed to assess the number of new bone fractures (BF) following critical illness focused on patients with a prolonged length of stay (LOS) in intensive care unit (ICU).

Material and methods: In the CC group, adults admitted in our ICU during 2013 with a LOS > 7 days were included. Patients who died in ICU or lost to follow up (FU) were

excluded. In a second phase, a control group was added, including patients who attended an anesthesia consultation for scheduled surgery or invasive procedure during 2013. For each CC patient still alive after the 2y of FU, 2 control patients, matched for gender and age, were recruited. Demographic and medical data were collected in the medical chart. Basal fracture risk before admission was calculated using the FRAX tool. General practitioners were phoned to check out new frailty BF during the 2 years after admission.

Results: A total of 1446 patients were admitted in ICU in 2013. Of those, 989 had an ICU LOS \leq 7d, 169 died during ICU stay and 3 were $<$ 18y. Among the 72 patients who died during FU, only one BF occurred in a 62y man. Finally, new BF occurred in 9 of the 178 patients who were still alive at the end of FU (5%). Fractured patients did not differ from non-fractured ones based on demographic and clinical characteristics, excepting for FRAX risks that were higher in fractured patients. In the control group, 327 patients were analyzed. Their rate of new BF was 3.4% without reaching statistical significance compared to the CC group ($p=0.35$). They had similar FRAX risks when compared to CC group.

Conclusions: No statistical difference was observed in BF occurrence 2y after admission in ICU or surgical ward. Results have to be interpreted with caution due to limited cohorts, making this study potentially underpowered. CC fractured patients had significantly higher basal FRAX risks than nonfractured patients, suggesting that screening of risk factors would be relevant as soon as ICU hospitalization in order to implement targeted prevention strategies.

P505 SERUM OSTEOPROTEGERIN IS A MARKER OF BOTH FRACTURE AND CARDIOVASCULAR RISK IN OLDER MEN: THE PROSPECTIVE STRAMBO STUDY

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Objective: Fractures and major adverse cardiac and cerebrovascular events (MACCE) often occur in one person; however, data on shared biological markers are missing. We assessed the utility of OPG for prediction of fracture and MACCE in men.

Material and Methods: In 817 men aged 60-87, serum OPG was measured at baseline (ELISA Biomedica). Bone mineral density and trabecular bone score (TBS) were assessed by DXA. TBS-adjusted FRAX (FRAX-TBS) for major osteoporotic fracture (MOPFx) was calculated. Over 8 yrs of

prospective follow up, 101 men had incident fragility fracture and 87 men had incident MACCE (acute coronary syndrome, stroke, sudden death).

Results: After adjustment for FRAX-TBS, higher OPG levels were associated with higher risk of fracture (HR=1.34 per SD, 95%CI: 1.11-1.61, $p<0.005$). After adjustment for FRAX-TBS, fracture risk was higher in the highest OPG quartile vs. three lower quartiles combined (HR=1.98, 95%CI: 1.31-2.99, $p<0.005$). A similar pattern was found for vertebral fracture, MOPFx and non-vertebral fracture analyzed separately, e.g., non-vertebral fracture risk was higher in the highest OPG quartile vs. the three lower quartiles combined (HR=2.38, 95%CI: 1.43-3.96, $p<0.005$). In the men with FRAX-TBS for MOPFx $<$ 15%, higher OPG levels were associated both with higher risk of all fragility fractures (HR=1.29 per SD, 95%CI: 1.06-1.58, $p<0.05$) and of various fracture subgroups (vertebral fracture: HR=1.49 per SD, 95%CI: 1.10-2.02, $p<0.01$). After adjustment for age, weight, lifestyle and cardiovascular risk factors, higher OPG levels were associated with higher risk of MACCE (HR=1.39 per SD, 95%CI: 1.09-1.77, $p<0.01$). After adjustment for confounders, the risk of MACCE was higher in the highest OPG quartile vs. the lowest one (HR=2.73, 95%CI: 1.06-7.03, $p<0.05$).

Conclusion: Older men with the high OPG levels are at increased risk of both fragility fracture and MACCE. Measurement of OPG may improve identification of older men at increased both cardiovascular and fracture risk.

P506 DIAGNOSIS AND TREATMENT IN HAND INTERPHALANGEAL ARTHRITIS

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Hand osteoarthritis affects 38% of the female population and 24,5% of the male population aged $>$ 60. The clinical picture of hand osteoarthritis, according to ACR criteria, are: pain, limited movement and joint deformation. Radiological exam includes: standard X-ray, the presence of osteophytes, narrowing of joint space, bone scanning. Clinical forms of hand osteoarthritis may be either: a. generalized forms, involving 3 joints or a group of joints; b. erosive, with sudden onset, pain, swelling, erythema, joint erosion and aggravating tendency. Therapy in hand interphalangeal arthritis was determined according to 13 multi-centre studies and consists of -symptomatic fast acting drugs -symptomatic slow acting drugs chondroprotective agents (GAG-PS). Treatment in hand osteoarthritis is

similar with that of knee or hip osteoarthritis. A major role is held by the patient's compliance to treatment, elimination of mechanical risk factors, local physical therapy, analgesics, anti-inflammatories. Chondroprotective medicine may prevent, stabilize and even repair cartilage damage. Medical treatment requires individual treatment associated with physical therapy and, in most severe cases orthosis.

P507

UNDERSTANDING PATIENT PREFERENCES FOR OSTEOPOROSIS TREATMENTS

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Objective: Adherence with osteoporosis treatment is poor. Incorporation of patient treatment preferences into decision-making may improve patient adherence. The objective of this study was to examine patient preferences for treatment options in osteoporosis.

Materials and Methods: We recruited patients with confirmed osteoporosis on DXA scan who were intolerant to oral bisphosphonates and referred by general practitioner to specialist osteoporosis clinic for consideration of injection treatments. Consenting participants were given standard drug information leaflets and offered a choice of either twice yearly subcutaneous Denosumab or yearly Zoledronate infusion. Patients were informed about equal efficacy and some common side effects of these drugs and an opportunity to discuss again in next clinic visit with the specialist.

Results: The study sample included 126 Caucasian women and 51 men (median age=71 years). Majority (85%) preferred SC Denosumab. Patients' treatment preferences were strongly influenced by route of administration with subcutaneous route more acceptable. The results were not influenced by age or sex of patient, previous fracture status. Main reasons amongst participants preferring annual infusion was convenience of less frequent blood test, less hospital visit or undue concern from side effects of Denosumab. 7% were unable to decide and would agree specialist recommendation. 2% had serious concerns about drug side effects and did not want injection treatments.

Conclusions: Patient preferences for osteoporosis treatment options are strongly influenced by route of administration. Our study results emphasize the need to incorporate individual patient preferences into treatment decisions for osteoporosis. This process of decision-making not only adheres to the principles of informed consent and patient autonomy, but also can increase patient satisfaction and improve compliance, both of which are essential to ensure successful long-term treatment of osteoporosis and ultimately prevent fractures.

P508

GENE EXPRESSION ANALYSIS DURING IN VITRO MYOGENESIS OF HUMAN SKELETAL MUSCLE SATELLITE CELLS

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Objective: Skeletal muscle regeneration represents a paramount target for diseases in which skeletal muscle is lost or damaged, such as sarcopenia or dystrophy. The importance of understanding the mechanisms that underlie the myogenesis process are fundamental for the development of new therapeutic strategies. The aim of this work is to analyse the expression of the most important genes of the myogenic differentiation (MyoD-1, MRF-4, Myogenin, Desmin, Myosin Heavy Chain) and of specific hormone receptors (VDR, TR α , TR β , GCR) in human skeletal muscle satellite cells (hSMSCs) in order to identify possible therapeutic targets for skeletal muscle regeneration.

Material and Methods: SMSCs have been isolated from biopsies of human skeletal muscles (pectoralis major, recto abdominal muscles) in healthy young adult volunteers undergoing plastic surgery. Primary cells have been cultured in growth medium (GM) and the obtained cell lines characterized by cytofluorometric assay. Then cells have been differentiated for 7 days with appropriate differentiation medium (DM) to evaluate the expression of MyoD-1, MRF-4, Myogenin, Desmin, Myosin Heavy Chain, Irisin, VDR, TR α , TR β , GCR by RealTime-qPCR, during myogenesis. Statistical analysis was performed by Student's t-test to evaluate the significant difference between gene expression values in DM and the respective value in GM.

Results: Cytofluorimetric assay has shown the presence of the satellite cell marker PAX-7 (99.12%) and the mesenchymal stem cell markers CD44 (98.76%), CD90 (68.21%), on the isolated SMSCs. RealTime-qPCR, performed on hSMSCs after 7 days of myogenic differentiation, has revealed significant increases in gene expressions of MyoD-1, Myogenin, Myosin Heavy Chain, TR α ($p < 0.005$), MRF-4, Desmin, Irisin, VDR ($p < 0.001$) and TR β , GCR ($p < 0.05$) with respect to baseline level, suggesting their involvement in skeletal muscle regeneration.

Conclusion: Our results have demonstrated the utility of skeletal muscle satellite cells, isolated from human biopsies, to study the myogenesis process. All the assayed genes may represent feasible targets in skeletal muscle regeneration. Studies are in progress in order to modulate and manipulate skeletal muscle differentiation pathway to identify possible therapeutic strategies for disorders associated with skeletal muscle diseases.

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HOW DEMOGRAPHIC AND TRANSFUSIONAL PARAMETERS EFFECTS BMD AND ENDOCRINOLOGICAL DISORDERS IN THALASSEMIA MAJOR PATIENTS: AN EXPERIENCE WITH 114 PATIENTS

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Objectives: Beta-thalassemia major patients frequently have endocrinopathies. We tried to determine relation between demographic and transfusion factor and endocrinopathies.

Material and Methods: Major beta-thalassemia patients, 114 cases, 3–38 yr of age, entered this study. Female to male ratio: 51/63. Children (less than 20 y/o) formed 57% of participants. Information about BMD and hormonal and biochemistry blood evaluation including FBS, ferritin, T3, T4 and thyroid-stimulating hormone (TSH), luteinizing hormone (LH) and follicle-stimulating hormone (FSH), testosterone (males), and estradiol (females) entered data sheet.

Results: Correlation was measured between age, sex, ferritin level and the spine and Low BMD and other endocrinological diseases. Sex and ferritin level showed no significant correlation with above disorders. Age significantly correlated to short

stature, diabetes, low BMD at femur and neck (P values, 0.031, 0.008, 0.009 and <0.001, respectively). Being 12 y/o and older increases the risk short stature, 7.71 times compared to younger patients (P-value=0.008). Being 35 y/o and older increases the risk of diabetes, 26.25 times compared to younger patients (P-value=0.03). Being 19 y/o and older increases the risk of Z-score ≤ -2 in femoral region, 5.84 times compared to younger patients (P-value=0.002). Being 14 y/o and older increases the risk of Z-score ≤ -2 in spinal region, 17 times compared to younger patients (P-value=0.007).

Conclusion: The main factor related with endocrinopathies was age. Short stature, diabetes and low BMD patients were significantly older. So, we recommend early monitoring of thalassemia patients (in their late childhood and early teenage) for these complications.

P510

HIGH-FAT DIET-INDUCED ACCELERATION OF OSTEOARTHRITIS IS ASSOCIATED WITH SUSTAINED METABOLOMICS SIGNATURE REGULATED BY LEPTIN/AUTOTAXIN PATHWAY

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Objectives: The contribution of metabolomic changes induced by high fat diet (HFD) to osteoarthritis (OA) is poorly understood. We investigated if HFD results in distinct and longitudinal changes to metabolites and their contribution to OA pathogenesis.

Methods: Mice were fed normal chow diet until 9-weeks of age and then placed onto HFD or lean diet (LD) for 18 weeks, followed by resumption of normal chow and evaluated longitudinally up to 12-months of age. Some mice were also subjected to surgically-induced OA at the end of HFD or LD. Plasma and knee joints were collected at each time point. Functional mechanistic studies were performed using human OA chondrocytes.

Results: Our results first show that HFD-fed mice exhibit acceleration of both spontaneous age-related and surgically-induced OA compared to LD-fed mice. Using metabolomic analyses, we for the first time, identified that HFD-fed mice exhibited a distinct and sustained longitudinal plasma metabolite signature rich in lysophosphatidylcholines, even after resumption of normal chow diet, suggesting their contribution to accelerated OA progression in HFD-fed mice. Using ROC and prediction modelling, we showed that concentration of these identified metabolites could efficiently predict diet and cartilage degeneration with an accuracy of 93%. Mechanistic studies revealed leptin/autotaxin pathway as a key driver of

sustained metabolomic changes as well as induction of catabolic enzyme expression in chondrocytes, thus contributing to articular cartilage degeneration.

Conclusion: Together this study is the first to identify a distinct, sustained, HFD-induced metabolite signature that is mediated by Leptin/autotaxin signaling and correlates with OA severity.

P511

THE WAY THE PATIENT WITH ARTHROSIS. WHY DELAY THE DIAGNOSIS?

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From the appearance of the first symptoms of the disease until the proper diagnosis and appointed therapy sometimes passes a long period of time. Analysis of the route of rheumatic patient gives us an idea of the reasons for late diagnosis. GPs refer patients with osteoarthritis and dorsopathy other professionals, most orthopedists and neurologists. The organization of world primary care seeks to solve this problem because it is associated with many unnecessary tests and orthopedic operations, which in turn leads to many suffering patients and thus to more spending. This publication analyzes the routing of patients with arthrosis and dorsopathy for a period of six years in Bulgaria.

P512

CONCOMITANT ATYPICAL FEMORAL FRACTURE AND OSTEONECROSIS OF THE JAW IN BISPHOSPHONATE USERS

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Introduction: Treatment with bisphosphonates is associated with two rare but serious adverse drug reactions (ADRs): atypical femoral fracture (AFF) and osteonecrosis of the jaw (OJ). The simultaneous appearance of both complications in the same patient is unusual.

Purpose: To describe some cases of patients diagnosed with AFF and OJ after a bisphosphonate-based treatment and to estimate the prevalence of these ADRs in the population treated with bisphosphonates attending our hospital between 2011 and 2015.

Methods: A retrospective search of patients diagnosed with AFF and/or OJ was conducted through the hospital computer system combining the terms (in Spanish): atypical fracture,

diaphysary fracture, external cortical fracture, femoral, osteonecrosis of the jaw, maxillary osteonecrosis, bisphosphonates. In order to make a rough estimation of the prevalence of both ADRs, the number of patients on bisphosphonates that lived in the hospital catchment area was asked to the Madrid region health authority.

Results: Six patients (all women with a mean age of 71.5 SD 13.03) were diagnosed with at least one of these ADRs between 2011 and 2015. Three of them had no maxillary lesions (two with AFF and a third patient with bilateral femoral fissures). A fourth patient diagnosed with AFF had also a jaw injury not described as OJ. The other two patients had OJ, one with pathologic femoral fracture and another with right subcapital femoral fracture not declared as atypical. All patients had been treated with bisphosphonates for more than five years except for the two patients with OJ and femoral fracture. Out of the total number of patients treated with bisphosphonates (13,666) between 2011 and 2015 that lived in the hospital catchment area, a prevalence of 0.029% was estimated for AFF and of 0.39% for OJ. Prevalence of both concomitant ADRs was 0.014%.

Conclusions: Half of the patients treated with bisphosphonates diagnosed with AFF also presented OJ. Despite the prevalence of AFF and OJ being very low, they are very serious ADRs. Whenever patients are diagnosed with one of these conditions, it seems wise to discontinue bisphosphonate treatment and to start a close follow-up one of the patient.

P513

COMPARISON OF THE MICRO-ARCHITECTURE OF TRABECULAR LUMBAR BONE BY TBS (TRABECULAR BONE SCORE) AMONG TYPE 2 DIABETIC AND NON-DIABETIC WOMEN OF THE PINARES MEDICAL SPECIALTY CENTER, SAN JOSÉ, COSTA RICA: CASES AND CONTROLS STUDY

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Objective: To know the relationship between the abnormal values of TBS and type 2 diabetes mellitus as well as the association between different risk factors for fracture and diabetes with abnormal TBS values.

Materials and methods: A descriptive observational study of cases and controls, in which 62 female patients (31 type 2 diabetic and 31 non-diabetic), selected from the bone densitometry database of a private medical center in San José, Costa Rica, are compared to each other to evaluate if there are differences in the results of the TBS study between both groups, as well as the influence that other variables such as BMD, age, BMI in each group could have on the TBS variable.

Results: The mean age of diabetic patients was 63.9 ± 1.499 years, while that of non-diabetic patients was 59.61 ± 1.466 years. The body mass index in diabetic women was 30.5 ± 1.031 kg/m² and in non-diabetic patients 25.6 ± 0.578 kg/m². The TBS (trabecular bone score) had a mean for diabetics of 1.2557 ± 0.015 (without units) and for non-diabetic patients of 1.2816 ± 0.015 (without units). The mean values of T Score for diabetics were: Lumbar Spine $-1,132 \pm 0,214$ DS, hip $-0,532 \pm 0,164$ DS, femoral neck $-1,232 \pm 0,135$ DS, and for non-diabetic patients were: Lumbar spine $-1,868 \pm 0,217$ DS, hip -1.039 ± 0.150 DS, femoral neck -1.655 ± 0.160 DS. Relationship of TBS with body mass index greater than 30 kg/m² (P value=0.002, OR=9.198) and TBS with low Lumbar spine T-score (P=0.043, OR=6.968).

Conclusions: There are no significant differences between the TBS values of diabetic and non-diabetic patients if there is a significant relationship between abnormal TBS values and body mass index as well as low values of lumbar spine t-score.

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AN OPEN SECRET: UTILISING PLAIN FILM X-RAY TO DIAGNOSE OSTEOPENIA

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Introduction: Osteopenia is considered an osteoporosis precursor¹, and osteoporosis is a severe global health concern. The majority of fractures happen in people with T-Scores lying within the osteopenic range². In Ireland 1 in 4 men and 1 in 2 women will develop an osteoporosis related fracture in their lifetime, with approximately 300,000 people suffering from osteoporosis³. A cost of €551 million per annum is associated with treating osteoporosis related fractures in the elderly in Ireland³. DXA has long been considered the Gold standard in diagnosing osteoporosis/osteopenia, but it has been established that osteopenia can be diagnosed from X-ray. This study was to investigate the accuracy of X-Ray at diagnosis of osteopenia.

Methods: All DXAs with an indication of "Osteopenia on X-Ray" in our university teaching hospital were retrospectively analysed. Each DXA was then reviewed, and presence of osteopenia/osteoporosis was recorded. T-scores from AP spine, left femur (total) and left femur (neck) were recorded, along with the presence of vertebral fractures. Statistical analysis was then performed using Microsoft SPSS.

Results: Of 1462 DXAs reviewed, 114 had an indication of "Osteopenia on X-Ray", 95 women and 19 men. Only 10

subjects (8.7%) had normal T-scores, 59 (51.8%) were osteopenic and 45 (39.5%) were osteoporotic. Of 104 subjects with complete data, mean T-scores were in AP spine $-1.58 (\pm 1.26SD)$, hip (neck) $-1.506 (\pm 1.029SD)$ and hip (total) $-1.365 (\pm 1.318SD)$. 91 subjects had lateral vertebral morphometric assessments, of whom 18 had evidence of vertebral fracture.

Conclusions: There is high concordance of reduced BMD on DXA with osteopenia identified on X-ray. An excellent opportunity to investigate further for osteoporosis is when osteopenia is incidentally diagnosed on X-Ray. Treatment could potentially be initiated in situations where DXA is not available, however prospective analysis of osteopenia on X-Ray may further outline its suitability in this role.

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P515

ASSESSMENT OF BONE STRENGTH AND CORTICAL POROSITY IN A GROUP OF PREMENOPAUSAL WOMEN WITH CELIAC DISEASE AFTER 3 YEARS ON GLUTEN-FREE DIET

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Previously we identified a significant deterioration of trabecular and cortical microarchitecture in peripheral bones of premenopausal women with recently diagnosed celiac disease (CD) using high resolution peripheral compute tomography (HR-pQCT), where trabecular bone was the most impaired.

Aim: To assess bone strength and cortical porosity measured by HR-pQCT in CD women after 3-years on gluten-free diet (GFD) and to compare the results with a group of healthy women of similar age and BMI.

Methods: This study is part of a prospective design evaluating CD patients at diagnosis and yearly after GFD. In the 3rd year-visit, 24 premenopausal women were evaluated to assess bone microarchitecture, strength and cortical porosity by HRp-QCT in addition to the standard tests to assess bone health (DXA scans, lab test and clinical evaluation). We assessed cortical porosity, calculated as the percentage of void space in the cortex, and bone strength by microstructural finite element analysis (F.E.A) to calculate whole-bone stiffness and failure

load (Scanco softwares). Results were compared with a control group of 18 healthy women of similar age and BMI who underwent the same procedures. Comparisons between groups were performed using unpaired T test or Wilcoxon Rank Sum according to data distribution.

Results: CD patients and healthy controls were comparable in terms of age, height, weight and BMI ($p=NS$). Results are shown in the table. The cortical compartment (density, thickness and porosity), did not reach statistical significance between groups. CD patients had lower stiffness and failure load at the radius (-14%; $p<0.01$). At the tibia they were 8% lower but not statistically significant.

Conclusions: In this group of premenopausal women with celiac disease, despite 3 years on a gluten-free diet, bone strength in the radius was significantly lower compared to a control group of similar age and BMI. Prospective follow-up would enable us to assess total extent of the recovery with treatment.

| | Healthy control (n=18) | CD after 3-years GFD (n=24) | P |
|--------------------------|---------------------------|--------------------------------|-------|
| Age (years) | 30.4 ± 5.6 | 33.7 ± 8.5 | 0.12 |
| Height (m) | 1.61 ± 0.07 | 1.59 ± 0.05 | 0.17 |
| Weight (kg) | 58.7 ± 7.7 | 61.9 ± 17 | 0.94 |
| BMI (kg/m ²) | 22.6 ± 2.3 | 24.7 ± 6.8 | 0.58 |
| HR-pQCT Distal Radius | | | |
| Stiffness (N/mm) | 73.5 ± 9.1 | 62 ± 9.2 (-14.5%) | <0.01 |
| Failure load (N) | 3670 ± 482 | 3143 ± 464 (-14.3%) | <0.01 |
| Cortical pore volume (%) | 1.23 ± 5.66 | 1.01 ± 0.40 | 0.12 |
| HR-pQCT Distal tibia | | | |
| Stiffness (N/mm) | 186.4 ± 25.4 | 171.8 ± 27.4 (-8%) | 0.09 |
| Failure load (N) | 9466 ± 1262 | 8700 ± 1353 (-8%) | 0.07 |
| Cortical pore volume (%) | 3.13 ± 1.41 | 2.97 ± 1.11 | 0.68 |

P516

ROLE OF PHYSICAL EXERCISE IN PATIENTS WITH KNEE ARTHROPLASTY FOR OSTEOARTHRITIS

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Objective: This study assessed the efficacy of a 2 weeks exercise program on functional status and quality of life in patients with knee replacement for osteoarthritis.

Material and Methods: The randomized, controlled, observational study included 81 patients with knee replacement for osteoarthritis, 64 women, mean age 63.7±7.3 years, randomly assigned to a control group (40 patients) and an exercise group (41 patients). All patients were diagnosed with knee osteoarthritis and had total knee replacement. All patients of the exercise lot had a stable cardiovascular status and were transferred from the Orthopedics Clinic to the Physical and Rehabilitation Clinic of Emergency County Hospital Craiova. They followed exercise programs based on increasing knee flexion, muscular strength and endurance, improving balance, coordination, respiratory exercises. The patients in the control group continued their daily living activities. The evaluation

was made at the beginning of the study and after 2 weeks based on knee mobility, muscular strength, pain assessment on a Visual Analogue Scale (VAS) and the Western Ontario and McMaster Universities (WOMAC) Osteoarthritis Index questionnaire.

Results: The benefits of the kinetic programs were shown by a significant improvement on knee mobility and muscular strength for knee extensors (quadriceps muscle) and knee flexor muscles. Pain, evaluated on a Visual Analogue Scale, had a mean decrease of 4.338 points and the results were a high statistic significant ($p=0.000057$). The WOMAC score was significantly reduced (from 4.32±1.85 to 3.65±1.96, $p=0.011$). The results for the control group remained basically unchanged.

Conclusion: The physical exercise program improves both functional status and quality of life in patients with knee replacement by increasing range of motion and muscular strength and by reducing pain.

P517

IDENTIFICATION OF MICRORNA-181A-5P AND MICRORNA-4454 AS NOVEL BIOMARKERS AND MEDIATORS OF FACET CARTILAGE DEGENERATION

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Purpose: Osteoarthritis (OA) of spine (facet joints, FJ) is one of the major causes of severe low back pain and disability worldwide. However, specific mechanisms associated with facet cartilage degeneration during FJ OA are largely unknown. For the first time, in this study we investigated the role of microRNAs (miRNAs) in the pathophysiology of facet cartilage degeneration during FJ OA.

Materials and Methods: Based on MRI and histopathology, we first established and validated a patient cohort (Group 1 patients [control group]: normal or mild facet cartilage degeneration and Group 2 patients [FJ OA group]: moderate to severe facet cartilage degeneration). Using this large cohort ($n=55$), we screened 2,100 miRNAs using miRNA-array and differentially regulated the expressions of miRNAs in facet cartilage were further tested by qPCR analysis and investigated their correlation with FJ OA severities based on MRI grading score (grade0; normal, grade1; mild, grade2; moderate and grade3; severe). Human FJ OA chondrocytes were cultured and transfected with miRNA enhancers/inhibitors (or control mimic/inhibitor) to determine the effect of miRNA enhancement/inhibition on the expression of catabolic/inflammatory/

anabolic/apoptosis markers. Target genes and signaling pathways modulated by miRNAs were also identified using mirDIP/pathDIP. Furthermore, we injected the miR-181a-5p mimic into FJs of rats to see the effect of overexpression of miRNAs on animal FJ cartilage *in vivo*.

Results: Out of 2,100 miRNAs, we specifically identified 2 miRNAs (miR-181a-5p and miR-4454) whose expression were markedly up-regulated in FJ OA cartilage compared to control facet cartilage and the levels of expression were significantly correlated with the severity of FJ OA based on MRI grading. We then treated FJ OA chondrocytes with miR-181a-5p or miR-4454 enhancer/inhibitor and showed that treatment with miR-181a-5p or miR-4454 enhancer significantly elevated the expression of inflammatory/catabolic/apoptosis markers and reduced expression of type II collagen; inhibition of these two miRNAs was able to reverse these destructive effects. Our study also identified that in facet cartilage both miR-181a-5p and miR-4454 signal by zinc finger protein (ZNF440) via modulation of the NF- κ B pathway. Furthermore, by injecting miR-181a-5p mimic in rat FJs, we observed a FJ OA phenotype in facet cartilage associated with enhanced catabolic activity and chondrocyte apoptosis *in vivo*. Our pilot data (n=40) also shows that circulating forms of miR-181a-5p and miR-4454 are also detectable and elevated in patient blood (plasma) with more severe facet cartilage degeneration.

Conclusion: Using clinical, *in vitro* functional and *in vivo* studies, we for the first time have identified miR-181a-5p and miR-4454 as novel mediators of facet cartilage degeneration as well as potential OA biomarkers.

P518

RESULTS OF CHONDROSARCOMA SURGICAL TREATMENT AT VARIOUS LOCALIZATIONS IN THE BONES

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Objective: To show the results of chondrosarcoma surgical treatment at various localizations in the bones.

Materials and methods: Chondrosarcoma amounts 7-16% of the total number of malignant bone tumors. The disease is detected in approximately 60% of 40-60 years old patients. Chondrosarcomas are divided into primary and secondary. By the degree of malignancy chondrosarcomas are divided into highly differentiated, moderately differentiated and poorly differentiated. Surgery is the main method of chondrosarcoma treatment. Prognosis depends on the degree of chondrosarcoma malignancy. The treatment was provided to 42 patients with chondrosarcoma. Chondrosarcoma of the limb bones was observed in 29 (69%) patients, of the pelvic bones – in 13 (31%). Arthroplasty was performed in 19 (45.2%) patients, resection

of bone segments – in 16 (38.1%), amputation, disarticulation limbs – in 7 (16.7%). Radical surgery performed in 37 (88.1%) patients, non-radical – in 5 (11.9%). The functional outcome of the operated limb was calculated by the MSTs system. Quality of life was measured by questionnaire EORTIC-QLQ-C30. The survival rate of patients evaluated by Kaplan-Meier method.

Results: Postoperative complications were observed in 7 (16.7%) patients, tumor recurrence - in 8 (19%). After radical surgery recurrences were detected in 3 (8.1%) patients, after non-radical - in 5 (100%). Distant metastases of chondrosarcoma were observed 10 (23.8%) cases. After radical surgeries tumor metastases were found in 6 (16.2%) patients, after non-radical - in 4 (80%) patients. Postoperative recovery of limb function and supporting ability was observed in 35 (83.3%) patients. Functional outcome of the limb after arthroplasty amounted from 64% to 92%. The quality of life of the patients improved from 25 points preoperatively to 84 points postoperatively. Three-year overall survival rate of patients amounted 72,2 \pm 4,1%, five-year - 64,5 \pm 4,6%.

Conclusions: The chondrosarcoma relapses usually depend on radical surgery. Metastases in cases of chondrosarcoma are defined by the degree of tumor cells differentiation.

P519

IOF ONE-MINUTE OSTEOPOROSIS RISK TEST AS VALUABLE SCREENING TOOL FOR DIFFERENT PATIENTS

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Objectives: Osteoporosis is a widespread disease, and the number of such patients is increasing as the world population is aging. It has to be diagnosed as early as possible in order to start treatment and decrease the amount of potentially fatal complications such as hip fractures. It is reasonable to use the IOF One-Minute osteoporosis risk test (the IOF test) as a screening tool before patients visit the physician or undergo osteodensitometry.

Material and methods: The IOF test was translated to Latvian and Russian languages and was given to different visitors on the Latvian World Osteoporosis day, 2017 and patients in different medical practices.

Results: Totally 53 respondents filled in the IOF test properly (94% women and 6% men). Only one respondent did not have any risk factors (RF), mostly respondents had 2 or more RF (83% of all). 72% of all respondents had modifiable RF, 87%

had non-modifiable RF. 64% had both kinds of factors, and these patients should undergo osteodensitometry. Also, the respondents were divided into age groups: >40 years (68% of all) and <40 years old. Respondents older than 40 years had significantly more often such RF as parents diagnosed with osteoporosis ($p=0,004$), broken bone as an adult ($p=0,01$), suffering from gastrointestinal and endocrine disease ($p=0,044$), avoiding milk or dairy products without taking any calcium supplements ($p=0,04$). Respondents age >40 years positively correlates with a significantly bigger amount of RF ($r=0,516$, $p<0,001$).

Conclusion: The IOF One-Minute osteoporosis risk test is a useful and valuable screening tool for revealing patients with osteoporosis, especially patients older than 40 years before their visit to the physician or before they undergo osteodensitometry.

P520

IMPORTANCE OF THE JOURNAL AND WEBSITE BONE HEALTH FOR PATIENTS WITH OSTEOPOROSIS AND OTHER MUSCULOSKELETAL DISEASES

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Objectives: One of the crucial points in diagnosing and appropriately treating patients with osteoporosis (OP) and other musculoskeletal diseases such as osteoarthritis is the patient's knowledge about the disease. Different sources of information for the patients (e.g., websites and journals) can be helpful for managing these diseases. Since 2013, a biannual, bilingual (Latvian, Russian) journal and website *Bone Health* (www.kauluveseliba.lv) is available for patients in Latvia. There is information about OP and other musculoskeletal disease risk factors, diagnosis, treatment and prophylaxis options.

Material and methods: Questionnaires with 14 questions about the journal and website *Bone Health* were given to different respondents (rsp.). Demographic data and rsp. opinion about the informational content, design, and usefulness of the journal and website *Bone Health* were analysed.

Results: Totally 81 questionnaires was filled in (90% women, the median age of rsp. was 48 yrs. [IQR 77–19]). Almost a third (30%, $n=24$) of the rsp. had OP or other musculoskeletal disease. In most of the cases (47%) rsp. had found out about the journal *Bone Health* from general practice and other specialists (e.g., endocrinologists and rheumatologists), 19% had found out about it from their family members or friends, 23% – from different sources (patient associations, World Osteoporosis day

events, etc.). A small part of rsp. had used the journal's website (21%). 69% of the rsp. liked the journal's design, 20% liked it very much, and only 5% did not like it. Most of the rsp. (97%) mentioned that the informational content of the journal was useful, important, and essential. All the rsp. would recommend *Bone Health* to their relatives or friends.

Conclusion: Electronic media and classical communication tools such as journal and website *Bone Health* are useful and informative in the patients' view and can help manage patients with OP and other musculoskeletal diseases.

P521

LONG-TERM EFFICACY OF ZOLEDRONIC ACID IN PATIENTS WITH PAGET'S DISEASE OF BONE WITH RESPECT TO PREVIOUS BISPHOSPHONATE TREATMENT

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Introduction: Paget's disease (PD) is a chronic metabolic bone disease, characterized by focal areas of increased bone turnover. Intravenous zoledronic acid (ZA) is highly effective in inducing disease control. It has been suggested that previous bisphosphonate treatment may be associated with a diminished therapeutic response to ZA.

Objective: To compare the long-term efficacy of ZA between bisphosphonates-naïve PD patients and patients previously treated with oral and/or intravenous bisphosphonates other than ZA.

Methods: Medical records of consecutive PD patients that have been treated with ZA and followed at a single medical center between the years 1992 - 2016 were reviewed for medical, biochemical and imaging data. The patients were divided into 2 groups: patients with previous administration of oral or intravenous bisphosphonates other than ZA (Group A), and patients who were bisphosphonates-naïve (Group B). Data on disease-related variables and serum total alkaline phosphatase (ALP) levels were analyzed and compared between the two groups.

Results: The cohort included 63 PD patients (50.8% male, mean age at diagnosis: 65.1 ± 10.7 years). Groups A and B included 36 and 27 patients, respectively. Thirty patients in Group A (83.3%) were treated with intravenous pamidronate prior to ZA treatment. All patients in Group A had disease reactivation and their treatment was switched to ZA. Serum total ALP significantly decreased in both Groups following ZA treatment. Ten and 4 patients in Groups A and B, respectively, received additional 1-3 treatments with ZA, most of them due to osteoporosis. All the patients in both groups had clinically silent disease at the last follow-up visit. Total serum ALP level was within the normal range in all but one patient in

Group A at the end of follow-up of 4.58 ± 1.6 and 4.18 ± 1.6 years after ZA administration, respectively.

Conclusion: ZA is highly effective in PD patients with no apparent impact of previous bisphosphonate administration on therapeutic efficacy. ZA induces and maintains long-term clinical remission and normalizes total serum ALP levels in nearly all PD patients.

P522

RISK OF NEW FRACTURES OVER 4 YEARS IN PATIENTS TREATED WITH TERIPARATIDE DUE TO OSTEOPOROSIS

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Introduction: Bone fractures, of any type, location or severity, cause resources and worsen the quality of life. They also bring about an increase in morbidity and mortality. Teriparatide is the treatment of choice in case of osteoporosis with fracture, objectifying both in studies and in real life, an optimal bone gain.

Objective: To evaluate whether treatment with teriparatide (for 18-24 months) in patients with osteoporosis and fractures (low impact) decreases the risk of new fractures as a function of bone gain during the treatment period. Bone density with DXA will be assessed at baseline and at the end of treatment. The subsequent period will be between 4 and 10 years.

Material and methods: Design: Prospective cohort study. Population under study: Patients who have received complete treatment with teriparatide (at least 18 months) for osteoporosis (criteria for BMD) and associated fracture, coming from the rheumatology clinic of the Hospital of Calahorra, with a reference population of 90000 people. The total was 129 patients (118 females and 11 males, all of them over 65 years of age except 3 (females) under the age of 65).

Baseline variables: For each patient the following variables:
-Clinical variables: Age, sex, time of known evolution of the disease, smoking, weight, height.

-Biochemical variables: PTH, Vitamin D, calcium, phosphorus, albumin, magnesium, urea, creatinine..

-Other determinations: Radiology of Dorsal and lumbar spine and DXA (BMD).

Clinical endpoint: The clinical end point is the appearance of new bone fracture.

Cohort follow-up: All patients are prospectively followed up until the onset of a new fracture, until their death or until the study closes.

Follow-up period: Start of follow-up in January 2006 and last patient included with term or treatment in October 2014. The minimum observation period is 4 years after the end of treatment with teriparatide. To say that all the patients who received this treatment, were treated with intravenous

zolendronic acid (3 doses) except 2 patients (contraindicated and oral bisphosphonate).

Statistical methods: The quantitative variables are described by their means and standard deviation or by their median and qualitative variables by frequency distribution. The comparison of quantitative variables will be done by student's t-test for independent samples and that of qualitative variables by chi squared test, with linear trend test where appropriate. As proof of normality we will use the Kolgomorov-Smirnov test.

Results: Failing to complete the collection of all variables, since there are patients who have not completed a minimum of 4 years after treatment, we can say that the tendency is to have a lower incidence of refracture in those with greater bone mass gain measured Through DXA.

Discussion: In case of reduction of refractories after treatment with teriparatide, cost-efficiency studies should be carried out in order to assess the indication of such treatment in patients at high risk of fracture without a previous low impact fracture.

P523

EVOLUTION OF BONE MINERAL DENSITY IN PATIENTS UNDERGOING BARIATRIC SURGERY: POST-INTERVENTION FOLLOW-UP

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Introduction: Bariatric surgery is an effective treatment for obesity, achieving a significant weight loss and the comorbidities that accompany this disease. Depending on the surgical technique, it is more or less frequent the appearance of nutritional and metabolic deficiencies. These deficits are more frequent when mixed surgical techniques are used, with a restrictive and malabsorptive component, such as gastric bypass or biliopancreatic diversion. Nutritional deficiencies include, in May or less, malabsorption of fats and fat-soluble vitamins such as vitamin D, in addition to other micronutrients such as calcium. As a consequence, alterations in the bone mineral metabolism, the increase of the remodeling and the disorders of the bone mineralization can develop.

Objective: To evaluate the state of bone mineral density of patients undergoing bariatric surgery and the evolution over time, as well as the benefit of treatment with calcium, vitamin D and drugs if there is osteoporosis.

Material and methods: Design: Prospective cohort study. Population to study: Patients undergoing bariatric surgery in a hospital in Zaragoza. These patients are controlled at the endocrinology clinic specialized in bariatric surgery.

Basal Variables: For each patient the following variables:

-Clinical variables: Age, sex, tall, Smoking, weight, physical activity, BMD, treatments for osteoporosis, calcium and / or vitamin D.

-Biochemical variables: PTH, calcium, phosphorous, urea, creatinine, Alkaline phosphatase, albumin, magnesium, urinary calcium and urinary phosphorus.

Cohort follow-up: A prospective follow-up of all patients undergoing bariatric surgery is performed. BMD is performed after the intervention and every 2 years to see the evolution. It will be supplemented with calcium and vitamin D, maintaining them at normal serum levels (Calcium: 8'4-10'2 mg / dL and vitamin D > 30).

Follow-up period: Start of follow-up in September 2016.

Statistical methods: Quantitative variables will be described by their means and standard deviation or by their median and the qualitative through frequency distribution. The comparison of quantitative variables will be done by student t for independent samples and that of qualitative variables by chi square, with linear trend test where appropriate.

Results: In phase of data collection.

Discussion: Alterations in bone metabolism such as vitamin D deficiency, calcium malabsorption and secondary hyperparathyroidism are frequent after bariatric surgery. In addition, there is a marked increase in bone remodeling and a loss of bone density following surgery which could be linked proportionally to weight loss. It would be of interest to know and quantify, with objective data, the evolution of the bone density of these patients, as well as the speed of emperoamiento of the same. Another question to be evaluated would be the cost-effectiveness benefit of an osteoformer / osteoprotective treatment at initial stages as primary prevention added to the already established supplementation with calcium and vitamin D.

P524

BONE ANALYSIS OF STRONTIUM DOPED BIOMATERIALS IN OSTEOPOROTIC RABBITS: COMPARISON BETWEEN HEALTHY, OSTEOPOROTIC AND TRAUMA AFFECTED BONE

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Objectives: To evaluate bone regenerative properties in osteoporotic rabbits' bone defect filled with and without strontium (Sr) doped biomaterials and compare between healthy, osteoporotic and trauma affected bone.

Material and methods: Intact bone of 4 healthy rabbits were set as standard (group A). Experimental group consisted of 27 matured female rabbits. Osteoporosis was induced by ovariectomy and administration of glucocorticosteroids. Four rabbits were set as osteoporotic group B. Sr doped hydroxyapatite

(HA) in concentration of 30% and tricalcium phosphate (TCP) of 70% was implanted in the bone defect of greater trochanter in 7 rabbits (group C), while HA (30%) and TCP (70%) alone in 7 rabbits (group D). Bone defect was left for spontaneous healing in 9 rabbits (group E). Bone samples were taken 12 weeks after surgery. Histomorphological analysis was done to measure bone volume of trabecular field. Immunohistochemistry was performed to evaluate appearance of osteoprotegerin (OPG).

Results: Bone volume analysis proved experimentally induced osteoporosis. Mean trabecular field was higher in group A (0.41mm², SD±0.04, p<0.05, rs>0.72) with comparison to group B (0.12mm², SD±0.07), group C (0.24mm², SD±0.06), group D (0.23mm², SD±0.04) and group E (0.21mm², SD ±0.08). Group C, D and E showed similar results without strong statistical correlation (p>0.05, rs<0.34). Detectable changes of expression level of OPG were found. Numerous OPG positive cells appeared in group A. Groups B, D and E showed only moderate amount of immunostaining positive cells with no difference among them, whereas group C noticeably recurred to the same level as healthy bone (p<0.05, U>6.5). Numerous OPG positive cells were found around the strontium doped granules.

Conclusion: No considerable difference of bone volume in osteoporotic traumatized bone and such with biomaterials proves almost equal influence of biomaterial and trauma on the bone regeneration and indicates the necessity for prolonged time of experiment. However, the notable increase of OPG-containing cells proves the increase of osteoclastogenesis suppression and gives the evidence for renew of bone functionality.

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P525

A CLINICAL CASE OF OSTEOPOROSIS, HYPERTHYROIDISM AND CONGESTIVE HEART FAILURE IN A MAN

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We present the clinical case of a 73 year old man recently diagnosed with congestive heart failure who was submitted for endocrinological evaluation in the context of a suppressed TSH. Patient also has a recent medical history of hip fracture and no familial medical history.

Results: Hormonal evaluation indicated a suppressed TSH (TSH<0,01) with normal fT4 and ATPO. Ultrasound of the thyroid revealed a hypoechoic macronodule in the left thyroidian lobe, 5/3,44 cm with hypoechoic halo and increased vascularity on Doppler. Furthermore, the assessment of bone mineral density on DXA showed a T score: -0,4 DS at lumbar spine and -2,6 DS at the left hip. 25(OH)Vit D was low (10,71 ng/ml) with normal PTH, osteocalcin, cross laps and low normal serum calcium.(8,6 mg/dl, normal range: 8,6-10,2 mg/dl). In addition, blood analyzes indicated normocyte normochromic anemia with elevated levels of cholesterol.

Discussion: Laboratory analyzes and investigations has suggested the diagnosis of hyperthyroidism, osteoporosis and congestive heart failure. Patient started therapy with antithyroid drugs, Alendronate, Vitamin D, calcium and continued therapy with diuretics, beta blockers, statins and antiplatelet drugs with indication of thyroidectomy. Patients with HF (heart failure) have a poor physical performance and a higher frailty score and the association between heart failure and lower BMD (bone mineral density) is known. In addition our patient also has hyperthyroidism which contributed to low BMD.

Conclusion: We reported the case of a 73 year-old man diagnosed with toxic thyroidian nodule, osteoporosis and congestive heart failure in which hyperthyroidism and congestive heart failure definitively contributed to osteoporosis and hip fracture.

P526

THE SCOPE OF THE TESTING AND TREATMENT FOR OSTEOPOROSIS AND ITS COMPLICATIONS IN PATIENTS WITH LOW-ENERGY FRACTURES

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Objectives: An assessment of osteoporosis risk factors and the level of anti-osteoporotic treatment, and osteoporosis detection coverage in patients suffering from low-energy fractures. Evaluation of the prevalence of the osteoporosis risk factors and patients' comorbidity.

Materials and methods: The study group included 101 patients (77 women) with new low-energy fractures admitted to the Injury Treatment and Orthopedics Center of St. George Hospital, Saint-Petersburg, Russia. The average age of patients was 63.7±7.1 years.

Results: According to the interview, 32 patients (31.6%) had at least one low-energy fracture in the past. Only five patients (15.6%) with previous low-energy fractures were properly examined. 11 patients (10.8%) had results of

osteodensitometry; seven of them had osteoporosis and three patients - osteopenia. 3 patients received treatment with bisphosphonates (alendronic and zoledronic acids) and 1 patient with denosumab. Four patients received vitamin D and calcium supplementation during a period of 1 to 8 years. Four patients did not receive any treatment even after the diagnosis of osteoporosis. 20 (19.8%) patients were current smokers. 29 (28.7%) patients had smoked in the past. The cumulative duration of smoking was 20.6 ±17.7 years. 11 patients (10.8%) consumed alcohol beverages once in a week, two patients consume alcoholic drinks 3-7 times a week. The others consumed alcohol episodically. 8 patients (7.9%) received glucocorticoids for a long period of time. None of them was consulted about the risk of osteoporosis. 25 patients (24.7%) had spontaneous falls in the past year. The average number of falls was 3.2±2.2. The majority of the patients had concomitant diseases. 31 (30.6%) had ischemic heart disease, 54 patients (53.4%) - hypertensive disease. 18 (17.8%) patients had congestive heart failure. 7 patients (6.9%) were diagnosed with chronic kidney disease. 18 patients (17.8%) had a diagnosis of cerebrovascular insufficiency.

Conclusion: Patients with low-energy fractures were not examined properly and did not receive appropriate therapy before the fracture. Moreover, patients demonstrated significant comorbidity that complicated their further therapy and rehabilitation.

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THE FUNCTIONAL CHARACTERISTICS OF THE PATIENTS WITH LOW-ENERGY FRACTURES

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Objectives: An assessment of the functional characteristics of patients admitted to a hospital with low-energy fracture.

Materials and methods: The study group consisted of 101 patients (77 women) admitted to Injury Treatment and Orthopedics Center of St. George Hospital (Saint Petersburg, Russia) with low-energy fractures. The average age was 63.7 (17.1 SD) years. Patients were given self-complete questionnaires. We used the EQ-5D-5L questionnaire to assess the level of physical activity before the last fracture, mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. The level of physical activity was assessed by the original six-point questionnaire.

Results: The results of the EQ-5D-5L questionnaire are shown in the Table.

| Index values | 1 | 2 | 3 | 4 | 5 |
|--------------------|---------------|---------------|---------------|---------------|---------------|
| Mobility | 10 (10.1%) | 2 (2.0%) | 15 (15.2%) | 26 (26.3%) | 46 (46.4%) |
| Self-care | 12 (12.1%) | 14 (14.2%) | 12 (12.1%) | 28 (28.3%) | 33 (33.3%) |
| Usual activities | 3 (3.0%) | 5 (5.1%) | 6 (6.1%) | 15 (15.2%) | 70 (70.6%) |
| Pain/discomfort | 13 (13.1%) | 28 (28.3%) | 33 (33.3%) | 18 (18.2%) | 7 (7.1%) |
| Anxiety/depression | 53 (54.1%) | 22 (22.4%) | 12 (12.2%) | 10 (10.3%) | 1 (1.0%) |

Patients' self-rated health evaluated with the EQ visual analog scale (VAS) shows normal distribution with the mean 57.8 (SD 21.7). We assessed patients' physical activity with the original questionnaire. Only 1 patient was bed-ridden. 8.1% of patients showed mobility within patients' home. The majority (39.4%) limited their activity to walking from home to/from workplace or local stores. The second largest part of patients (33.3%) went for a walk for at least two hours daily. 16.2% of patients performed physical exercises additionally, and only 2% of patients had labour intensive job or performed constant gym trainings.

Conclusion: The results showed decline of the patients' functional status, high level of the pain, but not high levels of anxiety/depression. Self-rated health evaluations with VAS demonstrated average values with almost half of the answers reaching 40-60 points. Patients demonstrated low levels of physical activity. More than a third of the patients restricted their physical activity to the walking from home to workplace/local stores, and another third restricted their physical activity to walking 2 hours per day.

P528

EFFICACY AND SAFETY OF KRN23 IN ADULTS WITH X-LINKED HYPOPHOSPHATEMIA (XLH): DATA FROM A PHASE 2 EXTENSION STUDY

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Objectives: To evaluate the long-term safety, pharmacodynamics (PD), and efficacy of KRN23, an investigational antibody against FGF23, in adults with XLH.

Materials and Methods: Adult participants with XLH who were previously enrolled in the Phase 1/2 studies of KRN23, were enrolled in an open-label extension study and received KRN23 every 4 weeks (Q4W) for 24 weeks. The time from

the last dose of KRN23 in the previous studies to enrollment in this study was > 12 months in all subjects.

Results: Twenty subjects enrolled. The mean age was 49.8 years (range 23-69) at extension study entry and 70% were female. Mean serum phosphorus increased from 1.89 mg/dL (0.61 mmol/L) at baseline to an average of 3.31 mg/dL (1.07 mmol/L) at visits corresponding to the midpoint of the dosing interval (i.e., Weeks 2, 6, and 10). KRN23 treatment for 24 weeks produced statistically significant ($p < 0.03$) improvement from baseline in the severity of pain and stiffness and in physical functioning as measured by the Brief Pain Inventory (BPI) and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Significant improvements in the six-minute walk test (6MWT; +25 m; $p = 0.047$) and timed up and go test (TUG; -2.0 s; $p = 0.042$) were observed in the overall population at Week 24. In subgroup analyses, subjects with the greatest improvement from baseline to Week 24 in pain (≥ 2 -point reduction in worst pain on BPI; $n = 9$) and stiffness (decrease ≥ 10.0 on WOMAC Stiffness; $n = 12$) also had the greatest improvement in the 6MWT (+40.2 and +40.9 m, respectively) and TUG (-2.7 and -3.7 s, respectively). There were no significant safety findings with KRN23 treatment in this study, with a similar safety profile as in previous studies in adults with XLH.

Conclusions: KRN23 treatment Q4W significantly improved phosphate homeostasis, patient reported outcomes, and mobility in these adult subjects with XLH.

Disclosures: TC: grant support, travel fees from Ultragenyx (UGX); MP: none; TJW: travel fees, consultant UGX; AP: travel fees, advisory panel; KI: none; EI: research grants, travel fees, consulting; DL, CTO, MM, JSM: UGX employees; MR: advisory panel UGX; H Zoog, PhD, of UGX provided medical writing assistance.

P529

IMPACT OF NEUROPATHIC PAIN ON HEALTH RELATED QUALITY OF LIFE AND DISABILITY IN PATIENTS WITH CHRONIC LOW BACK PAIN

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Objectives: The aim of this study was to evaluate the frequency of neuropathic pain and determine its impact on health related quality of life and disability in chronic low back pain patients.

Methods: A total of 120 chronic low back patients participated in the study. Clinical and demographic data were collected. Those who had low back pain were asked about duration, severity of pain and location including axial low back pain and with or without associated leg pain. Severity of pain was

assessed by using the visual analogue scale (VAS) ranging from 0 mm (no pain) to 10 mm (worst pain). Low back pain associated disability was measured by Oswestry Disability Index. Leeds assessment of neuropathic symptom and signs pain (LANSS) scale was used to determine neuropathic pain. The impact of low back pain on health related quality of life measured using Short Form-36 was investigated.

Results: 49 patients (40.8%) had neuropathic pain. Age and radicular low back pain were associated with neuropathic pain ($p=0.016$ and $p<0.001$, respectively). Oswestry Disability score in patients with neuropathic pain was worse than that in those without neuropathic pain ($p<0.001$). Patients with neuropathic pain had lower physical function, body pain, general health and physical component subscales of short form-36 in comparison with those without neuropathic pain ($p=0.043$; $p<0.001$; $p=0.012$; $p<0.001$, respectively).

Conclusion: Presence of neuropathic pain was found related with poor health related quality of life and disability. Older age and presence of radicular pain were associated with neuropathic involvement in chronic low back pain.

P530

OSTEOPOROSIS WITH OSTEOPOROTIC FRACTURES AS THE ONLY SYMPTOM OF INTRAOSSEOUS NON HODGKIN LYMPHOMA: CASE REPORT

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Objective: Primary lymphoma of bone is lymphoma arising within the medullar cavity without lymph node and organ involvement. Among primary lymphomas of bone diffuse large B-cell lymphoma accounts for the greatest percentage of cases. Symptoms are aching bone pain, sometimes local swelling, with male predilection, mostly reported in the age of 60 years and above, and in 25% cases there are bone pathological fractures, more common at appendicular than axial skeleton. In contrast to the classical manifestations of patients with non-bone lymphoma, symptoms, including fever, loss of body weight and night sweating, are rarely noted. X-Ray appearance are usually pathological fractures, what can be interpreted like osteoporotic features, then permeate pattern of bone lyses and destruction. In differential diagnosis- osteosarcoma, Ewing's sarcoma, osteomyelitis, metastatic disease- needs to be eliminated. Definitive diagnosis includes bone biopsy with immunohistochemical analysis.

Material and Methods: We present a case of a 59-year-old male who came to our clinic with complaints of back and rib pain with 6 months duration.

Results: Examination revealed tenderness on thoracic, lumbosacral spine and ribs.

An X-ray of the spine showed multiple vertebral fractures of v Th 5,6,7,8, and v L2,3 described as osteoporotic. Standard laboratory analysis were normal. DXA vL1-4 T- score -2,5 and total hip T- score -2,0. We started treatment with bisphosphonates and painkillers and continued investigations. Bone scintigraphy revealed multiple areas of increased activity suspicious for osteolytic lesions in spine end ribs. We consulted orthopedic surgeon, endocrinologist, urologist, gastroenterologist, oncologist- normal findings of chest RTG, echosonography of abdomen and urinary tract, gastroscopy, colonoscopy, tumor markers, and finally hematologist who performed bone marrow biopsy. Results showed increased atypical lymphocyte infiltration immunophenotype BCL 2+, CD20 20%, CD10-, BCL6-, MUM1+, CD138-, CD23-, Cyclin D1-, CD5-, CD3-, CD117+, IgM+, IgG±, IgD-, IgA-, IgE-, DBA 44-, CD56- and diagnosis were finally established, and treated with CHOP protocol.

Conclusion: Primary bone lymphomas are rare, about 3-5% bone tumors. We wanted to show our diagnostic dilemmas and investigations we performed in male patient with osteoporosis when secondary osteoporosis is strongly suspected.

P531

EFFECTS OF KRN23, AN ANTI-FGF23 ANTIBODY, IN PATIENTS WITH TUMOR-INDUCED OSTEOMALACIA OR EPIDERMAL NEVUS SYNDROME-ASSOCIATED OSTEOMALACIA: INTERIM RESULTS FROM A PHASE 2 STUDY

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Objective: To evaluate the effect of investigational KRN23, a fully-human mAb against FGF23, on phosphate homeostasis and osteomalacia in adults with epidermal nevus syndrome (ENS)-associated osteomalacia or persistent tumor-induced osteomalacia (TIO).

Materials and Methods: In this ongoing Phase 2 study, subjects receive SC KRN23 (0.3-2.0 mg/kg) every 4 weeks (w). Interim data were obtained for 8 subjects (7 TIO, 1 ENS) who have completed ≥ 24 w of therapy.

Results: Mean age at entry was 52 y, and time since symptoms began ranged from ~3 to 37 y. Mean baseline (BL) serum phosphorus (Pi) was 0.55 mmol/L (range: 0.32-0.97; normal: 0.81-1.29). Serum intact FGF23 ranged from 94 to 2569 pg/mL (median: 288.5; normal: 10-62). Osteomalacia was present in all evaluable BL iliac crest bone biopsies (n=5). Mean serum Pi increased by 0.29 mmol/L, from 0.55 mmol/L at BL to 0.84 mmol/L at W24 ($p < 0.0001$), accompanied by increases in TmP/GFR (BL=1.39 mg/dL, W24=2.25; $p = 0.0002$) and serum 1,25(OH)₂D (BL=24.8 pg/mL, W24=47.6; $p = 0.003$). Mean serum P1NP increased by 60%, from 79.1 ng/mL at BL to 111.7 ng/mL at W24 ($p = 0.01$). Mean serum CTx increased by 42%, from 0.5 ng/mL to 0.8 ng/mL ($p = 0.01$). One subject had bone biopsy results available at both BL and W48, which showed improvement from severe to mild osteomalacia. Osteoid thickness decreased from 16.5 μ m at BL to 9.9 μ m at W48, OS/BS decreased from 94% to 75%, and OV/BV decreased from 21% to 10%. Through W24, treatment-emergent adverse events (TEAEs) were observed in all 8 subjects and were frequently musculoskeletal; 2 subjects had TEAEs of restless leg syndrome. One serious TEAE, neoplasm progression in a subject with preexisting metastatic sarcoma, was reported.

Conclusions: KRN23 treatment for 24 w improved serum Pi, TmP/GFR, and 1,25(OH)₂D in subjects with TIO or ENS-associated osteomalacia. Bone turnover markers also were increased. KRN23 treatment resulted in a marked improvement in osteomalacia in the subject who had available BL and W48 biopsy results.

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EVIDENCE TO SUPPORT A GLOBAL MAP OF DIETARY CALCIUM INTAKE BY COUNTRY AND SUBGROUPS

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Objectives: Globally, there is concern that low calcium intake across the population is adversely affecting bone health. To better understand the current status of dietary calcium intake around the world, the International Osteoporosis Foundation commissioned a systematic review of the evidence for average dietary calcium intake by country.

Materials and Methods: We searched PubMed, Embase, CAB Abstracts, CINAHL, Global Health, and 8 databases for studies reporting national average dietary calcium intake in adults. We prioritized larger population surveys conducted since 2000 but included older or smaller studies, convenience samples, or subpopulations, as necessary. We excluded studies of children, institutionalized adults, those with comorbidities, and pregnant or lactating women. We extracted mean or median (and range or SD) dietary calcium intake for the total sample and subgroups by age, sex, and socioeconomic factors (e.g., wealth, urban vs. rural).

Results: We have screened 17,137 abstracts and retrieved about 350 articles. To date, we have data for 62 countries, mostly from Europe, South and Southeast Asia, Africa, Latin America, and the Middle East. From national data, mean dietary calcium intake ranged from 288 mg (Nigeria) to 1151 mg (Netherlands). The 5 lowest estimates of mean dietary calcium intake (<350 mg/d) are from India, Thailand (women), Nigeria, South Korea, and Malawi. Nine countries had mean intake >1000 mg/d (from Europe or Canada). Within countries, men's intake tended to be higher. No clear pattern of mean intake by age is evident. In 3 countries, intake was higher in urban than rural dwellers.

Conclusions: Dietary calcium intake varies widely across the globe, with lowest intakes in Asia, Africa, and lower income countries and highest intakes in Europe and higher income countries. Average intake is usually higher among men than women. Data from this systematic review will support an interactive, global map of average dietary calcium intake.

P533

TRABECULAR BONE SCORE IN PATIENTS WITH RHEUMATOID ARTHRITIS ASSOCIATION WITH BONE MINERAL DENSITY AND CLINICAL RISK FACTORS

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Objectives: Rheumatoid arthritis (RA) is associated with an increased risk of osteoporosis and fractures. The aim of the study was to determine bone microarchitecture in RA patients using trabecular bone score (TBS) in relationship with bone mineral density (BMD) as well as to identify clinical factors associated with low TBS.

Materials and methods: The study included 60 female patients with RA who fulfilled the ACR/EULAR criteria. RA-related and osteoporosis risk factor data were obtained for

each patient. Spine and hip BMD were assessed by dual-energy X-ray absorptiometry. TBS was calculated from anteroposterior image of lumbar spine BMD.

Results: The patients aged 68.32 ± 9.58 (mean, SD) yrs, while the mean duration of RA was 11.75 ± 10.49 yrs. Osteoporosis (T-score ≤ -2.5) was detected in 22 patients (36.7%) and 16 (26.7%) reported non-traumatic fracture. Thirty-eight patients (64.4%) were currently treated with low-dose systemic glucocorticoids (GCs) and 12 (20%) were receiving specific osteoporosis drugs. The patients were divided into tertiles according to TBS results (1.29 ± 0.09). Those with TBS in the lowest tertile (TBS ≤ 1.25 , $n=20$) were compared with patients with a TBS in the 2 upper tertiles (TBS > 1.25 , $n=40$). In univariate analysis patients with low TBS (≤ 1.25) had higher body mass index (BMI) ($p=0.036$) and lower bone density parameters: total hip BMD ($p=0.020$), total hip T-score ($p=0.021$), and total L1-L4 BMD ($p=0.049$). Although low TBS values showed trends of association toward higher CRP/ESR as well as with TBS FRAX HF/FRAX MOF and high TBS with currently used specific osteoporosis therapy, Ca and vitamin D supplements the results did not reach significance. No association was observed between low TBS and age, duration of the disease, previous non-traumatic fractures, menopause duration, or use of GCs.

Conclusion: In this study of female patients with RA a low TBS strongly correlated with lower BMD and with higher BMI. Our results did not show significant association between TBS values and some other verified risk factors for osteoporotic fractures. Further studies including more patients are needed to confirm the place of TBS in assessing the fracture risk in patients with RA.

P534

THE OPTIMUM TIME FOR INITIATION OF OSTEOPOROSIS SCREENING

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Main objective in osteoporosis (OP) screening is finding the ideal point to detect and treat it. The present guidelines suggest initiation of OP screening in a risk factor-naïve people in 65 years of age for postmenopausal women and 55 for who have some risk factors. Repeat OP scanning with 2 years interval is suggested then after in most instances. OP is a silent pathology and imaging techniques are the most feasible tool for early diagnosis. Considering the critical years just after peak bone mass i.e. after around 40 years of age, we think that the start point should be shifted to that years for all men and women without the evident risk factor. From the economic/ cost point of view, we showed that this "early initial screening" bone densitometry could offset the unnecessary highly frequent

controls and more costly treatments then after. We suggest baseline and minimal BMD assessment as follows especially for postmenopausal women: At years 40- 50- 60- 65- 70- 75 (average 6 time per person). This protocol makes treatment strategies much more efficient when applied earlier.

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FRAX IN PATIENTS WITH STROKE

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Objective: To determine the risk factors for osteoporosis and fractures in patients after stroke.

Materials and Methods: A cross-sectional study, included 56 female patients with stroke (an average age of $68,279 \pm 9.3$ yrs), who were treated at Medical Rehabilitation Clinic, Clinical Center of Vojvodina during 2015 yr. Data were gathered by the means of anamnesis and available medical documentation. Lunar densitometer was used to determine BMD (bone mineral density in g / cm²). By applying the FRAX (Fracture Risk Assessment) calculator we are define a ten-year risk of hip fracture and major osteoporotic fractures.

Results: The most prevalent impairment was right-sided hemiparesis (N-30;53.6%). The most common risk factor for stroke was arterial hypertension 45 (37.2%). Based on collected data, the study of risk factors for osteoporosis fractures after stroke, patients were divided into three groups. The first group was composed of people with osteoporosis and with a history of fracture 10 (17.8%), the second group of people with osteoporosis without osteoporotic fractures 14 (25%) and the third group was composed of people without osteoporosis 32 (57.1%). Results showed that only 15 (58%) patients with osteoporosis after stroke was active 30-60 minutes a day. The average age at which menopause in women started was 44 ± 4.189 years. We have found no statistically significant differences between the total bone mineral density of the femur and lumbar spine between stroke patients with and without osteoporotic fractures ($p > 0.05$). In our research, we found statistically significant difference in the degree of fracture risk for a major osteoporotic fracture between the group of patients after stroke with osteoporotic fractures (moderate), and the group of patients after stroke without osteoporotic fractures (low) and in the control group ($p < 0.05$). The degree of fracture risk for hip fracture among the groups of patients with stroke was low. We have no found that there are significant differences in

the degree of fracture risk (FR) for hip fracture among patients after stroke with osteoporotic fractures and without them (p 0.05).

Conclusion: The results show that the most common risk factors for osteoporosis and fractures were: reduced daily physical activity and early menopause. The patients after stroke with previous fractures had a significantly higher fracture risk for hip fracture and a major osteoporotic fracture compared to patients with normal bone mineral density.

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PREVALENCE OF DELIRIUM AND DEMENTIA: DETECT (DELIRIUM AND DEMENTIA IN ELDERLY PATIENTS ADMITTED TO TRAUMA) STUDY

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Objective: Delirium is common in orthogeriatric hip fracture osteoporotic population and has impact on outcomes following surgery hence early detection and management is important. Hip fractures occurs in elderly and dementia is common condition. We took a prospective observational study-DETECT to evaluate the prevalence of dementia and delirium and its association with risk factors.

Materials and methods: Patients aged above 50 years admitted with hip fractures to trauma ward were included. Following admission data was collected on demographics, cognitive status (AMT4) functional status, number of medications, comorbid conditions, postoperative complications, delay to surgery, use of fascia-iliaca block. Nursing staff were educated and instructed to use tools. Delirium was identified by 4AT score done on day 3 or 4 postoperatively. 4AT Scores >4 suggested delirium, 1-3 suggested possible cognitive impairment, score 0 was normal.

Results: Out of total 140 patients mean age 81 years 75% were females. Postoperative delirium based on 4AT score >4 was identified in 30% patients. The incidence increased with age, comorbidities, polypharmacy of more than 5 drugs, not receiving fascia-iliaca block, history of cognitive impairment. Cognitive impairment (based on AMT4 score) was prevalent in 25% study population.

Conclusions: 4AT and AMT4 are a quick and feasible test to identify and screen for delirium and dementia even by the nursing staff. Delirium is common in admitted hip fracture patients following surgery. Adequate control of perioperative assessment and management including risk factor control and early identification of delirium has the potential to improve outcomes. Closer collaboration with mental health teams can improve management of dementia in this frail elderly population.

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CHANGE IN WELLBEING AND HEALTH-RELATED QUALITY OF LIFE FOLLOWING A FRAGILITY FRACTURE: AUSICUROS

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Objective: To compare the change in wellbeing using a capability instrument and health-related quality of life (HRQOL) in 809 Australian adults with a fragility fracture (Fx) during 18 months.

Material and Methods: Wellbeing and HRQOL data were obtained prospectively using ICECAP-O and EQ5D-3L respectively from adults aged 50+ years within 2 weeks of a fracture, at 4, 12 and 18 months from patients in 8 locations across Australia. Wellbeing was determined by ICECAP measuring a person's capacity (1 of 4 levels) to achieve 5 attributes: attachment, role, enjoyment, security and control. We examined changes and predictors of the ICECAP and EQ5D for all fractures and by fracture type (hip, wrist and vertebral).

Results: There was a rapid fall in wellbeing and HRQOL at 4 months. Both improve by 12 months, but do not return to pre-fracture levels by 18 months except for HRQOL for wrist Fx. However in contrast to HRQOL, a further decline in wellbeing was observed between 12 and 18 months in patients with hip and vertebral Fx. Both ICECAP and EQ5D were positively correlated for all fracture types but the relationship was weaker for hip Fx (Spearman's correlation; rho=0.484, p<0.001). The greatest predictor for both wellbeing and HRQOL loss was the baseline measure and fracture type.

Conclusions: Fx has an immediate and pronounced impact on both a broad measure of wellbeing and HRQOL which extends over 18 months. The further decline of wellbeing 12 months after hip or vertebral Fx is inconsistent with HRQOL and reflects the longer term impact of Fx on non-physical attributes of attachment, role, enjoyment, security

and control of one's life. An increased focus on these aspects of patient's wellbeing may reverse this trend.

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BONE MASS DENSITY IN PATIENT WITH SICKLE CELL ANEMIA

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Background: Sickle cell anemia is an inherited genetic disorder of haemoglobin synthesis. The bone involvement in this pathology ranges from acute manifestations, such as painful vaso-occlusive crisis or osteomyelitis, to more chronic and debilitating complications, such as: osteonecrosis, osteoporosis and osteopenia, impaired growth and chronic infections. The skeletal manifestations of sickle cell disease result from changes in bone and bone marrow caused by chronic tissue hypoxia, which is exacerbated by episodic occlusion of the microcirculation by the abnormal sickle cells. The main processes that lead to bone and joint destruction are as follows: infarction of bone and bone marrow, compensatory bone marrow hyperplasia, secondary osteomyelitis and secondary growth defects.

Objective: Evaluation of bone mass density (BMD) in patients with sickle cell anemia (SCA).

Methods: The subject of the study were 68 patients (29 female 42.6%, 39 male 57.3%) diagnosed through haemoglobin electrophoresis with SCA, of age 18 – 39 years with the average group of 28.5±3.3 years. There were excluded from the study the patients who were in premature menopause, those under hormonal treatment, the patients with metabolic diseases and those with vertebral fractures and with the reconstruction of the coxo-femoral art. All patients were evaluated the BMD through DXA (dual X-ray absorptiometry) at their lumbar spine, collum femori and radial distal part. According to the data results from the DXA, the patients were classified in osteopenic (T-score -1.0 – ≤ 2.5 SD) and osteoporotic (T-score ≥ -2.5SD).

Results: The results from the DXA were as follows according to T- score value in each and examined region.

Region: Distal radius Lumbar spine Collum femori T-score result: Osteopenic 28 (80%) 22 (33.3%) 20 (42.5%) T-score -1.4±0.2 T-score -1.9±0.4 T-score -1.5 **Osteoporotic** 7 (20%) 44 (66.6%) 27 (57.5%) T-score -2.8±.03 T-score -4.2 ±0.5 T-score -3.1±0.5

Discussions: Patients with SCA display lower T-score values for osteopenia and osteoporosis in lumbar spine(66 patients 97.05%) compared to those of the distal radius (35 patients 51.5%) and collum femori (47 patients 69.1%). T-score values for both osteopenia and osteoporosis are lower on lumbar spine, then in collum femori and distal radius. T-score low values in lumbar spine are related to the highest rate of vaso-occlusive crisis that experience these patients in this body region.

Conclusions: SCA is a risk factor for osteoporosis development in patients who suffer this haemoglobinopathy. It is necessary for this patients to be the subjects of periodic bone BMD measurements.

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FAT DISTRIBUTION IN ELDERLY MEN: METABOLIC AND INFLAMMATORY PROFILES

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Introduction and aims: Bone marrow (MAT) and subcutaneous (SAT) adipose tissues display different inflammatory and metabolic behaviour in young and old mice (*Gasparrini et al, Exp Gerontol, 2009*). In old mice, MAT adipocytes show anti-osteoblastogenic and pro-apoptotic phenotype and express higher inflammatory cytokines. However, these differences have not been assessed in humans. Using a non-invasive imaging methodology we aimed to investigate the association between MAT, SAT, visceral fat (VAT) with insulin resistance and circulating inflammatory mediators in a population of older Asian men.

Materials and methods: Cross-sectional study of 120 healthy men (age: 67.7±6). Assessments included: anthropometric parameters, full serum biochemistry panel, dual-energy X-ray absorptiometry (DXA) and abdominopelvic computed tomography (CT).

Using CT images MAT was quantified in L2 and L3 vertebra and left and right hip marrows; and VAT and SAT were calculated at the level of L2 and L4. Insulin resistance index (HOMA-IR) was calculated.

Results: MAT volume in all regions of interest (ROIs) was independent of BMI, VAT and SAT. In all femoral ROIs there was a strong negative association between bone and fat volumes within and between ROIs (R=-0.80 to -0.95, $p<0.001$). The correlations were moderate for the L2 and L3 vertebral ROIs (R=-0.27 to -0.43, $p<0.001$).

Unlike VAT and SAT ($R=0.25$ to 0.59 , $P<0.008$), MAT was not associated with insulin resistance indicators in any ROIs; except weakly in vertebrae ($R=0.26$ to 0.34 , $p<0.05$). Of all adipose tissues, only vertebral MAT volume was negatively associated with inflammatory mediators IL1 α , IL6 and TNF α ($R=-0.23$ to -0.31 , $p<0.05$).

Discussion and conclusion: MAT displays different behaviour than other types of fat in older humans. Whereas the negative correlation between MAT and bone mass was confirmed, high levels of MAT were associated with metabolic or inflammatory markers in a location-dependent manner. Further studies are warranted to explore the molecular nature of these findings.

P540

BIOMECHANICAL IMPAIRMENTS OF ANKLE ASSOCIATED WITH KNEE OSTEOARTHRITIS

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Objective: Knee Osteoarthritis seems to negatively impact ankle biomechanics. However, the effect of knee osteoarthritis on ankle muscle torque has not been clearly established. The objective of this study was to evaluate the muscular function strength and muscle strength balance of the plantar flexors and dorsiflexors of individuals with knee osteoarthritis in different degrees of severity.

Material and Methods: Thirty-seven individuals with knee osteoarthritis and 15 controls, subjected to clinical and radiographic analysis, were divided into three groups: control, mild, and moderate knee osteoarthritis. Participants answered the Western Ontario and McMaster Universities Osteoarthritis Index, and accomplished a muscle strength assessment of the ankle using the Biodex dynamometer on isometric, concentric (concentric/concentric) and eccentric (reactive eccentric) modes. The peak torque, total work and power were obtained and processed using MatLab® (version 7.0.1, MathWorks Inc, Natick, MA, USA). The relationship between plantar flexion and dorsiflexion torques were calculated from the processed data.

Results: The mild osteoarthritis group (peak torque= 26.85 ± 3.58) was significantly weaker than the control (peak torque= 41.75 ± 4.42) in concentric plantar flexion ($P<0.05$). The control and the mild osteoarthritis groups were not significantly different from the moderate osteoarthritis group (peak torque= 36.12 ± 4.61) in concentric plantar flexion. There were no significant differences for dorsiflexion among the groups. The mild osteoarthritis group was significantly lower than the control and moderate osteoarthritis groups in the concentric plantar flexion by concentric dorsiflexion torque ratio.

Conclusions: Ankle function exhibited impairments in individuals with knee osteoarthritis, especially in the plantar flexion strength in which the mild osteoarthritis group was weaker than the control. Interestingly, individuals with moderate knee osteoarthritis demonstrated results similar to the control group in plantar flexion strength. The results raise the possibility of a compensatory mechanism of the plantar flexors developed by patients in more advanced degrees to balance other muscle failures.

Acknowledgments: For the support obtained from CAPES scholarship.

P541

ABNORMALITIES IN KNEE STRUCTURE AUSTRALIAN RULES FOOTBALL PLAYERS: THE AFL TAS KNEE STUDY

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Objectives: To determine the prevalence of knee structural abnormalities in Australian Rules Football players, their relationship with knee pain and past knee injury, and the relationship between knee structure change and incident knee injuries.

Materials and Methods: 58 of 75 male players (aged 16-30 years) from the Tasmanian State Football League underwent magnetic resonance imaging of both knees early in the season, assessing cartilage defects, bone marrow lesions (BMLs), meniscal tears/extrusion, and effusion. History of knee injury and surgery and knee pain and function (VAS and KOOS) and incident knee injuries were assessed. Measures were repeated at the end of the season (3-5 months later).

Results: Abnormalities were common at baseline (67% BMLs, 16% meniscal tear/extrusion, 43% cartilage defects, 67% effusion). At baseline, presence of BMLs was associated with higher knee pain and dysfunction (VAS 3 vs. 17, $P<0.01$; KOOS 6 vs. 18, $P=0.03$) in the right but not left knee, and higher prevalence of previous knee injury and surgery (21% vs. 53%, $P=0.01$; 0% vs. 18%, $P=0.03$, respectively). Findings were similar for meniscal tears/extrusion. Previous injury and previous surgery were more common in those with an effusion and with cartilage defects respectively. Incident knee injuries were associated with worsening knee pain and

function (*VAS* -6 vs. 27, $P < 0.01$; *KOOS* -5 vs. 21, $P < 0.01$), presence of new or enlarging BMLs (22% vs. 67%, $P < 0.01$) and incident cartilage defects (3% vs. 17%, $P = 0.03$). Interestingly, knee abnormalities were also common in asymptomatic players with no prior history of injury or surgery (5–59%).

Conclusions: Structural abnormalities commonly seen in osteoarthritis are also common in sub-elite AFL players. Their associations with pain, function, injury and surgery suggest they are clinically significant however, the implication for long-term knee health is unknown especially in asymptomatic players.

Disclosures: JPP and JMP are shareholders in ArthroLab. FA is an employee of ArthroLab.

P542

BASELINE LOWER LIMB MUSCLE STRENGTH IN YOUNGER WOMEN AND ITS CHANGE IN OVER 12 YEARS INDEPENDENTLY PREDICT BALANCE IN MIDDLE-AGE: DATA FROM A PROSPECTIVE POPULATION-BASED STUDY

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Objectives: Little is known about which modifiable factors affect balance in younger women, despite the importance of poor balance as a risk factor for falls and fracture in older adults. The aim of this study was to examine the potential for lower limb muscle strength (LMS) to influence balance in younger people and specifically assess whether LMS in young women and changes in LMS are both independent predictors of balance in middle-age.

Materials and Methods: This was an observational study following up women aged 25–44 years at baseline who were previous participants in a 2-yr population-based randomised controlled trial of osteoporosis education interventions. Ten years after the completion of the trial, 347 women were assessed measuring LMS (by dynamometer, also measured at baseline) and balance by the timed up and go test (TUG), step test (ST), functional reach test (FRT) and lateral reach test (LRT). Linear regression was used to examine associations between baseline LMS and its change over 12 years with balance measures at 12 years.

Results: There was a mean decline in LMS of 17.3 kg over 12 years. In multivariable models which were adjusted for potential confounders, both baseline and change in LMS were independently beneficially associated with TUG ($\beta = -0.008$ sec/

kg, 95% confidence interval (CI): -0.01 to -0.006 and -0.006sec/kg: -0.009 to -0.003 for baseline and change respectively), FRT ($\beta = 0.057$ cm/kg, 95%CI: 0.030 to 0.084 and 0.071cm/kg: 0.042 to 0.101) and LRT ($\beta = 0.030$ cm/kg, 95%CI: 0.012 to 0.049 and 0.022cm/kg: 0.002 to 0.043) at 12 years. Baseline LMS but not change in LMS was associated with ST ($\beta = 0.044$ steps/kg, 95%CI: 0.022 to 0.067 for baseline LMS).

Conclusions: Greater LMS in young women and slower decline in LMS over time are both associated with better balance in midlife. This is analogous to how both peak bone mass and bone loss contribute to fracture risk in older adults. It suggests that improving muscle strength in younger women and preventing age-related loss of muscle strength could both be potentially useful strategies to improve balance and reduce falls in later life.

P543

SARCO-OSTEOPENIA VS. SARCO-OSTEOPOROSIS: TOWARDS A UNIFIED DEFINITION OF OSTEOSARCOOPENIA

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Introduction: In older persons, the combination of low bone mass (osteopenia/osteoporosis) and sarcopenia has been proposed as a subset of frailer individuals at higher risk of falls and fractures. However, unified criteria to define this syndrome is still lacking. In this study, we aimed to compare the clinical, biochemical and imaging phenotype and prevalence of poor outcomes (falls and fractures) in a population of older fallers classified as sarco-osteoporotic (SOP), sarco-osteopenic (Sop), and non-sarcopenic/non-osteopenic.

Methods: We assessed 344 individuals (79% females), aged 52–99 years, who were referred to the Falls and Fractures Clinic at Nepean Hospital, Penrith (Australia). BMD was determined using DXA, with osteopenia defined as a BMD between -1.0SD and -2.49SD and osteoporosis as a BMD less than -2.5SD. Sarcopenia was determined by fulfilment of at least two of the following criteria: appendicular lean mass by height² (ALM/ht² method) < -2 SD compared to young individuals, gait velocity < 0.8 m/second and grip strength < 20 kg for females and < 30 kg for males. Chemistry profile included 25(OH)vitamin D, parathyroid hormone, albumin, creatinine, calcium, phosphate, vitamin B-12, folate and TSH for all patients, and serum testosterone in men.

Results: Osteopenia was present in 57% of those with sarcopenia (125/216). Osteoporosis was present in 42% of those with sarcopenia (91/216). Mean age of the Sop and SOP were 79.7 and 81.3 years respectively. Univariate analyses showed that both Sop and SOP were more likely than non-sarcopenic/non-osteopenic individuals to be female (OR 3.73, CI95% 2.19 – 6.3, $p < 0.001$), older ($p < 0.001$), and significantly associated with arthropathy and poor mobility. Compared with Sop, multivariate analysis found age, female gender, depression, higher nutritional risk, BMI < 25 , and history of previous fractures to be significantly associated with SOP. Compared to normal, SOP are at higher risk of fractures (OR 4.268, CI95% 2.382 – 7.645, $p < 0.001$). Both groups showed a similar risk of falls. Biochemical and hormonal profile showed no differences between SOP and Sop groups.

Conclusion: Sop and SOP are components of the same syndrome, which could be named as Osteosarcopenia. Both groups are at higher risk of falls. As expected, when suffering from both osteoporosis and sarcopenia, older patients are at higher risk of fractures. In conclusion, screening for sarcopenia in those with osteopenia or osteoporosis – indistinctively – would improve the diagnosis rates for those with osteosarcopenia, allowing for improvements in the management of these individuals at very high risk for falls and fractures.

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CHANGES OF BONE MINERAL DENSITY AT ELDERLY PATIENTS WITH THE OSTEOARTHRITIS OF KNEE JOINTS DEPENDING ON BODY MASS INDEX

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Body mass index (BMI) is an important determinant that affects the level of bone mineral density (BMD) of different skeletal sites. However, data on the relationship of BMI and change indices densitometry BMD in patients with osteoarthritis (OA) are contradictory.

Objectives: To estimate changes of BMD in elderly patients with OA of knee joints, who received treatment in a specialized hospital of a traumatology profile, depending on BMI.

Materials and Methods: The analysis of BMD and calculation of BMI in 384 patients with OA of knee joints of varying severity, aged from 65 to 83 years, mean age - 71,2±4,65 (335 of them women – 87,2%, men 49 - 12,8%) were done. Patients performed BMI calculation of the standard formula and dual-energy X-ray absorptiometry of the lumbar spine and proximal femur with a score of T-criterion, according to WHO

recommendations. Taking into account indexes of BMI patients were divided into 3 groups: normal weight, overweight and obesity.

Results: Among the patients of these groups the frequency of reduced BMD was 88,5% - 340 people (46% of osteoporosis - 177 people, osteopenia 42,5% - 163 people). Significant differences in BMD rank in all three groups ($p = 0,004$) and between groups: normal weight – obesity were obtained. Evaluation of BMD values at the lumbar spine is also characterized by the presence of significant differences between the three groups ($p < 0,001$) and in groups: normal weight - obesity and overweight - obesity ($p < 0,05$). Significant differences in values of BMD of the proximal femur according to the BMI is not revealed.

Conclusions: The findings evidence a direct correlation of indicators BMD of the lumbar spine in patients with OA of knee joints, and BMI.

P545

PREVALENCE OF SECONDARY HYPERPARATHYROIDISM IN PATIENTS WITH DIABETES MELLITUS (DM) WITH CHRONIC KIDNEY DISEASE

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Objectives: Life expectancy of patients (Pts) with chronic kidney disease (CKD) has increased, recently. Renal osteodystrophy occurs in CKD Pts when GFR is below 60-65 ml/min and is one of the complications of CKD. The objective of study was to estimate Ca-P M and osteoporosis (OP) due to secondary hyperparathyroidism (SHT), developed in Pts with DM 1, 2 and CKD of 3-4 stages.

Materials and methods: Altogether, 730 Pts with DM 1,2 at 3-4 stage of CKD were examined. Total Ca, P, alkaline phosphatase (AP), PTH levels - measured. Spinal and femoral bones - examined by DXA densitometry. Obtained results - analyzed statistically: quantitative indicators determined by Wilcoxon, qualitative - with Fisher-Irvine's test.

Results: GFR lower than 65 ml/min was in 264 Pts out of 839 Pts with DM 1,2 that comprised 31.5%. SHT was diagnosed in 75 Pts out of 264 Pts (30.2%). Frequency of SHT among Pts with type 1 and 2 DM comprised 24% (n=18) and 76.0% (n=57), correspondingly. Compared to the group of "SHT-", changes of all values of P-Ca M, such as reduction of Ca, increased P, AP, and PTH were in "SHT+" group. Average concentration of PTH in the "SHT+" group was 82.7 pg/ml, total Ca - 1,9 mmol/L and P - 1.8 mmol; AP ranged 135-846 U/L and 328 U/L on average. Prevalence of SHT showed that

it was more common in women (53.3%) than in men (46.6%), although there was no significant difference. Pts with SHT had either of bone mineral density disorders (BMDD): OPn in 66.6% (n=50) and OP in 33.3% (n=25). Although there was no difference in the frequency of OPn, with regard to gender (55.5%±5.7 and 44.5%±5.2 in men and women respectively), the frequency of OP was more common in women than men (70%±5.3 and 30%±3.4, respectively).

Conclusions:

1. SHT was seen nearly in 1/3 of the Pts with DM, whose GFR was less than 65 ml/min.
2. BMDD, in the form of OPn and OP, were detected in 100% of Pts with SHT.
3. Mean concentration of indicators, reflecting disturbances of Ca-P M, such as AP, Ca, P, and PTH were beyond normal ranges.

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ASSOCIATION OF BETWEEN-PERSON AND WITHIN-PERSON VARIABILITY IN SERUM 25-HYDROXYVITAMIN D, PHYSICAL ACTIVITY, KNEE PAIN AND DYSFUNCTION AND FALLS RISK IN COMMUNITY-DWELLING OLDER ADULTS

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Objective: Traditionally, analysis has focused on examining how risk factors for falls differ between individuals (*between-person* comparison). Less well recognized is how variability in risk factors over time within the same individual (*within-person* comparison) is associated with falls risk. To describe the associations between falls risk, and between-person and within-person variability in 25-hydroxyvitamin D (25OHD), physical activity (PA), knee pain and dysfunction in community-dwelling older people.

Material and Methods: Data for 1053 participants (51% women; mean age 63±7.4 years) studied at baseline, 2.5, 5, and 10 years were analysed. Falls risk (Z-score) was measured using the validated Physiological Profile Assessment. Knee pain and dysfunction were assessed using the Western Ontario and McMaster Universities Osteoarthritis index (WOMAC). Moderate and vigorous PA (MVPA) was measured using accelerometer. Linear mixed effect regression models, with adjustment for confounders, were used to estimate the association between falls risk and between-person and within-person variability in PA, 25OHD and WOMAC score.

Results: Between-person effects showed that 10-year average falls risk was lower in participants who had a higher 10-year average 25OHD ($\beta=-0.005$ per nmol/l, 95% CI: -0.008, -0.002, $P<0.001$), log-MVPA ($\beta=-0.16$ per minute, 95% CI: -0.22, -0.10, $P<0.001$) and lower mean WOMAC score ($\beta=0.005$ per-unit score, 95% CI: 0.003, 0.01, $P<0.001$). Within-person effects showed that a higher falls risk at any time-point was associated with higher than average WOMAC score ($\beta=0.002$ per-unit score, 95% CI: 0.0003, 0.004, $P=0.025$) and lower than average log-MVPA ($\beta=-0.15$ per minute, 95% CI: -0.24, -0.06, $P=0.003$), but not 25OHD, at the same time-point.

Conclusions: Within-person analysis showed that at time-points when participants had higher pain and dysfunction and lower MVPA, they also had a higher falls risk. This supports clinical recommendations of promoting PA for reducing falls risk in older people, but it also suggests that having higher knee pain and dysfunction above an individual's average may warrant more attention as falls risk is likely to be higher at this time.

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CORRELATION BETWEEN PLASMA FIBROBLAST GROWTH FACTOR 21 LEVELS AND REGIONAL BONE MINERAL DENSITY REVEALS AN INVERSE RELATIONSHIP

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Background: Osteoporosis is the most prevalent bone disease leading to a high risk of fracture. A bunch of secreted molecules were identified as regulators in skeletal homeostasis. FGF21 modulates glucose and lipid metabolism, and recently, was found to be responsible for bone loss in animals. However, there was a published study that held the contradictory view and reported a positive association between plasma FGF21 levels and BMD in women. The controversial statements suggest further investigation. Here, we examined associations of FGF21 levels with regional BMDs in 168 unrelated Chinese subjects to draw a more reliable conclusion.

Material and Methods: 168 healthy Chinese subjects were recruited including 49 males and 119 females. Fasting plasma FGF21 levels were determined using the ELISA method. Regional BMDs and body composition were measured by dual energy X-ray absorptiometry (DXA).

Results: Correlation analyses observed that FGF21 was inversely associated with the BMD of femoral neck (neck-BMD, $P=0.034$) and Ward's triangle (Ward's-BMD, $P=0.002$) at the hip region, and the results remained

significant even after adjusting for sex, age and body composition ($P=0.048$ for neck-BMD; $P=0.002$ for Ward's-BMD). Meanwhile, the association between FGF21 levels and spine BMD reached a near significant level ($P=0.057$) after adjustment. There was no significant signal presented when considering sex determine.

Conclusions: Contrary to the previous study, we support the previous laboratory findings by obtaining the negative relation between FGF21 and regional BMDs in Han Chinese population. With a larger sample set and rational body composition adjustment, our study provides a more convincing result comparing with the early published.

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NOVEL SOCIO-DEMOGRAPHIC RISK FACTORS FOR OSTEOPENIA AND OSTEOPOROSIS IN THE MIDDLE-AGED SAUDI FEMALE POPULATION

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Objective: Risk factors for bone-related diseases such as age, gender and family history, to name a few, are well established. In the present study we tried to explore other socio-demographic variables not previously identified as risk factors for osteopenia and osteoporosis, particularly in the Saudi female adult population.

Methods: We studied 1270 Saudi adult female subjects taken from the Saudi Osteoporosis Registry Database. They were grouped based on the presence or absence of osteoporosis and osteopenia; 310 with osteoporosis (Age 58.6 ± 8.8 ; Body Mass Index (BMI) 30.5 ± 6.0), 568 with osteopenia (Age 56.2 ± 7.8 ; BMI 33.5 ± 6.0) and 392 normal (without osteoporosis and osteopenia) (Age 53.3 ± 7.7 ; BMI 34.1 ± 5.8). A general questionnaire was filled which included medical and family history as well as other sociodemographic variables. Anthropometrics was taken. Diagnoses of osteoporosis and osteopenia were based on DXA scans.

Results: Age- and BMI adjusted multinomial logistic regression results showed that having a lower education status was significantly associated with osteopenia [Odds ratio (OR) 1.63

(Confidence Interval (CI) 1.17-2.8; $p<0.01$] and osteoporosis [OR 2.07 (CI 1.34-3.2); $p<0.01$]. Furthermore, subjects with a family history of hypertension and/or diabetes mellitus (DM) were less likely to develop osteoporosis by 37% and 39%, respectively [OR 0.63 (CI 0.45-0.88); $p<0.01$ and OR 0.61 (CI 0.44-0.86); $p<0.01$, respectively]. Lastly, subjects with DM was 31% less likely to develop osteoporosis [OR 0.69 (CI 0.49-0.98); $p<0.05$] and 67% less likely with Crohn's disease [OR 0.33 (CI 0.14-0.78); $p<0.05$].

Conclusion: The present study showed new risk factors not previously identified in osteopenia and osteoporosis in the Saudi population. While still controversial and understudied even in the current literature, some chronic metabolic conditions are protective of osteoporosis among Saudi middle-aged females. The present findings warrant further investigation.

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DOES VITAMIN D DEFICIENCY INFLUENCE THE INCIDENCE AND PROGRESSION OF KNEE OSTEOARTHRITIS? A SYSTEMATIC REVIEW

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Objectives: Vitamin D has been believed to have a bearing in the pathogenesis of knee osteoarthritis (OA). This study was done systematically to review the correlation between vitamin D levels in knee OA in the adult population and the outcome of vitamin D supplementation in knee OA.

Methods: An exhaustive search of Pub Med and Cochrane library database was done with keywords vitamin D, knee and osteoarthritis for a period from Jan 2005 to December 2015. All Randomized Control Trials (RCT), Cohort, Case-control, cross-sectional studies were included in the present systematic review.

Results: The search resulted in a total of 86 studies; out of which 11 studies were included in the current review. There were two Randomized Control Trial (RCT), one case-control, four cross-sectional and four cohort studies (Figure 1). These studies comprised of a total of 5137 participants (ranging from 46 to 1248) Our results suggested there was a moderate evidence of positive association in vitamin D deficiency (VDD) and progression of radiographic OA (ROA), as assessed by Kellgren and Lawrence (KL) grading (Figure 2). However, VDD was not associated with the incidence of ROA and MRI-detected change in focal cartilage defect. However, this study has a limited evidence for a positive correlation in VDD and the cartilage volume loss. There was also limited evidence showing no role of vitamin D therapy in reducing cartilage volume loss and knee pain in Knee OA.

Conclusion: The VDD is common and has been associated with knee OA, in an adult population. However, there is still inconsistent evidence regarding the prevention of incidence and progression of ROA after vitamin D therapy. There is a need for multicentric and well-conducted randomized studies with larger samples to conclude the positive effect of Vitamin D therapy.

Figure 1. PRISMA chart

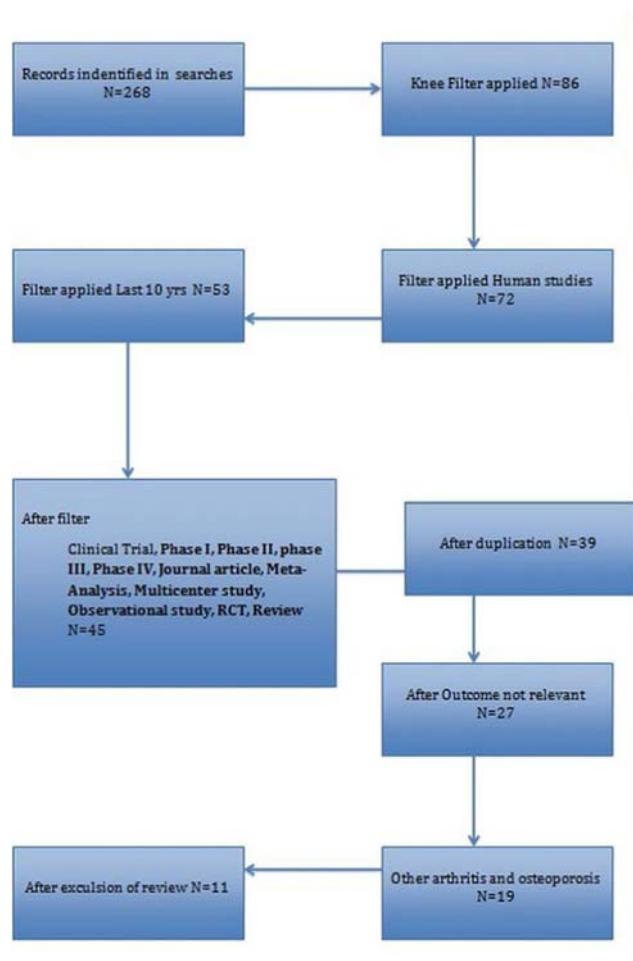


Figure 2. Evidence level for VD association with knee OA.

| Association of VDD to OA knee | | Study | Effective level | Evidence | Types of studies |
|------------------------------------|-----------------|--|------------------------|----------|------------------------------------|
| SOA prevalence | Questionnaire | Muraki S et al + Heidari et al + Mohamed A. Abu + | Moderate (4+) | | 1case control/ 3cross-sectional |
| ROA Prevalence | KL | Muraki S et al (-) | Limited 1- | | cross-sectional study |
| | Osteophytes | Ding C. et al (-) | limited 1- | | cross-sectional study |
| | JSN | Ding C. et al (+) | limited1+ | | cross-sectional study |
| ROA Incidence | KL | Bergnik AP. et al (-) Mc Alindon et al (-) | Moderate 2- / | | 1Cohort study 1RCT |
| | JSN | Bergnik AP. et al (+) | Limited 1+ | | Cohort study |
| Distal femoral cartilage thickness | Ultrasonography | Fevziye Unsai Malas et al (+) | Limited 1+ | | retrospective study |
| ROA Progression | KL | Bergnik AP. et al (+) Mc Alindon et al (+) | Moderate (2+) | | 1Cohort 1RCT |
| | Osteophytes | Mc Alindon et al (+) Felson DT. et al (Framingham)(-) Felson DT et al (BOKS) (-) | Conflicting (2-and 1+) | | Cohort studies |
| | JSN | Fang fang et al (+) | Limited 1+ | | Cohort studies |
| Cartilage defect | | Felson DT et al BOKS (-) | Moderate 2- | | Cohort studies |
| Progression | | Ding C. et al (-) | | | |
| Cartilage volume loss | | Ding C. et al (+) | 1+ | | Cohort studies |
| Progression | | | | | |

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KNOWLEDGE AND PERCEPTION ABOUT MEDICAL JOURNALISM AMONG MEDICAL REPORTERS: BARRIERS AND OPPORTUNITIES

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Media is an important source of health-related information for the public, policymakers and health professionals. It can influence individuals' health behaviors, prompt policymakers to make decisions to promote health and disseminate health research results to the medical and science community. It is well recognized that the media plays an enormously influential role in public responses to health issues. It has substantial power in setting agendas. Medical professionals have always been sensitive to the persuasive power of the mass media

Over the past three decades, a number of works have investigated how news is sought and shaped by journalists within media organizations. Many health and medical scholars and professionals would agree with those doctors and news commentators who recently stated that the media fails health services, and that the structural limitations on news production made "evidence based journalism" a "forlorn hope".

Media can also be a tool to promote evidence-informed policymaking and bridge the existing "know-do" gap through disseminating research results to policymakers and the public. In Bangladesh we did not find any research work or any data about perception of medical Journalism among health reporters and health professionals.

This Qualitative and Quantitative quasi experimental study will be carried out in Bangabandhu Sheikh Mujib Medical University among Medical Journalists, Health Professionals and Policy Makers to The present study will be conducted to

1) explore the nature of media coverage of health stories and evidences, 2) assess the quality of health reporting, 3) understand the perception of reporters and physicians about medical journalism, 4) identify the factors influencing health reporting, 5) identify strategies to enhance the use of evidences in health journalism and 6) design and test an intervention program to improve the quality of medical journalism. Data will be collected by (1) Checklist of medical health news review (2) Questionnaire and (3) Qualitative guideline on Key Informant Interview, Focus Group Discussion. After collection, data will be checked for inadequacy, irrelevancy, and inconsistency. Irrelevant and inconsistent data will be discarded.

Both qualitative and quantitative data will be analyzed. Results will be published in peer reviewed journal and a well circulated newspaper.

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EFFICACY OF VARIOUS VITAMIN D CORRECTION STRATEGIES IN SAUDI ADULTS AND CHILDREN

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Background: Vitamin D deficiency is highly prevalent in the Saudi population and there are different strategies. This study aims to evaluate the efficacy of different strategies for vitamin D deficiency correction in Saudi adults and children.

Methods: A total of 860 Saudi school students (children's) aged 12-17 years and adults (teachers) aged 25-50 years were recruited over a 6 month period were included in this interventional study, whose baseline serum 25 (OH) D falls below (<50nmol/l) were selected from different secondary schools in Riyadh, Saudi Arabia. Serum (OH) D deficient subjects were grouped according to different vitamin D correction schemes: sun-exposure, vitamin D-fortified milk consumption, oral vitamin D supplementation (1000IU/day) and control (advise). Follow up measurements were done after 6 months.

Results: Follow-up results revealed that the prevalence of server serum vitamin D deficiency significantly decreased (23.9% at baseline vs. 10.7% after 6 months; $p < 0.001$) in the oral vitamin D supplementation group and this was not observed in other correction strategies. 6-month oral vitamin D supplementation also showed significant positive associations between delta (Δ) changes in improving total and HDL-cholesterol in both adults and children. The least effective strategy were observed in milk group in adults and control (advised) group in children.

Conclusion: A 6-month oral vitamin D supplementation was the most effective way to improve lipid profile and vitamin D status in both Saudi children and adults than sunlight exposure and vitamin D fortified dairy products consumption. The latter strategy is the least effective in adults and giving advice is the least effective in children, probably due to poor compliance.

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THE EFFECT OF PARATHYROID HORMONE (1-84) TREATMENT ON SERUM BONE MORPHOGENETIC PROTEIN 4 AND VASCULAR ENDOTHELIAL GROWTH FACTOR IN POSTMENOPAUSAL WOMEN WITH ESTABLISHED OSTEOPOROSIS

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Objective: to investigate the effect of 18 months parathyroid hormone 1-84 (PTH 1-84) treatment on serum levels of bone morphogenetic protein 4 (BMP 4) and vascular endothelial growth factor (VEGF), in postmenopausal women with established osteoporosis.

Methods: Thirty-seven postmenopausal women with osteoporosis (mean age 72.9 \pm 8.1 years old) and 23 healthy controls (mean age 68.9 \pm 9.9 years old) were enrolled. Patients were treated with daily subcutaneous injections of PTH (1-84) 100 mcg for 18 months, plus calcium 1 gr and vitamin D 800 IU per os daily. Blood samples were taken every 6 months during the study.

Results: At baseline, there were no differences considering anthropometric parameters, co-morbidities, current medications used between patients and controls. Mean serum VEGF levels were significantly higher in osteoporotic patients compared to controls (436.7 \pm 259.7 vs. 260.3 \pm 184.3 pg/ml, $p = 0.006$), while there were no differences in mean serum values of BMP 4 (5.3 \pm 1.7 vs. 5.7 \pm 1.6 pg/ml, $p = 0.40$). Serum VEGF levels increased by approximately 20% after 12 months of PTH (1-84) treatment compared to baseline ($p = 0.03$) and by 22% after 18 months ($p = 0.01$). A significant increase of 10% in mean serum BMP 4 levels was observed after 18 months of PTH (1-84) treatment compared to baseline ($p = 0.02$). In the control group we found no differences after 18 months compared to baseline in BMP 4 (5.7 \pm 1.6 vs. 6.0 \pm 1.5 pg/ml, $p = 0.53$) and VEGF (260.3 \pm 184.3 vs. 257.4 \pm 107.1 pg/ml, $p = 0.94$)

Conclusions: PTH (1-84) treatment increased serum levels of VEGF and BMP 4 in postmenopausal women with severe osteoporosis.

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PARATHYROID HORMONE IN RELATION TO VARIOUS VITAMIN D METABOLITES IN ADULT FEMALES

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Background: Vitamin D binding protein (DBP) and albumin are the important determinants of circulatory 25(OH)D in adults. Physiological function of vitamin D is particularly regulated by DBP. Physiological function of vitamin D is particularly regulated by DBPs. Serum parathyroid hormone (PTH) is considered as the biological activity reader of circulating 25(OH)D. We therefore examined the relationships between serum total, free and bioavailable 25(OH)D vs. PTH in apparently healthy Saudi female adults.

Methods: A total of 350 apparently healthy Saudi female adults [(Mean±standard deviation) Age (years) 52.9±9.2; Body Mass Index (kg/m²) 32.9±5.4] were included in this observational study. Anthropometrics was measured as well as fasting glucose, lipid profile, calcium and phosphorous using routine methods. Serum 25(OH)D was measured using an electrochemiluminescence immunoassay. Serum DBP was determined by ELISA. Free and bioavailable 25(OH)D were calculated by comparing concentrations of total 25(OH)D, DBP, and albumin.

Results: Data revealed that circulating total 25(OH)D had weak but significant inverse association with DBP ($R=-0.24$; $p<0.01$), and strong inverse associations with free 25(OH)D ($R=-0.87$; $p<0.001$), albumin bound 25(OH)D ($R=-0.88$; $p<0.001$) and bioavailable 25(OH)D ($R=-0.89$; $p<0.001$). None of the vitamin D metabolites, including 25(OH)D, correlated with serum PTH.

Conclusion: Various metabolites of 25(OH)D are not correlated with serum PTH in Saudi adult females. Bioavailable, albumin-bound and free 25(OH)D cannot be surrogate measures for vitamin D status, at least in this population.

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MULTIPLE STRESS FRACTURES IN A WOMAN WITH ANTIPHOSPHOLIPID SYNDROME AND VITAMIN D DEFICIENCY

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A 44-year old, non-smoking woman with definite antiphospholipid syndrome (there spontaneous abortions before 10 weeks of gestation, venous thrombosis, twice positive anticardiolipin antibodies), otherwise healthy, presented with sudden pain and swelling of her right foot, that developed during several hours while walking. X-ray performed on the same day was unremarkable. US revealed mild synovitis of the second metatarsophalangeal joint. CBC, CRP, RF, uric acid were normal, ANA 1:320 (ENA were absent). The patient was advised ice applications, topical and oral NSAIDs. Two weeks later pain in her foot persisted and intraarticular steroid injection was performed, also without significant effect. X-ray showed 2nd metatarsal bone fracture and cast was applied. Her calcium, creatinine and TSH were normal, phosphorus slightly decreased. She had moderate vitamin D deficiency and mild PTH elevation. DXA

showed minimal osteopenia, parathyroid glands scintigraphy without pathological changes. The patient received vitamin D supplement. After cast removal 6 weeks later she still felt moderate pain in her foot while walking. CT-scan proofed full fracture consolidation, otherwise was unremarkable. A week after CT the patient felt increasing pain in her right foot. X-ray was performed and 3d metatarsal bone fracture was diagnosed. A month later cast was removed. Gradually pain reduced. Her PTH, phosphorus, vitamin D reached normal limits.



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DOES THE SITE OF VARUS DEFORMITY IDENTIFY THOSE AT HIGHER RISK OF PROGRESSION IN EARLY SYMPTOMATIC OSTEOARTHRITIS OF THE KNEE: DATA FROM THE OSTEOARTHRITIS INITIATIVE (OAI)

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Objectives: To determine which of the geometric alignment variables contribute to symptomatic and radiographic progression of knee osteoarthritis (OA).

Material and Methods: The OAI is a multicentre, observational, prospective cohort study. Its publically available datasets and imaging archive, enable researchers to investigate the natural history of knee osteoarthritis (OA). To be included in this study subjects had to demonstrate early to moderate radiographic osteoarthritis (Kellgren Lawrence grade 1, 2 and 3), symptoms in the knee for more than half the days of a month in the past year, complete follow up at 24 months and long leg radiographs (LLRs) available for analysis. 1,327 knees from 961 subjects were included. All LLRs were assessed using Mediacad[®] (Hectec GmbH, Germany) planning software. This gives reproducible measurements of the key angles which contribute to overall lower limb alignment including; medial proximal tibial angle (MPTA), medial proximal femoral angle (MPFA), lateral distal tibial angle (LDTA) and lateral distal femoral angle (LDFA). Outcomes were assessed at 2 years. Symptom worsening was defined by a deterioration in WOMAC score of >9points. Structural progression was defined by joint space narrowing >0.7mm. Demographic characteristics including age, BMI, employment status, smoking status and other co-morbidities were recorded. Generalised estimating equations were used to identify which variables predicted symptom or structural progression.

Results: In 1,327 knees (Female=60%, mean age years) with symptomatic knee osteoarthritis, 19% demonstrated structural progression and 16% demonstrated symptom progression at 2yrs. Baseline WOMAC score ($p<0.001$) and BMI ($p=0.02$) were predictive of symptom progression. Of the four measures of alignment, only medial proximal tibia angle (MPTA) predicted structural progression ($p<0.001$).

Conclusions: This is the first study to identify that specifically varus alignment of the proximal tibia predicts structural progression in early symptomatic knee OA. This finding may inform clinical decision making in patients presenting with early knee OA.

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VITAMIN D RECEPTOR GENE POLYMORPHISMS MODIFY CARDIOMETABOLIC RESPONSE TO VITAMIN D SUPPLEMENTATION IN T2DM PATIENTS

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Background: There is conflicting evidence on the favorable effects of vitamin D supplementation on metabolic profile in Type 2 diabetes mellitus (T2DM) patients and this might be due to genetic variations in vitamin D receptor (VDR). Thus, we studied the metabolic effects of a 12-month vitamin D supplementation in T2DM patients according to VDR polymorphism.

Methods: 204 T2DM subjects received 2000IU vitamin D3 daily for 12- months. Serum 25(OH)D and metabolic profiles were measured pre- and post-supplementation. VDR polymorphisms (*Taq-I*, *Bsm-I*, *Apa-I* and *Fok-I*) were identified using TaqMan genotyping assays.

Results: Vitamin D supplementation significantly increased HOMA β -cell function ($p=0.003$) as well as significantly decreased triglycerides, total and LDL-cholesterol ($p<0.001$). The lowest increment in 25(OH)D levels was detected in patients with *Fok-I* CC genotypes ($p<0.0001$). With vitamin D correction, carriers *Taq-I* GG genotypes showed significantly better improvements in triglycerides, LDL- and total cholesterol, insulin, HbA1c and HOMA-IR ($p<0.005$, 0.01, <0.001 , <0.005 , 0.03 and 0.01, respectively). Similarly, subjects carrying *Bsm-I* TT genotypes showed significantly better improvements in triglycerides ($p=0.01$), insulin and HOMA-IR ($p<0.05$).

Conclusion: VDR polymorphisms influence metabolic response to vitamin D supplementation as improvement in glycemic and lipid profile was more evident in carriers of *Taq-I* GG and *Bsm-I* TT genotypes.

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COMPUTER DIAGNOSTICS OF OSTEOPOROSIS BY EVALUATION OF MICROARCHITECTONICS OF BONE

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Background: Osteoporosis is among the most spread metabolic disease of the skeleton which leads to a high percentage of disability among the working population. CT Changes in

bone in osteoporosis appears in reducing bone density and microarchitectural bone tissue, which leads to multiple microscratches. Digital processing of medical images, particularly CT scans of vertebrae, opens up new opportunities for quantitative diagnostic criteria changed bone structure, as well as to assess mineral bone density.

Aim: To study the possibilities of digital analysis of computer tomograms of the skeleton to reveal osteoporosis.

Material and Methods: To implement the objectives of the study developed special software designed for the analysis of tomographic images on a personal computer. CT image of the lumbar vertebral body in the axial projection of the archive was transferred to the scanner of PC. Obtained in the study of anatomical specimens vertebrae ICP values were compared with the calcium, phosphorus and magnesium in the samples.

Results: Analysis of data obtained from digital processing of CT scans showed significant differences in some indicators in patients groups I and II. So, ICP values patients in groups I and II amounted to $16,2 \pm 1,3$ and $11,5 \pm 1,7\%$ respectively and had significant differences. LTE values were also significantly higher in patients in group I compared with same indicators in group II ($P < 0.05$). When measuring the APC reliable difference in the groups studied were found. Changing the number and trabecular thickness that occurs when osteoporotic bone reflected on the cut vertebra ratio, a decrease in bone density number of elements per unit area. A significant decrease in the values of $L_t | p$ revealed patients of group II, consistent with changed ICP and also indicates the growing osteoporotic changes with increasing duration of treatment with hemodialysis.

Conclusion: Thus, the digital analysis of CT lumbar vertebrae allows to evaluate the architecture of bone and mineral density. Given the definition of the ICP values, LTE, APCs for unmodified bone becomes possible to develop diagnostic criteria for early diagnosis of osteoporosis. We have developed a method of estimating the state of the bone allows complex to study IPC and architecture of bone and can be costly alternative methods of assessment of the IPC (CCV and DXA) and bone microarchitectonics analysis by high-resolution MRI and CT.

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DIPEPTIL-AMINOPEPTIDASE 4 (DPP4) AND ITS RELATIONSHIP WITH OSTEOPOROSIS AND BONE REMODELING

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Objective: A relationship between Glucagon-like peptide 1 (GLP1) and 2 (GLP2) and osteoporosis has been demonstrated. The enzyme responsible for its metabolization, dipeptidylaminopeptidase 4 (DPP4), has also been associated with osteoporosis, although the existing evidence is scarce. Our objective is to evaluate whether there is a relationship between DPP4 and osteoporosis and bone remodeling.

Methods: One hundred and eighteen volunteers were included in a Case-Control study: 60 cases and 58 controls, matched by age and sex. Inclusion criteria were for Cases: T-score -2.5 and below and for Controls: normal Bone Mineral Density (BMD). Exclusion criteria were secondary osteoporosis, diabetes mellitus, cancer, hospitalization in the last 6 months and current treatment with antidiabetic and anti-osteoporotic drugs. As variables we determined food intake; BMD measured by Dual-energy X-ray absorptiometry (DXA) in the posteroanterior spine and hip and Bone Turnover Markers (BTM). DPP4 activity was determined using “DPP4 Activity Assay Kit”, by Sigma-Aldrich. Statistical analysis: Student's t-test for continuous variables, χ^2 test for categorical variables and regression lineal analysis.

Results: Women were 98% of the sample. Mean age was 59.25 for Cases and 59.01 for Controls ($p=0.78$). Results for DPP4 activity and BTM are presented in Table 1.

Conclusion: There is an association between DPP4 and BTM in patients with osteoporosis. Studies are necessary to evaluate the consequences on BMD and BTM of therapy with DPP4 inhibitors in diabetic patients.

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| Variable | Cases | | Controls | | |
|-------------------|---------------------|----------|---------------------|----------|------|
| | Mean \pm MSE | | Mean \pm MSE | p Value | |
| DPP4 (ng/mL) | 7844.83 | (176.27) | 7749.39 | (186.58) | 0.71 |
| Lineal Regression | | | | | |
| BTM | Coefi. β (EE) | p Value | Coefi. β (EE) | p Value | |
| Osteocalcin | 67.93 (24.01) | 0.01 | 7.21 (29.50) | 0.81 | |
| Propeptid | 24.01 (9.25) | 0.01 | 33.02 (14.03) | 0.02 | |
| CTX | 2407.32 (863.15) | 0.007 | -134.69 (1465.80) | 0.93 | |

P559**MRI DIAGNOSTICS OF COMPRESSION FRACTURES OF THORACIC SPINE**K. Aminov¹¹tashkent Institute For Postgraduate Medical Education, Tashkent, Uzbekistan

Background: A compression fracture of the spine refers to one of the most serious injuries. The cause of spinal fractures can be a sudden load on the spine (usually fall), and regular daily load due to lower bone density in a patient (osteoporosis). Medical Statistics states: at least 1 time in the life of a compression fracture occurs in 40% of men and women over 80 years. More often, compression fractures occur in young people are very mobile, active lifestyle.

Objective: To specify informative value of magnetic-resonance imaging (MRI) with compression fractures of the thoracic spine.

Materials and methods: The material for the study were 80 patients with suspected traumatic spinal injury, aged from 43 to 78 years. All patients were underwent: MRI of the thoracic spine. Diagnostic work-up was performed on MRI apparatus Siemens 1,5T.

Results of the study. Patients performed X-ray examination in which all of traumatic changes in thoracic vertebrae were found. As a screening method in all patients was conducted MRI. In the 45 cases confirmed the presence of traumatic lesions of the vertebrae, in 9 patients traumatic changes were detected in 6 cases there was a contusion of the vertebrae.

Conclusions: According to the study it found that MRI of the spine revealed such changes, which are not visualized by X-ray examination that helps in choosing the right tactics of treatment and monitoring its effectiveness. MRI should be the first method of choice in the diagnosis of spinal compression fractures.

P560**DIFFERENT THRESHOLDS FOR THE FRAX AND TBS-ADJUSTED FRAX USED FOR PREDICTION OF CLINICAL FRACTURES IN OSTEOPENIC POSTMENOPAUSAL WOMEN WITHOUT PREVIOUS FRACTURES**M. Kuzma¹, D. Hans², T. Koller¹, E. Nemethova¹, P. Jackuliak¹, Z. Killinger¹, H. Resch³, J. Payer¹

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Introduction: Little is known about the clinical relevance of treating postmenopausal women with no prior history of fragility fracture and bone mineral densities (BMD) within the osteopenic range. In recent years, in addition to BMD and FRAX fracture probability assessments, a surrogate measure

of bone micro-architecture quality, called the trabecular bone score (TBS), has been proven to predict future fragility fractures independently of both BMD and the FRAX.

Patients and methods: In this prospective, longitudinal cohort study, we compared three risk assessment instruments — the FRAX, the TBS, and a TBS-adjusted FRAX score — in their ability to predict future fragility fractures over a minimum of five years of follow-up among postmenopausal osteopenic women with no prior fragility fractures. We also sought to determine if more- vs. less-stringent criteria were better when stratifying patients into higher-risk patients warranting osteoporosis-targeted intervention vs. lower-risk patients in whom intervention would usually be deemed unnecessary.

Results: Over a mean 5.2 years follow-up, 18 clinical fragility fractures were documented among 127 women in the age 50 years and older (mean age=66.1). On multivariate analysis utilizing regression models and Kaplan-Meier curve analysis, less-stringent criteria for the FRAX and TBS-adjusted FRAX were capable of predicting future fractures, while more-stringent criteria were incapable of doing so. Neither TBS threshold alone was a significant predictor of future fracture in our study. However, Hazard ratio analysis revealed slight superiority of the TBS-adjusted FRAX over the FRAX alone (HR=3.09 vs. 2.79).

Conclusions: Adjusting the FRAX tool by incorporating the TBS may be useful to optimize the detection of postmenopausal osteopenic women with no prior fractures who warrant osteoporosis-targeted therapy.

P561**DEVELOPMENT OF THE FIRST IN VITRO MODEL OF CANCER STEM CELLS FROM A RARE HUMAN SMALL OSTEOSARCOMA FOR STUDYING NEW THERAPEUTIC MOLECULAR TARGETS**G. Palmi¹, R. Zonefrati¹, C. Romagnoli¹, F. Marini¹, A. Aldinucci², C. Mavilia¹, G. Leoncini¹, D. A. Campanacci³, A. Simoni⁴, R. Capanna⁵, A. Franchi⁴, M. L. Brandi¹

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Objective: To establish a bone cancer stem cells (CSCs) line from the small cell osteosarcoma (SCO), a rare human primary bone cancer.

Material and Methods: The human SCO sample has been collected at the “Unit Ortopedia Oncologica e Ricostruttiva”, AOU Careggi, Florence, with informed consent approved

by the local Ethical Committee. First, primary human cancer cell culture of SCO have been established. After that, the subpopulations of CSCs have been isolated from these, with the sphere-formation assay. Hence, the cancer stem cell phenotype has been evaluated by several cellular assays/stainings, by flow cytometry analysis and by analysing the expression profile of the main genes related to CSCs phenotype.

Results: For first, we have established a primary cell culture of an high grade SCO from the sample collected, named OSA3. Consequently, from this we have started to isolate CSCs and we have established a SCO-CSCs line, marked as OSA3-CSCs. The stemness of OSA3-CSCs line has been confirmed by observing their capacity to differentiate into osteoblasts and into adipocytes, by showing the positive presence of the mesenchymal stem cells (MSCs) and of the embryonic stem cells (ESCs) markers into the cell line, and by evaluating a good rate as clonogenic capacity. The presence of the ESCs markers was confirmed also by their gene expression together with the positive expression of the marker genes of the CSCs phenotype. We have also assessed the neoplastic phenotype by demonstrating the presence of the expression of genes involved in invasion/migration processes and in the pluripotency of CSC, by the agar soft and by the Aldehyde dehydrogenase 1A1 (ALDH1A1) assays.

Conclusions: In conclusion, we have established a primary cell culture from a collected SCO sample. We have isolated and completely characterized a SCO-CSCs line at cellular and molecular level. For the first time we have established a good cellular model for the study of the biology of the SCO and of the particular cluster of CSCs, with the final goal to discover new possible molecular targets to develop more effective therapies against this rare type of osteosarcoma.

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THE DIAGNOSTICS OF OSTEOPOROSIS IN MALE RHEUMATOID PATIENTS

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Rheumatoid arthritis (RA) - chronic immune inflammatory joint disease leading to early disability of patients at high risk for cardiovascular events and osteoporotic fractures. Of particular relevance, this problem becomes in men with RA, due to more frequent severe disease and increased mortality in the year after the fracture. Reduced bone mineral density (BMD) and muscle mass are significant predictors of fracture, which leads to the high importance of studying the state of the IPC and body composition.

Objective: improving the diagnosis of osteoporosis in patients with RA male subjects.

Material and methods: A total of 146 male patients with definite diagnosis of RA at the age of 59 years. Depending on the reception of glucocorticosteroids (GCS) is allocated two subgroups: I subgroup - 40 patients not receiving corticosteroids and II subgroup - 66 patients receiving corticosteroids. The control group consisted of 24 healthy men, matched by age and body mass index. IPC Study in the lumbar spine (L1-L4) and femoral carried out by dual-energy X-ray absorptiometry using osteodensitometry. Evaluation of body composition was carried out with the help of "Pod" program.

Results: In 63% of patients with RA revealed male BMD reduction corresponding to osteopenia / OP (OP was diagnosed in 36 (24.7%) patients with RA, and osteopenia - in 56 (38.4%)). The incidence of OP in the II subgroup was significantly higher ($p < 0,05$), than in the I subgroup (48.5% and 5% respectively). The most significant decrease in BMD observed in femoral neck in the study group as a whole, and in individual subgroups. There was a negative correlation between the degree of RA activity and performance of the IPC as a lumbar spine ($r = -0,4$, $p < 0,05$), and the proximal femur ($r = -0,38$, $p < 0,05$). Evaluation of body composition showed that the treatment group had a significant decrease in total lean mass (TM) body, as well as the trunk and extremities TM compared with those of control group ($p < 0,05$). Sarcopenia detected in 80 (55.8%) of RA patients, whereas in the control group it was absent. In 50 (67.6%) of patients with RA male sarcopenia observed to decrease the level of the IPC osteopenia (35.2%) and OD (32.4%). After receiving a negative correlation parameters TM and the absolute 10-year risk of osteoporotic fractures ($r = -0,302$, $p < 0,05$) on the FRAX.

Conclusion: 63% of men suffering from RA, observed BMD decrease corresponding OP / osteopenia with a primary decrease in BMD at the femoral neck. Reduced BMD in patients with RA was significantly associated with a high degree of disease activity ($r = -0,4$, $p < 0,05$). Receiving corticosteroids had no significant effect on BMD at the femoral neck. Analysis of body composition in 55% of RA patients revealed a decrease in TM limbs to the level of sarcopenia. Received correlation decrease BMD and TM limbs ($p < 0,05$; $r = 0,28$). Thus, in patients with RA males along with OP / osteopenia revealed a significant decrease in TM, that in view of the biomechanics of the movements may be an additional risk factor for falls and fractures.

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DIFFERENT EFFECT OF BIOLOGICS VS. METHOTREXATE ON BONE TURNOVER IN ACTIVE RHEUMATOID ARTHRITIS: 1-YEAR FOLLOW-UP

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Introduction: It was shown, that anti-TNF α agents may reduce circulating RANKL, resulting from favorable change in OPG/RANKL ratio and thus increases bone formation and decreases bone resorption markers. In addition, the role of glucocorticoids (GC) use (and their reduction during anti-TNF therapy) and menopause status on bone turnover markers (BTM) remains unexplained.

Objective: Comparison of the biological disease-modifying antirheumatic drugs (bDMARDs) and conventional synthetic DMARDs effect on BTM after one year of active rheumatoid arthritis (RA) treatment and with regard to GC use and menopause status.

Patients and methods: A 12-month prospective follow-up in 105 patients with active RA (Disease Activity Score - DAS 28 > 5.1) was performed. This cohort was divided in two groups: group 1 (n=84, mean age 54 yrs) treated with bDMARDs (anti TNF blockers) and group 2 (n=21, mean age 53 yrs) treated with non-biological DMARDs (Methotrexate) with equivalent GC dose (6.2 mg vs. 6.6 mg), respectively. From group 1, also a subset of patients without GC treatment (n=29) was analysed. BTM, osteocalcin (OC) and CTx were measured at baseline and after 1 year of treatment using conventional electrochemiluminescence immunoassay.

Results: During follow up, a significant increase in serum levels of osteocalcin in patients within group 1 (19,8 ug/l at baseline vs. 27,1 ug/l at month 12; p<0.001) and increase of OC in the subset of pts without GC treatment (20,3 ug/l at baseline vs. 27,4 ug/l at month 12; p<0.001) was observed. In group 2 the levels of OC remained unchanged. In both groups, no treatment effect on CTx or menopause status influence was observed.

Conclusion: Significant increase of OC levels, but not CTx levels was observed only in group treated with bDMARDs. In addition, sustained OC increase was observed in patients without GC treatment, which supports theory that bDMARDs may have beneficial effect on BTM.

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BONE MICROARCHITECTURE ANALYSIS BY HR-PQCT OF YOUNG ADULTS WITH KLINEFELTER SYNDROME REVEALED SEVERE BONE FRAGILITY
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Klinefelter syndrome (KS) is a frequent disease due to the karyotype disorder XXY (1/660 male births). In literature, patients with KS have an increased prevalence of osteoporosis and a 40-fold increased risk of surmortality by femoral neck fracture. Nevertheless, their bone microarchitecture is largely unknown. Thus we aimed to analyze in vivo bone microarchitecture of KS patients by high resolution peripheral quantitative tomography (HRpQCT).

Non-mosaic KS patients included in the French Research Fertility Program were included before introduction of androgen therapy. They underwent assessment of areal BMD at lumbar spine and hip by DXA as well as whole body composition (DiscoveryA, Hologic®) and bone microarchitecture at distal tibia and distal radius by HR-pQCT (XtremeCT, Scanco Medical AG®). Each patient was age-matched with two to three healthy adult men from the STRAMBO cohort (adults) and the VITADOS cohort (teenagers). Statistical analyses were adjusted for height and body weight.

We enrolled 103 men: 24 patients with KS and 79 healthy controls aged respectively mean (\pm SEM) 24 \pm 2 years and 27 \pm 1 years (p=0.07). KS patients were leaner than controls (BMI 22.5 \pm 1.1 vs. 24.8 \pm 0.4 kg/m²; p=0.027). Except one, none of the KS patients had personal fracture history. Nearly half of the patients had a regular sport activity (11; 46%). Surprisingly, only 36% of KS patients had low serum total testosterone (<10nmol/L). Relative appendicular lean mass was lower in KS than controls (7.5 \pm 1.3 vs. 8.9 \pm 1.0 kg/m²; p<0.001). Lumbar spine and total hip areal BMD were significantly lower in KS patients than controls with 0.949 \pm 0.02 vs. 1.076 \pm 0.02 g/cm² and 0.987 \pm 0.03 vs. 1.110 \pm 0.02 g/cm² respectively (p<0.001).

Furthermore, bone microarchitecture was severely and significantly impaired at the tibia with a significant decrease of BV/TV (p=0.02), cortical thickness (p<0.001) and all vBMD (total, cortical and trabecular; p \leq 0.002). In addition, cortical area was significantly decreased at both sites (tibia and radius) (p=0.008).

In young KS patients, naïve of androgen therapy, we observed lower areal and volumetric BMD and severely impaired trabecular and cortical bone microarchitecture at the weight-bearing distal tibia. Follow-up of bone microarchitecture of these patients under androgen therapy will be performed.

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PREVALENCE AND RISK FACTORS OF LOW BONE MINERAL DENSITY IN ANTIRETROVIRAL THERAPY-NAIVE HIV-INFECTED YOUNG MENJ. Paccou¹, N. Viget¹, E. Drumez¹, B. Cortet², O. Robineau¹¹Université Lille Nord-de-France, Lille, France, ²Department of Rheumatology, Lille University Hospital, Lille, France

Objectives: Patients with human immunodeficiency virus (HIV) infection have a higher risk of low bone mineral density (BMD) and fragility fracture, but little is known of these risks in antiretroviral therapy (ART)-naïve, HIV-infected young men. Our aim was to investigate prevalence of low BMD and factors associated with BMD levels in this population.

Methods: In this cross-sectional study, dual-energy x-ray absorptiometry (DXA) was used to measure BMD and for laboratory assessments. BMD at the lumbar spine, total hip and femoral neck was expressed as a Z-score (number of standard deviations away from the mean in an age-, race-, and sex-matched reference population). Low BMD was defined as Z-score ≤ -2 at any of the three sites. Prevalence of low BMD was evaluated, as were risk factors associated with BMD z-scores at the lumbar spine, total hip and femoral neck.

Results: The study cohort comprised 49 men, of which 87.8% were white. Mean age was 31.6 (± 7.7) years and mean BMI was 22.7 (± 4.0) kg/m². Half of the patients (51.0%) were current smokers. The prevalence of low BMD was 24.5% [95% CI, 13.3-38.9]. Low oestrogen levels and low BMI were associated with low BMD z-scores at each skeletal site, whereas current smoking and high IGF1 levels were associated with low BMD z-scores at lumbar spine. Among the HIV-related factors, low CD4+ cell count was associated with low BMD z-scores at the lumbar spine.

Conclusion: We found a high prevalence of low BMD in an ART-naïve cohort of young men. Risk factors associated with low BMD z-scores were those traditionally found in HIV individuals (low BMI, current smoking, and CD4+ cell count), or linked to endocrine hormone levels (estradiol, IGF-1).

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SHORT-TERM EFFECTS OF LOW DOSE GLUCOCORTICOID ON SERUM LEVELS OF BONE TURNOVER MARKERS AND WNT INHIBITORS IN EARLY RHEUMATOID ARTHRITISM. Vitiello¹, O. Viapiana¹, N. Malavolta², G. Saviola³, R. Bortolotti⁴, L. Idolazzi¹, F. Bertoldo¹, D. Gatti¹, M. Rossini¹¹Rheumatology Section, Department of Medicine, University of Verona, Verona, Italy, ²Rheumatology Unit, AOU of Bologna, Policlinico S. Orsola Malpighi, Department Cardio-Toraco-Vascolare Alma Mater Studiorum, Bologna, Italy, ³Rheumatology and Rehabilitation Unit, Salvatore Maugeri Foundation IRCCS, Castel Goffredo, Mantua, Italy, ⁴Rheumatology Unit, S. Chiara Hospital, Trento, Italy

Objectives: To evaluate changes in serum bone turnover markers and Wnt inhibitors at 7- and 30-days after initiation of low dose glucocorticoid (GC) treatment of early Rheumatoid Arthritis (RA).

Methods: 27 adult patients suffering from early RA were prospectively enrolled. Blood tests including C-Reactive Protein (CRP), amino-terminal propeptide of type 1 procollagen (P1NP, marker of bone formation), carboxyterminal telopeptide of type 1 collagen (CTX, marker of bone resorption), Sclerostin, and Dickkopf-related protein 1 (DKK1) were detected at baseline and 7 and 30 days after starting low dose of GC (methylprednisolone 4 mg/day).

Results: At baseline we observed a significant positive correlation between CRP and DKK1 serum levels ($r=0.63$; $p<0.05$) and between DKK1 and CTX serum levels ($r=0.38$; $p<0.05$). A significant decrease in serum levels of CRP, P1NP, and Sclerostin was observed after 7 and 30 days of GC treatment ($p<0.05$). About DKK1, it has been detected a not significant tendency to decrease after starting GC. CTX serum levels showed no significant changes.

Conclusions: This study has shown that a low dose GC treatment might have complex and conflicting short-term effects on bone metabolism in early RA (a reduction of bone formation, without increase of bone resorption), different from those observed with higher dose, in other diseases or in healthy subjects. The observed decrease in P1NP and Sclerostin serum levels might mean that also low dose of GC could acutely suppress bone formation and induce loss of function and/or number of osteocytes.

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17-BETA-ESTRADIOL PREVENTS OXIDATIVE STRESS-INDUCED APOPTOSIS IN OSTEOCYTES BY GSTP1-1 OVEREXPRESSIONV. Domazetovic¹, F. Fontani¹, G. Marcucci², T. Iantomasi¹, M. L. Brandi², M. T. Vincenzini¹¹Department of Biomedical Experimental and Clinical Sciences "Mario Serio", Biochemistry Section, University of Florence, Florence, Italy, ²Department of Surgery and Translational Medicine, Unit of Bone and Mineral Diseases, University of Florence, University Hospital, Florence, Italy

Objective: Estrogen plays an important role in bone growth and in regulating bone turnover in adult bone. Estrogen deficiency causes bone loss, increased oxidative stress and osteocyte apoptosis. This leads to increased bone turnover and resorption observed in osteoporosis in postmenopausal women (1). Previously, it has been demonstrated in osteocytes that starvation induced-apoptosis is related to reactive oxygen species (ROS) production, c-Jun N-terminal kinase (JNK) activity and alteration of factors involved in bone remodeling (2). The aim of this study was to

identify molecular mechanism by which 17β -Estradiol (17β -E2) prevents osteocyte apoptosis induced by oxidative stress.

Materials and Methods: A murine osteocyte-like cell line, MLO-Y4, was used to study starvation-induced apoptosis; ROS were measured by fluorimetric analysis; apoptosis by DNA fragments; expression of glutathione S-transferase P1-1 (GSTP1-1), caspase and JNK activation by western blot; GSTP1-1/JNK association by immunoprecipitation and immunoblots; GSTP1-1 involvement in 17β -E2 effect by siRNA transfection.

Results: 17β -E2 quickly prevents starvation-induced apoptosis, caspase and JNK activation related to oxidative stress in osteocytes, but it is not able to reduce ROS levels. Therefore, estrogen effect occurs through GSTP1-1 overexpression and the maintenance of GSTP1-1/JNK association thus inhibiting JNK activity. N-acetylcysteine also preserves JNK bounding to GSTP1-1, but this is due to its antioxidant action.

Conclusion: The data demonstrate that 17β -E2 is able to prevent osteocyte apoptosis by a non-redox-regulated mechanism involving GSTP1-1 overexpression and JNK activity inhibition. They suggest a possible role of GSTP1-1 in bone repair mechanisms.

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CORRELATION BETWEEN TRABECULAR BONE SCORE AND LOCALISATION AND NUMBER OF FRACTURES IN POSTMENOPAUSAL SERBIAN WOMEN

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Introduction: Osteoporosis is a disease characterized by low bone mineral density and impaired microarchitecture of bone tissue, leading to increased bone fragility and a consequent increase in fracture risk. Conceptual description of the disease puts into focus two important characteristics of bone: bone mineral density and quality, especially bone microarchitecture.

Aim: To investigate the correlation between Trabecular Bone Score (TBS) and Bone Mineral Density (BMD), localisation and number of fractures.

Methods: Cross-sectional study was conducted in Railway Healthcare Institute, Belgrade, in period Jan 1st- April 31, 2016. 250 postmenopausal women, aged 45-86 years, were included. Study included only those who were first time on BMD testing and never had treatment therapy for osteoporosis before. BMD was measured on Hologic Discovery C device, on lumbar spine and hip region. The vertebral fracture assessment was performed, and Th4-L4 region was analysed in aim to detect vertebral fractures on the same device. The lumbar spine scans were reanalysed in TBS iNsite[®] software (V1.9.2, Med-Imaps, France) and TBS was calculated. All the participants were previously tested using an epidemiological questionnaire.

Results: In relation to the existence of a small trauma fracture, the subjects are divided into two groups: with no previous fracture- 121 (48,4%) and group with fracture-129 (51,6%). Postmenopausal women with fractures have a higher percentage of osteoporosis measured on the lumbar spine (46.3% vs. 34.1%; $\chi^2=4.883$, $df=2$, $p=0.09$) according to DXA findings and totally degraded microarchitecture than women without fractures (85.1% vs. 45.7%; $\chi^2=43.10$, $df=2$, $p=0.00$). TBS is lower in women with a greater number of fractures ($F=12.4$, $p=0.00$), and the lowest values are in the group of participants with spine fractures ($F=14.28$, $p=0.00$). 93.2% of women with vertebral fracture have lowest values. There is a statistically significant positive correlation between BMD and T-score with TBS. All correlations are of medium intensity and statistically significant at $p < 0.0001$.

Conclusion: TBS is a useful adjunct in the evaluation of fracture risk. Combining the normal and osteopenic BMD values with the lowest range of TBS can help in defining a significant subset of non-osteoporotic women at higher risk of fracture which is useful in clinical practice and patient management.

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TREATMENT WITH NERIDRONATE IN ADULTS AND CHILDREN WITH OSTEOGENESIS IMPERFECTA: DATA FROM OPEN-LABEL, NOT CONTROLLED, THREE-YEAR ITALIAN STUDY

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Neridronate is an amino-bisphosphonate licensed in Italy for the treatment of osteogenesis imperfecta (OI). The aim of our study was to assess the long-term efficacy and safety of this treatment in patients with OI. The patients enrolled were divided by age into two groups: 55 patients younger than 20 years old (included) and 114 patients older than 20 years old.

Both groups were observed for 3 years. Neridronate was administered by i.v. infusion at the dosage of 2 mg/kg, up to a maximum of 100 mg at three-monthly intervals for three years. Dual X-ray absorptiometry of the lumbar spine and hip were evaluated every 6 months. Blood calcium, phosphate, albumin, fasting urinary calcium/creatinine ratio, urinary free-deoxypyridinoline and serum bone alkaline phosphatase were obtained at baseline and every 3 months.

The mean lumbar spine and total hip BMD significantly and progressively increased from baseline up to month 36 in both patients groups. The mean lumbar spine and total hip BMC significantly increased to any time point from baseline up to month 36 in both patients groups. The mean number of fractures observed in the 3 years of treatment was significantly lower than that observed in the 3 years before the start of treatment in both groups. Adverse drug reactions (ADRs) were reported in 31 patients (56.4%) younger than 20 years and in 29 patients (25.4%) older than 20 years. Most of AEs were symptoms of an acute phase reaction, which was reported in 47.3% of patients younger than 20 years and in 22.8% of those older than 20 years. Serious adverse events (SAEs) were reported in 19 patients (34.5%) younger than 20 years and in 26 patients (22.8%) aged older than 20 years. None of the reported SAEs in both groups was considered as treatment-related.

Long-term treatment with i.v. neridronate has positive effects on BMD, BMC, bone turnover markers and fracture risk with a good safety profile in both groups.

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DIETARY ANTIOXIDANT QUALITY SCORE (DAQS) AND HEEL BONE ULTRASOUND ATTENUATION IN YOUNG ADULTS

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Introduction: The intake of antioxidants could positively influence bone mass by preventing bone metabolism against oxidative stress. The aim of this study was to investigate the possible influence of Dietary Antioxidant Quality score (DAQs) on heel bone ultrasound attenuation in a population of young adults.

Methods: The study population comprised 605 young Spanish adults (median age 20.38±2.67). Bone mass was measured by heel quantitative ultrasound (QUS) to determine Broadband Ultrasound Attenuation (BUA, dB/MHz). DAQs was applied to calculate antioxidant nutrients intake. Linear regression analyses were performed to investigate the possible influence of DAQs on calcaneal QUS.

Results: Most of young adults showed a low-quality antioxidant intake (only 17.6% of women and 20.3% of men had a score of 4 or 5 in DAQs). A positive correlation between DAQs and BUA was observed in women ($r=0.117$; $p=0.024$). Linear regression analysis revealed that DAQs was significantly associated with BUA parameter in women after adjusting by body weight, height, calcium intake and physical activity ($p=0.035$). No significant associations between single antioxidant and calcaneus QUS measurement were found.

Conclusion: Our findings suggest that high-quality antioxidant intakes could influence bone health in young women. Future studies should further investigate the role of antioxidant nutrients against osteoporosis.

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ESTROGEN RECEPTOR 1 GENE POLYMORPHISMS AND HEEL BONE ULTRASOUND IN EARLY ADULTHOOD

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Introduction: Genetic factors are considered as determinant in several phenotypes relevant to the pathogenesis of osteoporosis including heel quantitative ultrasound (QUS) measurement. Different genetic variants in estrogen receptor 1 (*ESR1*) have been shown to influence bone phenotypes in later life. In order to identify genetic markers contributing to bone mass acquisition during adulthood, we aimed to investigate the role of *ESR1* polymorphisms in bone status assessed by heel QUS in a population of young adults.

Methods: The study sample consisted of 466 healthy subjects of Caucasian ancestry (315 females and 152 males) with a median age 20.39±2.70. Six *ESR1* polymorphisms (rs302033, rs2982552, rs2982575, rs2504063, rs2234693-*PvuII* and rs9340799-*XbaI*) were selected as genetic markers and genotyped using Open Array technology. Bone status was estimated in the right heel with QUS.

Results: In the unadjusted analysis, rs2982575 polymorphism was significantly associated with QUS parameter in the whole sample ($p=0.014$, β (95% CI)=-0.114 (-1.023, -0.115). However, after adjusting for multiple confounding factors (age, sex, weight, height, physical activity and calcium intake) this association did not remain significant. For the rest of the selected SNPs in *ESR1*, no significant association was observed with QUS parameter in the combined population as well as stratifying individuals according to gender.

Conclusion: Our findings revealed a lack of significant association between *ESR1* polymorphisms and heel quantitative

ultrasound in a cohort of young adults suggesting that *ESR1* gene do not play a major role in the acquisition of bone mass during early adulthood.

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PAIRWISE SNP-SNP INTERACTION INFLUENCING QUANTITATIVE HEEL ULTRASOUND IN EARLY ADULTHOOD

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Introduction: Osteoporosis is a complex disease determined by multiple genetic variants that interact with each other and with the environment modulating individual susceptibility. The aim of this study was to perform SNP-SNP interaction analyses in selected candidate genes influencing heel quantitative ultrasound (QUS) parameter in a population of young Caucasian adults to identify non additive effects and, potentially, novel insights into the mechanism of disease.

Methods: The study population comprised a total of 575 individuals (mean age 20.41; SD 2.36) whose bone status was assessed through QUS to determine broadband ultrasound attenuation (BUA, dB/MHz). Thirty-two SNPs were included as genetic markers on the basis of their previous association with QUS and/or bone mineral density (BMD) parameters. The association of all possible SNP pairs with QUS was assessed by linear regression and a SNP-SNP interaction was defined as a significant departure from additive effects.

Results: The pairwise SNP-SNP analysis revealed several significant interactions. The interaction involving SNPs rs9340799 and rs3736228 located in the *ESR1* and *LRP5* genes, respectively, showed the strongest association after adjusting for BMI, physical activity and calcium intake (p -value=0.001, β (95% CI)=14.289 (5.548, 23.029)). In addition, our model reported others such as *TMEM135-WNT16* (p =0.007, β (95%CI)=9.101 (2.498, 15.704)), *ESR1-MBL2/DKK1* (p =0.012, β (95%CI)=13.641 (2.959, 24.322)) or *OPG-LRP5* (p =0.012, β (95%CI)=8.724 (1.936, 15.512)).

Conclusion: Our findings provide new insights into the genetic architecture of QUS traits supporting for the first time that several SNP-SNP interactions, especially that between *ESR1* and *LRP5* genes, influence heel QUS in Caucasian young adults.

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REFERENCE VALUES FOR CALCANEAL BROADBAND ULTRASOUND ATTENUATION IN COLOMBIAN YOUTH: THE FUPRECOL STUDY

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Objective: Bone mineral density (BMD) reference values for children and adolescents have not been published for a Latin-American population. In this regard, the aim of this study was to establish a normal reference range of calcaneal broadband ultrasound attenuation (BUA) in Colombian children and adolescents with ages ranging from 9 to 17.9 years.

Material and Methods: A sample of 1001 healthy Colombian youth (boys $n=445$ and girls $n=556$), children, and adolescents (9-17.9 years old) participated in the study. A calcaneus QUS parameter (BUA) was obtained for boys and girls, stratified by age group. Furthermore, height, weight, fat mass percentage, and body mass index were measured. Centile smoothed curves for the third, tenth, 25th, 50th, 75th, 90th, and 97th percentiles were calculated using the LMS method (L [curve Box-Cox], M [curve median], and S [curve coefficient of variation]).

Results: Mean (\pm SD) values for the participants' anthropometric data were 12.9 \pm 2.3 years of age, 45.2 \pm 11.5 kg weight, 1.51 \pm 0.1 m height, 19.5 \pm 3.1 kg/m² BMI, and 69.5 \pm 17.1 dB/MHz BUA. Overall, all variables were significantly higher in boys except in BMI and body fat percentage. Girls generally had higher mean calcaneal BUA (dB/MHz) values than the boys, except in the age ranges 16 and 17.9, $p>0.05$. In addition, the BUA (dB/MHz) increased with age throughout childhood and adolescence and reached a plateau by age 15-17.9 for girls.

Conclusions: For the first time, our results provide sex- and age-specific BUA reference values for Colombian children and adolescents aged 9-17.9 years. A more specific set of reference values is useful for clinicians and researchers and informs clinical practice to monitor bone mineral status.

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DIAGNOSTIC ACCURACY OF SERUM BONE TURNOVER MARKERS TO DETECT BONE GAIN IN POSTMENOPAUSAL WOMEN TREATED WITH PROPHYLACTIC BISPHOSPHONATES

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Introduction: Osteocalcin (BGP), osteoprotegerin (OPG), bone-specific alkaline phosphatase (BALP), C-telopeptide crosslaps (CTX), tartrate-resistant acid phosphatase (TRAP), intact-parathyroid hormone (iPTH) and 25-hydroxyvitamin D (25[OH]D) play an important role in bone metabolism. Thus, the aim of this study was to investigate the diagnostic accuracy of these serum bone turnover markers to detect bone gain in a population of postmenopausal women treated with glucocorticoids (GCs) and prophylactic bisphosphonates.

Methods: A total of 71 postmenopausal women suffering different systemic autoimmune diseases treated with glucocorticoids (GCs) and prophylactic bisphosphonate in the Systemic Diseases Unit of the San Cecilio Hospital (Granada, Spain) were enrolled (mean age 56,1±16,1). Bone mineral density (BMD) measurements in lumbar spine (LS) and femoral neck (FN) were carried out at the beginning of the study and after 1 year. Serum levels of BGP, OPG, BALP, CTX, TRAP, iPTH and 25[OH]D were measured as bone turnover markers. Diagnostic accuracy was evaluated by Receiver operating characteristic (ROC) curve analysis.

Results: A total of 30 postmenopausal women (42%) showed an increment in LS BMD. Statistically significant lower levels of serum BALP ($p=0.02$), CTX ($p=0.02$), TRAP ($p=0.04$) were identified in this group in comparison with women who not presented increased LS-BMD. BALP (Area under curve (AUC)=0.655, $p=0.049$), CTX (AUC=0.661, $p=0.040$) and TRAP (AUC=0.716, $p=0.006$) demonstrated moderate diagnostic accuracy. Regarding FN, 25 patients (35%) showed bone gain. Compared with postmenopausal women who did not have an increase in FN-BMD, only serum level of CTX were observed to be statistically significant increased ($p=0.03$). CTX as molecular marker had low diagnostic accuracy (AUC=0.678, $p=0.028$)

Conclusion: Our findings suggest that baseline serum levels of BAP, CTX, and TRAP are not suitable to detect bone gain in postmenopausal women treated

with glucocorticoids (GCs) and prophylactic bisphosphonates.

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EFFICACY OF DENOSUMAB IN PATIENTS WITH STEROID INDUCED OSTEOPOROSIS WITH/ WITHOUT PRIOR TREATMENT WITH BIPHOSPHONATES

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Objectives: To assess the benefits of Denosumab as an antiresorptive treatment in patients with steroid-induced osteoporosis who received or not prior therapy with bisphosphonates.

Material and Methods: retrospective, descriptive, observational and follow-up study of patients with chronic glucocorticoids therapy and with secondary prophylaxis of steroid-induced osteoporosis with Denosumab that where attended in the Autoimmune Systemic Disease Unit of San Cecilio Hospital (Granada). We observed the variations in bone mineral density (BMD), femoral neck (FN) and lumbar spine (LS) during a period of one year. Also, in those patients treated previously with bisphosphonates, we compared the increase obtained with these facing Denosumab. The statistical analysis was performed using SPSS. The normality of the sample was verified using the Shapiro-Wilk test and comparison of continuous variables was performed using T-Student for paired samples.

Results: We included a total of 21 patients, 17 of them women with an average age of 61 years and all menopausal. After a year of therapy with Denosumab, there was an increase of BMD at lumbar spine and femoral neck in 76 and 85% respectively as reflected in table 1. On the other hand, 13 of the patients included had received prior therapy with bisphosphonates, 6 of them with annual densitometry after starting them. When compared the average percentage gained in annual densitometry for each therapy, Denosumab had a greater increase in BMD both LS (4,28 vs. - 1.10%) as FN (3.63 vs. - 1.6%) being statistically significant at FN ($p=0.024$).

Conclusion: We consider that Denosumab could be an effective alternative therapy in patients with steroid-induced osteoporosis who have poor response to classic treatments or who have any contraindications for the use of these.

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THE LEVEL OF MARKERS OF BONE DESTRUCTION IN THE SERUM IN NATIVE PEOPLE OF TRANSBAIKALYE OF RUSSIAN AND BURYAT NATIONALITIES

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Objective: To assess the level of C-terminal telopeptide and serum pyridinoline among native people of the region of Transbaikalye of Russian and Buryat nationalities.

Materials and methods: 58 women with OP were examined - 29 women of Russian nationality and 29 women of Buryat nationality aged between 50 and 80. 20 healthy women of the same age group were included in the control group. The level of pyridinoline and C-terminal telopeptide in the serum was determined by a standard laboratory kits "Biohommak".

Results: It was found out that the levels of pyridinoline were not significantly different in groups of women of Russian and Buryat nationalities suffering from OP: 1.9 [1.6, 2.6] nmol / l and 1.9 [1.6, 2] nmol / L, respectively ($p < 0.05$). Similar data were obtained on the level of C - terminal telopeptide: in the group of Russian people with OP the concentration was 0.49 [0.3; 0.6] ng / ml and in the group of Buryat people it was 0.5 [0.4; 0.8] ng / mL. The correlation analysis between the parameters studied and the indicators of a ten-year absolute risk of fractures was carried out to identify the relationship between the levels of markers of bone destruction. The direct correlation between the level of C-terminal telopeptide and HF ($R=0,42$, $p=0.025$) was established in the patients of Russian nationality. The direct relationship between the level of C-terminal telopeptide and MO ($R=0,37$, $p=0.04$) was established in the patients of Buryat nationality.

Conclusion: The level of bone resorption markers in serum did not differ in patients with OP and healthy people of both nationalities. The concentration of C-terminal telopeptide has a direct correlation with a high risk of hip fractures among the representatives of Russian nationality and the risk of any osteoporotic fractures (MO) in the women of Buryat nationality.

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THE EFFECT OF BISPHOSPHONATE ON THE TREATMENT RESPONSE TO TERIPARATIDE IN JAPANESE POPULATION

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Objective: The previous antiresorptive treatment may influence the response to teriparatide. The objective of this study is to determine the effect of prior bisphosphonate exposure on the treatment response to teriparatide (1-34 PTH) in Japanese population.

Materials and Methods: This is nonrandomized prospective study. 197 postmenopausal female patients completed the 24 months treatment with teriparatide. Over all changes in bone mineral density (BMD) were measured. BMD were measured every 6 months both in lumbar spine (L2-L4) and in femoral neck. Patients who had compression fracture of lumbar spine (L2-L4) or sever deformity were excluded from spinal BMD study. Patients were divided in two groups. Prior bisphosphonate group had more than 1year exposure to bisphosphonate ($n=88$). Bisphosphonate naïve group had no previous bisphosphonate exposure ($n=81$). Patients with less than a year of bisphosphonate exposure were excluded from this study ($n=28$). The response to teriparatide was compared using change rates of BMD from baseline. PINP was measured at 3 months and correlation between BMD increase was evaluated.

Result: The patient demographic showed no significant change between two groups. The overall change rate of BMD from baseline were 11.7% for lumbar spine and 4.6% for femoral neck. The change in spinal BMD was 9.3% and 14.6% ($p < 0.0001$) at 24 months, in the prior bisphosphonate group and bisphosphonate naïve group, respectively. The respective change in femoral neck BMD was 1.5% and 8.3% ($p < 0.0001$) at 24 months. PINP at 3 months had strong relation with femoral neck BMD increase.

Discussion: Middleton et al.¹⁾ reported that prior bisphosphonate exposure might suppress the treatment response to teriparatide. Our data clearly show that prior bisphosphonate exposures inhibit the increase of BMD both in spine and femoral neck compare to bisphosphonate naïve group.

Conclusion: Prior treatment with bisphosphonate prevented increases in both spinal and femoral neck BMD in Japanese population. We should consider using teriparatide prior to bisphosphonate if the osteoporosis is sever and patient is at risk for a fracture.

Reference: 1) Middleton et al. Calcif Tissue Int 2007;81:335

P578

ATYPICAL BILATERAL FEMORAL SHAFT FRACTURE IN PATIENT TREATED WITH BIPHOSPHONATES

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We report a patient with previous history of long-term bisphosphonate intake who suffered the fracture of both femurs consecutively. The radiological characteristics of both fractures

allowed to catalog a posteriori of atypical fractures associated with the prolonged treatment with bisphosphonates. After surgery, treatment with bisphosphonates was definitely suspended, initiating treatment with subcutaneous PTH 1-34. At 2 months of prosthetic replacement, assisted load support was restarted assisted by orthoses support in ischium, showing complete radiological consolidation at 4 months after surgery. Atypical fractures represent an entity of recent definition that in the last years have attracted considerable attention due to the publication of an increasing number of its clinical suspicion before they appear and the characteristics of this type of fractures to provide the most appropriate clinical and surgical treatment. This fractures are most commonly located in the proximal third of the femoral shaft and usually occur as a result of low energy trauma. It is essential to know the incidence in general population of these fractures in patients without osteoporosis who are not treated and untreated, so that studies to demonstrate this association are carried out. It is important to advise patient who uses these drugs about the possibility of this type of fracture, so that any pain in thigh or groin which may appear is reviewed. It is also important to highlight the potential association of contralateral fracture that will require study by the surgeon.

P579

BULLEYACONITINE A, AN ANALGESIC AND ANTI-INFLAMMATORY DRUGS, INHIBITS OSTEOCLAST FORMATION IN VITRO, TITANIUM-PARTICLE-INDUCED OSTEOLYSIS AND OVARIETOMY-INDUCED OSTEOPOROSIS IN VIVO VIA SUPPRESSING RANKL-INDUCED ACTIVATION OF NF-KB SIGNALING PATHWAYS

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Objectives: To explore the mechanism of bulleyaconitine A (BLA) inhibiting osteoclast differentiation and maturation.

Methods: In this study, the effects of BLA on osteoclast formation, bone resorption, osteoblast differentiation and mineralization were initially assessed in vitro, followed by further investigation on titanium-particle-induced osteolysis model and osteoporosis of ovariectomized rat model in vivo. To further explore the signaling pathways mediated by BLA during osteoclastogenesis, the effect of BLA on RANKL-activated NF- κ B signaling pathway was examined.

Results: (1) BLA inhibited RANKL-induced osteoclast differentiation, osteoclast-specific genes expression(CTSK, CTR, ACP5, V-ATPase-d2, V-ATPase-a3, NFATc1) and bone resorption in a concentration dependent manner without toxicity to BMMs, which was caused by suppressing the NF- κ B signaling pathway.

(2) BLA did not affect osteoblast differentiation(Alkaline phosphatase staining), mineralization(Alizarin red staining) and osteoblastic-specific genes expression (RUNX 2, COL, ALPI, Bglap, SPP1, Sparc) in vitro.(3) Titanium-particle-induced osteolysis and ovariectomy-induced osteoporosis were prevented by BLA in vivo.

Conclusions: These results demonstrated BLA effectively inhibited osteoclastogenesis without affecting osteoblast differentiation and mineralization, prevented titanium-particle-induced osteolysis and ovariectomy-induced osteoporosis in vivo.

P580

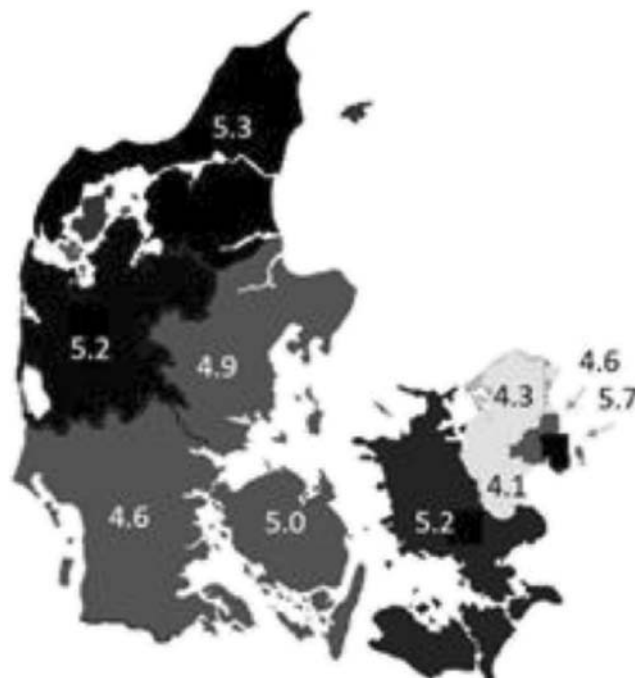
GEOGRAPHIC HETEROGENEITY IN HIP FRACTURE INCIDENCE IN DENMARK, A REGISTER-BASED NATIONAL STUDY ON SURGICALLY TREATED HIP FRACTURES

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Objective: To obtain information about any geographic variation in hip fracture rates between residents of urban and rural areas or privileged vs. more deprived areas of the country.

Methods: We used National Hospital Discharge data to determine the age and gender specific rates of surgically treated hip fractures (N=8,045, age 50+) for 2010 within each of ten areas of the country defined by the Eurostat ('NUTS' level 3 classification). Location was by residence not location of event.



Results: Standardized hip fracture rates (per 1,000 person years) for age 50+ for women (fig 1) ranged from 4.1 (E Zealand) and 4.3 (N Zealand) to 5.3 (N Jutland) and 5.7 (Inner Copenhagen), a difference of 40% between lowest and highest rate. For men, rates were 1.8 (E Zealand) to 2.7 (Inner Copenhagen), a difference of 50%. Low risk areas had the highest average personal income (N and E Zealand) while high risk areas, except Inner Copenhagen, had low average incomes (N Jutland and W Zealand).

Summary and conclusions: Considerable differences in hip fracture rates, which parallel socioeconomic differences, are present in Denmark despite a comprehensive universal national health service. While Inner Copenhagen had the highest hip fracture rates, rates were also high in predominantly rural areas with low family incomes such as W Zealand and N Jutland.

P581

THERAPEUTIC AFFECT: THE EFFECT OF ANTI-DEPRESSANT MEDICATIONS ON BONE HEALTH

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Objectives: Depression and antidepressant medications (ADTs) negatively affect bone health, but little is known of the relative impact of different ADTs. We aimed to establish the bone health implications of ADTs for elderly patients attending our osteoporosis clinic.

Materials and Method: We identified patients prescribed ADTs: Venlafaxine, citalopram, escitalopram, fluoxetine, sertraline, paroxetine, mirtazapine, duloxetine, amitriptyline, clomipramine, lofepramine, dothiepin and trimipramine. We compared them with a random control group not prescribed ADTs. We examined DXA bone mineral density (BMD) and T-scores, and fracture history.

Results: 1578 individuals: 522 on ADTs; 1056 control. Mean age 66.9 (SD 14.6); 79.2% female; mean BMD total hip 0.795g/cm² (SD 0.156); mean BMD spine 0.908g/cm² (SD 0.189). Patients on ADTs had significantly lower hip BMD than controls: BMD hip 0.025g/cm² lower in ADT group (SE 0.010, 95%CI 0.011–0.048, p<0.002), adjusted for age, gender, BMI. BMD spine did not differ significantly between groups (p=0.850). Those on ADTs had higher prevalence of hip fracture: OR 2.18 (95% CI 1.68–2.83, p<0.001). BMD hip was significantly lower in patients on ADTs who had never had hip fracture: BMD mean difference 0.121g/cm² (SE 0.017, 95%CI 0.087–0.154, p<0.001). There was significant variation in prevalence of hip osteoporosis between different ADTs, p<0.001, chi-squared test. Highest rates were in: mirtazapine, 50% (n=20); citalopram,

45.9% (n=109). Lowest rates in fluoxetine, 6.7% (n=30). OR for hip osteoporosis, comparing citalopram to fluoxetine, was 11.86 (95% CI 2.69–52.29, Pearson's chi-squared test p<0.001).

Conclusions: We confirmed in an elderly Irish population that ADTs are associated with lower BMD hip, and higher risk of hip fracture. While no single drug was clearly linked with reduced BMD or increased fracture, some evidence indicates that fluoxetine may be associated with a less-negative impact on bone health compared with other ADTs.

P582

THE ANTAGONISTIC EFFECT OF ESTROGEN AND IRON ON BIOLOGICAL ACTIVITY OF OSTEOBLASTS AND OSTEOCLASTS

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Objective: To understand the antagonistic effect of estrogen and iron on biological activity indicators of osteoblast and osteoclast, and to explore the role of reactive species and NF-κB signaling pathway in this progress.

Methods: 1, The primary osteoblasts were cultured in vitro. The experiment were divided into four groups treated as follows:(1) cells received with 10uM ferric ammonium citrate (FAC); (2) a group intervention using 10nM estradiol (E2); (3) E2 pretreatment and using the same concentration of FAC intervention; (4) a group of normal control. ALP staining and ALP activity were detected. The expression of gene were examined through q-PCR. 2, Cell line RAW264.7 was used for osteoclasts assay. Cells were divided into 4 groups as osteoblasts research. 10nM estradiol and 50μM FAC were used for intervention. Trap staining and resorption pit assay were examined. The expression of bone resorption gene were examined through q-PCR. Level of ROS in each group were tested using a multi-detection reader. Cytoplasmic and nuclear proteins of osteoclasts were extracted. Expression of nuclear proteins p50, p65, pp65, cytoplasmic proteins p50, p65, IκBα, pIκBα were measured with western blot analysis.

Results: 1, The level of ALP was significantly suppressed by FAC with or without estradiol (P<0.05), which was in correspondence with the consequences of ALP staining. Meanwhile, FAC could inhibit the gene expression of SP7, Runx2 in presence or absence of E2. 2, FAC could only stimulate osteoclasts differentiation in the absence of estradiol. Iron heightened trap positive cells number in the absence of E2, while there was no significant difference between FAC group and FAC+E2 group, which was in correspondence with the consequences of resorption pit

assay. FAC could stimulate the gene expression of Ctsk, Acp5, MMP9 and Calcr only in the absence of E2. Gene expression ratio of the optical density was positively correlated with active oxygen content. Western blot result: Pretreatment with E2 significantly suppressed the activation of p65 and p50, whereas phosphorylated I κ B α , p65, and p50 were increased in the presence of FAC.

Conclusion: Estrogen inhibits iron-induced osteopenia by eliminating ROS and suppressing the NF- κ B signaling pathway in osteoclasts. This inhibition seemed to be non-related with osteoblasts and bone formation.

P583

EVALUATION OF ALENDRONATE TREATMENT IN PATIENTS WITH ASEPTIC NECROSIS OF THE FEMORAL HEAD

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Objectives: Aseptic necrosis of the femoral head is a condition caused by partial or total interruption of blood supply, which ultimately leads to bone tissue necrosis. Responsible management therapy is either conservative (hygienic-dietary measures, lifestyle changes, wearing walking aids, physiotherapy, physical therapy, medication) or surgically – saving methods (drilling biopsy, bone grafts, osteotomies) or reconstructive (partial or total arthroplasties). The objective of our study was to assess the effectiveness of alendronate therapy in a group of patients diagnosed with this condition.

Material and Methods: The study, type single-blind, randomized, was carried out over the year 2016 (January-December 2016). It included 34 patients, aged between 23 and 62 years, diagnosed in evolutionary stages II and III (Ficat and Arlet), which were divided into two groups. Lot I- 16 patients (4 women and 12 men) who received conservative treatment and medication – alendronate; group II - 18 patients (5 women and 13 men) who received only conservative treatment. The two groups were evaluated clinically and paraclinical - laboratory tests, imaging techniques (Rx, CT, MRI), DXA test, initial and at completion of the study.

Results: After imaging evaluation, there were highlighted changes in the bone from the affected hip, in some cases also at the contralateral one, such as bone loss, increase of bone transparency and loss of trabecular structure. Comparing distributions of the two groups according to DXA test, we found for group I a statistically significant improvement (chi square=0.026 p <0.05), whereas in the case of group II, we observed that the differences were not significant (chi square=0.870 p > 0.05).

Conclusions: Imaging techniques are not as sensitive in detecting specific changes for osteoporosis in patients with aseptic necrosis of the femoral head, T score (DXA) is more useful, indicating the extent of the bone destruction fairly. We believe that treatment with alendronate in patients diagnosed with aseptic necrosis of the femoral head, regardless of age, can play an important role in slowing bone destruction from the affected area.

P584

INFLUENCE OF TOBACCO ON BONE QUALITY AMONG WOMEN LIVING IN LAUSANNE

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Objective: Tobacco influences negatively the bone health. Although many studies have shown that smokers have a lower bone mineral density (BMD) and a higher risk of fractures, studies investigating the effect of smoking on bone quality are rare. The aim of this study was to evaluate the impact of tobacco on bone quality as assessed indirectly by trabecular bone score (TBS) in the women from the OsteoLaus cohort.

Material and Methods: OsteoLaus is a population-based cohort of 1500 randomly selected Caucasian women (50 to 80 y old) living in Lausanne, Switzerland and followed every 2.5 years. Amongst other classical clinical factors for osteoporosis, women were asked about their smoking habits, and had both spine and hip BMD (by DXA) and spine bone texture measurements by TBS. For this study, we used baseline data. Participants were divided into smoker and nonsmoker (FRAX questionnaire). Differences between groups were assessed with adjustments for age, calcium and vitamin D intake and menopausal hormone therapy (MHT) exposition.

Results: Results: 1320 women were included (mean age 64.63±7.64 y, mean BMI 25.75±4.52). 1082 women were nonsmoker and 238 were smoker. No significant differences between the two groups were noted in spine BMD (0.912 vs. 0.925, p=0.17). However, significant differences were found between groups for femoral neck (0.721 vs. 0.729, p=0.02), total hip BMD (0.839 vs. 0.857, p<0.01) and TBS (1.354 vs. 1.365, p<0.01). Smoker had lower values than nonsmoker.

Conclusions: In this study, women who are smokers have a lower spine bone quality than women who are nonsmoker. For density, the femur is a better site than the spine to show the effect of tobacco. Otherwise, lumbar spine BMD increases with age due to increase of degenerative disorder. In

conclusion tobacco has an impact not only on bone quantity, but also on bone quality.

P585

THE IMPORTANCE OF DIAGNOSING HEART DISEASES IN ELDERLY PATIENTS WITH OSTEOARTHRITIS

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Objectives: Due to poor or atypical symptoms of heart disease in the elderly, at least a quarter of cases remain undiagnosed. Clinical syndromes of the elderly with mixed coronary pathology and osteoarticular become manifest weeks or months later, if complications arise that lead to new onset heart failure or when there are high oscillations in blood pressure. The objective of our study was the identification of all elderly patients diagnosed with osteoarthritis of various localisation and ischemic heart disease, hospitalized during a year in our clinic.

Material and Methods: The study was a prospective one and was conducted over a period of one year (January to December 2016). They were included in the study a total of 485 patients, aged between 60 and 75 years, diagnosed with osteoarthritis in different locations. Evaluation of patients was performed by clinical and laboratory (lab tests, imaging techniques-Rx, CT, MRI, ECG, Holter ECG for 24 or 48 hours, echocardiography), cardiology check-up.

Results: Following the clinical history, symptoms of ischemic cardiovascular diseases have been revealed in 117 elderly patients diagnosed with osteoarthritis, 34 men and 83 women. After performing an electrocardiogram and Holter ECG, we found that a number of 29 of the 34 men and 71 of 83 women who accused symptoms of ischemic heart disease were highlighted electrocardiographic changes. 9 men (26.4%) and 32 women (38.5%), patients who were explicit about the existence of specific symptoms, were tested by performing an electrocardiogram and echocardiography, changes that suggest the existence of a previous MI (myocardial infarction), which most of them did not notice at the time of occurrence.

Conclusions: Elderly patients with osteoarthritis generally have a sedentary lifestyle, with activity limitation due to manifestations of osteoarthritis and cannot perceive the onset of cardiovascular pathology. An extended clinical history, insisting on elements that could indicate the presence of disease, as well as conducting a thorough clinical and laboratory assessment are essential in the diagnosis, proper evaluation and management of these patients.

P586

COMPARISON OF RISK FRACTURE ASSESSED BY THE FRAX TOOL IN HIV-INFECTED PATIENTS FOLLOWED IN A SPANISH TERTIARY HOSPITAL REGARDING NON HIV-INFECTED SPANISH POPULATION

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Objective: To assess the bone mineral density (BMD) and 10-year fracture risk according to the World Health Organization (WHO) Fracture Risk Assessment Tool (FRAX) in patients with human immunodeficiency virus (HIV) infection followed in a tertiary hospital of Madrid and compare them with the ESOSVAL cohort, which included 11035 patients and is representative of the non-HIV population seen in Spanish tertiary hospitals.

Material and Methods: We performed a cross-sectional study in which FRAX values were determined in a prospective cohort that included patients with HIV infection seen in the Infectious Diseases Department of our center during the period from 2010 to 2015. Collected data included demography, comorbidities, treatment, risk factors required for the FRAX calculation and densitometric variables.

Results: 97 patients from a total of a total of 311 had bone densitometry data and FRAX assessment available and were included in this study. The mean age of the patients was 55.4 years (range: 50-80), 75 were men (77%), most of them were Caucasians (89%), with a mean body mass index of 24.2 (range: 15-32.7). The median time of HIV infection was 194 months (interquartile range [IQR]: 155.2- 259), the median nadir of CD4+ lymphocytes was 168 (IQR: 81-308) and concomitant hepatitis C virus infection was present in 40%. Among the risk factors included in FRAX calculation, 44% reported smoking, 10% inadequate alcohol consumption and 3% hyperthyroidism; there was no history of steroid therapy or previous fractures in any case and only one had a family history of hip fracture. The mean value of BMD in lumbar spine (LS) was 0.9 g/cm² (range: 0.83-0.99) and in femoral neck (FN) 0.74 g/cm² (range: 0.65-0.82). For the comparison with the ESOSVAL cohort the worst value of T-score in either LS or FN was chosen and the patients were classified according to WHO definitions (osteoporosis ≤ -2.5 , osteopenia -1 to -2.5); the results are presented in the table. Only the data for the 50-64 years group were compared because the number of older HIV patients in our center was small. No significant differences were found between the categories of osteopenia and osteoporosis in both genders, but there was a significant difference with respect to the risk of both major and hip fractures in males, being higher in patients with HIV infection compared to the population of the ESOSVAL cohort.



Conclusions: HIV-infected patients followed in our center do not show significant differences regarding the prevalence of osteopenia and osteoporosis compared to non-HIV Spanish population represented by the ESOSVAL cohort. However, the fracture risk estimated by FRAX is significantly higher in men with HIV infection probably due to a higher frequency of associated risk factors.

References:

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P587

SHORT-TERM FRACTURE (FX) INCIDENCE AND RISK FACTORS FOLLOWING FRACTURE IN A SWEDISH DATABASE STUDY

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Objectives: To report the incidence of subsequent Fx within 12 months (m) after a Fx in postmenopausal (PM) women, and identify associated risk factors.

Materials and Methods: Women ≥ 50 yrs with any type of Fx were identified from a Swedish national registry between 2006–2012; cumulative subsequent Fx incidence over 12m was determined. Potential baseline (1 yr before index Fx) risk factors were included in a risk-survival model (Fx as outcome; death as competing event).

Results: 242,108 women (mean age 74 yrs) were included. Fx type at baseline was: 21.4% hip; 6.2% spine; 72.3% non-hip/non-vertebral (NHNV). 16,145 subsequent Fx events were seen within 12m (cumulative incidence: 7.1% at 12m [95% CI: 6.9%–7.2%]). Risk factors for Fx within 12m are shown (Table).

Conclusions: Fx occurrence is a strong risk factor for subsequent Fx. Fx risk was high over the first 12m post Fx. Furthermore, vertebral Fx was associated with a twofold increase in Fx risk vs. NHNV Fx. Known risk factors for Fx, e.g. advanced age or steroid use, contribute to an increased Fx risk within 12m. Drugs influencing falls and multiple

comorbidities were also relevant risk factors. Attention to all such risk factors, most importantly advanced age, will assist in identifying PM women at short-term subsequent Fx risk.

| Fx risk factors <12m | Hazard ratio* |
|--|------------------|
| Age, yrs (vs 50–59) | |
| 60–69 | 1.4 [§] |
| 70–79 | 2.1 [§] |
| 80–89 | 3.1 [§] |
| 90+ | 3.3 [§] |
| Index Fx type (vs NHNV Fx) | |
| Hip | 0.8 [§] |
| Vertebral | 2.1 [§] |
| Osteoporosis treatment, yes/no [†] | 1.1 [†] |
| Glucocorticoids, yes/no [†] | 1.1 [§] |
| Dependency, yes/no | 1.1 [§] |
| Drugs that increase fall risk, yes/no [†] | 1.2 [§] |
| Comorbidities, yes/no | |
| Myocardial infarction | 1.1 |
| Congestive heart failure | 0.9 [†] |
| Peripheral vascular disease (dis) | 1.1 |
| Cerebrovascular dis | 1.1 [†] |
| Dementia | 1.1 [§] |
| Chronic pulmonary dis | 1.2 [§] |
| Rheumatic dis | 1.2 [†] |
| Peptic ulcer dis | 1.1 |
| Mild liver dis | 1.9 [§] |
| Moderate–severe liver dis | 1.0 |
| Diabetes - chronic complication | 1.1 |
| Diabetes + chronic complication | 1.1 |
| Hemiplegia/paraplegia | 1.0 |
| Renal dis | 1.1 [†] |

*multivariate model; [†]within last 12m; [†]p<0.01; [§]p<0.001

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BONE MINERAL DENSITY AND CAROTID ATHEROSCLEROSIS IN PATIENTS WITH DIABETES TYPE 2

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Objective: Osteoporosis and atherosclerosis are the two most common diseases in elderly individuals and are associated

with significant morbidity, mortality, and disability. Many epidemiological studies have shown that low bone mineral density (BMD) and atherosclerosis appear to be related. This association has been proposed to be explained by a number of biological mechanisms including similar processes of bone and vascular mineralization, osteoblastic differentiation by lipid oxidation, and shared risk factors including lifestyle factors, estrogen deficiency, and vitamin D receptor polymorphisms. Moreover, the connection between BMD and atherosclerosis is also controversial. The aim of this study was to examine the relationship between bone mass and carotid measurements in patients with diabetes type 2 (DT2).

Material and Methods: 250 patients both sexes with type 2 diabetes aged 55.87 ± 19.03 years were studied. Control group included 84 healthy subjects the same age. The definition of normal BMD, osteopenia, and osteoporosis was made according to the criteria of the WHO. Carotid intima media thickness (cIMT) and carotid plaque occurrence were determined by B-mode ultrasound and BMD by dual-energy X-ray absorptiometry. The plaques were measured in both common and internal carotid arteries.

Results: BMD of lumbar spine and cIMT were inversely associated in patients with DT2. The correlation was stronger in females than in males, and in females, the correlation was stronger after menopause. Patients with DT2, with carotid plaque had higher cIMT at low BMD than at normal BMD, $p=0.020$. Multiple linear regression analysis reveals that age ($p<0.001$), smoking ($p=0.001$), and osteoporosis ($p=0.007$) were significantly associated with increased cIMT. In women, cIMT was significantly related to age ($p=0.02$) and osteoporosis ($p=0.03$). In men, though there was no significant relationship, a trend toward old age and having osteoporosis was observed in increased cIMT ($p=0.054$, $p=0.058$).

Conclusion: We found inverse association between BMD and carotid measurements in diabetic patients. Diabetes type 2 patients, especially postmenopausal women, with decreased BMD may have a higher risk of developing coronary atherosclerosis.

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UPPER GASTROINTESTINAL SAFETY WITH THE BUFFERED SOLUTION OF ALENDRONATE 70 MG: POST-MARKETING EXPERIENCE

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Alendronate (ALN) and other bisphosphonates have been the mainstay in osteoporosis management and fracture prevention

for over 20 years. While ALN reduces risk of vertebral, non-vertebral and hip fractures by 55%, 64% and 47% respectively¹, adherence to treatment is problematic and >50% discontinue within 12 months^{2,3}. Upper gastrointestinal (GI) side effects are one of the most common reasons for treatment discontinuation⁴. ALN 70mg effervescent (ALN EX) was developed to improve the GI tolerability; it is ingested as a buffered solution of fully dissolved ALN to increase the pH in the stomach and to eliminate the contact of solid ALN with esophageal mucosa⁵.

Objective: To assess the impact of ALN EX on occurrence of upper GI adverse reactions (AR).

Materials and Methods: The post-marketing experience with ALN EX, launched in 2012, comprises of approximately 1,485,183 prescriptions, which translate into 123,765 patient years and 5,940,732 ingestions. Number of upper GI AR, descriptive of GI tolerability and associated with use ALN EX were extracted from the pharmacovigilance database.

Results: Three serious, erosive oesophagitis (1) and abdominal pain upper (2); and 28 non serious GI AR were reported. Among the non-serious AR were abdominal pain upper (4), GI pain (1), dyspepsia (2), dysphagia (1), nausea (4) and GI disorder (3).

Conclusion: The reported frequency of esophagitis with ALN Tablets is 0.1 – 1%⁶. Assuming the same frequency for ALN EX in the 123,765 patient years, at least 123 cases of oesophagitis would be expected. Even when considering that only 6-10% of all ARs are reported⁷ post-marketing, the number of ALN EX cases is appreciably below the level expected for ALN Tablets.

The available safety data suggest that ALN EX is associated with a lower frequency of upper GI AR than reported for ALN Tablets and that it is a well tolerated oral bisphosphonate option in the management of osteoporosis.

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P590

SKELETAL MUSCLE INDEX AND BONE VARIABLES IN A GROUP OF YOUNG OVERWEIGHT MEN

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Aim: The purpose of this study was to explore the relationships between skeletal muscle index (SMI) and bone variables (bone mineral content, bone mineral density, geometric indices of hip bone strength and trabecular bone score) in a group of young overweight men.

Methods: Forty young overweight (BMI > 25 kg/m²) men whose ages range from 18 to 32 years participated in this study. Weight and height were measured, and body mass index (BMI) was calculated. Body composition, bone mineral content (BMC) and bone mineral density (BMD) were measured by DXA. Appendicular skeletal mass (ASM, in kg) was calculated by summing the muscle masses of the four limbs, assuming that all non-fat and non-bone mass is skeletal muscle. SMI was defined as ASM/height². Lumbar spine trabecular bone score (TBS), femoral neck cross-sectional area (FN CSA) and femoral neck cross-sectional moment of inertia (FN CSMI) were also measured by DXA.

Results: SMI was positively correlated to whole body (WB) BMC (r=0.46; p <0.001), WB BMD (r=0.43; p <0.001), TBS (r=0.23; p <0.05), total hip (TH) BMD (r=0.34; p <0.001), FN BMD (r=0.37; p <0.001), FN CSA (r=0.46; p <0.001) and FN CSMI (r=0.39; p <0.001).

Conclusion: This study suggests that SMI is a positive determinant of bone strength parameters in young overweight men. Optimizing SMI in young overweight men may help to prevent osteoporosis later in life.

P591

LOW LEAN MASS AND THE SHORT-TERM FUNCTIONAL RECOVERY IN MEN FOLLOWING A FRAGILITY FRACTURE OF THE HIP: A PROSPECTIVE STUDY

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Objective: To assess the capability of different definitions of low appendicular lean mass (aLM) to predict the short-

term functional recovery in men with a fragility fracture of the hip.

Material and Methods: We investigated 80 of 95 men with a hip fracture admitted consecutively to our rehabilitation hospital. All the hip fractures were either spontaneous or due to minimal trauma (trauma equal to or less than a fall from a standing position). Body composition was assessed by dual-energy x-ray absorptiometry at a mean of 19.1 (SD 4.1) days after fracture occurrence and aLM was calculated as the sum of lean mass in arms and legs. Functional recovery at the end of post-acute inpatient rehabilitation was evaluated using Barthel Index scores.

Results: The patients with aLM above the FNIH cut-point of 19.75kg had significantly higher Barthel Index scores (p=0.002) and significantly higher age-adjusted odds of gaining a Barthel Index score ≥85 (odds ratio=7.17; 95% CI 1.43-35.94; p=0.017) than those with aLM below the cut-point. Conversely, patients' categorization according to either Baumgartner's cut-point (7.26kg/m²) for aLM/height² or FNIH cut-point (0.789) for aLM divided by body mass index (BMI) was not significantly associated with the Barthel Index scores.

Conclusions: Categorization according to the FNIH threshold for aLM, but not according to the FNIH threshold for aLM/BMI or Baumgartner's threshold for aLM/height², significantly predicted the short-term recovery in activities of daily living following a hip-fracture in men. The FNIH cut-point for aLM emerges as a valid threshold to discriminate the patients according to their functional recovery.

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RELATIONSHIP BETWEEN BONE MINERAL DENSITY AND ALCOHOL CONSUMPTION

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Objective: Alcohol is widely consumed across the world in different cultural and social settings. Most population-based studies have shown a positive association between alcohol and bone mass and no change or a decrease in fracture risk. It has been difficult to demonstrate alcohol-induced bone loss and increased fracture rate. The malnutrition, lack of exercise, hormonal changes are additional causative factors, which also contribute to the effects of alcohol consumption on bone and mineral metabolism.

The aim of this study is to evaluate the effect of alcohol intake on bone mineral density (BMD) and fracture risk.

Material and Methods: A cross-sectional study was performed including 137 men, aged 35-72 years. Alcohol intake

was determined by self-administered questionnaires, and BMD was measured by dual energy x-ray absorptiometry. ANOVA was used to determine the relationship between alcohol intake and BMD, and ANCOVA was performed after adjusting for age, body mass index, education, household income, smoking status, calcium intake and physical activity. Types of alcohol consumption differ between (a) light, only occasional consumption, (b) heavy chronic alcohol consumption, and (c) binge drinking.

Results: 34 men reported light, only occasional alcohol intake; 75 reported heavy chronic alcohol consumption, and 28 reported moderate to heavy intake in the year before baseline. A positive association between light alcohol consumption and BMD was shown, in contrast to the negative effect of binge drinking on BMD. Moderate alcohol consumption is not harmful to bone health and may even be beneficial. Beneficial effects do not appear to be mediated through an action on bone metabolism. Greater alcohol intake was not associated with greater risk for hip fractures. Men with heavy alcohol intake, but not patients with binge drinking, had a lower risk of two or more incident falls (heavy intake: relative risk (RR)=0,61, 95% confidence interval (CI)=0,58-0,89; binge drinking intake: RR=0,81, 95% CI=0,66-1,20) than patients with light alcohol intake.

Conclusions: Alcohol consumption is a risk factor for osteoporosis based on the frequent finding of a low bone mass and increased fracture incidence in alcoholics.

P593

OSTEOBLAST MENIN AND BONE MASS: STUDIES IN CONDITIONAL KNOCKOUT MICE

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Background: Menin, the product of the MEN1 tumor suppressor gene, facilitates cell proliferation control and differentiation. Our in vivo studies showed the importance of menin in the mature osteoblast and for maintenance of bone mass in adult mice. Objective: In the present study, we examined the in vivo role of menin at earlier stages of the osteoblast lineage through conditional knockout of the Men1 gene.

Materials and Methods: This was implemented through Cre-LoxP recombination at the level of the limb bud osteochondroprogenitor, osteoblast progenitor as well as the mature osteoblast. Prx1-Cre;Men1f/f, Osx-Cre;Men1f/f and OC-Cre;Men1f/f mice represent knockout of the Men1 gene in the mesenchymal stem cell, the preosteoblast and the mature osteoblast, respectively. Mice were analyzed at six months of age.

Results: Prx1-Cre;Men1f/f and Osx-Cre;Men1f/f mice were smaller than wild-type littermates whereas OC-Cre;Men1f/f

mice were of normal size. Femur lengths of Prx1-Cre;Men1f/f and Osx-Cre;Men1f/f mice were shorter whereas those of OC-Cre;Men1f/f mice were of normal length. Prx1-Cre;Men1f/f and Osx-Cre;Men1f/f mice had reduced bone mineral density by dual energy X-ray absorptiometry whereas that of OC-Cre;Men1f/f mice was normal. By 3-dimensional micro-computed tomography imaging of femur, all three strains of Men1 knockout mice had decreased trabecular bone volume with altered trabecular structure and decreased cortical bone thickness. In all strains of knockout mice trabecular number and spacing were decreased and increased, respectively. Primary calvarial osteoblasts of all strains of knockout mice relative to those of wild-type mice were deficient in mineralization and differentiation as assessed by Alizarin red, von Kossa and alkaline phosphatase staining, and had altered gene expression profiles. Osteoblasts from heterozygous (Cre;Men1+/f) mice were intermediate in this respect.

Conclusions: Menin plays a crucial role in the development as well as maintenance of bone mass. Haploinsufficiency of osteoblast menin may contribute to the more severe bone phenotype of the hyperparathyroidism of MEN1 relative to that of sporadic primary hyperparathyroidism. Menin is a potential gain-of-function therapeutic target for treatment of low bone mass disorders.

P594

FUNCTIONAL HYPOPARATHYROIDISM IN 257 HIP-FRACTURE WOMEN WITH SEVERE VITAMIN D DEFICIENCY: A CROSS-SECTIONAL STUDY OF A POORLY UNDERSTOOD CONDITION

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Objective: To investigate the factors associated with functional hypoparathyroidism, i.e., inappropriately normal levels of parathyroid hormone (PTH) despite severe vitamin D deficiency, in hip-fracture women.

Material and Methods: We studied 405 women who had serum 25-hydroxyvitamin D below 12ng/ml, 20.0±5.9 (mean±SD) days after a fragility fracture of the hip. PTH was assessed by a chemiluminescent immunometric assay, and bone mineral density (BMD) by dual-energy x-ray absorptiometry at the unfractured femoral neck.

Results: Two-hundred fifty-seven of the 405 women (63.5%; 95%CI 58.8%-68.2%) had inappropriately normal levels of PTH despite severe vitamin D deficiency, whereas the remaining 148 had secondary hyperparathyroidism. The women with functional hypoparathyroidism were younger (78.7±8.1yr vs.

82.4±6.7yr; mean difference 3.7yr; 95%CI 2.2-5.3yr; $p<0.001$), had higher estimated glomerular filtration rate (79.0±23.8ml/min vs. 69.1±21.1ml/min; mean difference 9.8ml/min; 95%CI 5.2-14.5ml/min; $p<0.001$), higher phosphate levels (3.7±0.6 mg/dl vs. 3.4±0.6 mg/dl; mean difference 0.3mg/dl; 95%CI 0.2-0.4mg/dl; $p<0.001$), and higher femoral bone mineral density (T-score -2.6±0.8 vs. T-score -2.9±0.9; mean difference 0.23; 95% CI 0.1-0.4; $p=0.010$) than those with secondary hyperparathyroidism. Conversely, we found no significant differences between the two groups of women in body mass index, albumin, albumin-adjusted calcium, 25-hydroxyvitamin D, and magnesium. At binary logistic regression, age, glomerular filtration rate and femoral BMD maintained a significant association with the PTH status.

Conclusions: Functional hypoparathyroidism is a highly prevalent condition in hip-fracture women. It is associated with higher femoral BMD than secondary hyperparathyroidism, despite similar vitamin D depletion and after adjustment for multiple potential confounders, including younger age and higher glomerular filtration rate.

P595

IS SYSTEMATICAL VITAMIN D SUPPLEMENTATION COULD BE POTENTIALLY USEFUL IN CASE OF DEFICIENCY

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The discovery of both vitamin D receptor expression and the ability to convert 25-hydroxyvitamin D [25(OH)D] to 1,25 dihydroxyvitamin D in immune cells identified a potential role for vitamin D in immunoregulation, in addition to its role in the muscular, endocrine and central nervous systems.

Case control and cohort studies have suggested that high vitamin D level were associated with a reduced risk of autoimmune diseases, type 2 diabetes, cardio-vascular diseases, irritable bowel syndrome, depression, cancers and infectious diseases. Nevertheless, during many years, multiple hypothesis concerning the effective contribution of vitamin D supplementation which is potentially different in supposed effects or effective impact of vitamin D deficiency, was probably modulated by an unavailable vitamin D measurement standardisation.

Resolving this situation requires excellence in measurement of serum total [25(OH)D] and the recognized standard for defining an individual's vitamin D status, even it could be useful to introduce a concept of different thresholds. To address this situation the vitamin D standardization program (VDSP) developed a reference measurement system based on gold standard procedures, in NIST and Ghent University, to standardize current and future research on this topic. VDSP also developed methodology for standardizing prior research. This standardisation may help to improve the determination of

the effect of vitamin D on osteoporosis and osteopenia, knowing that the identification of a correlation for osteoporosis and osteopenia in vitamin D deficiency patients may reduce the risk of osteoporosis related fractures and, may be, improve incidence of osteopenia. The level of [25(OH)D] fluctuates according to seasons, the reference ranges observed in "healthy" populations may be different in summer and winter. All experts agree that a threshold definition of vitamin D deficiency should be determined in relation to clinical outcomes, corresponding to a value below which a detriment for health could be expected. It is different whether we consider the general population or diseased patients. The synthesis of several recent studies does not conclude with high evidence to the usefulness of systematical vitamin D supplementation whatever the age. When taking in account the different parameters and the suspension of meta-analysis based on unstandardized [25(OH)D] results, additional studies are needed to define optimal treatment modalities, including dose, mode of administration and duration in each situation.

P596

DENOSUMAB FOR JUVENILE PAGET'S DISEASE: FIVE-YEAR RESULTS FROM TWO ADULT PATIENTS WITH "BALKAN" MUTATION IN THE TNFRSF11B GENE

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Objective: The 5-year effect of denosumab (Dmb) administration on bone turnover markers, pain, retina lesions and hearing loss in two adult patients with juvenile Paget's disease (JPD) due to homozygous "Balkan" mutation in the *TNFRSF11B* gene, resulting in defective osteoprotegerin.

Material and Methods: Patient #1 and #2, a 35-year woman and a 32-year man at baseline, were administered Dmb for 5 years. After a preparatory period, Dmb (30mg) was administered every 3 and 2 months in patient #1 and #2, respectively. Calcium and cholecalciferol administration were also administered as indicated. Total alkaline phosphatase (TSAP), bone-specific alkaline phosphatase (BSAP) and procollagen type I N-terminal peptide (PINP) were measured with ELISA. A 10-point visual analogue scale (VAS) was used to estimate bone and articular pain. Standard retinal and otological examination were performed annually.

Results: Despite initial fluctuation in patient #1, TSAP was normalized in both patients, being around the middle (50-70 U/l) of the reference range (25-120 U/l) for the last 2 and 3

years in patient #1 and #2, respectively. BSAP and PINP generally followed the same pattern as TSAP. VAS substantially improved in both patients (patient #1: 8-9 at baseline, 0-1 at year 1 and thereafter; patient #2: 7 at baseline, 2-3 at year 1 and thereafter). In parallel, the self-reported well-being and quality of life improved in both patients. The loss of hearing and the retinal lesions (angioid streaks) remained unchanged in both patients during the treatment. No adverse event, including hypocalcemia or secondary hyperparathyroidism, was observed during the 5-year treatment.

Conclusion: Low-dose Dmb every 2-3 months consistently normalized bone turnover and improved VAS and well-being in both patients with JPD. No deterioration was observed in hearing and retina lesions. Since recombinant osteoprotegerin is not commercially available, Dmb, acting on the same pathway as osteoprotegerin, seems to be an alternative therapeutic approach for JPD.

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P597

THE IMPACT OF REHABILITATION PROGRAM ON INCREASING QUALITY OF LIFE IN PATIENTS WITH LOW BACK PAIN

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Aim: The studies concerning the quality of life in patients with mechanical low back pain proved the impact of this condition on their daily living activities and on their social and professional life. The main purpose of this study was to evaluate the efficacy of complex rehabilitation treatment and its influence on the functional status and on the quality of life in patients with mechanical low back pain.

Material and Methods: The study included 138 patients with mechanical lumbar pain, mean age 41.52±11.63 years, randomised in function of the treatment in three lots: two control lots with medication (56 patients), respectively with kinesitherapy (41 patients) and a test lot with physical therapy and exercises (41 patients). All patients were evaluated clinical and functional at the initiation of the study, after 3 months, 6 months and one year.

Results: The efficacy of physical-kinetic treatment is reflected by statistically significant improvements ($p < 0.05$) of mean scores for the questionnaires for functional status- RMDQ (Roland-Morris Questionnaire) and for the quality of life- HAQ (Health Assessment Questionnaire), for lumbar pain evaluated on a visual analogue scale (VAS) and for spinal mobility (Schöber's test). RMDQ influence on HAQ

improvement is well above 50%; there is a correlation between indicators estimated as moderately high (0.8).

Conclusion: The improvement of the clinical and functional parameters has a significant impact on increasing the quality of life in patients with mechanical lumbar pain.

P598

POLYMORPHISM OF ESTROGEN RECEPTORS ALPHA GENE AND BONE MINERAL DENSITY IN WOMEN WITH CHRONIC KIDNEY DISEASE ON HEMODIALYSIS THERAPY

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Objective: The aim of the study was to analyze the influence of estrogen receptors alpha polymorphism on bone mineral density and risk of fractures in female patients receiving hemodialysis patients.

Materials and methods: To study gene polymorphism we used samples of DNA from lymphocytes nuclei of female patients with CKD on hemodialysis. The middle age of the patients was 43.7±12.5 years. The patients did not differ significantly by duration of hemodialysis. For polymorphism analysis we used 1 Ed Taq polymerases and 0.4 μM oligonucleotide primers. Zones of restriction for each endonucleases were signed as small letters (p, x), whereas the absence of restriction zones for each endonucleases was signed as capital letters P, X. The genotypes pp, Pp, PP were defined for endonuclease *PauII*, and xx, Xx, XX for endonuclease *XbaI*. The patients were classified as homozygous (pp, xx, PP, XX) and heterozygous (Pp, Xx). Bone mineral density was analyzed with dual energy absorptiometry in lumbar spine, hip, and arm.

Results: The prevalence of allele "X" in studied population was 30.2%, allele "x" – 69.8%. The prevalence of allele "P" was 39.5%, and "p" – 60.5%. Patients with genotype XX had higher BMD than patients with Xx and xx genotypes. Lowest BMD was revealed in patients with Xx genotype. In groups divided by alleles "p" and "P", the lowest BMD was revealed in patients with genotype "PP". We did not reveal the difference in the incidence of fractures in genotype groups.

Conclusion: Genotype "XX" and presence of allele "p" in female CKD patients was associated with the highest BMD. We did not find association of polymorphism of estrogen receptors alpha with fracture risk in studied population of hemodialysis patients

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BONE MINERAL DENSITY AT PATIENTS OF EARLY ONSET RHEUMATOID ARTHRITIS

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Objective: Rheumatoid arthritis (RA) is a chronic inflammatory and destructive joint disease that affects 0.5–1% of the world's population and commonly leads to significant disability and consequent impairment of quality of life. Osteoporosis is an early and common feature in RA and occurs during the course of the disease as extra articular manifestation of rheumatoid arthritis which may result in increased risk of fractures, morbidity and mortality. In this study we evaluated bone mineral density changes in patients with early onset rheumatoid arthritis.

Material and methods: We investigated 30 patients with early onset rheumatoid arthritis in Private Clinic "Rheuma". Bone mineral density of these patients measured at lumbar spine and hip by using dual energy x-ray absorptiometry scan (DXA-Stratos800). Demographic and clinical data were collected like age, gender, BMI, menstrual status, disease duration, erythrocyte sedimentation rate, vitamin D level, total calcium level, phosphorous, clinical disease activity index and seropositivity for rheumatoid arthritis was measured.

Results: A total of 30 patients fulfilling inclusion criteria were registered. Among the total number 21 patients or 70% were female, with mean age of patients 50.95 ± 7.87 years. Nine patients or 30% were male, with mean age 42.01 ± 11.01 years. Twelve or 40% had low bone mineral density. Low bone mineral density was found higher in female patients with 21 (70%) as compared to male patients 9 (30%), whereas higher low bone mineral density was found in 15 (71.4%) female patients that were in post-menopause stage.

Conclusion: Low BMD was found in patients at earlier stage of the rheumatoid arthritis with seropositivity, age and menopausal status as significant risk factors.

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ANTIDIABETIC MEDICATION USE AND THE RISK OF FRACTURE IN TYPE 2 DIABETIC PATIENTS: A NESTED CASE-CONTROL STUDY

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Background: Patients with type 2 diabetes mellitus (T2DM) have an increased risk of fragility fractures due to several factors, such as a greater risk of falling due to hypoglycaemia and/or impaired bone quality. Anti-diabetic oral agents and insulin may also impact on fracture risk. There is however scarce data available on the effect of such therapies combined as usually prescribed in real-life practice conditions.

Objectives: The objective of this study was to compare the risk of fracture among T2DM patients who are users of different antidiabetic treatments.

Methods: A nested case-control study was conducted using incident T2DM patients registered in computerised primary care records in the Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària (SIDIPAP) between 2006-2012, with follow-up available until end/2013.

Each case (incident fractures of the hip, spine, wrist, or proximal humerus in 2006-2013) was risk-set matched with five controls of the same gender, calendar year of T2DM diagnosis and age at index date (± 10 years). Study exposure included metformin mono-therapy (reference category), insulin monotherapy, and other antidiabetic medications (alone or in combination as prescribed in actual practice) in the 180 days before the index date. Conditional logistic regression analysis was used to estimate odds ratios and 95% confidence interval adjusting for the following confounders: age, gender, HbA1c level, body mass index, history of fracture, co-morbidities, and concomitant medication use.

Results: Data on 12,277 T2DM patients (2,049 cases and 10,2280 controls) was analysed. Insulin use was associated with increased fracture risk (adjusted OR 1.63 [95%CI 1.30-2.04]), as was the combination of metformin + sulphonylureas (adjusted OR 1.29 [1.07-1.56]). No significant association was found with other antidiabetic medications and/or combinations.

Discussion: Insulin and sulphonylureas use appear to be associated with an increased fracture risk when compared to metformin amongst recently diagnosed T2DM patients. Residual confounding cannot be ruled out, and more studies are needed to confirm these findings. Given their impact, risk of fracture should be taken into account in the management of T2DM patients.

P601**SLEEP DISORDERS ARE ASSOCIATED WITH TRABECULAR BONE SCORE AND OSTEOPOROTIC FRACTURE, NOT WITH BONE MINERAL DENSITY**

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Context: Sleep disorders and osteoporosis increase with age and are associated with high morbidity, mortality and economic burden. The prevalence of sleep-disordered breathing in Swiss women is 23% above 40 years and the remaining lifetime risk of osteoporotic (OP) fracture at 50 years is >50%. Poor sleep quality is associated with increased risk of fall and inconsistently with low bone mineral density (BMD), but the effect sizes were small and the mechanisms are unknown. Our study aimed to assess if sleep characteristics are associated with markers of bone health: BMD, microarchitecture assessed indirectly by trabecular bone score (TBS), and OP and non OP fractures.

Methods: OsteoLaus is a population-based cohort of 1500 randomly selected Caucasian women (50 to 80 y old) living in Lausanne, Switzerland. All women had lumbar spine BMD and TBS, hip BMD, vertebral fracture assessment, and questionnaire about OP and non OP fractures. A random selection of 660 women was included in the HypnoLaus Sleep cohort study and had a polysomnography. Total sleep time (TST), sleep onset latency (SOL), slow-wave sleep and rapid eye movement sleep (REM) quantity, apnoea-hypopnoea index (AHI), oxygen desaturation index (ODI) and sleep efficiency were evaluated.

Results: After adjustment, sleep parameters were not associated with BMD, AHI and ODI were inversely associated with TBS. All the results for fractures were adjusted for age, BMI and psychoactive drugs. Sleep onset latency was associated with OP fractures ($p < 0.001$). REM was associated with OP and non OP fractures ($p < 0.05$). We create a score of “sleep quality” including 6 parameters: total sleep time, sleep onset latency, slow-wave sleep, REM sleep, AHI, and sleep efficiency. This score was significantly lower only for women with prevalent OP fracture: women with OP fracture vs. women without fracture (-0.25 ± 0.09 vs. 0.05 ± 0.04 , $P < 0.03$).

Conclusion: Our study demonstrates for the first time that TBS is altered in women with high AHI or high ODI. We found however no relevant association between BMD and sleep characteristics. The sleep quality score was lower for women with OP fracture. Further studies are needed to: 1) explain how some sleep characteristics affect TBS; and 2) validate the score of “sleep quality” in other studies.

P602**BONE HEALTH INDEX IN BOYS AND ADOLESCENTS WITH KLINEFELTER SYNDROME**

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Background and objectives: Although adult men with Klinefelter syndrome are known to be at higher risk for osteoporosis, studies regarding bone status during childhood and adolescence are very rare. Therefore, the bone mineral status was evaluated retrospectively in pediatric KS patients at the level of the metacarpal bones of the left hand using an automated radiogrammetric method (BoneXpert).

Methods: In 19 (6 prepubertal) KS boys and adolescents bone age using the Greulich and Pyle method as well as the Bone Health Index (BHI), which describes bone mass as a function of the cortical thickness of three metacarpals and the metacarpal width and length, were calculated by the program from the most recent X ray of the left hand and wrist. The bone age was expressed as a z-score for gender and chronological age and BHI as z-score for gender bone age. Height and BMI z score were transformed into SDS values based on a reference data set for Flemish children.

Results: Median (range) age, body height SDS and BMI SDS were respectively 13.5 (4.8-16.8) years, 1.10(-1.32-2.28) and 0.70(-2.27-2.78). In total 8/13 KS adolescents had a high (> 15 mIU/L) FSH concentration and only 2 had a decreased testosterone concentration. Median (range) bone age SDS and BHI SDS were 0.04 (-1.92-2.67) and -0.64(-2.93-1.10). Overall, 6/19 KS patients had a low (z-score ≤ -1.0) bone mineral status. No significant correlations between BHI SDS and age, bone age, bone age sds, height sds and BMI sds and FSH were present in the studied population.

Conclusion: KS boys and adolescents have a slightly decreased bone mass, irrespective of pubertal and gonadal status, adiposity and tallness. Preventive measures as sufficient calcium and vitamin D intake should be encouraged in KS patients with a low bone mass.

P603**OSTEOPOROTIC HIP FRACTURES AND BENZODIAZEPINES**

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Objectives: To evaluate the excess risk posed by the use of benzodiazepines (BDZ) for osteoporotic hip fractures. To compare the clinical outcome during hospitalization of

patients with hip fractures treated with BDZ respect to those without this treatment.

Material and Methods: All patients who were admitted in the last year with hip fracture in the Hospital de León were included. We collected the following data: Age, sex, length of stay, death, surgical procedure, psychopharmacological treatment and total number of drugs. We defined as a patient with poor outcome who had one or more of the following criteria: Death, length of the stay over 20 days or failure to perform surgical procedure.

Results: The prevalence of BDZ among patients treated at a health center is 27.3% [1]. In our group of hip fractures was of 33.63%. We found a total of 559 patients, of whom 73.5% were women (N=411) and 26.5% men (N=148) and the mean age was 87.46 ± 5.41 years. The proportion of women taking BDZ was significantly higher than men ($p=0.047$). The proportion of death was not different ($p=0.77$) nor the length of the stay ($p=0.74$) in patients who were taking BDZ. We found a significant older age in the treatment group ($p=0.037$). Among patients with poor outcome we did not find a significantly higher proportion who received BDZ ($p=0.86$) although we identified as associated with poor outcome male sex ($p=0.0002$) and the total number of drugs patterned ($p=0.0004$). Age was not associated with poor outcome of the patients ($p=0.098$).

Conclusions: Consumption of BDZ is a risk factor for hip fractures. The use of BDZ is associated with female and older patients with hip fracture. The use of BDZ not raise the risk of death or poor outcome during hospitalization. Factors of poor outcome in hip fractures are male sex and the total number of patterned drugs.

P604

EFFECT OF TERIPARATIDE “OFF LICENSE” ON FRACTURE HEALING: A CASE REPORT

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Objective: We present a case report showing a potential use of Teriparatide as a coadjuvant on fracture healing.

Material and Methods: We present the case of a 81 year-old woman referred to our clinic following a right knee periprosthetic fracture. She underwent a total knee arthroplasty (TKA) 10 years prior and a further replacement with a constrained condylar knee prosthesis 4 years later. She presented a supracondylar femur fracture at the level of femoral stem and loosening signs on tibial and femoral components (Rorabeck and Taylor Classification, type III). Significant comorbidities were morbid obesity (BMI >45), hypertension and ischemic cardiopathy (3 stents placed in). Due to her high anesthetic risk, we decided to proceed with

a minor surgical osteosynthesis with a 3 tension band wiring through a minimal lateral approach instead of a prosthesis replacement. The administration of Teriparatide and a non weight-bearing protocol for a minimum of 3 months was the treatment initiated on early postoperative period. She did not have any postoperative complications.

Results: On consecutive radiological imaging check-ups we verified a complete healing of her fracture which resulted in pain resolution, a range of motion between 0-90° and the ability to self-sufficient deambulation supported by crutches. Teriparatide treatment was maintained for another 24 months and currently she is taking Denosumab every 6 months without suffering any other fracture.

Conclusion: Teriparatide is a recombinant formulation of endogenous PTH. Although the main indication of Teriparatide is to act as an anti-osteoporotic drug, a systematic review of the literature reveals several reports of its applicability in fractures, non-union and pseudoarthrosis because it may enhance osteogenesis. Even though these hypotheses seem very hopeful, further studies are needed in order to support its beneficial effects as an adjuvant therapy to promote fracture healing since its use is not licensed for that purpose yet. Due to the medical history of our patient and because the surgical procedure (prosthetic replacement and osteosynthesis) was not free of potential and severe complications, we did choose to use Teriparatide for this goal.

P605

BILATERAL HIP PAIN AFTER INNOCENT FALL

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Objective: The main goal of this case report is to show an unusual combination of two common fractures.

Material and Methods: 87 year-old woman. Hypertension, hypothyroidism and atrial fibrillation treated with apixaban were the comorbidities presented in her medical history. She was sent to the emergency services due to severe disabling bilateral coxalgia following a fortuitous fall in the street. The X-ray study confirmed that there was a bilateral pertrochanteric fracture.

Results: Due to the severity of her injuries, we performed a surgical fixation with trochanteric intramedullary nails right after anticoagulation therapy was antagonized for 48 hours. During postoperative period she suffered an upper gastrointestinal bleeding episode which required treatment by the Internal Medicine Service that consisted in drug therapy and a packed red blood cells transfusion. By the time she was discharged, we prescribed her a treatment based on Denosumab every 6 months, supplemented with calcium plus D vitamin. At her 3-month check-up both clinical and

radiological evolution of her injuries was good, and the fractures were consolidated. Nowadays she is able to walk painlessly aided by a cane (Barthel=70, Holden=3). She has not suffered any additional fractures to date.

Conclusion: Bilateral extracapsular hip fractures following a low energy trauma are extremely unusual in elderly. After reviewing the literature to date, we found that there are only a few cases like ours reported. It's related with younger people following high energy trauma, due to malignancy complications or secondary to seizures. These type on injuries are usually the result of a concomitant rotation force applied over a baseline «insufficient» bone, meaning “insufficient” as a bone with abnormal baseline quality because of reduced elastic compliance. Typically, surgical fixation is the procedure used to manage these injuries. Also, it is strongly recommended a multidisciplinary approach in order to minimize anesthetics and surgical risks and to reach the best postoperative outcomes. Since these fractures are frequently associated with bone fragility, drug therapy is highly recommended. In our case, we chose denosumab due to its tolerance threshold, its therapeutic compliance profile and its lower risk of vertebral and non-vertebral fractures (including hip fractures) in postmenopausal women.

P606

A NEW PERSPECTIVE FOR THE DIAGNOSIS OF PERIPROSTHETIC INFECTION

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Objective: To assess usefulness of newer biomarkers for earlier diagnosis of periprosthetic infection.

Material and Methods: Between May 2015 and October 2016, we have used alpha-defensin screening test during in 18 cases of painful prosthesis without any apparent reason. The test was implemented in cases where infection findings were objectively absent following laboratory study (reactive C protein [RCP] and erythrocyte sedimentation rate [ESR]), microbiological culture and/or disorders on x-ray or bone scan examination. Our study included 10 female and 8 male patients, age from 48 to 81 years (mean=67.4 ys). Time from surgery ranged from 22 months to 19 years (mean=10.3 ys), including 11 total knee arthroplasty (TKA) and 7 total hip arthroplasty (THA). Screening involved to obtain synovial fluid samples through standard knee arthrocentesis and X-ray guided hip arthrocentesis, assessing the findings based upon a marketed ELISA-like test where alpha-defensin, acting as an antigen, binds to an specific antibody, resulting in a colorimetric reaction and allowing its diagnostic performance.

Results: 10 positive results were obtained (5 TKA and 5 THA). These cases were treated surgically with a two-stage

exchange. Diagnostic microbiology yielded positive results within the 10 samples following sonication and intraoperative biopsy (Sensitivity=100%). A conservative approach was chosen in the 8 remaining patients (6 TKA and 2 THA). Their clinical manifestations improved in all of them at follow-up 3 months later, except in one case of TKA. This later patient was underwent to surgical examination, resulting in positive microbiological infection after surgical samples were analyzed (Specificity=87.5%).

Conclusions: Diagnosis of periprosthetic infection may be challenging, especially in chronic cases with minimal manifestations and findings on laboratory data, because neither a gold standard has not been reached yet. Recently, some authors suggested several laboratory assays, such as measurement of RCP and other biomarkers at synovial fluid, or serum levels of procalcitonin and interleukin-6. The alpha-defensin protein is a peptide released from neutrophils when exposed to a pathogen organism. The mere fact that their synovial levels are unaffected with antibiotherapy neither other inflammatory factors makes alpha-defensin a promising target as a biomarker of joint infection. Based upon our limited data, we may conclude that alpha-defensin test may be a useful tool to aid an earlier diagnosis of this type of infection.

P607

PERIPROSTHETIC HIP INFECTION CAUSED BY LISTERIA MONOCYTOGENES: A CASE REPORT

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Objective: The main purpose of this case is to show a periprosthetic infection caused by an unusual pathogen.

Material and Methods: A 79-year-old man was admitted referring a clinical picture of pain associated with inflammatory signs on his right thigh. The patient's medical history included hypertension, and chronic liver disease due to an hepatitis C virus infection caused by a blood transfusion after a hip fracture surgery 30 years treated with a total hip arthroplasty. Several complications appeared on the next years and required to perform an exchange of acetabular component 7 years ago and a new implant 2 years later with a constrained acetabular component due to prosthetic instability. A study was ordered with x-ray and bone scan, which documented the diagnosis of septic loosening of his hip arthroplasty, with a massive bone stock loss involving the greater trochanter and proximal femur (Paprosky IIIa).

Results: In light of the diagnosis of chronic total hip arthroplasty infection, we decided an approach with a two-stage exchange arthroplasty, with antibiotic loaded cement (ALC) in the form of spacer at the first stage. Sonication of removed prosthesis suggested a diagnosis result compatible

with *Listeria Monocytogenes* infection. Based on results of culture and sensitivity tests, a 6 weeks of intravenous Ampicillin course was instated until acute phase reactants were completely normalized. After antibiotic therapy was completed, the patient underwent to a definitive surgical treatment with a cemented double mobility acetabular implant and distal locked modular stem. Postoperative period was unremarkable and nowadays our patient is painless, with a good functional capability and just need a walking cane as assistance.

Conclusions: *Listeria monocytogenes* is a gram-positive anaerobic bacterium. Manifestations of listeriosis are rich and varied, specially gastrointestinal and neurological, and exceptionally bone and joint involvement. Periprosthetic infection by *Listeria monocytogenes* was not described until 1990, and from that time there has been only 34 cases reported on literature in a French study and 50 cases reported overall. This type of infection is related to advanced age (>60 years), implants and immunocompromised states (diabetes, malignancies, steroids therapy, rheumatic diseases, etc.). Usually is a food-borne illness. Clinical manifestations associated joint involvement are insidious, with minimal impact on laboratory results, which is compatible with chronic infections that can be spread through blood. Even though available information is limited, a consensus have been reached recommending removing all the implants (otherwise recurrence >40%) and intravenous antibiotic therapy with ampicillin or penicillin extended, at least 6 weeks, trying to reach the healing. In our case we could highlighted the absence of any infectious risk factors to develop his joint involvement due to listeriosis and that clinical manifestations were more aggressive than usual.

P608

CHOLESTEROL LEVEL IN SERUM AND OSTEOPOROSIS

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Background: Most of the current therapies available for its treatment are limited to the prevention or slowing down of bone loss rather than enhancing bone formation. Discovery of statins as bone anabolic agents has spurred a great interest among both basic and clinical bone researchers. In-vitro and some animal studies suggest that statins increase the bone mass by enhancing bone morphogenetic protein-2 mediated

osteoblast expression. Dose optimization and/or discovery of bone-specific statins or their bone-targeted delivery offers great potential in the treatment of osteoporosis.

Objective: The aim of this paper is to present the problems of osteoporosis as a result of hormone imbalance in climacteric women and to determine the frequency of increased values of cholesterol and osteoporosis.

Methods: dealt with 88 patients, of whom 61 suffered from osteoporosis-study group. The control group makes 27 patients. Determination of bone density in all patients was done in the way of the. osteodensitometry Testing of the lipidograms was done by painted enzyme reaction.

Results: Listened was 88 postmenopausal women on combined therapy and the result were compared with subjects who were only HRT. BMD was significantly higher in the group with combined therapy. This study has shown that statins can improve the effects of estrogen on bone density. We analyzed in our study the effect of statin on biochemical markers of bone metabolism, depending on age of the postmenopausal women and our study suggest a positive effect of statin on bone turnover in older patients.

Conclusion: We found a strong association between the reduction of fractures and BMD patients who were on treatment by statin and a very small effect of statin on markers of bone remodeling.

P609

ANTI-RESORPTIVE THERAPY COMPROMISES BONE'S MATERIAL COMPOSITION PREDISPOSING TO ATYPICAL FEMORAL FRACTURES

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Background: Antiresorptive therapies slow bone remodeling and thereby slow microstructural deterioration. However, the less often renewed bone matrix may accumulate microcracks and undergo more complete mineralization facilitating microcrack propagation. We hypothesized that treated women with atypical femoral fractures (AFFs) are distinguished from similarly treated women without AFFs by having less deteriorated microstructure and higher matrix mineral density (MMD).

Methods: Distal radial cortical porosity and MMD were measured using high resolution peripheral computed tomography

in 342 healthy pre- and 55 healthy postmenopausal women and 109 women treated with antiresorptives; 49 with AFFs, 29 with incident typical fragility fractures and 31 remaining fracture free. Deterioration in porosity and MMD was quantified using Strax1.0 and expressed as a Material Fragility Score (MFS). Results were expressed as standardized deviations scores relative to the young normal mean (SD) \pm sem and odds ratios (OR with 95% confidence intervals (CI).

Results: There was an inverse association between cortical porosity and matrix mineral density in healthy women and in women treated with antiresorptives without AFF. Women with AFFs had 0.88 ± 0.26 SD ($p < 0.0001$) lower cortical porosity but 0.68 ± 0.17 SD higher matrix mineral density than treated women without AFF ($p < 0.0001$); features captured in the MFS which distinguished treated women with AFF from treated women without AFF [OR=5.7, 95%CI 2.5-12.9, $P < 0.0001$, sensitivity 77.4%, specificity 65.4%] and from untreated women [OR=7.5, 95%CI 3.1-18.2, $P < 0.0001$, sensitivity 80%, specificity 65.3%].

Conclusion: High porosity and high matrix mineral density captured using a material fragility score identifies women at risk for AFF. High porosity and low matrix mineral density may identify women at risk for typical fragility fractures; a distinction that may assist in targeting therapy.

Disclosures: R Zebaze has received research support from Amgen, speaker fees from AMD and is one of the inventors of the StrAx1.0 algorithm. A Ghasem-Zadeh is one of the inventors of the StrAx1.0 algorithm. Y. Peng is the StraxCorp employee. E Seeman has received research support and lectured at national and international meetings funded by from Allergan, Amgen, Asahi pharmaceuticals, Eli Lilly, and MSD; is a director of the board, remunerated as Chief Medical Officer, shareholder in StraxCorp, and is one of the inventors of the StrAx1.0 algorithm.

P610

TBS AND BMD ASSESSMENT IN WOMEN WITH SHORT STATURE

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Objective: Areal bone mineral density (aBMD) by dual X-ray absorptiometry (DXA) is influenced by bone size such that true BMD is underestimated on smaller bones and

overestimated on larger bones. Trabecular bone score (TBS), a gray-level texture measure derived from lumbar spine (LS) DXA image, appears to be independent of bone size. We aimed to assess TBS in a group of women > 50 years with short stature, compared to a control group.

Material and Methods: We retrospectively analyzed LS DXA scans of all women aged 50 to 90 years old with short stature (<144 cm in height), from a single center as part of their clinical routine care, between 2006 and 2016. The control group comprised of women > 161cm in height, selected from the same database and matched to the case group for age and LS BMD. Patients with a body mass index (BMI) outside of 15 - 37 kg/m² range, and those with artifacts at the LS that precluded image analyses were excluded. Site-matched LS TBS was extracted from the DXA image (GE-Lunar Prodigy Advance #41985 software Encore 9.3v) using the TBS iNsite software v2.1. Rede Mater Dei Ethics committee approval CAAE 56045216.0.0000.5128. No conflicts of interest to declare.

Results: The study population included 346 women (173 per group). Cases and controls were matched for age (69.8 ± 8.7 vs. 69.8 ± 8.5 yrs; $p=0.9$), LS BMD (0.992 ± 0.155 vs. 0.990 ± 0.160 g/cm²; $p=0.8$), and LS BMD T-score (-1.6 ± 1.3 vs. -1.6 ± 1.3 ; $p=0.9$). Cases had a lower height (141 ± 2 vs. 165 ± 3 cm; $p < 0.0001$) and body weight (55 ± 8 and 71 ± 12 kg; $p < 0.0001$) than controls, but greater BMI (27.4 ± 4.2 vs. 26.3 ± 4.2 kg/m²; $p=0.013$). Despite the comparable LS BMD between both groups, TBS was greater on cases group than in controls' (1.347 ± 0.102 vs. 1.248 ± 0.111 ; $p < 0.0001$). A total of 97 women (47 cases) had a LS BMD T-score in the osteoporotic range. In this subgroup of subjects; age, LS BMD, and BMI were comparable between cases and controls, but TBS was greater in women with short stature (1.298 ± 0.102) than in taller women (1.184 ± 0.111 ; $p < 0.0001$). Remarkably, 34% of patients with short stature had a normal TBS (>1.350), despite being considered osteoporotic by BMD T-score. In contrast, none of the women with osteoporosis in the control group had a TBS > 1.350.

Conclusion: TBS is greater in women with short stature than in their taller counterparts. These findings suggest that TBS may offer advantages over aBMD alone to assist treatment decisions on individuals with smaller bones.

P611

PRELIMINARY RESULTS OF AN ONGOING STUDY OF CONCOMITANT TREATMENT WITH TERIPARATIDE AND ZOLENDRONIC ACID IN SEVERE OSTEOPOROSIS

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Objective: To describe preliminary results of a long term ongoing study of concomitant treatment of teriparatide and

zoledronic acid in the treatment of severe osteoporosis in Indian patients

Material and method: In this prospective, observational study planned for four years, we enrolled patients between 60 to 80 years with severe osteoporosis defined as T score more than -3 and bone mineral density (BMD) less than 0.5 g/cm². Injection teriparatide and zoledronic acid were given concomitantly to all enrolled patients. Teriparatide was given in the dose of 20 mcg subcutaneously daily. Dose of zoledronic acid was 5 mg every year. Vitamin D, calcium and protein supplements were added as required. Efficacy of concomitant treatment was evaluated by calculating percentage of patients reporting improvement in activity of daily living (ADL) whereas safety was evaluated by recording adverse events.

Results: A total of 336 patients [female 226 (67.3%); male 110 (32.7%)] were enrolled in this study. The indications for giving study treatment included glucocorticoid associated osteoporosis, impending hip fracture, loosening of hip implant and poor result of anti-resorptive treatment given alone. Of the enrolled patients 220 (65.5%) have completed the study of four years while 100 (29.8%) patients are still under study treatment. A total of 16 (4.8%) patients dropped out from the study. Out of all completed patients, 90% reported improvement in activity of daily living (ADL) whereas 10% were not sure about the improvement. However, no patients reported deterioration in ADL. A total of six (1.8%) patients had hip fracture which needs to be operated. No serious adverse event or complication was reported in this study.

Conclusion: Preliminary results of our ongoing study show that concomitant administration of teriparatide and zoledronic acid along with routine treatment of calcium and vitamin D is effective and well tolerated in patients with severe osteoporosis.

P612

CHANGE IN BONE MINERAL DENSITY (BMD) OR BONE TURNOVER MARKERS (BTM) DID NOT PREDICT RISK OF VERTEBRAL FRACTURE AFTER DISCONTINUATION OF ALENDRONATE IN THE FLEX STUDY

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Objectives: There are few data to guide clinical decision making after stopping bisphosphonates (BPs) for a drug holiday. We have previously shown that 1 or 3 year change in BMD or BTM after stopping alendronate (ALN) did not predict clinical fracture risk, but whether they predict vertebral fracture (VF)

risk is uncertain. We examined this question in the FIT Long term extension Trial (FLEX) study.

Material and Methods: In FLEX, after 5 years of alendronate during FIT, women were re-randomized to 5 more years of ALN or to placebo and followed for 5 years. We studied only the placebo group. The association of 1 and 3 year change in hip BMD or BTM (serum Bone ALP and urine NTX) were examined as predictors of any incident VF (morphometric or clinical) over 5 years. Multivariate logistic regression was used to adjust for confounders (age and prevalent fracture at ALN discontinuation).

Results: Following 5 years of ALN there were a total of 15 incident VF among 437 placebo women (13%). BMD, prevalent VF and age at the time of stopping significantly predicted incident VF risk after stopping (p<0.05). One or three-year change in either BMD or BTM after ALN discontinuation did not significantly predict 5-year risk of VF. For example, one-year% change in total BMD was not significantly associated with risk of incident VF (OR=1.1 per 1% decrease, p=0.11).

Conclusions: Follow-up measurements of BMD or BTM after 1 or 3 years of BP discontinuation are not associated with vertebral fracture risk after adjusting for baseline measurements, prevalent vertebral fractures and age. This is similar to previous results for clinical fractures. These results suggest that these follow-up measurements are of little clinical utility during a drug holiday after 5 years of ALN.

P613

THE IMPACT OF SARCOPENIA ON THE RESULTS OF LUMBAR SPINAL SURGERY

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Objective: The purpose of this study was to investigate the prevalence of sarcopenia and to evaluate the impact of sarcopenia on the results of lumbar spinal surgery.

Materials and Methods: This study included two groups: one group consisted of patients with lumbar spinal disease (LSD group) and a second group consisted of patients without (control group). 1:1 propensity score-based matching was performed. Sarcopenia was diagnosed when the appendicular skeletal muscle mass index by Dual energy X-ray absorptiometry was ≤ 7.0 kg/m² for male patients and ≤ 5.4 kg/m² for female patients. In order to evaluate the impact of sarcopenia on the clinical outcome of lumbar spinal surgery, the Japanese Orthopaedic Association (JOA) score, the recovery rate based on the JOA score, and Visual Analogue Scale (VAS) score were compared within the LSD group.

Results: 54 matched pairs without residual significant differences were created. The prevalence of sarcopenia showed no statistical difference between groups (LSD group 38.9%,

control group 53.7%). In the LSD group, while VAS score showed no statistical difference between the sarcopenia subgroup and non-sarcopenia subgroup, the sarcopenia subgroup demonstrated inferior results for the JOA score and recovery rate at final follow-up when compared with the non-sarcopenia subgroup ($p < 0.05$).

Discussion: This study demonstrated high prevalence of sarcopenia among Japanese populations and its negative effect on clinical outcomes after lumbar spinal surgery.

P614

OSTEOCALCIN AND PROCOLLAGEN-3 N-TERMINAL PEPTIDE LEVELS IN NON-FUNCTIONAL ADRENAL ADENOMA

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Aim: The etiology and underlying pathology of non-functional adrenal adenoma has not been clearly defined, yet. The percentage of adrenal adenoma that became functional is still unclear, furthermore what triggers the acquisition of functionality is not yet fully defined. Bone formation marker including osteocalcin and procollagen-3 N-terminal peptide (P3NP) is not evaluated in adrenal adenoma. In various liver disease P3NP has been obtained to be higher. Additionally, in the liver disease with fibrosis, P3NP is the predominantly molecule of collagen deposition. Therefore; we evaluated these markers together with cardiometabolic risk factors in adrenal adenoma group.

Materials and Methods: We studied twenty-two newly diagnosed adrenal adenoma patients and 20 healthy participants in a tertiary health-care center. Fasting glucose, insulin, lipid profile, and osteocalcin and procollagen-3 N-terminal peptide levels were evaluated.

Results: Mean age was $54,91 \pm 9,11$ year in adenoma group and $49,70 \pm 10,63$ year in control group. Mean fasting glucose, insulin, HOMA-IR, CRP, osteocalcin and procollagen levels were higher in adrenal adenoma group compared with the control group, however; the differences did not reach statistical significance ($p > 0.05$). Mean osteocalcin was $21,10 \pm 7,15$ ng/ml in adenoma group, it was $19,54 \pm 7,55$ ng/ml in control group. After adjusted for age mean osteocalcin level was remained higher in adenoma group ($21,01 \pm 1,57$ ng/ml) compared to control group ($19,63 \pm 1,69$ ng/ml) ($p = 0.55$). Mean procollagen-3 N-terminal peptide level was $0,65 \pm 0,18$ E/mL in adenoma group, while it was $0,58 \pm 0,12$ E/mL in control group. After adjusted for age mean procollagen-3 N-terminal

peptide level was remained higher in adenoma group ($0,64 \pm 0,03$ E/mL) compared to control group ($0,58 \pm 0,03$ E/mL) ($p = 0.24$). The correlation did not obtained between the cardiometabolic risk factors and bone formation markers.

Conclusions: Cardio metabolic risk factors and bone formation markers including osteocalcin and procollagen levels were found to be higher in non-functional adrenal adenoma compared to control group, however the statistical difference did not obtained. The small study group may be the reason of statistical similarity. Tumorigenesis process in development of adrenal adenoma may play a role in the increased bone turnover. Therefore patients with non-functional adrenal adenoma should be followed for the increased cardiometabolic risk and behind this they should be followed for the healthy bone status.

P615

A RISK ASSESSMENT STUDY ON WORK-RELATED MUSCULOSKELETAL DISORDERS AMONG DENTISTS IN MANGALORE CITY

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Background: Work-related musculoskeletal disorders (WMSDs) are responsible for morbidity in many working populations, which are of multifactorial in origin and of global concern due to industrialization. Dentists as one of the health-care professionals are prone to develop these WMSDs. The study aims to determine the prevalence of WMSDs among dentists in Mangalore region and explores the various risk factors for the development of MSDs and WMSDs.

Materials and Methods: This proposed study is a cross-sectional study conducted among dentists of two randomly selected dental colleges of Mangalore, India. A structured questionnaire was used to collect the demographic information, occupational history, risk factors, and ergonomic awareness with job task details. Prevalidated standardized tools such as quick exposure check list, rapid entire body assessment score sheet, and Nordic Musculoskeletal Questionnaire were also used. Data were entered in MS-Excel and analyzed through SPSS version 22.

Results: More than 88% of the participants reported pain and discomfort in at least one part of their body. The major affected body part is neck, followed by the lower back and wrist. More than half of the orthodontists and oral surgeons reported that their MSDs are work-related origin. Pearson's correlation test indicated that there is a positive correlation between the current exposure and risk ($r = 0.789$). Multivariate regression analysis found that younger participants, male (OR=3.7), involved physical activity (OR=1.04), dentists not taught about ergonomics in their dental school (OR=1.69) or never attended any workshops (OR=1.38), who reported task involving sustained muscle contraction (OR=1.72) or task with

repetitive movements (OR=1.89) are the major risk factors for the development of MSDs among the dentists.

Conclusion: This risk assessment study found that there is a high prevalence of MSDs and WMSDs among dentists. Ergonomic awareness and health promotion need to be integrated with the professional practice for dentists.

P616

SCLEROSTIN DOWN-REGULATION STIMULATES BROWNING OF HUMAN BM-MSCS

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Background: Adipose tissue is composed of visceral, subcutaneous and marrow depots. The role of marrow adipose tissue (MAT) remains obscure. MAT was discovered to actively participating in whole organism metabolism. Marrow adipocytes were found to express both white and brown adipocyte characteristic markers. This brown-like phenotype diminished with aging and diabetes in mice. Sclerostin, an inhibitor of the canonical Wnt pathway, was recently reported to positively regulate adipogenesis *in vitro*. We asked if blocking sclerostin affects MAT gene expression profile.

Material and Methods: Fresh femoral bone marrow was harvested during femoral canal preparation in female patients undergoing partial hip replacement following a hip fracture (n=2) or hip replacement (n=1). Mesenchymal stem cells were plated and treated with the anti-sclerostin antibody (Scl-AbII), kindly provided by Amgen. mRNA expression of adipogenic gene markers: *PPAR γ 2*, *AP2/FABP4*, *UCP1*, *Dio2*, *PGC1 α* , *PRDM16*, *FOXC2* and *β 3AR* was determined by quantitative real time PCR. The study was approved by the Hadassah-Hebrew University Medical Center ethics committee (HMO-361-06), and informed consent was obtained from each patient prior to surgery.

Results: Blocking sclerostin with the anti-sclerostin antibody did not affect *PPAR γ 2* and *AP2* expression. However, a dramatic increase in brown-like adipocyte gene markers was observed including a 2-fold increase in the expression of the thermogenic gene *UCP1*, the hallmark of brown adipocytes, *Dio2* (12-fold), *β 3AR* (6-fold), *PGC1 α* (2-fold), *PRDM16* (2-fold), *FOXC2* (14-fold).

Conclusion: Blocking sclerostin promotes a brown-like adipocyte gene program in human femoral MAT. Blocking sclerostin is an emerging novel therapy for osteoporosis. It may also favorably affect fat metabolism.

P617

DOES OBESITY CAUSE CHRONIC INFLAMMATION? THE ASSOCIATION BETWEEN COMPLETE BLOOD PARAMETERS WITH BODY MASS INDEX AND FASTING GLUCOSE

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Aim: To determine the relationship of complete blood count (CBC) parameters and derivatives with fasting blood sugar and the body mass index.

Methods: This was a prospective, observational clinical study. Hospitalized patients who received a physiotherapy program in the Physical Medicine and Rehabilitation Clinic between March and June 2016 were included in the study. The age, height, weight, body mass index (BMI), fasting blood glucose, erythrocyte sedimentation (ESR), C-reactive protein, and CBC parameters (leukocytes, platelets, neutrophils, lymphocytes, and monocytes) and red cell distribution width, platelet distribution width, neutrophil-lymphocyte ratio (NLR), and platelet-lymphocyte ratio of the patients were recorded. The relationship between the BMI, fasting glucose, and CBC parameters and derivatives were investigated. Patients were assorted into the following groups based on BMI: BMI \leq 25 kg/m², normal; BMI=26–30 kg/m², overweight; and BMI>30 kg/m², obese. A P value>0.005 was considered statistically significant.

Results: A significant difference in the lymphocyte count, ESR, and NLR values was observed across the three groups (P=0.011; P=0.021; P=0.04). A significant difference in NLR was found between groups 1 and 3 (P=0.04). Between groups 1 and 3, a significant difference in platelet count was noted (P=0.013). On separating the groups into two groups: normal and overweight/obese, a significant difference in lymphocyte count, glucose, and ESR values was observed (P=0.038; P=0.05; P=0.013). The lymphocyte count, ESR, and glucose values were found to be higher in the overweight group. According to Spearman's correlation analysis, the BMI and NLR values were found to be negatively correlated (P=0.029; r=.145); however, the lymphocyte count and ESR values were positively correlated (P=0.009; r=.173); (P=0.013; r=.182).

Conclusions: This study found a negative correlation between the NLR and BMI values and a lower NLR value in the obese group compared with the normal group. The overweight group showed a higher lymphocyte count, thereby confirming the positive correlation of lymphocyte count with BMI. A comprehensive clarification of the mechanisms underlying the relationship between obesity and inflammation may allow developing treatment strategies to reduce the negative effects of obesity.

P618**FRAGILITY FRACTURES OF THE CUBOID: CLINICAL EXPERIENCE AND LITERATURE SURVEY**E. Ntouvali¹¹Orthopaedic Surgery and Traumatology, Diagnostic and Therapeutic Center of Athens "Hygeia" S.A, Athens, Greece

Cuboid fractures are rare foot fractures, usually resulting from trauma or repetitive stress on the lateral foot column. Recently, we have been focusing on a subset of cuboid fractures which could be characterized as “fragility fractures”. Their timely diagnosis and effective treatment can be challenging, with long – term sequelae on the patients’ quality of life. Therefore, a high degree of suspicion for this type of injuries is required, which can be achieved by sharing information and increasing awareness regarding such fractures. With this objective, we are hereby presenting our clinical experience and a review of the pertinent literature.

Since December 2012, unilateral cuboid fractures in 3 postmenopausal female patients have been diagnosed and treated by the author. With respect to the mechanism of injury, the aforementioned patients reported on a preceding accident with minimal - force trauma; in addition, one of them was under anti – osteoporotic treatment with denosumab. There were associated soft – tissue injuries in all 3 cases and a concomitant fracture of the base of the ipsilateral fifth metatarsal in 1 case. Despite clinical and radiological examination, the cuboid fracture diagnosis was initially missed in all 3 patients, who resorted to the author’s advice due to persistent symptoms after an average 2 – week interval. At that point, clinical signs attributable to a cuboid fracture were recorded. A targeted CT and MRI examination revealed sagittal, undisplaced, cuboid fractures with intraarticular expansion in 2 out of 3 cases and a similar, extraarticular cuboid fracture in 1 case. All 3 patients were treated conservatively with immobilization of the injured foot in a short – leg cast and avoidance of weight – bearing for 6 – 8 weeks, followed by physical therapy to ensure their prompt functional rehabilitation.

Cuboid fractures can be missed owing to their relative rarity and the simultaneous occurrence of more readily identifiable foot lesions. There is a lack of published articles about cuboid fractures in osteopenic or osteoporotic postmenopausal women, who may be more susceptible to such fractures after minimal – force trauma. Hence, further studies aiming to the identification of cuboid fractures as “fragility fractures” that could potentially influence current treatment guidelines are required.

P619**DEPRESSION, ANXIETY, PERSONALITY TRAITS, AND GENDER DIFFERENCES IN PATIENTS WITH PRIMARY RESTLESS LEG SYNDROME**T. T. Koca¹, N. B. Siverekli¹¹Physical Medicine and Rehabilitation Clinic, Research and Training Hospital, Malatya, Turkey

Aim: To investigate some personal traits accompanying primary restless leg syndrome (RLS).

Method: The study included 75 patients with RLS who visited Physical Therapy and Rehabilitation outpatient clinic between February and June in 2016. The diagnostic criteria for RLS were determined according to the 2003 minor criteria of the International RLS Working Group. The depression and anxiety levels of the patients were evaluated using Beck depression and Beck anxiety scales. Hacettepe Personality Inventory (HPI) (Team A) was used to detect personality traits.

Results: The gender-based results indicated statistically significant differences in some subtypes such as neurotic symptoms, psychotic symptoms, personal adaptation, and general adaptation. Higher neurotic and psychotic symptoms (with less scores), lower personal adaptation score, and higher general adaptation score were observed in females relative to males. However, males were younger than females. The patient group was very similar to the general population in terms of self-fulfillment, family relation, social relation, social norm, antisocial personality features, social adaptation, and general adaptation sub-parameters, but emotional stability, neurotic and psychotic symptoms, and personal adaptation sub-parameters were different and stayed under the 25% percentile. In multiple regression analysis, evaluation of personality sub-features with Beck anxiety scale results detected significant correlations between emotional stability, social norms, and personal self-reliance. Evaluation of personality sub-features of the patients according to Beck depression scale results also revealed a statistically significant correlation between psychotic symptoms.

Conclusion: Patients with RLS showed gender-based differences in neurotic, psychotic, emotional stability, and personal adaptation parameters compared with the general population.

P620**SPECIAL FEATURES OF BONE MINERAL METABOLISM AND BODY COMPOSITION IN CHILDREN WITH NEPHROTIC SYNDROME**N. Volkova¹, A. Soltsava², I. Kozyro², N. Vasileva³¹2th City Children's Clinical Hospital, Minsk, Belarus, ²Belarusian State Medical University, Minsk, Belarus, ³Republican Center for Medical Rehabilitation and Balneotherapy, Minsk, Belarus

Objective: to learn characteristics of biochemical markers of bone metabolism, parameters of bone mineral density (BMD)

and fat component of body composition for early diagnosis of bone disorders in children with nephrotic syndrome (NS).

Material and Methods: We compared data of laboratory investigations (phosphorus (P), total calcium (Ca), parathyroid hormone (PTH), and alkaline phosphatase (ALP)), protocols of dual-energy X-ray absorptiometry of the axial skeleton and total body of 24 children with NS (group 1 – G1, age 10,41 ±4,59 yrs) and 13 children of control group (G2, age 11,30 ±10,77 yrs, p=0,55). Group 1 was divided in subgroups G1a (relapse of NS, n=11) and G1b (remission of NS, n=13). Results were processed using SPSS17 and Excel 10.

Results: Children with NS have had from 1 till 12 relapses by the time of study. 19 children (82,3%) received steroid therapy in the average dose for prednisolone 0,96±0,77 mg/kg. G1 showed significantly lower age-matched z-score of BMD of lumbar spine (L1-4) (-0,97±0,86) compared with G2 (0,06 ±1,00, p=0,024). One child of G1 had low bone density (z-score of BMD L1-4=-2,9). Total BMD was similar in the groups (0,90±0,11 g/cm² in G1 vs. 0,95±0,18 g/cm² in G2, p=0,38). Fat component of body composition was increased in G1 (40,63±10,90%) compared with G2 (24,81±7,75%, p=0,002). Android/gynoid fat ratio was higher in G1 (0,95 ±0,15) than in G2 (0,70±0,20, p=0,003). Children of G1a showed lower level of Ca than control (2,19±0,19 mmol/l vs. 2,41±0,18 mmol/l, p=0,002). Concentration of Ca in G1b was similar to G2 (2,41±0,13 vs. 2,41±0,18 mmol/l, p=0,96) We did not reveal significant difference in of PTH, P and ALP levels in the groups (p>0,05).

Conclusions: Most children with NS showed normal BMD of lumbar spine, though it was decreased compared with healthy controls. Patients with NS had higher fat component in body composition with increased android type of its distribution.

P621

EARLY PULMONARY ALTERATIONS IN PATIENTS WITH ANTI-CITRULLINATED PROTEIN ANTIBODY-POSITIVE RHEUMATOID ARTHRITIS USING HRCT

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Objective: It is known that anti-citrullinated protein antibodies (ACPA) are present years before the onset of clinical rheumatoid arthritis (RA) and the lung could be a venue for ACPA formation. Aim of this study was to evaluate the presence of subclinical pulmonary abnormalities in anti-citrullinated

protein antibody (ACPA) positive subjects without evidence of arthritis and in patients with RA using HRCT.

Material and Methods: We enrolled 22 consecutive patients, 6 men and 16 women (mean age 48.93±12.1 SD) all ACPA-positive. 6 subjects without clinical evidence of arthritis; 10 patients with early RA (E-RA) naive to therapy (duration <24 weeks); 6 patients with clinically manifest RA (CM-RA) in therapy (duration <36 months). All patients underwent to a HRCT of the chest (Somatom definition Siemens) with helical supine inspiratory acquisition contiguous (5mm); images were reconstructed at 1 mm every 20 mm with high-resolution algorithms. HRCT images were reviewed by 2 radiologists who were blinded to each subject with regard to disease status. Lung abnormalities were classified as the presence or absence of airways disease (1 or more of the following: bronchial wall thickening, bronchiectasis, centrilobular opacities and abnormal air trapping) or parenchymal disease (1 or more of the following: ground-glass opacities/ alveolar infiltrates, nodules, and interstitial lung disease/ fibrosis).

Results: Pulmonary nodules were detected in 12/22 (55%) patients: 2/6 (33%) of positive ACPA subjects without arthritis, 7/10 (70%) of the E-RA patients, 5/6 (83%) of patients CM-RA. Others pulmonary abnormalities were observed: fibrosis (45%), enfisema (18%); consolidation, bronchiectasis, bronchial wall thickening and abnormal air trapping in 13%; ground glass opacities (9%). These lung abnormalities had a significantly higher prevalence in patients CM-RA respect to those without arthritis (p=0.021).

Conclusion: This preliminary study demonstrated that pulmonary nodules are developed early and frequently in the course of the RA. Because the early lung involvement in RA is often subclinical and hardly detectable by commonly used tests (PFR), the results of this study suggest the use of HRCT in positive ACPA subjects without arthritis and E-RA patients.

P622

EVALUATION OF SLEEP DISORDER AND ITS EFFECT ON SEXUAL DYSFUNCTION IN PATIENTS WITH FIBROMYALGIA SYNDROME

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Objective: Sexual problems are commonly seen in women with fibromyalgia syndrome (FMS). The objective of this study was to reveal the relationship between the severity of symptoms, sleep disorder, and sexual dysfunction in women with FMS.

Materials and Methods: A total of 140 sexually active women with FMS aged 17-67 years who presented to our physical medicine and rehabilitation outpatient clinic between January 2016 and June 2016 were enrolled in the study. The patients' age, height, body weight, body mass index (BMI), and general pain score [visual analogue scale, (VAS)] for the last 1 week were recorded. The patients were given three different sets of questionnaires: the Pittsburgh Sleep Quality Index (PSQI), Fibromyalgia Impact Questionnaire (FIQ), and Female Sexual Function Index (FSFI).

Results: The mean age of the patients was 40.3 ± 8.5 years; the mean BMI was 27.1 ± 4.4 kg/m², VAS (last 1 week) was 6.9 ± 2 cm, the mean PSQI was 24.8 ± 10.8 (one patient with PSQI ≤ 5), FIQ was 65.9 ± 19.2 , and FSFI was 19.0 ± 6.9 . No significant relationship was observed between the mean PSQI and BMI values ($p=0.401$), whereas a significant relationship was found between the mean values of VAS, FIQ, and FSFI ($p=0.03$; $p=0.034$; $p<0.001$, respectively). In Pearson's correlation analysis, a positive correlation was noted between PSQI and VAS ($r=0.324$; $p<0.001$) and FIQ values ($r=0.271$; $p=0.001$). A significant relationship was found between the FIQ and VAS values ($p<0.001$). P less than 0.005 was considered statistically significant.

Conclusion: Sleep disorder is regarded as the underlying cause for many signs and symptoms in FMS. Sexual dysfunction may develop in women with FMS, based on the severity of the disease and poor sleep quality. We found that sleep dysfunction was significantly related with the severity of disease, pain, and sexual dysfunction. We also found a positive correlation between VAS and PSQI.

P623

OSTEOPOROSIS MAY BE TREATED BY ULTRASOUND: THEORETICAL EXPLANATION WITH STREAMING POTENTIAL

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Objective: Osteoporosis may be treated by a low intensity ultrasound and, theoretically the relationship of ultrasound with streaming potential, a primary stimulus of bone remodeling process, is explained theoretically.

Introduction: Bone remodeling process is mainly induced by bone fluid flow, streaming potential, piezoelectricity, and so on. Clinically a low intensity ultrasound treatment to osteoporosis has been studied. Thus we try to examine the relationship between ultrasound and streaming potential, one factor of bone remodeling process.

Methods: Poroelasticity theory combined with charge density (or streaming potential) is employed and numerically the

relationship between charge density and ultrasound wave speed (and attenuation) is shown.

Results: We can simply conclude that the excessive charge ions in bone fluid flow are attached on the trabecular struts and increase the fast wave velocity and attenuation in ultrasound. Since the charge ions are gathered on the trabecular struts, which recruit the osteoblasts to be attached.

Conclusion: The fast wave in ultrasound may play an important role in bone remodeling process of trabecular bone and it may explain why osteoporosis is treated by a low intensity ultrasound.

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P624

CAN ALP BE THE SURROGATE MARKER OF BONE TURNOVER?

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It is important to measure bone turnover markers (BTMs) as well as bone mineral density in the diagnosis and treatment of osteoporosis. However the measurement of BTMs remains to be less prevalent due to the high cost. Serum ALP level is commonly determined in the basic blood test. We questioned if it can be used as the marker for the rough estimation of the bone turnover. The present study thus investigated the correlation between ALP and BTMs in serum levels.

BTMs (P1NP and serum NTX) and ALP were measured in blood samples obtained from 85 patients (12 male and 73 female) in our hospital from January 2015 to July 2016. The average age was 68.5 years old. Thirty six patients were given no drug treatments for osteoporosis before examination, while others had been administered either bone resorption inhibitors (34 examples) or Teriparatide (15 example).

Data points showed a non-standard distribution, and therefore analysis was performed by Spearman rank correlation. A strong correlation (coefficient of correlation, 0.801) between P1NP and ALP was found. A correlation was also found in the analysis between serum NTx and ALP (coefficient of correlation, 0.602).

Consistent with a previous study showing a correlation between ALP and Bone ALP (BAP), our results revealed that in serum levels ALP shows a correlation with P1NP and NTx, suggesting that variations in serum ALP levels reflect the difference in bone turnover. In clinical practice, bone resorption inhibitors are often administered even in the case of a low bone turnover, increasing the risk of Severely Suppression Bone Turnover (SSBT) and Atypical Femoral Fracture

(AFF). Thus the index of serum ALP levels may provide safety consideration for osteoporosis medications.

The present study suggests that serum ALP levels can be used as a potential maker of bone turnover. Because serum ALP level is obtained in normal blood test, it is thus worth considering this low cost index to avoid inappropriate use of bone resorption inhibitors.

P625

BONE MASS AND VASCULAR WALL CONDITION DEPENDING ON CELLULAR AGING BIOMARKERS IN POSTMENOPAUSAL WOMEN

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Objective: to study the association of bone mineral density (BMD) with the intima-media thickness (IMT), the atherosclerotic plaques (ASP), the pulse wave velocity (PWV) and the augmentation index (AI) depending on telomere length (TL) in postmenopausal women.

Materials and Methods: 107 women at the age range of 45-82 years old were observed ambulatory and included into a cross-sectional study. The lumbar spine and hip BMD was determined using DXA (Hologic, USA). IMT and ASP were examined using duplex scanning. PWV and AI were measured using applanation tonometry (SphygmoCor). The telomere DNA in the genome was estimated by the real-time PCR. The median telomere length was 9.75 kbs. The highest tercile of telomere length distribution ($\geq 10,00$ kbs) was ranked as 'the longest', the lowest tercile ($<9,50$ kbs) was regarded as 'the shortest'. Statistical analysis was performed using the software application Statistical Analysis System (USA).

Results: With the increase in duration of menopause a gradual increase in the stiffness rate (PWV, AI, IMT, the presence ASP), decrease of BMD and a telomere length were observed. The maximal vascular stiffness, minimal BMD values and the shortest telomeres were found in patients with 10+ years of menopause. The risk of bone mass loss increased by 3 times in patients with values of $PWV \geq 10$ m/sec, by more than 4 times in patients with $AI \geq 20\%$ and the $IMT > 0.9$ mm and by 2.45 times in patients with presence of ASP in the carotid arteries as well as in the presence of the shortest telomeres.

The negative correlation between IA, IMT and BMD remained valid as a result of a multivariate regression analysis performed, whereas with respect to PWV, ASP presence, telomeres and BMD such correlation was not confirmed.

Conclusion: Low BMD is associated with high rates of IA and IMT in postmenopausal women. Shortest telomeres were observed 2.45 times as often in patients with low bone mass, though the relationship was not confirmed by the regression analysis. This fact suggests that osteoporosis is not a result of the bone tissue's early aging, but rather is an outcome of the changes in bone cell function and bone remodeling.

P626

MODERATE MECHANICAL STIMULATION MODULATES CHONDROCYTES AFFECTED BY THE TRIGGER DIACEREIN UNDER INFLAMMATORY AND NON-INFLAMMATORY CONDITIONS

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Objective: Osteoarthritis (OA) as the main chronic joint disease, characterized by destruction of articular cartilage in the joints, concerns almost forty% of adults over the age of sixty, thereby causing significant restrictions in life quality. The treatment of pain and disability as the main clinical symptoms includes a number of medical approaches comprising a limited combination of pharmacological and non-pharmacological therapies. To study treatment options in more detail, the study was designed to explore the influence of a mild mechanical stimulation combined with the disease modifying osteoarthritis drug (DMOAD) diacerein on inflammatory and growth factor regulation in chondrocytes. The alternative treatment paradigm of a combination therapy was tested at the cellular level as a model for an integrated biophysical approach for osteoarthritis (OA) that might improve treatment options.

Methods: Chondrocytes were studied under non-inflammatory and inflammatory conditions using unstimulated T/C-28a2 and IL-1 β stimulated C-28/I2 cells, both undergoing mild mechanically treatment plus/minus diacerein. Changes in cyclooxygenase-2 (COX-2), interleukin-6 (IL-6), and prostaglandin E2 (PGE2) and the growth factors, platelet-derived growth factor (PDGF), vascular endothelial growth factor A (VEGF-A) and the basic fibroblast growth factor (bFGF) were characterized by quantitative real-time PCR and enzyme linked immune assays. Cell proliferation and cell migration under the influence of a conditioned medium was determined.

Results: Both treatments reduced IL-6 expression, whereas mechanical stimulation lowered PGE2 synthesis only under inflammatory conditions. IL6 and PGE2 were reduced by diacerein plus mechanical stimulation. COX2 expression was increased by mechanical stimulation, diacerein alone had no effect. Although enhanced PDGF and VEGF-A expression was detected, FGF was down regulated by the combined treatment modalities. Physiological changes triggered by the two treatments influenced cell growth and cell migration of chondrocytes.

Conclusion: Moderate mechanical stimulation (representative for exercises) appears beneficial for the fate of the cell, and improves the pharmacological effect of diacerein. Improvements are based on cross-talks between different initiated pathways. Combining two different treatment options broadens the perspective to treat OA.

P627

FRACTURE OR ATYPICAL FRACTURE? THAT IS A QUESTION: DISCUSSION ABOUT THE BIPHOSPHONATES TREATMENT IN OSTEOGENESIS IMPERFECTA

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Objective: Osteogenesis imperfecta (OI) is typically associated with frequent fractures in childhood and adolescence, thus, bisphosphonates play an important role. However, when they get mature, they also face another problems with age-associated decline in bone density, patients may enter a second period of heightened fracture risk. Several literatures concluded that bisphosphonates using may improving the bone density, reducing the fracture rate, decreasing amount of bone pain. However, prolonged using the Bisphosphonates may result in atypical femur fracture (AFF).

Material and Methods: We reviewed the documents of those patients ever visited or admitted to Macky Memorial Hospital Since 1989. Finally, we total collect 19 patients data. There are 10 patients under 18-year-old and mean age is 12.2-year-old, 9 adults whose mean age are 34.5-year-old. Total 19 patients' mean age is 22.7-year-old.

Results: There are 15 OI patients continuous received bisphosphonates therapy more than 5 years. 5 patient were detected the Gene COLA2 (Four of them are family), 9 patient were detected the Gene COLA1, and 1 patient did not received the Gene examination. 8 of them had lateral femur cortical bone hypertrophy and 6 in 8 experienced more than one time of femur fracture (total: 9 femur fractures, below the lesser trochanter and above the supracondylar). Bone density of them were increasing accompanied with bisphosphonates using.

Conclusions:

1. Improvement the bone mineral density is agreed
2. According to our experience. More than half patients using the bisphosphonates will experience lateral femur cortical bone hypertrophy, and more than 40% patients suffered the AFF.
3. We should notify patient be alertness about the symptoms of thigh pain, groin pain, though the possibility of atypical fracture after bisphosphonates applied on those OI patient is not proved
4. We suggest those patient under the Regular follow bilateral thigh x ray annually
5. Consider Ceasing the Bisphosphonates therapy after adult or 5 year course therapy
6. May shift Bisphosphonates to Teriparatide if Bone scan or PET show stress fracture or atypical fracture over lateral thigh.
7. Risks factors when consideration about the fracture in Osteogenesis imperfect: a type-I collagen abnormality, osteoporosis, and bisphosphonate.

P628

IMPACT OF CHOLECALCIFEROL SUPPLEMENTATION ON THYROID PEROXIDASE ANTIBODY TITERS IN PATIENTS WITH HYPOTHYROIDISM

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Objective: To evaluate the impact of cholecalciferol supplementation on thyroid peroxidase antibody (TPO-Ab) titers in patients with hypothyroidism of autoimmune genesis in a randomized trial.

Material and methods: Fifty two patients with newly diagnosed hypothyroidism were randomized into 2 groups. The patients of the first group additionally received cholecalciferol in a dose 4000 IU/daily (28000 IE/weekly) and calcium in a dose 1000 mg/daily during 12 weeks. The patients of the second group received levothyroxine and calcium in a dose 1000 mg/daily during 12 weeks. The positive result of treatment was defined as 25% fall in TPO-Ab titers.

Results: Vitamin D deficiency was observed in 94.2% patients with hypothyroidism. In patients with hypothyroidism a negative correlation was observed between 25(OH)D and TPO-Ab titer after adjusting for age ($r = -0.172$; $p = 0.046$). The additional supplementation of cholecalciferol resulted in a significant fall in serum TPO-Ab titers in patients of the first group (-48.1%) compared to second group. Greater than 25% reduction in TPO-Ab titer was achieved in 73.1% patients in the first group. Cholecalciferol supplementation led to a significant increase in serum 25(OH)D titers with a corresponding fall

in plasma intact parathyroid hormone levels in the first group.

Conclusions: Cholecalciferol supplementation in patients with hypothyroidism have a positive effect on autoimmunity as evidence by significant reductions in TPO-Ab titers.

P629

PEAK MUSCLE MASS AND REFERENCE VALUES TO IDENTIFY SARCOPENIA IN IRANIAN HEALTHY POPULATION

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Objective: Sarcopenia is a common problem in elderly with the adverse outcomes. The objective of this study was to estimate the peak appendicular skeletal muscle mass (ASM) and age of its attainment by sex among Iranian population.

Materials and Methods: A total of 691 men and women aged 18-94years participated in this cross-sectional, population-based study in Bushehr, Iran. ASM was measured by dual x-ray absorptiometry(DXA). Cut-off points for men and women were established considering two standard deviations below mean values of skeletal muscle index (SMI) for young reference groups. The relationship between ASM and age was described by the second degree regression models. Two standard deviations below the mean SMIs of reference groups were as cut-off values of low muscle mass in Iranian population.

Results: The peak ASM values were 21.35±0.12 kg and 13.68±0.10 kg, and the age at peak ASM were 26 (24-28) years and 34 (33-35) years for men and women, respectively. Mean and standard deviation (SD) of SMI in those ages were 7.01±0.02 kg/m² and 5.44±0.02 kg/m² among men and women, respectively. Calculated cut-off values of low muscle mass among Iranian population were 7.0kg/m² and 5.4 kg/m² among men and women, respectively.

Conclusion: Iranian reference values of SMI for both genders were similar to Asia Working Group for Sarcopenia (AWGS) recommendation and lower than the European values. Further studies from different nations and Middle East countries are needed to obtain reference values for populations enabling the researchers for comparison and more valid reports on sarcopenia prevalence.

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BMP-2 AND BMP-4 PLAYS A POSITIVE ROLE IN ARTICULAR CARTILAGE MAINTAINING IN MICE

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BMPs, specifically BMP-2 and -4, have been shown to play a major role in mesenchymal cell differentiation and chondrocyte hypertrophy. The graded genetic expressions of BMP-2 and -4 within the four major growth plate zones represent an important molecular component of long bone formation after birth. However, the role of BMP-2 and -4 in mature articular cartilage remains limited. In this study, we investigate the significance of the BMP2While BMP signaling plays an important role in chondrocyte metabolism, and BMP2 and BM and BMP 4 gene in articular cartilage maintaining at postnatal stage in mice vivo.

Objective: To observe the phenotype of deleting BMP-2 and BMP-4 gene in chondrocytes in the development and maintaining of articular cartilage in mice. Try to demonstrate the molecular mechanism of articular cartilage development and degradation through BMP 2 and BMP 4 gene related signaling.

Material and Method: Bmp-2, Bmp-4 conditional knockout mice, (Bmp-2 Bmp-4)^{Col 2^{ER}} mice were generated by breeding (Bmp-2,Bmp-4)^{fx/fx} mice with Col2-CreER transgenic mice. Knee joints were harvested from 3 months and 6 months old mice for histology to compare the difference in morphology of AC. Immunohistochemical were performed to analyze the OA-related proteins expression, which involves mmp13, adams 4, and adams 5.

Result: 1. The silence of BMP2 and BMP4 induced articular cartilage degradation phenotype, such as narrowed AC area, shortened AC depth, and massive subchondral bone, and the osteometric data of calculated AC area is consistent to the dramatically morphology changes in both 3- and 6- month old mice. ($P<0.05$) 2. The protein expression of MMP 13, Adams4 and Adams5 in superficial zone of articular cartilage tissue is significantly increased in (BMP2, BMP4)^{Col 2^{ER}} Group in 3-month old mice. ($P<0.05$) While in the 6-month old mice there showed the same tendency but the data is not statistical.

Conclusion: Bmp2 and Bmp4 are not only involved in the formation of articular cartilage but also the mature cartilage metabolism and play a positive role in cartilage maintaining.

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INFLUENCE OF VITAMIN D STATUS ON BONE DENSITY AND BONE TURNOVER DURING WEIGHT RESTORATION IN PATIENTS WITH ANOREXIA NERVOSA

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Background: Patients with Anorexia Nervosa (AN) have low vitamin D status and progressive bone loss, the latter preventable by normalization of weight gain. However, if the efficacy of a nutritional intervention in improving bone health depends on vitamin D status is currently unknown.

Objective: To investigate the potential role of vitamin D status in determining the efficacy on bone mineral density (BMD) of weight restoration in AN.

Methods: 91 female AN subjects underwent an inpatient weight restoration treatment. Vitamin D (25-OH-D) levels, bone mineral markers and BMD assessed by DXA were evaluated both at baseline and post-treatment.

Results: There was a significant increase in weight, BMI, P1NP (all $p < 0,001$) and PTH ($p < 0,04$). Conversely, a significant decrease was found in 25-OH-D ($p < 0,04$) and CTX ($p < 0,05$). The mean BMD values were significantly increased only at the spine ($1.0 \pm 3.6\%$, $p = 0.009$). A significant positive trend was demonstrated between post-treatment 25-OH-D and BMD percentage changes at the spine ($p = 0.032$). The increase in spine BMD resulted significantly higher only for patients with a post-treatment 25-OH-D ≥ 30 ng/ml ($p < 0,03$), and was inversely correlated with CTX values after treatment ($R^2 = 0,095$; $p < 0,03$). A significant positive correlation was found between both absolute and percentage changes in weight and percentage changes in P1NP ($R^2 = 0,27$) but not with percentage changes in CTX.

Conclusion: In AN, the efficacy of weight restoration could depend primarily on bone formation. A hypovitaminosis D status counteracts the efficacy of the nutritional treatment because of an increase in bone resorption mediated by a secondary hyperparathyroidism. Our study strongly support the use of vitamin D supplements for bone health in AN patients.

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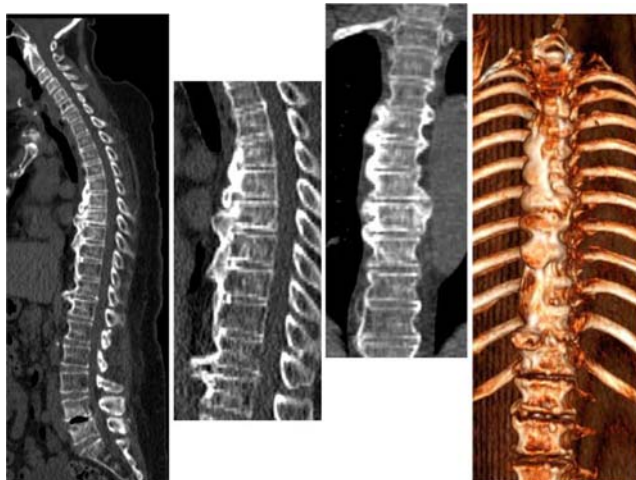
GIANT DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS (DISH) AND ELEVATED BONE TURNOVER IN A PATIENT SUFFERING FROM PSEUDOHYPOPARATHYROIDISM TYPE I

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A female patient aged 56 developed the last 6 months walking difficulties necessitating the use of a walker. Pseudohypoparathyroidism type I (PSP1) was diagnosed at the age of 25, based on hypocalcemia, slight hyperphosphatemia, high iPTH and lack of response of u-cyclic AMP to PTH injections; 24-H urinary calcium was low. Moreover, an heterozygote mutation of ARG 231 HIS was found. A brain CT-scan showed FAHR' calcifications. She also had brachymeta-carpia and – tarsia. She developed menopause at the age of 36, and she was put on hormone replacement therapy (HRT) until the age of 52. C-cell hyperplasia necessitated thyroidectomy and substitution. Hyperplasia of 4 parathyroid glands was observed during the operation. Later on, diabetes mellitus developed, but without signs of neuropathy. MRI of the cervical and lumbar spine showed spinal stenosis, as well as majestic DISH. Biological work-up beyond hypocalcemia demonstrated a dramatic increase in sCTX when HRT was weaned. Renal function deteriorated (complication of hypertension). Spinal stenosis is a rare, but recognized complication in PSP, but giant DISH is unusual in a patient aged 56 y. Extremely elevated bone turnover is not seen in hypoparathyroid states. The BMD values of the patient were still in the normal range. The cause of the high turnover cannot be attributable to PTH (resistance) nor in 1,25(OH)₂D₃. Postmenopause can be accompanied by an acceleration of bone remodeling, but not to such an extent. Renal insufficiency could have contributed, however. Such a majestic DISH rapidly developing could also be a responsible factor.

| | 2004/Oct | 2006/Jul | 2010/Oct | 2011/May | 2016/Oct | 2016/Nov |
|---------------------------------|----------|----------|----------|----------|----------|----------|
| creat (mg/dL) | 0.90 | 0.70 | 0.76 | 0.73 | 1.93 | 2.22 |
| GFR (IDMS) | 77 | 96 | 80 | 84 | 27 | 23 |
| Ca (mmol/L) | 1.75 | 1.55 | 1.95 | 2.00 | 2.70 | 2.41 |
| P (mmol/L) | 1.81 | 1.32 | 1.30 | 0.97 | 1.29 | - |
| Alk P ^{ase} (mg/L) | 36.1 | 21 | - | - | 34.7 | - |
| sCTX (pg/mL) | 980 | 330 | 329 | 360 | 2135 | - |
| iPTH (pg/mL) | - | 110 | 178 | 168 | 26 | - |
| 25OHD (ng/mL) | - | 13 | - | <5 | 32 | - |
| 1,25(OH) ₂ D (pg/mL) | - | 30 | - | - | 25.1 | - |



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APPLICATION OF A RUSSIAN MODEL OF THE WHO FRACTURE RISK ASSESSMENT TOOL (FRAX®)

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Objective: To estimate the 10-year probability of major osteoporotic fractures and hip fractures among the urban population of the Russian Federation based on the Russian model FRAX.

Material and methods: Representative samples of the population from 8 Russian cities were used as a material for analysis. In total 9143 Russian residents participated in the study, among them 6324 were women and 2819 were men aged 40-69 years (mean age 53,29±0,02 years). 10-year probability of fractures was calculated on the basis of the Russian model FRAX without BMD using the batch processing of data.

Results: The average 10-year probability of major fractures is 7,8% (8,9% in women and 5,5% in men (p=0,0001)), hip fractures – 0,7% (0,9% in women and 0,4% in men, p=0,0001). By the age of 70 the risk of major fractures in women and men increased by 2 and 1,2 times respectively, while the risk of hip fractures increased by 5,5 and 4,5 times in women and men respectively. In women 10-year probability was authentically higher in all age groups across all cities in comparison with that in men both for major and hip fractures. The proportion of individuals who had a previous fragility fractures, was 15,2% (in total 1211 respondents, 438 men and 773 women). According to the schedule defining intervention threshold for Russia, 30,6% of the respondents (371 people) were determined to be in a high-risk of fractures zone (red) and 69,4% of the respondents (840 people) - in the low-risk of fractures zone (green).

Conclusion: The average 10-year probability of major and hip fractures increased with age regardless of participants' gender, and was significantly higher among female population. The majority of the respondents with the previous fragility fractures (individuals with the known high risk of fractures requiring medical intervention), according to the schedule defining intervention threshold for Russia, have been included into the green zone which implies the low sensitivity of the intervention threshold currently established for Russian Federation.

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DEVELOPMENT AND VALIDATION OF ANTHROPO-METRIC PREDICTION MODEL FOR ESTIMATION OF MUSCLE MASS IN THE ELDERLY

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Objective: Age- related muscle loss, named sarcopenia, has been linked to functional declines and an increased risk of complications. The aim of this study was to identify predictors of low skeletal muscle mass in older adults toward development of a practical clinical assessment tool for use by clinicians to identify subjects requiring dual-energy X-ray absorptiometry (DXA) screening for muscle mass in Iranian older people.

Materials and methods: Data were available for 2000 people aged ≥60 years who participated in the second stage of

Bushehr Elderly Health (BEH) program, a population-based prospective cohort study, in a southern province of Iran. The participants were randomly assigned to two groups; a model-development group and a validation group.

Appendicular skeletal mass (ASM) was measured by DXA, as the dependent variable. To estimate predictive model, multiple linear regression analysis, anthropometric measures contains; weight, height, limb circumferences (upper arm, forearm, thigh and calf), waist, hip and neck circumferences, age, sex, body mass index (BMI), hand grip strength were used as independent variables. ASM_{DXA} was used as criterion measurement. Agreement was verified by intra-class correlation coefficient (ICC) and by the Bland-Altman technique.

Results: Prediction models were established using the data from model -development group. A five- variable model was developed as follows: $ASM=9.29 - 0.18 \times \text{age} - 4.68 \times \text{sex} + 0.09 \times (\text{hand- grip strength}) + 0.22 \times \text{calf circumference} + 0.196 \times \text{BMI}$ (where adjusted $R^2=0.79$, $P<0.0001$). The high agreement (ICC=0.85) observed between ASM estimated by equation and DXA. This model performed well in the validation group.

Conclusions: The simple anthropometric prediction model developed in this study showed useful and good practical tool in clinical evaluation to estimate muscle mass and thus sarcopenia in elderly people

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QUALITY OF LIFE AND FUNCTIONAL STATUS IN RELATION TO BONE HEALTH IN PAKISTANI CHILDREN WITH TRANSFUSION DEPENDENT B-THALASSEMIA

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Objective: To determine quality of life and functional status in relation to bone health in Pakistani children with transfusion dependent β -thalassemia.

Material and methods: This was an observational descriptive study conducted at Fatimid Foundation Karachi from January 2013 to December 2014. All the patients with diagnosis of transfusion dependent β -thalassaemia major were recruited. Following demographic and anthropometric variables were recorded: site and severity of bone pains, fractures, abnormalities of facial bones, weight, height and intake of analgesics, calcium and vitamin D supplements. Two laboratory parameters, pre-transfusion haemoglobin (Hb) and serum ferritin levels were also included. Bone health assessment for pain was performed using Wong-Baker Faces Pain rating scale¹. Performance status was assessed using Eastern Cooperative Oncology Group scoring (ECOG). Z-scores for height and weight were calculated utilizing following formula:

$Z=x-\mu/\sigma$. WHO 2007 growth charts for boys and girls were used to assess physical growth. Accordingly, a Z-score of <-2 for height was considered as stunted growth and BMI of <-2 was considered as underweight or thin for age.

Results: A total of 380 patients were included. Mean age at first evaluation was 10.6 ± 3.3 with M:F ratio of 1.1:1. Majority of patients were taking calcium (87%) and vitamin D (77%) supplements and 46% required calcium infusions for muscle spasm on regular basis. Despite 82% of patients having bone pains, 81% had ECOG score of "Zero" (Fully active). Fifty five% were taking analgesics whereas, modest degree of pain "Hurts even more" was present in 37.1% children. Forty-eight (12.6%) had history of fractures. Most (n=338; 88.9%) had normal facial bone structure whereas frontal bossing, prominent maxillary bones, prominent zygomatic bones and bowing of legs were present in 5.5%, 3.2%, 4% and 1% children respectively. Mean \pm S.D of different variables were: Haemoglobin: 7.6 ± 1.3 g/dl, ferritin 5401 ± 2650.2 ng/ml, height Z-score: -2.65 ± 1.64 , weight Z-score: -1.82 ± 1.12 and BMI Z-score: -1.77 ± 1.40 . With increasing age, decrease in pre-transfusion Hb and an increase in ferritin levels along with worsening BMI and height Z-scores were observed. Significant association of higher ferritin levels (5632.75 ± 2543.97 ng/ml) was found in patients with stunted growth (n=250, 66%; $p=0.019$).

Conclusions: Despite very poor bone health in this study, majority of Pakistani children with transfusion dependent β -thalassemia were able to maintain a good functional status. Appropriate transfusions and chelation along with good nutrition must be ensured for maintaining optimum bone health.

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A COMPARISON IN DETERMINING OF VITAMIN D STATUS BETWEEN COMMERCIALY AVAILABLE ASSAYS

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Objective: To compare the effectivity of various assays used in the determination of vitamin D concentrations.

Material and methods: Serum 25-hydroxyvitamin D levels were measured from blood samples of 109 patients with

different immunochemical methods. We compared the performance of three automated vitamin D immunoassays (Abbott, Roche, Siemens) mutually and to high – pressure liquid chromatography (HPLC), which was chosen as the golden standard in measuring vitamin D concentrations. Linear regression model (Pasinng – Bablok) and Bland Altman analysis were used to compare the performance of methods of measurement tested.

Results: Taking into account the permissible error of measurement 21.5% (CV=10% Bias=5%), our Bland-Altman analysis demonstrated that results obtained by all of the assays differ significantly. The mean concentration of 25-hydroxyvitamin D obtained by HPLC-UV (76.82 nmol/l) was nearest to the mean concentration given by the Roche assay (78.28 nmol/l). The biggest difference in the 25-hydroxyvitamin D mean were observed between HPLC method and the Siemens method (49.59 nmol/l). Levels of vitamin D measured using the Roche assay were overestimated compared to results given by HPLC, while Siemens and Abbot assays underestimated its level. The deviation from the HPLC means increased as the levels measured grew. The rate of conformity of vitamin D level measurement between HPLC and Abbot was 65.21%, HPLC and ROCHE 59.63%, HPLC and SIEMENS 47.79%.

Conclusion: Our results implicate statistically significant and clinically relevant variation in the vitamin D levels measured with different immunochemical methods.

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CONFRONTING MORPHOMETRIC X-RAY RADIOGRAPHY AND DUAL-ENERGY X-RAY ABSORPTIOMETRY IN THE DIAGNOSIS OF OSTEOPOROSIS

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Objective: To compare two techniques for the diagnosis of Osteoporosis (OP). Dual-energy-x-ray absorptiometry (DXA) allowed patients to be classified in to three categories: osteoporotic, osteopenic and normal. Morphometric x-ray radiography (MRX) was used to diagnose vertebral fractures (VF).

Materials and Methods: From 2006 to 2010, 290 patients who went to an outpatient clinic were involved in this observational study. 243 of them (72 men and 171 women with an average age of 64,5 years) completed the study.

Results: Even without a compatible T-score diagnosis for OP, some patients reported VF at DXA as below:

- 60 patients (24,7%) with T-score suggestive of OP, 47 (78,3%) reported VF at DXA;
- 86 patients (35,4%) with T-score suggestive of osteopenia, 78 (90,7%) reported VF at DXA;
- 97 patients (39,9%) with normal T-score, 93 (95,9%) reported VF at DXA;

The chi-square test shows an important relationship between bone mineral density (BMD) and incidence of VF in the sample (P=0,002).

Conclusions: A correct diagnostic approach to OP is to use diagnostic procedures to identify both BMD and patient's risk of fracture by completing a MOC with a qualitative and quantitative evaluation of the vertebral column through MRX. This technique permitted to identify VF even in patients with T-scores not suggestive of OP who are not apparently at risk for VF. The diagnosis of this fracture suggests an increased risk of other ruptures, not related to BMD, as proposed by the National Osteoporosis Foundation (NOF)¹ (Kanis et al.), and the International Osteoporosis Foundation (IOF)². They state that these diagnostic techniques should be used in the screening of patients at risk of OP and in the therapeutic follow up of osteoporotic patients.

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P638

STUDY OF RADIOLOGIC SIGNIFICANCE OF ARTICULAR JOINT WIDTH COMPARING STANDING RADIOGRAPHS, MRI AND ARTHROSCOPIC FINDINGS IN KNEE OSTEOARTHRITIS

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Introduction: Articular joint width in osteoarthritic knees is a parameter widely used in standing radiographs, but few papers study the correlation between this measurement and osteoarthritic degree comparing radiographs, MRI and arthroscopy.

Objective: To study the usefulness of articular joint width and its correlation with osteoarthritic degree in standing radiographs, MRI and arthroscopy.

Material and methods: Three years prospective study of 59 patients (63% males) of 49.6 years (21-82) with chronic pain

in their knee. Standing radiographs were classified according to Kellgren-Lawrence (intraobserver correlation 0.95). MRI images were classified according to Vallotton criteria. Interobserver correlation for MRI was calculated by Kappa index (0.37), McNemar symmetry and Wilcoxon Signed Ranks tests (interobserver correlation 0.576). Arthroscopic findings were graded with Outerbridge criteria. The articular joint width was related to osteoarthritic degree with Spearman and Mann-Whitney tests.

Results: Diagnostic accuracy of radiographs was calculated in 0.423 (Kappa index 0.251) and MRI in 0.491 (Kappa 0.333), establishing arthroscopy as gold standard. Articular joint width was inversely and strongly correlated with osteoarthritis degree in the three diagnostic procedures ($p < 0.001$). If these results were stratified in two groups of articular joint width, < 5 millimeters wide group (< 5 mm) and > 5 millimeters wide group (≥ 5 mm), the three parameters showed a high degree in < 5 mm group. In this group, the average decrease in articular joint width was more evident (1.94 mm) than in ≥ 5 mm group (1.82 mm).

Conclusions: Articular joint width in standing radiographs shows a strong correlation with osteoarthritic degree in radiography, MRI and arthroscopy. It could be considered a complementary diagnostic tool to monitoring osteoarthritic disease in knee.

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THALASSEMIA AND SUBSEQUENT RISK OF OSTEOPOROSIS: A NATIONWIDE POPULATION-BASED COHORT STUDY

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Objective: Thalassemia-associated osteoporosis constitutes a major complication in patients with thalassemia. The association between risk of osteoporosis and thalassemia is yet to be fully examined. Most of the studies identified are of poor quality, are not randomized controlled, and include small number of participants. We performed nationwide population-based cohort study to investigate whether thalassemia major or minor is associated with an increased risk of developing osteoporosis.

Materials and Methods: We conducted this population-based study using data from the National Health Insurance Research Database of Taiwan during the period from 2000 to 2011. Each patient was randomly frequency-matched with 4 controls without thalassemia, based on age and index year of diagnosis. We identified 2,008 patients with thalassemia and 8,032 controls. Cox's proportional hazard regression analysis was performed to estimate the effect of thalassemia on the risk of osteoporosis. Kaplan-Meier curves of the probability of osteoporosis for each cohort were compared using the log-rank test.

Results: The risk of developing osteoporosis was significantly higher in the thalassemia cohort (adjusted hazard ratios (aHR)=1.75, 95% confidence intervals (CI)=1.30-2.36), thalassemia major cohort (aHR=3.48, 95% CI=0.48-25.3) and thalassemia minor cohort (aHR=1.78, 95% CI=1.31-2.41) compared to the group without thalassemia. The cumulative incidence of osteoporosis was higher in the patients with thalassemia than in the controls ($P < 0.001$).

Conclusion: Our large population-based cohort study provides evidence that thalassemia may increase the risk of osteoporosis in Taiwan.

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NEGATIVE EFFECT OF CURATIVE ANTI-THROMBOTIC TREATMENT IN AN INFECTED HIP PROSTHESIS

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Currently total hip replacement (THR) surgery is the most common joint replacement procedure in the orthopedic field. The rising number of THR cases brought an increased incidence of complications. One of the major, surgically and medically challenging complications is the infection. Late infections of THR often lead to loosening of the prosthesis which requires the removal of the implant and thorough debridement of the infection site. The gold standard in the case of an infected prosthetic material is removal of the implant followed by rigorous debridement and revision arthroplasty which can be done as a one or two stage procedure.

We present a patient with multiple comorbidities that underwent total hip arthroplasty with a Birmingham Hip Resurfacing (BHR) type of implant, 11 years ago. This patient presented in the emergency room of Bucharest University Emergency Hospital (SUUB) with sepsis. The clinical and paraclinical examination during the hospitalization revealed acute endocarditis and multiple splenic abscesses which

required valvuloplasty accompanied by intense anticoagulant therapy and splenectomy. Periprosthetic collection detected by the CT scan required the removal of the implant and multiple subsequent surgical interventions with sanitation purpose.

Because of the curative anticoagulation required by the valvuloplasty, bleeding caused by the hip surgeries could not be controlled, creating a vicious circle that sustained repeated hematoma formation and infection despite correctly performed treatment. All these led to septic shock and the death of the patient.

The association of these two pathological entities has grim prognosis, with a very difficult management and very little experience recorded in the specialty literature.

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MULTIPLE MUSCULO-SKELETAL ABSCESSSES IN A YOUNG MALE PATIENT

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Septic arthritis is an infectious pathology that can occur in any age group, the most common pathway being hematogenous dissemination. In the orthopedic field the most frequent bacteria is the *S. Aureus* which in the near past has developed significant resistance to antibiotics especially for methicillin. The treatment is a major challenge, which consists of surgical and medical treatment based on the antibiogram, which is crucial for targeted therapy and good clinical results. We present a case of a 31 year old male patient with swelling and pain of the left thigh and left knee, symptoms which appeared 3 weeks prior to his admission in our department. In this period he also experienced headache, nausea, fever and vomiting. The clinical examination reveals the presence of intra-articular liquid in the left knee and a swollen thigh. We performed a fine needle aspiration of the intraarticular collection, the sample was sent to microbiological exam and antibiogram. Routine laboratory test showed elevated white blood cell levels with marked inflammatory response (ESR, C reactive protein, fibrinogen). Radiological findings were not modified however MRI described a well determined perifemoral liquid collection from the proximal third of the femur communicating with the articular space of the knee. Surgical debridement was necessary in order to eliminate the perifemoral collection. The microbiological exam determined the presence of *Staphylococcus Aureus* resistant to Methicillin (MRSA). Intravenous treatment with Ciprofloxacin and Vancomycin

was begun for 3 weeks. The patient discharged after 4 weeks with normal inflammatory markers values and good functional result. MRSA infections in orthopedics represent an increasing health problem. Early diagnosis and swift treatment are crucial for a good clinical result.

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A COMPARISON OF VITAMIN D LEVELS IN PATIENTS WITH ACNE VULGARIS AND HEALTHY INDIVIDUALS

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Introduction: It is a common opinion that vitamin D plays a role in many immune system disorders. This study aimed to determine vitamin D levels in patients with acne vulgaris.

Methods: The study sample included 90 patients who came to the outpatient dermatology clinic of Malatya Public Hospital between March 2015 and June 2015, and were diagnosed with cystic nodular acne clinically. The control group included 67 voluntary healthy individuals. The 25-hydroxyvitamin D3 [25-(OH) vit D3] levels were recorded for both groups.

Results: In the group of patients with acne, the 25-(OH) vit D3 level was 18.28±9.92 (reference interval 10–40 ng/mL), and it was 15.40±10.92 in the control group. When the two values were compared statistically, the result was $p: 0.924$ ($p>0.05$) and there was no statistically significant difference.

Discussion and Conclusion: It is believed that vitamin D plays a role in the etiopathogenesis of acne vulgaris due to its anti-inflammatory and antimicrobial properties. The studies conducted with larger patient sets can provide a clearer view of the correlation between vitamin D and acne.

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APPLICATION OF MULTIPLE GENES TESTING DATA FOR RISK ASSESSMENT AND PREVENTION OF OSTEOPOROSIS

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Objective: In recent years, an increasing evidence of genetic predetermination of bone mineral density appeared. Over the past decade, hundreds of potential markers of genetic predisposition to osteoporosis (OP) were identified, and several

attempts were made on use of these specific polymorphisms for OP risk evaluation. However, there are still difficulties with complex interpretation of genetic testing data, considering multiple markers interaction. The purpose of this work was to identify allelic combinations and haplotypes of gene variants, involved in bone metabolism, and to evaluate their collective association with predisposition to OP in Belarusian postmenopausal women.

Methods: Sixty-six Belarusian postmenopausal women with OP, as well as 92 age-matched control subjects, were genotyped for *VDR ApaI* (rs7975232), *BsmI* (rs1544410), *TaqI* (rs731236), *Cdx2* (rs11568820), *COL1A1 Sp1* (rs1800012), *COL1A2 A18162G* (rs42517), *COL5A1 C/T* (rs12722) and *LCT T-13910C* (rs4988235) gene polymorphisms. Significance was assessed using χ^2 test and multivariate logistic regression (R-package). The differences were considered significant at $P < 0.05$.

Results: We found that rs7975232, rs1544410 and rs731236 markers are in a strong direct linkage disequilibrium ($P < 0.001$), suggesting that risk alleles of these markers are preferably inherited jointly. For the bearers of unfavorable haplotype *A-B-t* (consisting of rs7975232 rs1544410 and rs731236 risk alleles), the risk of OP is significantly higher ($OR = 4.3$, 95% *CI* 1.4-5.3, $P < 0.01$). This haplotype was over-represented in OP patients group compared to all other haplotypes. For the carriers of unfavorable *A-B-t-T-G* allelic combination, constructed from rs7975232, rs1544410, rs731236, rs1800012 and rs42517, the risk of OP was significantly increased ($OR = 19.5$, 95% *CI* 4.6-140.1, $P = 0.02$) compared to the bearers of wild-type *a-b-T-G-A* combination. This data, obtained for all allelic combination, can be used for genetic risk score calculation.

Conclusion: Our findings highlight the importance of identified allelic combinations of *VDR*, *COL1A1* and *COL1A2* gene polymorphisms and reveal mechanisms of their collective interaction with each other for OP risk evaluation purposes. Complex screening of these can be used to implement personalized prevention, treatment and rehabilitation programs.

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RELATIONSHIPS BETWEEN BONE FRAGILITY CAUSED BY VITAMIN D DEFICIENCY/INSUFFICIENCY AND BONE MINERAL DENSITY AS WELL AS SCLEROSTIN IN POSTMENOPAUSAL WOMEN

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Objective: Vitamin D deficiency/insufficiency (VitD D/I) is a risk factor for fractures. It has been reported that the majority

of Japanese individuals meets the criteria for VitD D/I. Therefore, the aim was to elucidate the factors that are useful for identifying individuals with VitD D/I who are at high risk of fractures.

Methods: The subjects were 201 healthy postmenopausal women who had undergone osteoporosis screening. Serum levels of 25-hydroxyvitamin D [25(OH)D], intact parathyroid hormone (PTH) and sclerostin were measured. Dual-energy X-ray absorptiometry was used to measure bone mineral density (BMD) at the lumbar (L) and the femoral neck (FN).

Results: Osteoporotic fractures were observed in 71 subjects. Subjects had a mean age of 64±8 years, and the following values: 25(OH)D 16±4ng/mL; sclerostin 1.3±0.4ng/mL; L-BMD T-score -1.6±1.3, Z-score 0.3±1.1; FN BMD T-score -1.5±0.8, Z-score 0.1±1.0. Serum levels of 25(OH)D had significant negative correlations with age and PTH, and significant positive correlations with L and FN BMD, but no correlation with sclerostin. The fracture group had significantly lower levels of 25(OH)D as well as L and FN BMD and significantly higher levels of sclerostin ($p < 0.01$). When subjects were classified into four groups based on 25(OH)D and L-BMD levels, the low 25(OH)D/low L-BMD group had a significantly higher proportion of fractures than the other groups. Furthermore, the low 25(OH)D/high sclerostin group had a significantly higher proportion of fractures than the high 25(OH)D/high sclerostin and high 25(OH)D/low sclerostin groups. Logistic regression analysis revealed that the group with low 25(OH)D/low L-BMD as well as low 25(OH)D/high sclerostin were a significant risk factor for fracture even after adjustments for age and BMI.

Conclusion: Candidate indicators for identifying cases at high risk of fractures among individuals with VitD D/I include measurements of L-BMD as well as sclerostin in addition to 25(OH)D.

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ANTIOSTEOPOROTIC ACTIVITY OF GENISTEIN AGLYCONE IN POSTMENOPAUSAL WOMEN: EVIDENCE FROM A POST HOC ANALYSIS OF A MULTICENTER RANDOMIZED CONTROLLED TRIAL

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Background: Genistein has a preventive role against bone mass loss during menopause. However experimental data in

animal models of osteoporosis, suggest an anti-osteoporotic potential for this isoflavone.

Methods: We performed a post-hoc analysis of a previously published trial that investigated the effects of genistein in postmenopausal osteopenic women. A cohort of the enrolled postmenopausal women was, in fact, identified at the baseline as osteoporotic (n=121) on the basis of their T-score and analyzed thereafter for the 24 months treatment with either 1000 mg of Calcium and 800IU Vitamin D3 (placebo; n=59), or Calcium, Vitamin D3 and Genistein aglycone (54 mg/day; genistein; n=62). The parent study was a randomized, double-blind, placebo-controlled trial involving postmenopausal women with a femoral neck (FN) density <0.795 g/cm².

Results: According to FN T-scores at baseline 31.3% of the genistein and 30.9% of the placebo recipients were osteoporotic. In placebo group and genistein group, the 10-year hip fracture probability risk was 4.1±1.9 (SD) and 4.2±2.1 (SD) respectively, assessed by FRAX. Mean BMD at the femoral neck increased from 0.62 g/cm² at baseline to 0.68 g/cm² at 1 yr and 0.70 g/cm² at 2 yrs in genistein recipients and decreased from 0.61 g/cm² at baseline to 0.60 g/cm² at 1 yr and 0.57 g/cm² at 2 yrs, in placebo recipients. At the end of the study only 18 postmenopausal women had osteoporosis in genistein group with a prevalence of 12%, whereas in placebo group after 24-months the number of postmenopausal women with osteoporosis was unchanged.

Conclusion: This post hoc analysis is a proof-of concept study suggesting that genistein may have a great potential for the treatment not only of osteopenia but also of osteoporosis in postmenopausal women. However this proof-of concept study needs to be confirmed by a large, well designed and appropriately focused randomized clinical trial in a population at high risk of fractures.

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THE IMPORTANCE OF SECONDARY OSTEOPOROSIS AT PATIENTS WITH PSORIATIC ARTHRITIS IN DEPENDING OF CLINICAL EVOLUTIONS

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Objective: Psoriatic arthritis causes chronic joint damage and functional disorders of bone and joints with significant social and health costs associated with a high rate of morbidity and mortality. It evolves with changes in both the erosive and destructive joint and bone as it is found in approximately 40-60% of patients. Our aim was to study the peculiarities of the clinical course of psoriatic arthritis in men with relation to degree of expression of osteoporosis.

Materials and methods: The research group consisted of 100 men aged > 50 years and certainly the diagnosis of psoriatic arthritis (GRAPA, 2006) in combination with osteoporosis and osteopenia according to criteria developed by WHO and confirmed by DXA.

Results: The study highlighted the clinical features of variants developed from psoriatic arthritis, which were characterized by a wide diversity of manifestations of articular syndrome, expressing itself through five clinical variants: polyarticular (31%), axial (25%), oligoarticular (18%), distal interphalangeal (15%) and mutilant (11%). Based on a complex clinical and laboratory examinations we have established the association of axial injuries in all clinical variants, allowing early diagnosis of psoriatic arthritis, assessing disease severity and prognosis. Simultaneously it appreciated the severity of osteoporotic damage. It has been found that 55% of men have shown osteopenia, and 45% - osteoporosis. Pain in the spine, were reported in 47% of cases; bone pain in the upper limbs and lower 30%. Men who use glucocorticoids have a much lower bone density (T score -3.1) compared with men not given glucocorticoids (T score -1.7). The most advanced osteoporosis was found in polyarticular forms (M T-score -3.0) and mutilating (M T-score -3.3), followed by axial (M T-score -2.6) with osteopenia in oligoarticular forms (M T-score -1.7) and distal interphalangeal (M T-score -1.6). In men with a rational Ca > 950 mg / day T-score was 1.75; but at 850-950 mg / day T-score was 2.05. The third group with the lowest rational Ca, 750-850 mg / day, are most susceptible to pathological fracture, because the T-score is -3.1 them. Male smokers have T-score lower than non-smokers, so patients who smoke T-score was -2.64 and -2.36 in the smoking (p <0.05). The frequency of femoral neck fractures in men is almost the same age between 50-70 years (50-60 years constitute 4% and at the age of 60-70 years is 7%, so there is a considerable increase in risk), but notes that begins to increase after the age of 70 years being 9% (p <0.05). With increasing age and increasing values are observed over 10 years and fracture probability is 0.7% at the age of 50-60 years; 0.8% at age 60-70 years and 5.9% older than 70 years (p <0.01).

Conclusions: Osteoporosis was imposed as nosologic unit being detected very commonly in patients with psoriatic arthritis, even the able men. In the evolution of the disease they were presented with high frequency following risk factors: age, smoking, corticosteroid, intake low calcium and, in particular, depending on the version clinical disease: the most serious - mutilant and polyarticular and light show in oligoarticular and distal interphalangeal. It was determined importance of FRAX score for the prevention of fractures, especially in patients with a history compounded, glucocorticoid use, smoking and low calcium intakes.

P647**DISCOVERY OF POLYMORPHISMS IN THE 101 KB VITAMIN D RECEPTOR GENE THAT CAN AFFECT OSTEOPOROTIC FRACTURES AMONG POST-MENOPAUSAL WOMEN SEEN AT THE PHILIPPINE ORTHOPEDIC CENTER**M. P. Zumaraga¹, P. J. Medina², C. P. Saloma³¹Food and Nutrition Research Institute, Taguig City, Philippines, ²Philippine Orthopedic Center, Quezon City, Philippines, ³National Institute of Molecular Biology and Biotechnology, Quezon City, Philippines

Aim: The study discovered genetic variants in the entire 101 kB vitamin D receptor (VDR) gene for osteoporotic fractures using targeted next generation sequencing (TNGS) approach. **Patient and Methods:** A total of fifty women with and without fragility fracture seen at the Philippine Orthopedic Center were included. DNA libraries were constructed using the Ion AmpliSeq Library Kit v 2.0 and a custom VDR AmpliSeq™ panel before they were sequenced using the Ion Torrent Personal Genome Machine. The variant calling was based on the GATK best practice workflow and annotated using Annovar tool.

Results: A total of 1,496 unique variants were identified. Novel sequence variations were found among diseased and healthy groups at a rate of 23.1% and 16.6% of total discovered variants, respectively. Noteworthy is the discovery of two disease-associated novel heterozygous frameshift deletions (Pearson chi square p -value <0.05).

Conclusion: Taken together, these findings show the power of using TNGS in identifying sequence variations in a very large gene and the surprising results obtained in this study greatly expand the catalogue of known VDR sequence variants that may represent an important clue in the emergence of osteoporotic fractures.

P648**VITAMIN D LEVEL IN TAIWANESE OSTEOPOROSIS WOMEN**J. S. Hwang¹, Y. R. Li¹, F. H. Liu¹, S. T. Chen¹¹Division of Endocrinology and Metabolism, Department of Internal Medicine, Chang Gung Memorial Hospital, Chang Gung University, Taoyuan, Taiwan, Province of China

Objectives: The aim of this study was to evaluate the vitamin D level in postmenopausal osteoporosis women with and without vertebrae or hip fractures in northern Taiwan.

Study design and methods: This single center, cross-sectional, observational study analyzed the vitamin D level in Taiwanese postmenopausal osteoporotic patients with and without non-trauma fragility vertebral or hip fracture that received post-fracture medical care at osteoporosis clinic.

Results: A total of 68 patients were enrolled at Chang Gung Memorial Hospital, in northern Taiwan. The mean serum 25(OH) D level was 26.9 ± 8.4 ng/mL, and lower vitamin D level 25.8 ± 7.9 ng/mL in 32 (47%) patients with hip and vertebral fractures, compared with 27.8 ± 8.9 ng/mL in 36 (53%) patients without fractures, resulting in a prevalence of vitamin D inadequacy of 65% of patients.

Conclusions: High prevalence of vitamin D inadequacy was found among women with osteoporosis and fragility hip or vertebral fracture patients in Taiwan.

P649**VITAMIN D RELEVANCE AND VDR ASSESSMENT FOR PREVENTION OF OSTEOPOROSIS IN DENTAL PRACTICE**F. S. Martelli¹, F. Piccotti¹, M. Martelli¹¹EDN Clinic, Florence, Italy

Objective: The aim of this paper is to investigate the variability of vitamin D receptor (VDR) genetic polymorphisms in a periodontal disease population and its associated correlation with the severity of periodontitis.

Materials and Methods: The study group for the investigation was comprised of 4454 patients who attended our clinics for periodontal treatment between the period January 1st 2013 and January 1st 2016. According to the literature, the VDR polymorphisms studied were TT, Tt and tt. DNA was extracted from the patients using buccal swabs.

Results: The prevalence of VDR genetic polymorphisms, associated with a low vitamin D affinity (TT and Tt) were found to be present for the majority of the sample (3769 patients: 84.42%). The TT polymorphism was found in 1534 patients (34.44%) and the Tt polymorphism in 2226 (49.48%). This means that in a periodontal disease affected population, early detection of people at high risk of future osteoporosis is possible.

Conclusions: There is scientific evidence showing the correlation between VDR polymorphism TT and the increased risk of developing periodontitis. Insufficient levels of vitamin D is very often associated with the TT variant of VDR, which provokes, in the same way, systemic problems of bone mineralization also increasing the risk of developing osteopenia and osteoporosis. Bone is the main component of the periodontal support tissue and every dental treatment has a deep impact on the bone supporting teeth or implants. The success and long term stability of the treatment is directly related to bone density and metabolism. The individual profiling of bone metabolism and the genetic assessment of the VDR variants, allow dental practitioners to alert their patients early about the risk for osteoporosis and future fragility fractures. The use of new, simple and non expensive diagnostic techniques of genetic screening

allows dental specialists to identify periodontal patients with possible decreased bone mineral density; at this stage patients can be referred to an endocrinologist to start a long term and low cost program of prevention. A complete understanding by dentists of the strong correlation between skeletal bone density, periodontal health and osseointegrated implant success could open new therapeutic approaches for periodontitis and bone regeneration techniques. This will help the NHS to reduce the economical and biological costs related to fragility fractures.

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COMPARISON OF MUSCLE ACTIVITY AND TRUNK COMPENSATION DURING MODIFIED PUSH-UP PLUS EXERCISES IN PEOPLE WITH SCAPULAR WINGING

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Objective: To compare the muscle activity, muscle activity ratio, and rotation degree of the thoracic and lumbar spine during a modified push-up plus exercise.

Material and Methods: Twenty subjects with scapular winging participated. The subjects performed a standard push-up plus with ipsilateral leg extension (SPP-ILE) and knee push-up plus with ipsilateral leg extension (KPP-ILE). During the SPP-ILE and KPP-ILE exercises, the serratus anterior (SA), pectoralis major (PM), ipsilateral external oblique (ipsiEO), and contralateral external oblique (contEO) muscle activities were assessed with surface electromyography, and rotation degree of thoracic and lumbar spine were assessed with a 3D motion tracking system. For normalization, muscle activities during maximal voluntary isometric contraction were collected for each muscle. The SA/PM ratio and ipsiEO/contEO ratio were calculated from the normalized muscle activities.

Results: The muscle activities of the SA, PM, ipsiEO, contEO, and SA/PM ratios were significantly higher during SPP-ILE than KPP-ILE. The ipsiEO/contEO ratio decreased significantly during SPP-ILE compared to KPP-ILE. The thoracic and lumbar rotation values were significantly lower in SPP-ILE. Increased muscle activities were expected when more weight on the upper limbs induced more activation of muscles to maintain posture during SPP-ILE. As a trunk stabilizer, increased bilateral EO activities stabilized the trunk and decreased lumbar rotation due to balanced activation of bilateral EO during SPP-ILE. Trunk stabilization also induced effective SA activation. Thus, SA/PM ratio was increased, and thoracic rotation was decreased during SPP-ILE.

Conclusion: In terms of the increased SA/PM ratio, SPP-ILE can be a suitable exercise for scapular winging subjects. SPP-ILE exercise is also better than KPP-ILE in terms of the diminished compensatory rotation through increased scapular stabilization muscles and co-contraction of abdominal trunk stabilization muscles. In conclusion, SPP-ILE exercise can be a useful exercise for subjects with scapular winging.

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DEVELOPMENT OF A NEW IMMUNOASSAY FOR CATHEPSIN K GENERATED PERIOSTIN FRAGMENT AS A BONE SPECIFIC BIOMARKER

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Periostin (Postn) is a matricellular protein mainly expressed in bone, but is also present in several other tissues. Available immunoassays for circulating Postn detect the intact protein and are not specific for bone tissue.

Objective: To develop a bone-specific Postn immunoassay based on the detection of fragments generated by cathepsin K.

Methods: Human recombinant Postn was incubated with cathepsin K at 37°C for various times and for different Postn/Cathepsin K ratio. The released Postn fragments were characterized by LC-MS/MS. Rabbit antibodies directed against the synthetic sequence of the most efficiently generated cathepsin K Postn fragment was produced and used for the development of a competitive ELISA. Serum from 160 healthy elderly women (mean age: 65 yr) participating in the Geneva Retiree Cohort were measured with this ELISA and data were correlated with hip aBMD by DXA, HR-pQCT parameters of the tibia and the bone markers S-CTX and PINP.

Results: The sequence of 20 fragments that were efficiently generated from cathepsin K digestion of intact Postn was determined by targeted LC-MS/MS. The abundance was highest for the ⁶⁸⁸GSLQPIIK⁶⁹⁵ sequence (K-Postn, patent filed P1971PC00) located in the C-terminal domain of Postn. The antibody directed against the GSLQPIIK peptide did not detect intact POSTN and the K-Postn peptide elongated or shortened by 1 amino acid at the C-terminal end. Immunohistochemistry of the tibia of mice showed that the K-Postn peptide localized at the periosteum surface of cortical bone region, specifically in osteocytes and lacuno canalicular system. The ELISA for serum K-Postn has intra and inter assay variability below 14%, respectively. The lower limit of detection was 7 ng/ml and the dilution recovery of human serum ranged from 99 to

120% (median 109%). In elderly women, serum K-Postn levels negatively correlated ($p=0.03-0.02$) with cortical parameters of the tibia, but not with trabecular measures, hip aBMD, S-CTX and PINP.

Conclusion: We have developed a sensitive and precise ELISA for the detection of a cortical bone specific Postn fragment generated by cathepsin K in vivo. This new bone marker should be useful for the clinical investigation of patients with osteoporosis and other metabolic bone diseases.

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EFFECT OF 6-MONTH ISOTRETINOIN TREATMENT ON 25-HYDROXYVITAMIN D LEVELS IN PATIENTS WITH ACNE VULGARIS

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Aim: Acne is a chronic inflammatory disease that affects the pilosebaceous units of the skin. Isotretinoin is a derivative of the synthetic 13-cis-retinoic acid and is an efficient drug for acne treatment. In clinical studies, the negative effects of long-term and short-term isotretinoin use on vitamin D levels and bone metabolism restrict its use. In this study, the effect of isotretinoin treatment on vitamin D levels was examined in patients with acne vulgaris.

Method: Ninety patients with clinically diagnosed acne vulgaris who came to the Malatya Public Hospital Dermatology Clinic participated in this study. Patients who had been using any systemic drug for the previous month or who had any systemic disease were not included in the study. Patients with abnormalities in calcium (Ca), alkaline phosphatase (ALP), and parathyroid hormone (PTH) levels, which affect vitamin D metabolism, also were not included in the study. Patients were treated first with 0.5 to 1.0 mg/kg (per kilogram of body weight) doses of isotretinoin, with the aim of total dosage of 120 mg/kg. The patients' 25-hydroxy vitamin D3 [25'(OH) vit D3] levels were measured before treatment and at the sixth month of treatment.

Result: Among the 90 patients who participated in the study, 51 (56.7%) were female, and 39 (43.3%) were male, with an age range of 16 to 50 years (mean±standard deviation) age, 23.55±5.58 years. Eight patients dropped out of the study. The patients' (mean±standard deviation) 25'(OH) vit D3 level was 18.28±9.92 before treatment and 13.28±7.78 at the sixth month of treatment ($p=0.000$).

Conclusion: The negative effect of isotretinoin on vitamin D levels and bone metabolism has been shown in previous studies. In this study, 25'(OH) vit D3 levels decreased significantly in patients treated with isotretinoin in the long term ($p>0.000$).

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NON-CODING RNA: A NEW STRATEGY TO IMPROVE BONE REGENERATION

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Objectives: Bone fractures are highly prevalent in patients suffering from osteoporosis and a cause of patient disability. The differentiation of Mesenchymal Stem/Stromal Cells (MSC) into osteoblasts is crucial for bone regeneration. Non-coding RNAs (ncRNAs) are involved in key regenerative processes such as cell proliferation and differentiation. Although some ncRNA are currently being used in clinical trials to treat human diseases, the vast majority remains unexplored. In this study, we aim to use ncRNA to regulate mechanisms that promote bone formation and repair.

Material and Methods: To achieve this goal, expression levels of microRNAs (miRs) and long non-coding RNAs (lncRNAs) during osteogenic differentiation of bone-marrow derived-MSC and MC3T3 cell line were determined by microarrays and/or RT-PCR. Then, ncRNA levels in MSC were modulated in vitro by electroporation or transfection to address their effects on osteogenic differentiation and proliferation and to analyze their paracrine effect on angiogenesis. Finally, the underlying molecular mechanisms were determined.

Results: Our results show that miRs, namely miR-195, miR-497 and miR-29, and transcribed ultraconserved regions (T-UCR), namely uc.64+, are involved in osteogenic differentiation. Anti-miR-195 improves expression of osteogenic markers, including ALP mRNA and protein levels, and increases MSC proliferation as shown by the increased percentage of Ki-67+/DAPI+ cells. The paracrine effect of MSC condition media on angiogenesis is also modulated by miR-195 and this effect are mediated by VEGF [1]. Moreover, we show that lncRNAs may interact with miRs.

Conclusion: ncRNAs control crucial processes of bone regeneration including MSC differentiation, MSC proliferation and angiogenesis. Therapeutic strategies using ncRNAs will open new venue for the treatment of bone fractures and may be useful to promote bone formation in osteoporotic lesions.

References: [1] Almeida et al, 2016

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SECONDARY OSTEOPOROSIS RISK IN RHEUMATOID ARTHRITIS FEMALE PATIENTS

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The effects of rheumatoid arthritis (RA) on bone include structural joint damage (erosions) and osteoporosis. The latter may lead to increased risk for fractures, which are associated with increased morbidity and mortality.(1)

Objective: To evidence the risk factors for development of secondary osteoporosis in patients with rheumatoid arthritis.

Patients and methods: We observed 59 patients with established rheumatoid arthritis, aged between 34 and 71 years (an average of 46,65); for each patient BMD was measured by means of dual energy X-ray absorptiometry (DXA) of hip and lumbar spine); we watched the presence of the common risk factors of osteoporosis, anterior corticosteroid treatments, the activity level of the illness and the stage of disease.

Results: 38 patients presented at the moment of study generalized osteoporosis; we found a significant correlations between osteoporosis and the following parameters: the stage of disease (prediction $R^2:0.613$), the functional Steinbroker class (prediction $R^2:0.507$), activity of disease (DAS28) (prediction $R^2:0.414$) but no important correlations were found between osteoporosis and smoking or corticosteroids therapy.

Conclusion: For the examined patients, the secondary osteoporosis was underrated; the osteoporosis management should be considered early in the disease evolution.

Reference: (1) Haugeberg G et al. *Curr Opin Rheumatol* 2003;15:469

P655

THE IMMEDIATE EFFICACY OF SPINOMED BRACE IN THE POSTURE AND EQUILIBRIUM IN THE PATIENT'S WITH HYPERKYPHOSIS

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Objective: We wanted to determine do the SPINOMED Brace (MEDI) produce the changes in relation with the posture, equilibrium and ability in the moment when you put the brace on.

Study design: We evaluated Overall Rating of control and stability in the patients affected by hyperkyphosis using the measuring system for equilibrium made by IBV performed 2 measures. 1 with the SPINOMED en 2nd without respecting 30 min of rest between the testing. The

system compare the results with the system database according by the height, age, weight and gender from the health population. The inclusion criteria: Angle of Cobb > 40°. The exclusion criteria: Severe pain(9-10/10);neurological disease; hip and knee replacement; vertebral arthrodesis/ankyloses. We evaluated 50 women between 51-87 years mostly of them with the osteoporosis and some of them with the vertebral fracture. Measuring Cobbs angle: 2nd thoracic vertebral superior plate and 12th thoracic inferior plate. The pain and disability evaluation: pain score, Roland- Morris and Oswestry questionnaire.

Conclusions: There is no difference in Overall rating of control and stability between the group with and without SPINOMED. The Spinnm group shows the clinically significant results in decrease of anterior displacement inRomberg testing and anterior displacement in voluntary control and ability evaluation - that means that the center of gravity moved back towards. There is no risk of equilibrium disturbance in the patient which wearing Spinomed brace.

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THE EFFECTS OF WEIGHT LOSS APPROACHES ON BONE MINERAL DENSITY IN ADULTS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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Background/Objectives: Findings are not consistent on the effect of weight loss on bone mineral density (BMD). We conducted a systematic review on the randomized controlled trials to assess the effect of weight loss strategies including calorie restriction and exercise programs on BMD in adults.

Methods: A structured and comprehensive search of MEDLINE and EMBASE databases was undertaken up to March 2016. Study-specific mean differences (MD) were pooled using a random-effects model. Subgroup analysis and meta-regression were used to find possible sources of between-study heterogeneity.

Results: Thirty two randomized controlled trials met predetermined inclusion criteria. The meta-analysis revealed no significant difference on total BMD (MD: 0.007, 95% CI: -0.020–0.034, p=0.608). In contrast, the pooled data of studies showed a significant effect of weight loss on hip BMD (MD: -0.008, 95% CI: -0.09to -0.006 gr/

cm², $p < 0.001$) and also lumbar spine BMD (MD: -0.018 gr/cm², 95% CI: -0.019 to -0.017 , $p < 0.001$). BMD in the hip site decreased after more than 4 months, especially in those who were obese. Moreover, calorie-restriction interventions longer than 13 months showed a significant decrease in lumbar spine BMD.

Conclusion: Weight loss led to significant decreases at the hip and lumbar spine BMD but not at the total. Weight loss response following calorie-restriction resulted in a decrease in hip and lumbar spine bone density especially more than one year; whereas an exercise-induced weight loss did not.

P657

THE RISK OF OSTEOPOROTIC FRACTURES AND BODE INDEX IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Objective: to study the risk of osteoporotic fractures and the BODE index in patients with chronic obstructive pulmonary disease (COPD).

Material and Methods: 212 patients with chronic obstructive pulmonary disease (COPD) were observed. The investigated group was made by the patients having the long experience of smoking. Research of function of external breath was studied with multimodular installation of type «Master-Lab/Jaeger». Research of bone mineral density (BMD) was studied with the densitometer «Lunar DPX-NT». The assessment of risk of osteoporotic fractures was calculated by means of the computer program FRAX. Patients were identified with the BODE index (body mass index, airflow obstruction, dyspnea, and exercise capacity).

Results: The BODE index increased with stage of COPD, minimum level of BODE index was in patients with COPD 2 stage 2.23 ± 0.88 . At 3 stage COPD the BODE index was 5.05 ± 1.19 , at 4 stage of COPD the BODE index was 7.0 ± 1.0 . Bone mineral density (BMD) of the hip in patients with COPD 2 stage was 0.97 ± 0.13 , in patients with COPD 3 stage BMD was 0.87 ± 0.14 , in patients with COPD 4 stage BMD was 0.7 ± 0.17 . The maximum risk of hip fractures was detected in patients with COPD 4 stage – 3.2 (1.1–5.4). Minimum risk of hip fractures was diagnosed in COPD 2 stage– 1.0 (0.5–2.1). The correlation coefficient between BODE index and BMD was -0.71 , $p < 0.005$. The correlation coefficient between BODE index and fracture risk was 0.54 , $p < 0.05$.

Conclusions: The correlation between the BODE index and the risk of fractures was noted.

P658

EFFECTIVENESS OF AN UNLOADING KNEE BRACE IN THE TREATMENT OF PATIENTS WITH KNEE OSTEOARTHRITIS: A PHASE III RANDOMIZED CONTROLLED TRIAL

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Objectives: The effectiveness of knee braces in the treatment of patients with knee osteoarthritis (KOA) remains controversial despite their wide clinical use. The aim of this RCT was to assess the additive effect of the unloading knee brace in conservative treatment of knee osteoarthritis.

Material and Methods: Patients with symptomatic medial KOA (Kellgren-Lawrence grade II-IV) were randomized into either Brace group (brace + usual care) or Control group (usual care alone). The unloading knee brace (Rebel Reliever®) is a gradually-adjustable lightweight aluminum unloading knee brace that applies corrective forces by a 3-point pressure system. Usual care consisted of analgesics and self exercises program. Primary endpoint was the global last-24h knee pain (assessed via a 100-mm visual analogic scale [VAS]) after 6 weeks of treatment. Secondary endpoints included pain during motion (100-mm VAS), function (Lequesne index), clinical global improvement according to both patients and investigators, responder rate, as well as safety and observance.

Results: Study population (ITT population) consisted of 67 patients aged 65.7 ± 9.6 years, mainly women (65.7%). Of them, 32 were assigned to the Brace group and 35 to the Control group. At baseline, last 24h-pain was 63.8 ± 10.6 mm in the Brace group and 64.7 ± 13.5 mm in the Control group. Pain during motion was 73.4 ± 12.7 mm and 71.9 ± 13.8 mm in the Brace and Control groups, respectively. Function (Lequesne index) was 13.4 ± 3.7 in the Brace group and 12.6 ± 3.2 in the Control group. At 6 weeks, last 24h-pain had decrease significantly more in the Brace group than in the Control group (-41.4 ± 3.4 mm vs. -15.4 ± 3.2 mm; $p < 0.0001$). Similarly, higher decrease for pain in motion (-51.9 ± 3.5 mm vs. -19.9 ± 3.3 mm; $p < 0.0001$) and algofunctional Lequesne index score (-5.8 vs. -2.3 ; $p < 0.001$) were observed in the Brace group compared to the Control group. Clinical global improvement was more pronounced in the Brace group, with more patients feeling ‘better’ to ‘considerably improved’ in the Brace group than in the Control group (86.2% vs. 3.1%), and with investigators reporting more patients ‘much’ to ‘very much’ improved in the Brace group than in the Control group (82.1% vs. 3.1%). Responder rate (OARSI-OMERACT criteria) was significantly higher in the Brace group (72.4% vs. 34.4%; $p = 0.003$). Safety and observance to the brace were excellent.

Conclusions: Superiority of this unloading knee brace + usual care compared to usual care alone was demonstrated. Combining the used unloading knee brace with usual care is a powerful therapeutic strategy to handle medial knee osteoarthritis. NCT02021136.

P659

ROLE OF BLUEBERRY EXTRACTS IN OXIDATIVE STRESS-INDUCED APOPTOSIS AND EXPRESSION OF OSTEOCLASTOGENIC FACTORS IN OSTEOCYTES

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Objective: Osteocyte apoptosis due to microdamage is related to oxidative stress, increased bone turnover and resorption encountered in various bone diseases. In previous studies, we demonstrated in an osteocyte-like murine cell line, MLO-Y4, that the starvation-induced apoptosis is due to increased oxidative stress. Moreover, an increased expression of osteoclastogenic factors such as receptor activator of nuclear κ B ligand (RANKL) and sclerostin has been observed in starved osteocytes. Antioxidants reverted these events showing their protective effect regarding osteocyte apoptosis *in vitro* (1).

Given that there are various studies indicating the potential of blueberries in improving the balance between bone formation and bone resorption, the aim of this study was to investigate the role of blueberry extract in reactive oxygen species (ROS) production, apoptosis and expression of osteoclastogenic factors in osteocytes. A comparison with N-acetylcysteine (NAC) effect was also performed.

Materials and Methods: MLO-Y4 cells were used to study apoptosis induced by starvation that mimics "in vitro" the apoptosis due to microdamage "in vivo". ROS were measured by fluorometric analysis; apoptosis by DNA fragments; RANKL and sclerostin expression by western blot.

Results: Preliminary results show that the extracts of blueberry are able to reduce ROS production in concentration- and time-dependent manner and to prevent apoptosis in starved MLO-Y4 cells. They also inhibit the increased expression of RANKL and sclerostin due to increased oxidative stress, and these effects are similar to those observed in NAC treated osteocytes. However, antioxidant effect of blueberry does not seem closely related to its anti-apoptotic and anti-osteoclastogenic effect.

Conclusions: These data indicate that the effect of blueberry on apoptosis and expression of osteoclastogenic factors in osteocytes is mainly due to its antioxidant component, although the involvement of other components in modulating these effects cannot be excluded. They show that blueberry may be useful for inhibiting bone resorption and reducing inflammatory events associated with bone diseases related to oxidative stress.

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P660

CORRELATION OF CLINICAL MEASURES WITH POTENTIAL CONTRIBUTING FACTORS IN FEMALES WITH PATELLOFEMORAL PAIN

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Background: Patellofemoral pain (PFP) is a common musculoskeletal disorder which is characterized by retropatellar or peripatellar pain during activities which impose compressive forces on articular surfaces. The etiology of PFP is thought to be multifactorial. Reduced strength and flexibility of lower limb muscles, malalignments of the lower extremity, and patellar malalignment have been proposed as major contributing factors to PFP. However, relationship of the potential risk factors with pain and function in people with PFP is not well understood, yet. The purpose of this study was to investigate the correlation of the contributing factors with pain and function in females with PFP.

Materials and Methods: Fifty females with PFP (age=27.5 \pm 4.8 years) and 50 matched healthy females (age=25.3 \pm 4.8 years) participated in this cross-sectional study. Muscle strength, muscle flexibility, and pain were assessed using a fixed dynamometer, an inclinometer, and visual analog scale, respectively. Kujalla questionnaire and step-down test were used to determine function. The navicular drop height and intercondylar/intermalleolar distance were measured to assess foot pronation and knee valgus and varus alignment. Sulcus, Congruence and Lateral patellar angles, and Insall-salvati ratio were determined on axial and lateral patellar radiographs taken in 45° and 30° knee flexion angles. The data were analyzed using an independent t -test, bivariate correlation test and stepwise regression.

Results: There were significantly lower strength of the knee extensors (P <0.001), the knee flexors (P <0.001), the hip

abductors ($P < 0.001$) and the hip lateral rotators ($P < 0.001$) in the PFP group as compared to the healthy group. The hip medial rotators ($P = 0.027$), iliotibial band ($P = 0.004$) and quadriceps ($P < 0.001$) flexibility in the PFP group were significantly lower as compared to the healthy group. There were no significant difference in the knee varus-valgus alignment ($P = 0.176$), and navicular drop ($P = 0.132$) between the groups. Also, no significant difference was found in the radiologic indexes between the groups. Based on regression analysis, quadriceps flexibility and hip abductor muscle strength may predict Kujalla ($R^2 = 0.13$) and step-down scores ($R^2 = 0.11$) in females with PFP. No significant correlation was found between pain intensity with other variables of interest in PFP group.

Conclusions: Our findings indicate that there is a significant correlation between objective measure of function and the hip abductor and external rotator muscle strength and Iliotibial band flexibility in PFP group. There was also a significant correlation between Kujalla scores and the knee flexor strength and quadriceps flexibility. Quadriceps muscle flexibility and the hip abductor muscles strength may predict subjective and objective functional scores in females with PFP, respectively. In general, lower limb muscles strength in females with PFP is significantly less than a healthy matched group.

P661

TAILORED EXERCISES IN A LOCAL CLUB FOR OSTEOPOROSIS PATIENTS WITH COMORBIDITY

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The Club was founded in September 2014, it is the local part of the HOPA (Hungarian Osteoporosis Patient Association) it is helped by the borough (Budapest, 12th district). The venue of our programs is one of the cultural centres of the borough, the Cultural Saloon. In the first months there were 51 participants (49 women and 2 men aged from 56 to 91), 19 of them regularly took part in our sessions. Our programs were: one hour a month of exercises with a physiotherapist, one hour a month lectures. From September 2015 we had osteoporosis exercises once a week. The number of participants increased. Until June 2016 the number of the participants was 79 (74 women, 5 men, aged from 59-92). Regularly 30 people took part in the exercise sessions.

Since the average age was about 70, we did not differentiate osteopenia from osteoporosis. We did exercises that are important and useful for patients with osteoporosis. We found it also important to take into consideration that multimorbidity is typical of elderly people. For the leader of the exercise program it is important to teach the elderly exercises and

position that do not have a negative effect on any of their diseases (for example they must not increase the blood pressure), but achieve the ideal aim, so increase the strength of the extensor muscles of the spine and decrease the kyphosis shape of the trunk. It is important to see the face of every participant, because the change of facial expression is an important nonverbal sign. The participants also have to see the leader of exercises, so that what everyone sees and hears at the same time complete each other. One of the conditions of doing the exercises the right way is that we understand what we have to do. The level of the intensity of the exercises (the number of repetitions) have to be felt by the participants on the basis of the Borg scale, and the leader helps them with it.

P662

CONSIDER IDIOPATHIC TRANSIENT OSTEOPOROSIS IN THE UNEXPLAINED PAIN OF THE FOOT

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A 51-year-old woman was investigated for longstanding (7 weeks) severe right foot pain associated with mild swelling and functional limitation, developed without history of trauma or infection. Neoplastic, inflammatory and infective diseases were excluded, laboratory tests were negative, conventional X-ray pointed out osteopenia of the bone involved. Consecutive magnetic resonance (MRI) revealed a picture of spongy bone marrow edema. The final diagnosis was "transient osteoporosis (TO) of the foot". The patient was treated with analgesics, immobilization of the foot and intravenous bisphosphonate for 12 months. After this therapy she was asymptomatic and the MRI images showed significant improvement. TO is a self-limited syndrome without a definable cause characterized by extremity pain of unknown etiology, the diagnosis is confirmed with MRI once other causes are excluded. Even if uncommon this condition should be known by the clinicians.

P663

HYPERPARATHYROIDISM SECONDARY TO VITAMIN D DEFICIENCY

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Secondary hyperparathyroidism is a common complication of many clinical conditions.

We reported the case of a 35 years old woman with a family history of thyreopathy. An ultrasound (US) examination and

thyroid function tests were prescribed as a routine monitoring. The US assessment showed parathyroid hyperplasia of two glands. Therefore a specific bone-mineral metabolism analysis was conducted. The results pointed out a severe Vitamin D (VD) depletion (below 20 ng/ml) with phosphaturia, secondary hyperparathyroidism and osteopenia. We started a VD oral supplementation with high doses (50.000 IU once a week) for 8 weeks, followed by maintenance therapy of 1500 IU one a day. The blood level of VD increased and the PTH normalized. In this case an inadequate exposure to sunlight and anti-convulsants medications were assumed to be the cause of VD deficiency. Chronic risk factors for VD depletion should be kept in mind in order to avoid abnormalities in calcium, phosphorus, PTH levels and bone metabolism.

P664

DISEASE ACTIVITY, FUNCTIONAL STATUS AND QUALITY OF LIFE OF AXIAL SPONDYLOARTHRITIS PATIENTS LIVING IN CYPRUS: A PILOT STUDY

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Objective: To investigate the disease activity level, pulmonary function, exercise capacity, functional level, spinal mobility and quality of life of Axial Spondyloarthritis (AxSpa) patients living in Cyprus.

Material and Method: Thirty one patients (%35.5 women, %64.5men) who received Axial Spondyloarthritis diagnosis according to the ASAS criteria and signed an informed consent form were included in the study. Pulmonary functions (Forced Vital Capacity (FVC%) and Forced Expiratory volume (FEV1%)) were measured with portable FUTUREMED Discovery Spirometry, pulmonary muscle strength (maximal Inspiratory Pressure (MIP%) and Maximal Expiratory Pressure (MEP%)) was measured with CAREFUSION MicroRPM. Functional exercise capacity was measured with 6 minute walk test (6 MWT%), functionality was measured with Bath Ankylosing Spondylitis Functional Index (BASFI), disease activity was measured with Bath Ankylosing Spondylitis Activity Index (BASDAI) and quality of life was assessed with Ankylosing Spondylitis Quality of Life (ASQOL). Predicted percentages of MIP MEP and 6 minute walk test distance were calculated by using formula. (1,2)

Permission of the ethics committee was taken from Hacettepe University on 05.04.2016 with Decision No.GO 16 / 147-07.

Result: 31 voluntary axial spondyloarthritis with a mean age of 44,35±11,48 years was included in our study. It was noted that 38.7% of the patients with symptom durations of 19.68

±10.28 years had smoked and 61.3% did not. If we generalize patients' BASDAI mean scores, it can be said that the disease is in the active period. Expected FVC, FEV1, MIP, MEP, and 6 MWT distance percentage, according to their age and gender groups, decreased. Also spinal mobility, the functional status and quality of life appear to have decreased (Table 1). Table 1. AxSpa Patients' disease activity level, functional status and quality of life level.

Mean±SD

BASDAI (0-10): 4,07±1,99

FVC% (>%80): 77,21±14,16

FEV1% (>%80): 79,21±14,88

Pred MIP% : 73,17±22,72

Pred MEP% : 54,89±17,15

Pred 6 MWT%: 77,09±16,066

BASMI (0-10):4,27±2,02

BASFI (0-10) :3,28±2,47

ASQoL(0-18) :8,84±5,62

Conclusion: Our research is the first screening study in AxSpa patients living in Cyprus and it is aimed to increase the number of samples. In the light of information, we suggest that AxSpa patients with high disease activity may have reduced pulmonary function, functional exercise capacity, spinal mobility and quality of life. The exercises recommended, as a part of physiotherapy program, at this time should aim to develop all of them.

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P665

CORRELATION BETWEEN QUALITY OF LIFE OF THE PATIENTS WITH KNEE OSTEOARTHRITIS AFTER ARTHROPLASTY AND CLINICAL PARAMETERS PREOPERATIVELY

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Objective: Total knee arthroplasty has been shown to be an effective procedure in improving of quality of life of the patients with knee osteoarthritis and disability. Clinical assessment of patients before knee arthroplasty could predict quality of life of these patients after arthroplasty and rehabilitation. The aim of this study was to establish correlation between quality of life of the patients with severe knee osteoarthritis 6 weeks after knee arthroplasty and early rehabilitation with clinical parameters (age, BMI, waist circumferences, physical function, pain and stiffness) before arthroplasty.

Material and Methods: Prospective research includes 96 patients (average age 67.5 ± 9.2 years, range of 45–78 years) that underwent total knee arthroplasty. Early program of kinesitherapy and occupational therapy was performed. Instrument used for assessment of the quality of life, physical function, pain and stiffness is modified version of Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). All patients completed the questionnaires preoperatively and 6 weeks postoperatively. Pearson test of correlation was used to analyze numerical data.

Results: Quality of life of the patients with knee osteoarthritis 6 weeks after arthroplasty shows significant correlation with physical function ($r=0.547$, $p<0.00$), pain ($r=0.281$, $p<0.01$) and waist circumferences ($r=0.208$, $p<0.05$) preoperatively.

Conclusion: Results of our research show that physical function, pain and waist circumferences of the patients with knee osteoarthritis before arthroplasty influences on the level of the quality of life after total knee arthroplasty. These findings can be important for creating the program of preoperative rehabilitation and for assessment of indications for arthroplasty.

P666

MOBILITY OF THE LUMBAR SPINE AND FUNCTIONAL DISABILITY IN PATIENTS WITH CHRONIC LOW BACK PAIN

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Objectives: The aim of this study was to examine the association between lumbar mobility and functional disability and the influence of body mass index (BMI) on the mobility of lumbar spine in patient with chronic low back pain (CLBP).

Material and Methods: The study was conducted on 29 patients-13 men (mean age 47.61 ± 11.92) and 16 women (mean age 51.25 ± 13.69) with CLBP which lasted more than three months (mean duration 12.62 ± 6.87 months). To assess range of motion (ROM) of lumbar spine we measured ante flexion (AF)- distance from fingers to floor in centimeters. Weight and height were measured to calculate BMI. We used Roland-Morris Disability Questionnaire (RMDQ) to assess disability. The RMDQ is scored as a unidimensional scale summarizing answers to all 24 questions (Yes/No) regarding daily life functioning. Visual Analogue Scale (VAS) is used for evaluated back pain. We used EZR statistical software in the statistical analysis.

Results: Mean value of AF was 26.60 ± 9.20 , mean value of RMDQ 15.62 ± 3.90 , mean value of VAS 6.03 ± 1.49 and median of BMI was 25.86 (19.09 – 41.35). There was medium positive correlation between AF and RMDQ ($t=2.9887$, $df=27$, p -value= 0.006 , correlation coefficient= 0.499) and

medium positive correlation between VAS and RMDQ ($t=2.301$, $df=27$, p -value= 0.03 , correlation coefficient= 0.405) used Pearson's correlation test. There is no significant correlation between BMI and AF ($S=4561.1$, p -value= 0.5236 , correlation coefficient -0.123) and between BMI and RMDQ ($S=3028.1$, p -value= 0.1834 , correlation coefficient 0.254) used Spearman's rank correlation test.

Conclusion: This study has found significant correlation with lumbar kinematic and functional disability. On the other hand, influence of overweight on mobility of the lumbar spine is not found.

P667

MUSCLE STRENGTH AND PHYSICAL PERFORMANCE FROM MIDLIFE AND BONE HEALTH IN EARLY OLD-AGE: THE MRC NATIONAL SURVEY OF HEALTH AND DEVELOPMENT

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Objective: There are few prospective data investigating how muscle strength and physical performance in adulthood may relate to later bone health. The aim of this study was to test associations between grip strength, standing balance and chair rise speed, measured from midlife, with bone outcomes in early old age in men and women from a British birth cohort study, the MRC National Survey of Health and Development.

Materials and methods: At age 60–64y, 1583 (824 women) had assessments of bone including pQCT (radius) and DXA (hip). Analyses were stratified by sex, and associations between bone outcomes (radius: volumetric BMD, cross-sectional area (CSA), medullary area; hip: aBMD, femoral neck cross-sectional moment of inertia (CSMI), total hip CSA) and grip strength, chair rise speed and standing balance (assessed at ages 53 and 60–64) were tested using linear regression before and after adjustment for height and weight. Results are presented as percentage mean [95%CI] difference in DXA- and pQCT outcome per unit difference in strength or performance measure.

Results: In men, stronger grip at ages 53 and 60–64 was associated with greater radius (0.3 [$0.2, 0.4$]) and hip (0.2 [$0.2, 0.3$]) CSA, femoral neck CSMI (0.5 [$0.3, 0.6$]) and hip aBMD (0.2 [$0.1, 0.3$]); all $p<0.001$). Associations with CSA and CSMI measures were robust to adjustment for body size. In women, similar sized associations were found and

remained after adjustment for body size for radius CSA 0.4[0.2,0.5], hip CSA 0.2[0.1,0.3] and hip aBMD 0.2[0.0,0.3]. Neither chair rise speed nor standing balance were consistently associated with bone outcomes with the exception of chair rise speed and radius CSA ($p<0.001$) and vBMD ($p<0.05$) in men.

Conclusions: In a large, nationally representative study, grip strength had the most consistent, positive associations with clinically relevant bone outcomes at the radius and hip. Fewer associations were found with chair rise and standing balance performance, possibly because grip strength is a more direct measure of muscle function and therefore better indicator of the muscle bone relationship than these measures which are dependent on more body systems. Evidence for the importance of muscle bone relationships in midlife and early old age suggest midlife may provide an opportune time for intervention for prevention of disability associated with sarcopenia and osteoporosis in later life.

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PLASMA RESISTIN ARE ASSOCIATED WITH CLINICAL SEVERITY IN KNEE OSTEOARTHRITIS

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Objective: It has been shown that risk of primary knee and hip joint replacement for osteoarthritis (OA) relates to both adipose mass and central adiposity. This is suggestive of a potential link between dysfunctional metabolism and joint damage. Systemic adipokines have been suggested to function as mediators between adipose tissue and joint metabolism in osteoarthritis. Therefore, the aim of the current study is to explore the association between plasma resistin with clinical severity in female patients with knee OA and central obesity.

Material and Methods: The study was conducted in 91 female participants with primary knee OA, who were consecutively recruited from the orthopaedic clinics at King Abdulaziz University Hospital (KAUH), Jeddah, Saudi Arabia. Patients with secondary OA (such as those with a history of trauma, inflammatory rheumatic disease) were excluded. The study was approved by the medical ethics committee of KAUH. OA was diagnosed by clinical and radiologic evaluation based on the American College of Rheumatology criteria. Western Ontario and McMaster Universities Arthritis Index scores were used to grade pain, joint stiffness and limitations in function among OA patients. Anthropometric measurements including weight (kg), height (cm), waist and hip circumferences (cm) were measured

according to standard protocols. Central obesity was defined as WC>88 cm. Following a 12-h overnight fast, venous blood samples were obtained from all participants, centrifuged, and stored immediately at -80°C for later measurement. Serum resistin concentration was measured by ELISA assay (BioVendor, Modrice, Czech Republic). Data are expressed as the mean \pm SD. Continuous variables were evaluated using ANOVA test, categorical variables by Chi square tests. A $p<0.05$ was considered statistically significant. All statistical analyses were performed using SPSS program.

Results: Ninety one patients, aged between 41 and 60 years, were 75.8 ± 1.0 kg in weight and 163.3 ± 0.6 cm in height. Based on radiographic changes, the patients were classified into three groups in relation to OA grades: mild, moderate and severe. Albeit nonsignificant, a trend of increased plasma resistin value with the increment in OA grade was observed.

Conclusion: Serum resistin may provide a non-mechanical link between obesity and joint integrity in OA.

P669

PLANTAR PRESSURE MEASUREMENT OF PLANTAR FASCIITIS AND RELATIONSHIP WITH PAIN AND FASCIAL THICKNESS

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Objective: Plantar fasciitis is the most common cause of heel pain in adults. These patients modify their gait pattern due to the heel pain. We aimed to investigate whether there was a significant difference in the plantar pressure distribution after pain relief by successful treatment response in plantar fasciitis and relationships with fascial thickness.

Methods: 49 patients with a diagnosis of chronic unilateral plantar fasciitis received 3 weeks of physical therapy intervention and home exercises. Visual Analog Scale (VAS), plantar pressure measurement by pedobarographic assessment and magnetic resonance imaging were performed before and 1 month follow up after intervention. At 1 month follow up participants were divided into 2 groups according to the good or poor response to the treatment. The success criteria of the treatment was defined as percentage decrease of heel pain more than 60% from baseline at 1 month after treatment for pain (VAS) measurements.

Results: 44 participants completed the study. The number of the subjects were 24 in Group 1 who had successful response to the treatment, while 20 subject in Group 2 with poor response. The dynamic plantar pressure values of the medial forefoot was significantly increased, $p=0.015$ after treatment in the patients with successful treatment response (Group 1). There was no significant plantar pressure change in patients

with poor treatment response. Plantar fascia thickness positively correlated with dynamic thumb pressures (coronal $p=0.03$ $r=0.434$, sagittal $r=0.451$ $p=0.02$).

Conclusion: These findings showed that fascial thickness and dynamic plantar pressures were associated with each other. Plantar pressure increased on the forefoot medial as a result of the restoration of the gait with significant decrease in pain.

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GREATER YOGURT CONSUMPTION IS ASSOCIATED WITH INCREASED BONE MINERAL DENSITY AND PHYSICAL FUNCTION IN OLDER ADULTS

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Background: The associations of yogurt intakes with bone health and frailty in older adults are not well documented. The aim was to investigate the association of yogurt intakes with bone mineral density (BMD), bone biomarkers and physical function in 4,310 Irish adults from the Trinity, Ulster, Department of Agriculture aging cohort study (TUDA).

Methods: Bone measures included total hip, femoral neck and vertebral BMD with bone biochemical markers. Physical function measures included Timed Up and Go (TUG), Instrumental Activities of Daily Living Scale and Physical Self-Maintenance Scale.

Results: Total hip and femoral neck BMD in females were 3.1 - 3.9% higher among those with the highest yogurt intakes ($n=970$) compared to the lowest ($n=1,109$; $P < 0.05$) as were the TUG scores (-6.7%; $P=0.013$). In males, tartrate-resistant acid phosphatase (TRAP 5b) concentrations were significantly lower in those with the highest yogurt intakes (-9.5%; $P < 0.0001$). In females, yogurt intake was a significant positive predictor of BMD at all regions. Each unit increase in yogurt intake in females was associated with a 29% lower risk of osteopenia (OR 0.71; 95% CI 0.51 - 1.01; $P=0.037$) and a 37% lower risk of osteoporosis (OR 0.63; 95% CI 0.44 - 0.91; $P=0.014$) and in males, a 51% lower risk of osteoporosis (OR 0.49; 95% CI 0.25 - 0.94; $P=0.032$).

Conclusion: In this cohort, higher yogurt intake was associated with increased BMD and physical function scores. These

results suggest that improving yogurt intakes could be a valuable and cost-effective health strategy for maintaining bone health in older adults.

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LONG TERM FOLLOW-UP OF SUBJECTS FROM THE FRACTURK STUDY FOR NEW FRACTURES, MORTALITY AND MORBIDITY

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Objective: In 2009, the Fracturk Study determined the incidence of hip fracture and prevalence of osteoporosis in a random sample of the general population in Turkey. The aim of the present study was to assess the subsequent fracture risk in men and women over 50 years of age who were determined to have an osteoporotic fracture, compared to “healthy” subjects whose bone mineral densities were measured in 2009.

Materials and Methods: Data collection was performed via Telephone Aided Telephone Interviews (CATI). Two different questionnaires were applied; one for those subjects who were determined to have an osteoporotic fracture in 2009, and the other for healthy subjects whose BMDs were measured in 2009. A total of 656 (out of 1974) questionnaires were successfully completed for healthy subjects with BMD measurements. Successful questionnaires were completed in 16 (out of 35) subjects with osteoporotic fracture.

Results: Seven% of healthy subjects had an osteoporotic fracture in the 7-year time frame (2009 – 2016). 13.4% of those subjects whose femoral neck T-score was below -2.5 had an osteoporotic fracture; significantly higher than that of subjects with higher femur neck T-scores. Osteoporotic fracture rate was 6.8% among those whose femur neck T-score was between -2.5 and -1.0 and the rate was 4.0% among those whose femur neck T-score was above -1.0. FRAX scores (calculated without BMD) of those subjects who had an osteoporotic

fracture was higher than that of those without incident fracture (7.41 vs. 5.63), significant at 90% confidence level ($p=0.074$). 43% of those whose femoral neck BMD score was below -2.5 were having regular follow up for their osteoporosis' management.

Six out of 16 subjects who were determined to have an osteoporotic fracture in 2009 died during these 7 years. None of deaths was attributed to the incident to the incident fracture. Four out of 14 (relatives of the 2 deceased could not respond) subjects had new fractures. Five out of 14 did suffer impairment of their activities of daily after the first fracture.

Conclusion: Under current situation, 7% of the study population over 50 years of age will have an osteoporotic fracture within a 7-year time frame. More than half of patients do not have a regular follow up for osteoporosis treatment. In order to reduce the rate of osteoporotic fracture, efforts should be increased for secondary prevention of fractures.

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INTRA-OPERATIVE FGF23 ASSAY DURING SURGERY FOR TUMOR INDUCED OSTEOMALACIA: TOWARDS A PRECISION MEDICINE

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Objective: To investigate the usefulness of fibroblast growth factor 23 (FGF23) intra-operative assay to monitor resection of tumor in patients with tumor induced osteomalacia.

Case description: A 33-year-old man with five years' history of lumbar and pelvis pain together with multiple vertebral fractures was admitted to our hospital. He was diagnosed ankylosing spondylitis one year before and treated with anti-TNF α therapy without benefit. On physical examination, he had severe kyphosis, proximal weakness with difficulties in performing daily activities. He was unable to walk without crutches.

Results Laboratory investigation showed low tubular reabsorption of phosphate (1.28 mg/dl) despite chronic hypophosphatemia (1.2 mg/dl). Increased plasma values of FGF23 (673 pg/ml, ELISA LIAISON, Diasorin, Saluggia, Italy; n.v. <95 pg/ml) together with elevated

values of bone alkaline phosphatase (58 mg/l; n.v. <17) and low-normal values of 1,25(OH)₂D (26.2 ng/ml; n. v 20-67) were also observed. A total body CT scan showed two suspicious areas located in the head of the right femur and in the right tibia, even though the OctreosanTM showed an increased uptake of the tracer only in the femur. We decided to remove first the head femur lesion and perform intra-operative FGF23 assay to confirm tumor resection; if this had been unsuccessfully, we would have extended the operation to excise the second bone lesion. Basal, 10, 60 and 225 m' values after excision of the right femoral head were 423, 127, 56 and 30, respectively. Starting from the 60 m' all values were in the normal range. The brisk fall of FGF23 values suggested that the head femur lesion was responsible for the syndrome. On histological examination, a mesenchymal tumor with highly vascular proliferation pattern (hemangiopericytoma-like tumor), was diagnosed.

Conclusion: This is the first report showing the possibility of intra-operative FGF23 assay to monitor tumor resection in patients with tumor induced osteomalacia. This approach could be particularly useful to prevent incomplete resection or in case of multifocality, that has been recently described as a cause of surgical failure.

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TERIPARATIDE TREATMENT IN A HEART TRANSPLANT PATIENT WITH CHRONIC KIDNEY DISEASE AND LOW-TURNOVER BONE DISEASE: A CASE REPORT

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Low-turnover bone-disease is a complication of chronic kidney disease and long-term steroid therapy. Currently, the only bone anabolic treatment available is teriparatide (TPTD). So far no data exist in heart transplant patients and only one single case with histomorphometric analysis of a dialysis patient with low-turnover bone disease has been published so far.

The current report shows the effect of a 1-year TPTD therapy in a cardiac transplant patient with 10 vertebral and 3 peripheral fractures who had developed chronic kidney failure while receiving triple immunosuppressive therapy.

A transiliac bone biopsy following tetracycline labeling was performed prior and after one year of treatment,

showing an increase in bone formation and improvement of structural indices (20-fold increase of Osteoid Volume/Bone Volume, 4-fold increase of Osteoid Surface/Bone Surface and increases of wall thickness (+15%), trabecular thickness (+9%) and trabecular number (+38%)). Bone mineral density was stable, no new vertebral fractures had occurred, the therapy was well tolerated and the patient improved clinically.

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VERTEBRAL DEFORMITIES IN POSTMENOPAUSAL TYPE 2 DIABETIC WOMEN

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Objective: To assess the vertebral deformations in postmenopausal type 2 diabetic women.

Materials and methods: We examined 100 type 2 diabetic women (mean age: 59,4+ 6,2 yrs, mean BMI: 32,4 +6,11 kg/m², duration of DM – median 7[5;12] yrs, duration of menopause median 8,5[4;15] yrs.). The control group consisted of 77 healthy age- and BMI-matched persons. Bone mineral density (BMD) was measured with DXA with lateral vertebral assessment (LVA). We used the Genant classification to assess a grade of vertebral deformity.

Results: Osteoporosis (T-score <-2,5) has been revealed in 16% (n=16) of diabetic patients, osteopenia in 43% (n=43), normal BMD in 41% (n=41). In the control group the distribution BMD was comparable to diabetic patients (osteoporosis 14%(n=11), normal BMD 39%(n=30), osteopenia 47%(n=36)). Type 2 diabetic patients had 29 vertebral deformities that was statistically higher than in the control group (16,4% vs. 4,5% respectively, Yates Chi-square (df=1) 8,02 p=0,00462). In diabetic group there have been detected mild vertebral deformities (1st degree) (n=32), moderate deformities (2nd degree) have been found in 5 patients, severe deformities (3rd degree) have been in 2 patients detected in Th12. 8 patients had 2-3 deformities of different types at the same time. In the control group all the deformities were mild and moderate (n=8). Wedge deformities and biconcave deformities have been presented in equal frequency while crush deformities only in 2 patients. Thoracic vertebrae were more frequently deformed compared with lumbar ones.

Conclusions: Our study showed that vertebral deformities might have place in postmenopausal diabetic women (16,4%), in comparison with the control group (4,5%)

Yates Chi-square (df=1) 8,02 p=0,00462. Prevalently we found mild and moderate vertebral deformities in thoracic spine.

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THE INFLUENCE OF BODY WEIGHT ON BONE MINERAL CONTENT IN NORWEGIAN ADOLESCENTS: THE TROMSØ STUDY, FIT FUTURES

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Objectives: Osteoporosis and fragility fractures constitute a global health problem. Maximization of the genetic potential for bone mineral acquisition during growth may reduce fracture risk later in life. The association between body weight (BW) and bone accumulation in adolescence remains controversial. The aim of this population-based study was to explore the influence of BW on bone mineral content (BMC) development in late adolescence.

Material and Methods: In 2010-2011 we invited all first upper secondary school students in Tromsø to the Fit Futures study and 1038 adolescents (93%) attended. We measured total body (TB) BMC (g) by DXA. Two years later, in 2012-2013, we invited all participants to a follow-up survey and 820 adolescents attended, providing 688 repeated measures. BW and height were measured to the nearest 0.1 kg and 0.1 cm and sexual maturation assessed by questionnaires. Linear mixed models were used to assess the time dependent associations between BMC and BW. We included 351 girls and 296 boys aged 15 to 17 years at baseline in the analysis.

Results: Mean follow-up time were 1.9±0.02 years. Mean annual changes for TB BMC were 39.6±6.3 g and 118.8 ±8.9 g for girls and boys, respectively (p<0.000). For girls, average annual BW change were 1.4±0.3 kg. BW change for boys were 2.7±0.4. After controlling for baseline age, height, sexual maturation and time between measurements, we found that BW was positively associated with TB BMC; 19.2±2.1g for girls and 18.6±2 g for boys (p<0.05). Intercepts and random slopes for weight varied significantly across participants in both models; For girls SD for: (u_{0j})=481.3 and (u_{1j})=8.0 (p<0.05). Correspondingly for boys, 446.7 and 6.3. Intercepts and slopes covaried positively; cov (u_{0j}, u_{1j}) for girls and boys were 63.2 and 39.6.

Conclusion: Our results indicate a positive combined between- and within subjects association between TB BMC and BW.

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EFFECTS OF ABALOPARATIDE-SC ON BONE MINERAL DENSITY AND RISK OF FRACTURE IN POSTMENOPAUSAL WOMEN AGED 80 YEARS OR OLDER WITH OSTEOPOROSIS

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Objective: Abaloparatide-SC (ABL-SC) is a novel, selective activator of the PTH 1 receptor signaling pathway. ABL-SC reduced vertebral and nonvertebral fractures and bone mineral density (BMD) compared to placebo (PLB), and reduced major osteoporotic fractures compared to teriparatide (TER). Here, we report safety and efficacy of ABL-SC in women ≥ 80 years in the ACTIVE trial.

Material and Methods: ACTIVE was a phase 3 trial of 2463 postmenopausal women with osteoporosis, randomized 1:1:1 to double-blind ABL-SC 80 μg or PLB, or open-label TER 20 μg SC for 18 months. Women ≥ 80 years of age enrolled in ACTIVE were studied for changes in BMD from baseline and safety. Fracture rates are presented, but these exploratory analyses were not powered to detect differences between treatment groups.

Results: 140 women ≥ 80 years [mean 82 years; range 80-86 years; mean femoral neck (FN) T-score -2.5] were randomized to receive ABL-SC (n=51), PLB (n=43), or TER (n=46). At baseline 51 (36%) patients had a prevalent vertebral fracture, 58 (41%) reported ≥ 1 prior non-vertebral fracture, and 52 (37%) had no prior fractures. Incidence rates for new vertebral fractures were 0%, 6%, and 3%, and Kaplan-Meier estimated rates for nonvertebral fracture were 2.2%, 5%, and 5.3%, for ABL-SC, PLB, and TER, respectively. At 18 months, significant increases in BMD from baseline were observed for ABL-SC vs. PLB at the total hip (mean change 3.86% vs. 0.60%; treatment difference [TD] 3.13% [95% CI 1.44%, 4.81%]; P=0.0004), FN (3.61% vs. 1.24; TD 2.87% [95% CI 0.82%, 4.92%]; P=0.0068), and lumbar spine (12.11% vs. -0.01%; TD 12.30% [95% CI 9.34, 15.26]; P<0.0001). Adverse events appeared similar across groups and similar to the overall population.

Conclusions: Among a small subpopulation of postmenopausal women with osteoporosis ≥ 80 years of age enrolled in ACTIVE, ABL-SC resulted in significant improvement in BMD, and numerical reduction in risk of vertebral and nonvertebral fractures, compared to placebo.

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NIGHT SWEATS ALONE DOES NOT PREDICT GREATER BMD LOSS: A PROSPECTIVE POPULATION-BASED STUDY IN WOMEN AGED 43-63 FROM THE CANADIAN MULTICENTRE OSTEOPOROSIS STUDY

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Objective: Our primary objective was to compare 2-year changes in lumbar spine (LS) BMD between women with clinically important night sweats (at least moderate severity ≥ 3 times in the last 2 weeks; VMSn) and without.

Methods: We examined data at baseline and 2-year follow-up for 1570 women, aged 43-63, in the Canadian Multicentre Osteoporosis Study (CaMos), a prospective Canada-wide study of skeletal health. We used linear regression to assess the relationship between VMSn and BMD change. Covariates included age, reproductive status, weight, physical activity, estrogen use, and family history of fracture.

Results: The prevalence of clinically important VMSn was 12.2%. Women with VMSn were younger (54.5 vs. 55.3 years, p=0.02) and less likely to use estrogen (39.8% vs. 51.4%, p<0.05). LS, total hip (TH), and femoral neck (FN) BMD were similar between groups at baseline and 2-year follow-up. In unadjusted and adjusted models, a non-significant greater loss in LS BMD at 2-year follow-up was seen in women with VMSn (mean difference -0.42%, 95%CI(-1.08, 0.24), p=0.21). Age and reproductive status (in separate models), weight, and estrogen use accounted for variations in LS BMD. Similar results were seen when evaluating 2-year change in TH and FN BMD (mean difference -0.41%, 95%CI(-0.90, 0.08), p=0.10 and -0.42%, 95%CI(-1.08, 0.24), p=0.24, respectively). No difference in low-trauma fracture incidence was seen between groups at 2 years.

Conclusion: We did not find a significant association between clinically important VMSn and 2-year BMD change that was not already accounted for by other modifying factors, but a trend towards greater BMD loss with VMSn was appreciable. Our results, though, are restricted to VMSn and may not truly capture the relationship between VMS and BMD. Additional research involving VMS and bone loss and fracture incidence is needed.

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P678**GO – ON AND CARTINORM IN TREATMENT OF GONARTHROSIS**

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Gonarthrosis is a degenerative disease of the knee joint (knee OA), which is accompanied by pain and a limited range of movements. In addition to the standard treatment of the knee OA, which includes anti-rheumatic drugs and physical therapy, the GO-ON, a sterile non-pyrogenic solution of sodium hyaluronate could be used in combination with Cartinorm tablets.

We analyzed 28 patients with gonarthrosis, who have been treated at the Clinic for Orthopaedic Surgery and Traumatology in Niš, from 01.09.2016. to 31.12.2016. by intra-articular administration of the GO-ON ampules in the knee joint. In the analyzed group there were 16 (57,14%) women and 12 (42,86%) men. The GO-ON ampules were administered once a week at a dose of 25mg (2.5ml of solution) for the period of five weeks. After that, the patients were prescribed tablets Cartinorm (Glucosamin, Chondroitin, Vitamin D3, Calcium, Manganese, Chromium, Vitamin C) once a day. The Pain and the range of movements of the knee were studied before and after the intra-articular GO-ON administration and Cartinorm tablets.

Analyzing the results, we have found that the GO-ON in combination with Cartinorm proved to have very good effects in 20 (71,43%) patients, good in 6 (21,42%) and 2 (7,14%) patients had partial improvement.

P679**ULTRASONOGRAPHY OF THE FIRST METATARSAL PHALANGEAL JOINT IN EARLY GOUT PATIENTS**

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Objective: To investigate by ultrasonography (US), frequency and characteristics of the first metatarsophalangeal joints (1st MTPJs) changes of patients with first attack of gout and in patients with asymptomatic hyperuricemia.

Methods: US examination of the 1st MTPJs of both feet was performed in 25 male patients with first attack of gout and 25 male patients with asymptomatic hyperuricemia. The presence of bone erosions adjacent to tophaceous material; tophi, hyperechoic material surrounded by anechoic rim; and hyperechoic band over the articular cartilage (double contour sign) were compared between groups.

Results: 25 male patients (average age 55.24) with first attack of gout and 25 age-matched male patients with hyperuricemia (average age 54.12) were compared. Double contour sign we found in 64% of gouty joints and in 36% with asymptomatic hyperuricemia ($P < 0.001$); tophaceous material, was seen in 24% gouty joints and in 8% with asymptomatic hyperuricemia ($P < 0.001$); erosions were seen in 28% and in 8% with asymptomatic hyperuricemia ($P < 0.001$).

Conclusions: These data show that US examination of the 1st MTPJ may help in the early diagnosis of the gout, identifying sonographic features of the disease even in clinically silent joints.

P680**RETROGRADE INFECTION AFTER A TREATMENT OF A TROCHANTERIC FRACTURE IN A FEMALE PATIENT WITH OSTEOPOROSIS**

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Osteoporosis represents a generalized bone disease, which is characterized by the reduction of the bone mass, and consequently by the reduction of the strength of the bones. Osteoporosis occurs in both sexes, but it is more frequent in women after the menopause. A 78-year-old female patient (P.V.) got a transtrochanteric fracture of the femur. After the complete preoperative preparation, a surgery has been done, osteosynthesis with an internal fixator by Mitković. During the postoperative course the screws of the internal fixator disintegrated and fell out, and a bed sore and a perforation of the skin formed. During the local anesthesia the screws of the internal Mitković fixator were removed but the propagation of the infection continued. Despite the regular bandaging and the antibiotic therapy the infection did not simmer down. The surgery was performed again and the osteosynthetic material was completely removed and a flow drainage was set up. Along with the antibiotic therapy and the regular bandaging

the infection simmered down. As a result of the disintegration and the infection, 4cm curtailment of the left leg remained. The female patient began to move with a help of the underarm crutches.

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IN PATIENT CARE FOR DIABETIC AND NON-DIABETIC PATIENTS WITH OSTEOPOROTIC HIP FRACTURES IN A FRACTURE LIAISON SERVICE AT AN ASIAN HOSPITAL: BRINGING THE BURDEN INTO THE SPOTLIGHT

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Introduction: Osteoporosis as well as Diabetes are increasing exponentially in Asia. Whether and how the burden of hospital care and problems after admission for osteoporotic hip fractures differ between diabetics and non-diabetics has not been explored in SE Asian populations.

Method: Retrospective review of patients admitted with new osteoporotic hip fractures and recruited into a FLS at Singapore's largest hospital.

Results: The study population included 150 non-diabetics and 88 diabetics. Chinese constituted 87.4%, Malays 6.7% and Indians 3.8%. 81.5% were women. Mean age was 74 years (10.3). On Univariate analysis, mean ((SD) time to operation (TTO) in days was significantly more in diabetics compared to non-diabetics; 4 (3) vs. 3.1 (3.3); $p=0.002$. Length of Hospital Stay (LOHS) in days significantly differed between diabetics and non-diabetics; (mean (SD) 14.3 (7.7) vs. 12.6 (10.8) respectively; $p=0.006$). Major post-operative complications were more in diabetics (19.3% vs. 8.7%; $p=0.023$). Non-diabetics were more likely to be discharged to their homes (55.3% vs. 42%) compared to diabetics who were more likely to get discharged to nursing homes or step-down facilities ($p=0.037$). There were no in-hospital deaths in either group. After adjusting for age and gender, patients with one or more co-morbidities at admission had a delay in time to operation by 1.66 days (CI 0.8-2.51; $p<0.001$) compared to those who had none. Logistic regression showed that the odds of developing post-operative complications was 2.15 times (0.98-4.74) higher in diabetics compared to non-diabetics ($p=0.055$). Both diabetic and non-diabetic patients with one or more other co-morbidities at admission had on average 3 days longer LOHS and those who developed a post-operative complication had 9 days longer LOHS than those who did not ($p=0.014$ and $p<0.001$ respectively). Linear regression analysis adjusted for age, gender, co-morbidities and post-operative complications showed that LOHS was longer in diabetics by 1.16 days compared to non-diabetics (1.01-1.34; $p=0.036$).

Conclusion: The burden of hospital care for patients with hip fractures is large. Though both non-diabetics and diabetics with other comorbidities present at the time of admission had more delays to operation and longer hospital stays, the burden appears to be even more in diabetics compared to non-diabetics with the former more likely to have post-operative complications and ultimately needing longer inpatient care.

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EFFECTS OF LOW-VOLUME HIGH-INTENSITY RESISTANCE TRAINING ON BONE MINERAL DENSITY AND FALLING RISK FACTORS IN OSTEOPENIC/OSTEOPOROTIC WOMEN

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Resistance training (RT) improves muscular strength, falling risk factors, and is associated with maintenance of bone mineral density (BMD), which is important to minimize fractures and costs, estimated at \$20 and \$30 billion in the U.S. and Europe, respectively. bioDensity is a low-volume high-intensity RT approach. Four limited-range exercises (chest press, CP; leg press, LP; core pull, Core; and vertical lift, VL) are performed at a voluntary-maximal effort for 5-seconds each once per week to elicit multiple body weight loading of the musculoskeletal system.

Objective: To determine whether 24-weeks of bioDensity training improves BMD and risk factors for falling in osteopenic/osteoporotic women.

Methods: 24 women (58±9.3 yrs; 24.1±4.0 kg/m²; T-scores <-1.0) completed once per week bioDensity training for 6-months. Pre- and post-training measures: BMD (total, lumbar, femoral neck) and body composition (DXA), Y-balance test, Senior Fitness Test, and muscular strength. Paired t-Test data analyses.

Results: At 24-weeks, there was no change in BMD (any site) or body composition (body fat or lean mass). CP (42%), LP (41%), and VL (29%) strength increased ($P<0.05$). Balance (right: 82.6% to 86.3%; left: 83.0% to 86.8%) improved significantly ($P<0.05$) along with agility (9%), chair-to-stand transfers (19%), and floor-to-stand transfer time (22%). Pharmacotherapy regimen and lifestyle were stable across study duration.

Conclusion: The absence of change in BMD is not entirely surprising despite the low BMD of participants. While evidence suggests that high mechanical loading favorably impacts BMD, the 24-week training exposure may be insufficient duration for measurable adaptation. Without a matched control group, it is unknown whether bioDensity may have prevented/diminished the typical decline in BMD over time.

The favorable changes in muscular strength, balance, and falling risk factors are clinically meaningful and may confer a lower fall/fracture risk. In the absence of lean muscle mass change, strength improvement may be due to improved neuromuscular facilitation, e.g., Type 2 motor unit recruitment. The low-volume high-intensity bioDensity approach improves several fall risk factors in osteopenic/-porotic women. Further longitudinal controlled trials should assess whether bioDensity attenuates age-related decline in BMD in at-risk populations.

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IMPACT MICROINDENTATION TESTING OF CORTICAL BONE USING THE OSTEOPROBE®: A FEASIBILITY STUDY IN POPULATION-BASED MEN

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Objective: Bone mineral density (BMD) does not fully elucidate fracture risk; the largest absolute number of fragility fractures occurs in people with osteopenia. Other determinants of bone strength such as bone material properties and microarchitecture may contribute to fracture risk. OsteoProbe® is a novel device that assesses bone material strength index (BMSi) in vivo. Research using this device is expanding, underscoring the need to assess acceptability in the clinical setting. In this preliminary study we assessed participant tolerability and feasibility of the OsteoProbe®.

Materials and Methods: In 107 men enrolled during 2016 in the Geelong Osteoporosis Study (age 33-92yrs), BMSi was measured using the OsteoProbe® at the mid-tibia in reclined position after the administration of local anaesthetic. Immediately following measurement, each participant completed a questionnaire that asked them to rate on a line scale (out of 10) the level of pain that was anticipated and experienced, their initial reluctance towards the measurement and their willingness to undergo the measurement again. Of 107 potential participants, exclusions were: needle phobia (n=2), skin infections (n=5), excessive soft tissues around mid-tibia region (n=7), due to discomfort (pressure, no pain) after the first indentation (n=2).

Results: The mean (±SD) BMSi was 83.2±6.4 (range 62.7-94.5). The expectation for pain during OsteoProbe® measurement was low (1.61±1.64), as was actual pain experienced (0.34±0.74). Participants were not reluctant to undergo measurement (0.43±1.15). Acceptability of the OsteoProbe® measurement was high; 98% of participants indicated a

willingness to undergo the measurement again while 2% of participants were unsure whether they would be willing to undergo the procedure again.

Conclusions: In this study, the OsteoProbe® was well accepted by participants. These preliminary data suggest that microindentation testing with the OsteoProbe® is feasible in clinical settings.

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INTEGRATING REGULATORY ELEMENTS AND GWASS IDENTIFIES NOVEL SUSCEPTIBILITY GENES AFFECTING BONE MINERAL DENSITY

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Objective: We aimed to identify new susceptibility genes for osteoporosis through integrating regulatory features and previous genome-wide association studies (GWASs) data.

Material and Methods: Osteoporosis-associated SNPs were obtained from NHGRI GWAS Catalog, PheGenI database and two recently published GWASs. The regulatory features derived from Encyclopedia of DNA Elements and Roadmap Epigenomics Mapping were used to acquire the characteristics of osteoporosis-associated SNPs with machine learning methods. Subsequently, we predicted the genome-wide SNPs using optimized algorithm to discover new susceptibility variants. We further utilized Genetic Factors for Osteoporosis Consortium (GEFOS) dataset and three in-house GWAS samples to check the associations between predicted positive SNPs and bone mineral density (BMD).

Results: We predicted 37,584 novel candidate osteoporosis-associated loci with optimized algorithm. 369 of them were significantly associated with femoral neck or/and spine BMD in the meta-analysis results after multiple testing corrections. We also found three novel genes that were significantly associated with spine BMD, including *AMT* ($P=8.98 \times 10^{-7}$), *GAL* ($P=7.89 \times 10^{-8}$) and *ESPL1* ($P=1.95 \times 10^{-7}$). *AMT* encodes one of four critical components of the glycine cleavage system which provides a bypass reaction in glycine metabolism and *GAL* encodes the precursor of galanin. Both glycine and galanin have been reported to be associated with osteoporosis. As for *ESPL1*, it has been reported to be correlated with *SP7*, a transcription factor that responsible for regulating osteoblast differentiation. Our findings highlighted the credibility of our prediction.

Conclusions: Combining GWASs and regulatory elements through machine learning could provide additional

information for understanding the molecular mechanism of osteoporosis. Our results would provide insights on searching osteoporosis-associated genetic variants. The three susceptibility genes, *AMT*, *ESPL1* and *GAL* could be novel targets for etiology research and treatment of osteoporosis.

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DIFFERENTIATING AND VALIDATING ‘PAIN PHENOTYPES’ IN KNEE OSTEOARTHRITIS

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Objectives: Pain in osteoarthritis (OA) is very common and often involves multiple joints. It is multifactorial and individualised with multiple factors involved in the genesis and pain experience, such as structural pathology, psychological factors and pain coping strategies. Thus it may be possible to group people together based on specific factors which are linked to experiencing pain. Therefore, this study aimed to identify and validate ‘pain phenotypes’ in knee OA.

Material and Methods: 1099 participants (mean age 63 years; range 51-81 years) from the population-based Tasmanian Older Adult Cohort study participated at baseline. 875, 768 and 563 participants were traced years 2.6, 5.1 and 10.7 follow-up, respectively. Demographic, psychological, lifestyle and comorbidities data were obtained at baseline. T1-weighted or T2-weighted fat saturated MRI of the right knee was performed to measure knee structural pathology—cartilage defects, bone marrow lesions (BMLs) and effusion-synovitis at baseline. Knee pain was assessed using Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) at each time-point. Presence of pain (yes/no) at the neck, back, hands, shoulders, hips, knees and feet was assessed by questionnaire at each time-point. Latent class analysis, was used to differentiate ‘pain phenotypes’ considering sex, body mass index (BMI), emotional problems, comorbidities, number of painful sites and knee structural damage on MRI.

Results: Three pain phenotypes were identified: Class 1: high levels of emotional problems and low levels of structural damage (24%); Class 2: high levels of structural damage and low levels of emotional problems (20%); Class 3: relatively low

levels of emotional problems and low levels of structural damage (56%). People within Class 1 were more likely to be female, had greater BMI, lower education level, more comorbidities, more severe knee pain and more painful sites as compared to Class 2 and Class 3. Furthermore, WOMAC pain scores and number of painful sites were consistently greater at baseline, 2.6, 5.1 and 10.7 years in Class 1 than Class 2 and Class 3 (all $P < 0.05$).

Conclusions: Psychological and structural factors interact with each other to influence pain perception.

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A FOCUSED LITERATURE REVIEW OF THE DIRECT MEDICAL COSTS ASSOCIATED WITH CLINICAL FRACTURES IN THE UNITED STATES

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Objectives: Osteoporotic fractures can either be grouped by fracture location, such as vertebral and non-vertebral, or by whether they are associated with clinical symptoms, which especially helps to further characterize vertebral fractures. Of all vertebral fractures, approximately 30% are clinical vertebral fractures that generate most of the morbidity and mortality. We evaluated the direct medical costs associated with clinical fractures (both clinical vertebral and non-vertebral), clinical vertebral fractures, and non-vertebral fractures, and determined the impact of the grouping of fractures by location or by symptoms on the average costs and the total US medical costs associated with these composite fracture classifications.

Methods: We conducted a focused literature review using PubMed from 2001 to present using the key words of fracture(s) and cost(s) or expenditure(s). More, we included only original research on osteoporotic fractures that reported or allowed the calculation of clinical, clinical vertebral, and non-vertebral fracture costs. Costs were normalized to 2016 US dollars using the medical Consumer Price Index. Average fracture costs for commercially insured patients and Medicare patients and the total costs of the fracture groupings in the US were analyzed.

Results: Findings are shown in Table 1. Clinical fractures can cost between \$14,404 - 17,806 on average depending on insurance type, and can cost \$21 billion a year in the US. **Conclusions:** Clinical fractures are a costly composite fracture grouping. Osteoporosis treatment and future studies should focus more on reducing the disease burden of clinical fractures.

Disclosures: The study was funded by Amgen Inc. All authors are employees of Amgen, and hold stocks or stock options of Amgen.

| | Clinical | Clinical vertebral | Non-vertebral |
|----------------------------|------------|--------------------|---------------|
| Average costs (commercial) | | | |
| Christensen et al. | 14,640 | 22,714 | 12,406 |
| Bonafede et al. | 15,676 | 27,748 | 14,547 |
| Brenneman et al. | 12,821 | 18,803 | 11,131 |
| Weighted average | 14,404 | 23,030 | 12,836 |
| Average costs (Medicare) | | | |
| Blume et al. | 29,573 | 26,308 | 30,134 |
| Christensen et al. | 15,748 | 12,826 | 16,744 |
| Bonafede et al. | 18,199 | 14,057 | 19,030 |
| Brenneman et al. | 10,094 | 8,458 | 11,110 |
| Weighted average | 17,806 | 15,407 | 18,573 |
| Total costs in the US | 21 billion | 8 billion | 13 billion |

P687**PREVENTION OF OVARECTOMY-INDUCED BONE LOSS IN MICE BY BORTEZOMIB**Y. Lee¹¹Dept. of Biochemistry, School of Dentistry, Kyungpook National University, Daegu, Republic of Korea

Bone homeostasis is achieved through coordinated activities of bone-forming osteoblasts and bone-resorbing osteoclasts. When the balance is skewed in favor of osteoclasts due to hormonal or inflammatory issues, pathologic bone loss occurs leading to the conditions such as osteoporosis, rheumatoid arthritis, and periodontitis. Bortezomib is the first in-class of proteasome inhibitors used as an anti-multiple myeloma agent. In the present study, we show that bortezomib directly inhibited the receptor activator of nuclear factor κ B ligand (RANKL)-dependent osteoclast differentiation of mouse bone marrow macrophages. Bortezomib significantly reduced the induction of osteoclast marker genes and proteins including nuclear factor of activated T-cells, cytoplasmic 1 (NFATc1). The intraperitoneal injection of bortezomib reduced ovariectomy-induced osteoclastogenesis and protected the mice from bone loss. These data propose novel use of bortezomib as a potential anti-resorptive agent.

P688**BILATERAL ATYPICAL FEMORAL FRACTURES AFTER ALENDRONATE AND SEVERE RASH WITH DENOSUMAB**J. Maharaj¹¹Division of Endocrinology/Wheeling Hospital, Wheeling, United States

Objective: Bilateral atypical femoral fractures (AFF) are infrequent complications of long-term bisphosphonates. Skin

rash with denosumab is also uncommon. The following case reports the extremely rare occurrence of both adverse events in the same patient.

Materials and Methods: A 60-year-old Asian lady with a past medical history of osteoporosis, presented with new onset left thigh pain and difficulty weight-bearing without any preceding trauma. Medications included 9 years of oral alendronate, calcium carbonate and cholecalciferol.

Results: X-Ray of the left femur revealed an incomplete transverse lucency in the lateral cortex of the femoral diaphysis with cortical thickening. Nuclear medicine scan confirmed a small focus of activity in the left femoral shaft with an identical focus of activity in the right femur, also corresponding to lateral transverse lucency on X-ray. Data was consistent with bilateral, atypical femoral shaft fractures. Laboratory studies were normal except for a low 25-hydroxyvitamin D level of 19 ng/mL. She failed to improve with conservative therapy and had successful bilateral intramedullary nailing. Bisphosphonate therapy was discontinued. She was supplemented with adequate calcium and cholecalciferol. Two years later, serial DXA showed significant bone mineral density loss. She started denosumab 60 mg subcutaneously every 6 months. One week following each injection, she developed an unbearable generalized urticarial rash. Denosumab was stopped after the third injection. Subsequently, the rash did not recur. After 18 months, she developed a lumbar spine compression fracture. She will be started on teriparatide with close follow-up.

Conclusions: Clinical suspicion for AFF should be high in patients on long-term bisphosphonates. Imaging of both femurs is necessary to avoid missing bilateral fractures. Alternative management strategies for osteoporosis should be explored following the occurrence of skin rash with denosumab.

P689**CORRELATION BETWEEN BONE MINERAL DENSITY AND SERUM TRACE ELEMENT CONTENTS OF ELDERLY MALES IN BEIJING URBAN AREA**L. Wang¹, H. T. Yu¹, G. H. Yang¹, Y. Zhang^{1,3}, X. Y. Song¹, T. J. Su¹, W. F. Ma¹, F. Yang¹, L. Y. Chen¹, L. He², Y. Z. Ma¹

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Objective: Trace element levels are associated with the incidence of osteoporotic fractures, but related mechanisms remain unknown. Trace elements may interfere with growth, development and maintenance of bones. Therefore, we investigated whether plasma trace element levels are

associated with bone mineral density in elderly males in Beijing.

Material and Methods: After epidemiologically investigating 91 elderly males with age ranging from 50 years to 80 years, we obtained a total of 30 healthy (group 1), 31 osteopenic (group 2) and 30 osteoporotic (group 3) subjects. Blood was collected, and serum concentrations of trace elements were detected. Elderly males in the three groups were carefully matched in terms of body mass index. Iron, manganese, zinc, copper, selenium, cadmium and lead were analysed by inductively coupled plasma-mass spectrometry. Bone mineral density (BMD) was measured by QDR-2000 dual-energy X-ray absorptiometry. Correlation between BMD and serum element contents was analysed using SPSS16.0.

Results: The plasma levels of manganese, zinc, copper, selenium and lead were similar in all of the groups ($P>0.05$). Cadmium was significantly and negatively correlated with BMD of the lumbar vertebrae ($P<0.05$). Moreover, cadmium and iron contents significantly differed in osteoporotic and healthy groups.

Conclusion: These elements may directly and correlatively affect BMD in elderly males. Many trace elements may directly and correlatively influence BMD. Future studies should be conducted to evaluate serum and bone levels of these trace elements to determine the relationship of these trace elements with osteoporosis.

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EFFECTS OF CHRONIC SLEEP DEPRIVATION ON GLUCOSE HOMEOSTASIS IN RATS

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Objective: Epidemiological studies have shown that chronic sleep disturbances resulted in metabolic disorders. The purpose of this study was to assess the relationship between chronic sleep deprivation (CSD) and the glucose homeostasis in rats.

Material and Methods: Twenty-four rats were randomly divided into CSD group and control (CON) group. The CSD rats were intervened by a modified multiple platform method (MMPM) to establish an animal model of chronic sleep disturbances. After 3-month intervention, all rats were subjected to an intraperitoneal glucose tolerance test (IPGTT) and an insulin tolerance test (ITT), and the body weight, aspartate aminotransferase (AST), alanine aminotransferase (ALT), creatinine, lipid profile group, and homeostasis model assessment-IR (HOMA-IR) were measured.

Results: Both the CSD and CON groups had an attenuation of weight gain after 3-month intervention. The plasma glucose level of CSD group was higher than that of the CON group during the IPGTT ($P<0.01$). The CSD rats showed a marked increase in HOMA-IR and ITT compared with the CON group ($P<0.01$). There were no significant differences of AST, ALT, creatinine, and most lipid parameters between the CSD and CON groups ($P>0.05$).

Conclusion: The CSD has a marked effect on glucose homeostasis, comprising glucose intolerance and insulin resistance.

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EFFECTS OF BONE MINERAL DENSITY ON GERIATRIC HIP FRACTURES

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Objective: The bone mineral density(BMD) of the proximal femur was measured on geriatric hip fracture patients to evaluate if BMD of the patient affects type and severity of hip fractures.

Material and Methods: From 2003 to 2016, 808 hip fracture patients aged over 65 yrs old who had bone densitometry study by dual-energy x-ray absorptiometry (DXA) of the hip within 1 month of the fracture was evaluated. There were 333 femur neck fractures and 475 intertrochanteric fractures. The fracture type was divided into neck and intertrochanteric fractures and neck fractures was subdivided into stable(Garden stage I, II) and unstable (GS III, IV) fractures and Pauwel's type 1, 2, 3. Trochanteric fractures were subdivided into AO/OTA classifications. The correlation between fracture type and subdivisions were compared with the patients age, BMD, t-score, and Z-score.

Results: Out of 808 patients only 143 patients had positive Z-score. The intertrochanteric fracture groups were 2 yrs older(79.5/77.3) and had poorer T-score(-2.5/-2.2) than neck fracture but better Z-score(-0.65/-0.85)($p<0.0001$). In the neck fracture groups, statistically not significant but stable(Garden stage I and II) fractures had poorer T-score(-2.36/-2.16) and Z-score(-0.75/-0.62)($p=0.08$). Pauwel's type 2 was the most common type but no correlation was found with the bone density and fracture type($p=0.12$). In the intertrochanteric fracture group, A1 fractures had poorest T-score(A1/A2/A3:-2.7/-2.46/-2.2) and Z-score (-0.997/-0.784/-0.585) compared to A2 and A3 type($p=0.01$).

Conclusions: More than 77% of hip fracture patients had negative Z-score implies that not only the absolute value of the bone density but their poor age matched value may be a implications for hip fractures. Intertrochanteric fracture groups were older and had poorer BMD since it is more related to osteoporosis. Stable femur neck fractures and

intertrochanteric fractures had poorer bone density because very light trauma may cause these fractures in more osteoporotic patients.

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COMPARISON OF FUNCTIONAL EXERCISES ON LOWER-EXTREMITY MUSCLE ACTIVATION IN PEOPLE WITH CHRONIC ANKLE INSTABILITY

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Objective: To compare muscle activation of lower extremity and trunk using surface electromyography (EMG) during five functional exercises and to determine optimized functional exercises in subjects with chronic ankle instability.

Material and Methods: Twenty-four subjects with chronic ankle instability (CAI) participated. Subjects performed five functional exercises in random order: (1) forward lunge (FL), (2) rotational lunge (RL), (3) anterior direction one leg standing exercise (A-OLS), (4) posteromedial direction one leg standing exercise (PM-OLS), (5) posteriolateral direction one leg standing exercise (PL-OLS). During the functional exercises, we collected surface EMG data of peroneus longus (PL), lateral head of gastrocnemius (GCM-L), gluteus medius (Gmed), peroneus longus (PL), ipsilateral erector spinae (ES-ipsi), and contralateral erector spinae (ES-con) muscle activities. A 5-s maximal voluntary isometric contraction (MVIC) value was calculated to determine a basis for EMG normalization.

Results: There were significant differences in PL and GCM-L muscle activities during the five functional exercises ($p < 0.05$). During A-OLS, PL and GCM-L muscle activities significantly higher than the other exercises (FL: $p = 0.005$, RL: $p = 0.006$, PM-OLS: $p = 0.007$, PL-OLS: $p = 0.008$ / FL, RL, PM-OLS, PL-OLS: $p < 0.001$, respectively). The muscle activity of Gmed significantly lower in RL than the other exercises (FL: $p = 0.001$, OLS: $p < 0.001$). Among the OLS exercises, muscle activity of Gmed was lowest in A-OLS. The muscle activity of ES-ipsi and ES-con significantly lower in FL and A-OLS than the other exercises (PM-OLS and PL-OLS: $p < 0.001$).

Conclusion: We thought that the exercise for people with CAI should have to increase of ankle muscle activation preferentially and at the same time, to lessen the activity of the muscles in the hips and trunk that compensate for unstable ankles. In A-OLS, PL and GCM-L muscle activities were much higher than other exercises, as well as Gmed, ES-ipsi, and ES-con muscle activities were lesser than the other OLS exercise. This study findings suggest that A-OLS may have an advantage over the other exercises in activating PL and GCM-L muscle contributing ankle stability and in reducing other muscles activation of proximal part. Therefore, A-OLS would be an effective method to activate ankle muscles in rehabilitation of people with CAI.

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THE EFFECT OF COOLED-DOWN PELOID AND WATER IN PATIENTS WITH ACTIVE RHEUMATOID ARTHRITIS

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Objective: To determine the effect of cooled-down peloid and water in patients with rheumatoid arthritis in its active stage.

Materials and methods: The research was conducted at Specialized Rehabilitation Hospital in Banja Koviljaca, Serbia, as a prospective study with 35 patients with active rheumatoid arthritis (RA) who had as a treatment method sulphuric peloid and water in cooled-down state. The control group with the same number of examinees had a combination of electrotherapy and hydrotherapy using tap water (four-cell baths). Both groups had kinesiotherapy and therapy using low-frequency electromagnetic field. The following factors were monitored: DAS - 28 (Disease Activity Score), the duration of morning stiffness, the strength of hand grip and functional assessments of loco motor apparatus.

Results: Average value of DAS - 28 score in the examined group was reduced from 6.1739 to 4.6539 and in the control group from 6.0032 to 5.4104 ($p < 0.001^{**}$, $F = 58.149$; $\text{Eta}^2 = 0.461$).

In the examined group, the average duration of morning stiffness was reduced from 103.43 to 94.14 min. ($p = 0.004^{**}$) and the difference between groups is of statistical significance ($p = 0.022^{*}$). The increase in strength of hand grip of both hands is significant in both examined group ($p < 0.01^{**}$) and the control group ($p < 0.05^{*}$) as well as the difference between groups at the end of the treatment period ($p < 0.05^{*}$).

Patients in the examined group achieved improved results in performing the "Stand up and walk" test by 2.38 sec ($p < 0.05^{*}$), and in the control group by 0.88 sec ($p > 0.05^{*}$) and the difference between the groups is statistically significant ($p < 0.05^{*}$).

Conclusion: The application of cooled-down peloid and water of Banja Koviljaca have a favorable effect in patients with active RA on the decrease of pain intensity levels, decreasing the inflammatory process and improving the functional status of the affected joints.

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CHANGE IN CAUSE OF MORTALITY IN FRAGILITY FRACTURE PATIENTS OVER A FEW YEARS IN A MAJOR TRAUMA CENTRE

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Objectives: It is well recognised that fractured neck of femurs (NOFs) are often terminal events. This study compares 30 day

mortality for inpatients following hip fracture at a trauma centre to both national and pre-regular orthogeriatrician input. It looks at causes of death and the impact regular orthogeriatrician review had on this including length of stay (LOS).

Material and Methods: Data was collected from local hip fracture and bereavement office databases for both LOS and mortality. Hip fracture ward LOS was collected for 2013 and 2015. Mortality data was collected for two periods; October 2010–September 2011 and November 2014–December 2015, which was then compared to national hip fracture database figures.

Results: In October 2010–September 2011, there were 24 deaths from a total 343 fractured NOFs (7.00%; national average 8.0%¹) with an average time until death of 10.66 days. In November 2014–Oct 2015, there were 34 deaths from a total 480 fractured NOFs (7.01%; national average 7.5%²) with an average time of death of 8.24 days. There was also a statistically significant difference in pre-morbid status; in the first study period the ASA grade was 2.81 compared to 2.95 (students T-test 0.002). This was reflected in the AMTS; in October 2010–September 2011 it was 6.93 compared to 8.05 in November 2014–October 2015. This was also statistically significant (<0.0001). Most deaths had medical origins with pneumonia remaining the most common. When looking at LOS the mean in 2013 was 25 days compared to 20 days in 2015.

Conclusion: Mortality rates were below the national average in both periods examined along with improved LOS. There was a more widespread cause of death in 2015 reflecting patients having more complex co-morbidities, and also the regular dedicated orthogeriatrician service, which provides daily reviews. These in-depth reviews allow earlier recognition of any medical problems, thereby minimising potentially avoidable causes of death and helping to reduce LOS. The regular orthogeriatrician also provides a much valued link to rehabilitation services.

References:

1. Royal College of Physicians. National Hip Fracture Database annual report 2012 - Supplement. London: RCP
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IDENTIFICATION OF SUSCEPTIBILITY GENES FOR OSTEOPOROSIS THROUGH INTERACTION ANALYSIS BETWEEN SMOKING BEHAVIOR AND GENETIC FACTORS

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Background Osteoporosis is influenced by the interaction between various genetic factors and environmental

circumstances. Smoking has been proved to be a risk factor for osteoporosis, while the molecular mechanisms underlying is unknown. In this study, we aimed to identify susceptibility genes for osteoporosis through interaction analysis between smoking behavior and genetic factors.

Methods Using microarray gene expression data of circulating B lymphocytes from 40 females (GSE13850), including 20 smokers and 20 non-smokers with low or high bone mineral density (20 low vs. 20 high), we conducted a two-way analysis of variance to screen candidate genes associated with both BMD and smoking behavior. Functional pathway enrichment analysis was applied to determine potential functional genes for osteoporosis, then followed by a validation at population levels employing gene-environmental interaction analysis, with genome-wide genotype and phenotype (hip or spine BMD, smoking behavior) data from 1617 Caucasian adults (phs000390.v1.p1).

Results We identified 441 genes significantly associated with interaction between BMD and smoking (FDR adjusted P-value <0.05). One functional pathway: Gap junction (including 12 susceptibility genes), was exclusively significantly enriched (BH adjusted P-value <0.05). Moreover, 3 genes (*ADCY9, EGFR, PRKGI*) in Gap junction were validated to be associated with interaction between hip (spine) BMD and smoking. These 3 genes all have close relationship with bone metabolism.

Conclusions Here we discovered a new regulatory framework connecting smoking and osteoporosis and demonstrated the importance of gene-environmental interactions in disease etiologies, which would offer new targets for osteoporosis related to smoking.

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SARCOPENIA AND OSTEOPOROSIS ARE NOT INDEPENDENT PREDICTIVE FACTORS OF HOSPITAL LENGTH OF STAY AND 6 MONTHS MORTALITY RATE IN CRITICALLY ILL PATIENTS

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Objective: Sarcopenia is a reliable marker of patient frailty that estimates the physiologic reserve of an individual patient. We evaluated the impact of sarcopenia and volumetric BMD on both hospital length of stay and 6-months-mortality rate in critically ill patients assessing clinical

and morphometric data using abdominal CT scans including total psoas area (TPA), psoas muscle density (PMD), skeletal muscle index (SMI) and bone mineral density (BMD).

Materials and Methods: Based on the data from the VITdAL-ICU randomized clinical trial¹⁾ we retrospectively reviewed abdominal unenhanced and contrast-enhanced CT examinations performed for any indication of a total of 37 critically ill patients (18 women, 19 men) with a mean age of 59 years. CT scans were taken between 6 months before and 3 days after intensive care unit (ICU) admission. Defining sarcopenia we used cut-off values for TPA (642,1 mm²/m² in women and 784 mm²/m² in men) and PMD (31.1 Hounsfield units (HU) in women and 33.3 HU in men), both measured at the level of L1, as well as for SMI (5.45 kg/m² in women and 7.26 kg/m² in men). Likely osteoporosis was defined by Th11 or L1 trabecular attenuation of ≤ 110 HU. TPA and PMD could not be obtained in 11 patients, BMD in 1 patient. The impact of these parameters on both hospital length of stay and 6-months-mortality rate were analyzed.

Results: Mean adjusted TPA was lower in women vs. men (478 vs. 749 cm³/m) as well as PMD (34.6 vs. 41.3 HU), SMI (6.2 vs. 7.7 kg/m²) and BMD (141.1 vs. 157.2 HU). Using defined cut-off values, 73% had sarcopenia assessed by TPA, 24% when assessed by PMD, and 38% when assessed by SMI. 28% had a trabecular attenuation value of ≤ 110 HU. No significant influence on hospital length of stay and on 6-months-mortality rate was detected, irrespective of the morphometric parameter used (TPA, PMD, SMI; BMD $p > 0.05$). However, survivors showed better values than patients who died within 6 months: TPA: 652 vs. 530 cm³/m; PMD: 38.4 vs. 37.4 HU; SMI: 7.03 vs. 6.96 kg/m²; BMD: 156 vs. 145.8 HU.

Conclusion: These data suggest that the presence of sarcopenia and likely osteoporosis assessed through CT scans is not an independent predictive factor of hospital length of stay and 6-months-mortality rate in patients who are critically ill. A limitation of the current study was the relatively small number of patients included.

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EFFECTS OF CHRONIC SLEEP DEPRIVATION ON BONE MASS AND BONE METABOLISM IN RATS

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Objective: To assess the effects of chronic sleep deprivation (CSD) on bone mass and bone metabolism in rats.

Material and Methods: Twenty-four rats were randomly divided into CSD and control (CON) groups. Rats were subjected to CSD by using the modified multiple platform method (MMPM) to establish an animal model of CSD. Biochemical parameters such as levels of serum N-terminal propeptide of type I procollagen (PINP), N-terminal cross-linking telopeptide of type I collagen (NTX), growth hormone (GH), estradiol (E2), serum 25(OH)D, and calcium (Ca) were evaluated at 0, 1, 2, and 3 months. After 3 months, each fourth lumbar vertebra and the distal femoral metaphysis of the left extremity of rats were harvested for micro-computed tomography scans and histological analysis, respectively, after the rats were sacrificed under an overdose of pentobarbital sodium.

Results: Compared with rats from the CON group, rats from the CSD group showed significant decreases in bone mineral density (BMD), bone volume over total volume, trabecular bone thickness, and trabecular bone number and significant increases in bone surface area over bone volume and trabecular bone separations ($P < 0.05$). Bone histomorphology studies showed that rats in the CSD group had decreased osteogenesis, impaired mineralization of newly formed bones, and deteriorative trabecular bone in the secondary spongiosa zone. In addition, they showed significantly decreased levels of serum PINP (1 month later) and NTX (3 months later) ($P < 0.05$). The serum 25(OH)D level of rats from the CSD group was lower than that of rats from the CON group after 1 month ($P < 0.05$).

Conclusions: CSD markedly affects bone health by decreasing BMD and 25(OH)D, deteriorating the bone microarchitecture, and decreasing bone formation and bone resorption markers.

P698

FRACTURES SUSTAINED PRE- BUT NOT DURING OR POST-PUBERTY ARE ASSOCIATED WITH BONE PARAMETERS IN EARLY ADULTHOOD

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Objectives: The long-term impact of fractures occurring in childhood on bone development is unknown. This study aimed to investigate the association between fractures occurred in different stages of puberty with bone parameters in early adulthood.

Material and Methods: We followed 201 young adults (mean age (SD)=25.5 (0.7) years) from birth for 25 years. At age 8, 16 and 25, fractures were self-reported with X-ray confirmation and areal bone mineral density (aBMD) was measured at the lumbar spine (LS), hip and total body (TB) by Dual Energy X-ray Absorptiometry. Total, trabecular and cortical volumetric bone density (Tt.vBMD, Tb.vBMD,

Ct.vBMD) and microarchitecture indices (cortical thickness, porosity and trabecular number, separation and thickness) were obtained by high-resolution peripheral quantitative computerised tomography in radius and tibia at 25 years. Multivariable linear regression was used to analyse the associations of the occurrence of pre-pubertal fractures (occurring before age 8 years) and pubertal and post-pubertal fractures (between ages 8–25 years) with all bone parameters.

Results: During the 25 years, 101 people experienced at least one fracture. Twenty-four sustained their first fracture before puberty and 77 in the pubertal/post-pubertal period. Pre-pubertal fracture was not associated with aBMD at age 8, but was inversely associated with LS aBMD (standardized $\beta = -0.56$, 95%CI: -0.97, -0.14; -0.69, 95%CI: -1.11, -0.28 for 16 and 25 years respectively), hip (-0.48, -0.88, -0.07; -0.61, -0.99, -0.22) and TB (-0.46, -0.86, -0.06; -0.58, -0.94, -0.22) at age 16 and 25 after adjusting for confounders. At 25 years, pre-pubertal fracture was significantly associated with all vBMD measures, cortical porosity, trabecular number and separation in the tibia (standardized $\beta = -0.72$ to 0.80), but only associated with Tb.vBMD, trabecular number and separation in the radius (standardized $\beta = -0.56$ to 0.71). Fractures occurring later than pre-puberty were not associated with any bone parameters.

Conclusions: Incident fractures in pre-puberty but not subsequent to this are associated with poorer bone outcomes in later childhood and early adult life. Children who sustain such fractures may be at risk of long-term poorer bone health and benefit from interventions to improve this.

P699

CLINICAL ANALYSIS OF BONE MINERAL DENSITY OF FEMALE KIDNEY TRANSPLANTATION RECIPIENTS

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Objective: To observe immunosuppressive therapy especially glucocorticoid treatment effects on the skeleton in female kidney transplantation recipients, we selected and analyzed the bone mineral density of them.

Material and Methods: We chosen 70 cases of female kidney transplantation recipients—38 postmenopausal and 32 premenopausal as study group, and 60 cases of women who did not receive the kidney transplant 30 postmenopausal and 30 premenopausal as control group. The bone mineral density BMD was measured by dual energy X-ray absorptiometry. The height, weight, the serum biochemical, bone turnover marker,

parathyroid hormone (PTH) and 25(OH)VD were tested. The BMD and serum biochemical levels were compared.

Results: The incidence of osteoporosis and osteopenia in study group was 25.7% and 48.6% respectively. The incidence of osteoporosis and osteopenia in control group was 20% and 38.3% respectively. At all lumbar sites, postmenopausal female kidney transplantation recipients had low BMD compared with the premenopausal female kidney transplantation recipients ($P < 0.05$). While in control groups, only the bone mineral density of L1 differed significantly between postmenopausal and premenopausal women who did not receive the kidney transplant ($P < 0.05$). Blood creatinine, urea nitrogen, uric acid and phosphorus significantly increased in the study group compared with control group ($P < 0.05$). The rate of glomerular filtration decreased in the study group compared with control group ($P < 0.05$). There is significant difference in bone alkaline phosphatase (BAP), parathyroid hormone (PTH), Osteocalcin (OC), 25(OH)VD and β -CTX between study and control group ($P < 0.05$).

Conclusion: Compared with women who did not receive the kidney transplant, the bone mineral density of female kidney transplantation recipients is lower. Bone turnover markers should be monitored periodically to guide the osteoporosis treatment.

P700

FRACTURE RISK IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Objective: Recent studies have suggested association between high fracture risk and type 2 diabetes mellitus even when BMD is normal. We examined type 2 diabetic patients and calculated 10-year probability of fracture using FRAX[®] tool to assess subjects with high risk factor.

Material and Methods: A total of 126 type 2 diabetic patients aged 40 to 79 years (mean 61.3±0.8), 35 males and 91 females were examined. DXA (Lunar Prodigy, USA) was performed in 56 subjects (50 females). Serum 25(OH)D and iPTH levels was performed using lab kits for Abbott Architect 8000, intra-assay CVs for 25(OH)D ranged from 1.60 to 5.92% whereas the inter-assay CV ranged from 2.15 to 2.63%. HbA1c was determined by standard method.

Results: The study results showed that only 29 subjects had normal body mass index (BMI), while 97 subjects were overweight or obese. All subjects had eGFR more than 45 ml/min/1.73 m². Mean HbA1c was 8.3±0.3% (from 5.9 to 11.2%).

Duration of diabetes was 1–36 years with the mean value of $12,9 \pm 1,2$. Approximately 50% of diabetic subjects received the insulin monotherapy or in combination with antihyperglycemic drugs. Serum 25(OH)D level was between 10,1 and 37,7 ng/ml (mean $18,5 \pm 3,8$). We found negative correlation between 25(OH)D and iPTH ($r = -0,35$, $p = 0,04$). Only 10 subjects (8,3%) had normal vitamin D status (serum 25(OH)D level more than 30 ng/ml), 116 subjects (91,7%) were insufficient or deficient. These data were similar to the previous results we had seen in the general population of the North-West region of Russia. We did not find association between 25(OH)D and HbA1c level. Thirteen patients had fracture in their medical history. DXA results showed low BMD in 15 (26,8%) diabetic patients. We found positive correlation between BMD in neck and BMI ($r = 0,55$, $p = 0,0004$) and negative correlation between BMD and age ($r = -0,47$, $p = 0,001$) in diabetic patients. BMD in patients with or without fractures in their anamnesis was the same ($p > 0,05$). We calculated 10-year probability of fractures using FRAX[®] tool and found that major osteoporotic risk was from 2,1 to 16,0% (mean $6,5 \pm 0,3$) and hip fracture risk was from 0,1 to 4,0% (mean $0,6 \pm 0,1$). Risk of fractures was associated with age ($r = 0,26$, $p = 0,002$), diabetes duration ($r = 0,31$, $p = 0,002$) and BMI ($r = -0,24$, $p = 0,008$), and was not associated with HbA1c, 25(OH)D or iPTH levels.

Conclusion: Our results showed that patients with sub-compensated diabetes mellitus type 2 and eGFR more than 45 ml/min/1.73 m² have low serum 25(OH)D level and normal BMD in most cases. FRAX[®] tool using in these population could identify subjects with high fracture risk even without DXA. Diabetes duration as well as age positively correlated with risk of fractures.

P701

EFFECTS OF ENDOGENOUS HYPERCORTISOLISM ON BONE TISSUE MRNA LEVELS RELEVANT TO BONE METABOLISM

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Molecular basis of the glucocorticoid-induced osteoporosis is largely unknown.

Objective: To investigate gene expression profiles that regulate bone metabolism in bone tissue samples from patients with Cushing's disease (CD).

Materials and Methods: patients with clinically evident and biochemically proven active CD and patients with hormonally

inactive pituitary adenoma matched by age, sex and BMI were invited to participate. Bone samples were taken during transsphenoidal adenomectomy from the base of the sellaturcica, immediately placed in lysis buffer (QIAzol) and subjected to homogenization. 24h urine free cortisol (24hUFC) was measured by an immunochemiluminescence assay on a VitrosECi (60–413 nmol/24 h). Total RNA isolation from bone tissue with on-column digestion of the genomic DNA was carried out with miRNeasy Mini Kit on the automatic station "QIAcube". Reverse transcription was carried out using a High-Capacity RNA-to-cDNA Kit. Gene expression analysis was performed by Real-Time PCR on StepOnePlus instrument with Custom TaqMan Array 48 Plus plates.

Results: We enrolled 24 subjects (15 patients with CD and 9 with hormonally inactive pituitary adenomas); 18 females and 6 males, the mean age was 41 years (confident interval (CI) 95% 36–46) mean BMI - 29 (CI95% 26–32) kg/m². There were no significant difference between the groups. Mean 24hUFC in subjects with CS - 1168 (CI95% 702–1634) nmol/24h.

Expression of osteoblast activity and bone formation genes was decreased in patients with CD: *ALPL* 0,34 (CI95% 0.24–0.43, $p < 0.001$), *BGLAP* 0,41 (CI95% 0.28–0.54, $p < 0.001$), *COL1A1* 0,26 (CI95% 0.14–0.37, $p < 0.001$), *COL1A2* 0,51 (CI95% 0.33–0.69, $p < 0.001$), *MMP2* 0,52 (CI95% 0.41–0.62, $p < 0.001$). The expression of *SOST* 5,3 (CI95% 1,8–8,8, $p < 0.001$), *WNT10B* 10,24 (CI95% 5,26–15,22, $p < 0.001$), *WNT3A* 1,44 (CI95% 0,3–2,57, $p = 0,016$), *CD40* 3,5 (CI95% 3,13–3,91, $p < 0.001$), *BMP7* 2,03 (CI95% 1,22–2,83, $p < 0.001$) was increased in subjects with hypercortisolism as compared to inactive pituitary adenoma.

Conclusion: Hypercortisolism suppress genes expression related to bone formation and these effects most likely realized through increased expression of *SOST* and Wnt signaling pathway.

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P702

FATIH DISTRICT-GERIATRICS STUDY: MOOD AND COGNITION OF OLD PEOPLE WHO LIVE IN COMMUNITY

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Aim: In this abstract, we aimed to investigate the mood and cognitive problems of old population living in Fatih/Istanbul province.

Material and Method: Elder people who live in addresses specified with cluster sampling method were included in the

study. Third and fourth year students of İstanbul Medicine Faculty worked as pollsters. Pollsters took standard training for related evaluations. Elder people whose ages between 65 and 101 were included in the study. Cognitive condition scanning was done with mini-cog test and depression scanning was done with GDS-SF. Life quality measurement with EQ-5D life quality survey, functional capacity evaluation with 6-items KATZ Daily Life Activities Scale and 8-items LAWTON-BRODY Instrumental Daily Life Activities Scale were evaluated accordingly. Number of illness and drug, present dementia, hypertension, diabetes and hyperlipidemia diagnosis were noted.

Results and Discussion: This study includes 204 old cases (94 male, 110 female). Average age: 75.4 ± 7.3 year. Table 1 summarizes demographic, cognitive and mood, functionality and life quality evaluation data and distribution between genders. While depression scanning positiveness is meaningfully high in women (22.6% vs. 4.3%; $p < 0.001$), mini-cog scanning test and present dementia diagnosis are similar in both genders. Life quality measurement was meaningfully low; chronic disease and the number of drugs were higher. There is no meaningful difference between two genders about age about basic GYA point, present HT, DM, HL diagnoses and subjective health status score.

Conclusion: Old people in society have significant levels of cognitive dysfunction and depressive mood. Depressive mood, low-life quality, multidisease and drug usage are more and education level and functionality is less than men for women.

P703

ADHERENCE AND PERSISTENCE TO TERIPARATIDE TREATMENT

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Objectives: Osteoporosis increases the risk of fracture and associated morbidity and mortality. Efficacy of anti-osteoporotic treatment is based on drug potency and adherence and persistence. Teriparatide (TPTD) is the first anabolic agent developed for the treatment of osteoporosis and can significantly reduce the incidence of vertebral fractures. We aimed to evaluate adherence and persistence to TPTD treatment in patients with severe osteoporosis in a specialised Bone Health Service.

Materials and Method: A cross-sectional and retrospective longitudinal study was performed of all patients in our clinic with severe osteoporosis treated with TPTD from 2004 to 2016.

Results: 597 patients commenced TPTD from 2004 to 2016: 90% female, mean age 70 years (range 30-99); 225 (38%) had

vertebral fractures; 136 (23%) had Colles fractures; and 75 (13%) had a hip fracture. 106 patients (18%) are currently on treatment. 491 (82%) are no longer on treatment with 367 (75%) having completed 18 months or more of treatment. 122 patients (25%) stopped treatment before 18 months. Of these, the mean length of time on treatment was 195 days. Reasons for prematurely stopping included self-discontinued 19 (16%), side effects 62 (51%), death from any cause 8 (7%), incidental cancer diagnosis 4 (3%), lost to follow up 8 (7%) and other 21 (17%). Most side effects experienced were mild and included rash 4 (6%), palpitations 4 (6%), headaches 6 (10%), fatigue 7 (11%), nausea 11 (18%), dizziness 12 (19%) and generalised/joint pain 29 (47%). However a small number reported night sweats 1 (2%), UTI/kidney stones 3 (5%) and weight loss 1 (2%).

Conclusions: In our study adherence and persistence with TPTD was higher than that reported with oral antiresorptive treatments. The major factor that reduced adherence and persistence was tolerability. These findings are important, as high adherence and persistence with therapy is necessary to ensure an optimal therapeutic outcome.

P704

SHORT-TERM SMOKING CESSATION DECREASES SERUM SCL LEVELS AND THEREBY PROMOTES BONE FORMATION, CAUSING HUNGRY BONE SYNDROME

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Objective: Smoking increases fracture risk. We have reported that short-term smoking cessation results in restored bone formation. However, the mechanism remains unclear.

Material and Methods: In this prospective study, we recruited 29 Japanese male smokers (37.7±8.2 years old, 16.9±11.3 pack years). Bone and calcium (Ca)/phosphate (P) metabolic markers, inflammatory cytokines, and serum sclerostin (SCL) levels were measured 0, 1, 2 and 4 weeks after smoking cessation.

Results: Two weeks after smoking cessation, Osteocalcin (OC) and PINP were significantly increased (OC: $15.0 \pm 5.0 \rightarrow 20.6 \pm 5.1$ ng/ml (+44.7%, $p < 0.01$), PINP $44.0 \pm 15.5 \rightarrow 54.0 \pm 19.0$ ng/ml (+26.4%, $p < 0.01$)), whereas Tracp-5b was decreased from 322.8 ± 110.9 to 282 ± 82.7 mU/dL (-8.5%, $p < 0.001$). Serum Ca and P levels were also significantly decreased. Intact PTH (40.1 ± 19.3 pg/mL) and 25(OH)D (16.3 ± 5.9 ng/mL) showed no correlation, and both significantly increased after smoking cessation. 1,25(OH)₂D levels remained unchanged. Increase in PINP and OC was already

recognized at one week without any appreciable changes in PTH. Decrease in P correlated with plasma cotinine concentration at baseline ($r=-0.493$, $p<0.01$), FGF-23 also decreased as a result of P decline. Serum SCL was negatively correlated with OC ($r=-0.493$, $p<0.01$) at baseline, and significantly decreased at week 2 ($23.7\pm 13.3 \rightarrow 20.1\pm 10.6$ pmol/L, -7.1%). Changes in SCL and OC were more remarkable in those with higher IL-6 at baseline, and were not correlated with PTH changes.

Conclusion: Increased bone formation and decreased bone resorption after smoking cessation was followed by both PTH elevation and Ca decline, suggesting a hungry bone-like phenomenon. And such bone metabolic changes, at least in the early phase, were not dependent on systemic hormones but were more likely associated with diminished inflammation and resultant decrease in SCL.

P705

GENU-VALGUM AND VIT D

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Genu Valgum commonly called "knock-knee", is a condition in which the knees angle in and touch one another when the legs are straightened. Individuals with severe valgus deformities are typically unable to touch their feet together while simultaneously straightening the legs. This condition from the age of 6 months, children with vitamin D deficiency often present with bony deformity knock knees (genu valgum). The clinical presentation is common during 3-6 years group and gives a strong evidence of vit D deficiency. Vitamin D deficiency has emerged as a significant public health problem throughout the world. Even in the Indian context, it has been reported to be present in majority of children in spite of wide availability of sunlight. During school health program it was found to be a common finding, and we herewith present our finding and its relation with vit D.

Total 25 (20%) children 4-6 year of age group of a primary school among 150 children were detected to have genu valgum deformity as clinical presentation of rickets, 10 cm or more of distance between feet keeping both knee in contact, being common, it was reconfirm with parental interview regarding absent of any vit D, supplementation.

All the children were put on therapeutic doses of oral vit D for six months, and were reassessed about improvement according to distance between both feet, keeping their knee in same level of contact.

It was noted and observed that all children has shown, remarkable improvement in gait stability, running, scholastic performance and parental perception of wellbeing of their children. Rickets, once thought vanquished, is

reappearing. In some less developed countries it hardly went away, though this study is small but it gives and prove that early supplementation from neonatal period onwards is going to benefit young children in preventing orthopedic, cardiac, renal and CNS ailments during growth period, as the importance of vit D, in various system physiology is being postulated, further more elaborative studies may require to increase importance of vit D in various early clinical presentation.

P706

CROSS-CULTURAL ADAPTATION AND VALIDATION OF THE FILIPINO TRANSLATION OF THE KNEE INJURY AND OSTEOARTHRITIS OUTCOME SCORE (KOOS) IN FILIPINOS WITH KNEE OSTEOARTHRITIS AT THE UNIVERSITY OF THE PHILIPPINES-PHILIPPINE GENERAL HOSPITAL (UP-PGH)

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Objectives: 1.) To cross-culturally adapt and validate the Filipino translation of KOOS in patients with knee osteoarthritis (kOA) at the UP PGH.

2.) To validate the Filipino translation of KOOS with the Filipino Short Form 36 Health Survey (SF-36).

Methods: Filipino version of the KOOS was cross-culturally adapted and validated from the English version following standard guidelines (Beaton, 2000). Patients were asked to complete identical questionnaires containing the Filipino version KOOS and Filipino SF 36, with re-test on the same patients after a median of 14 days. Reliability was assessed using Cronbach's alpha and intraclass correlation coefficients (ICC), dimensionality using convergent and divergent construct validity.

Results: The Filipino translation of KOOS was administered to 30 patients with knee OA (kOA). Cronbach's α across the Filipino KOOS domains ranged from 0.71 to 0.89 suggesting internal consistency. The reproducibility of measurements of all KOOS subscales by ICC ranged from 0.97 to 1.0. Convergent construct validity is shown moderate correlations between KOOS ADL (0.38, $p=0.03$) and knee related QoL (0.42, $p=0.02$) by SF-36 Physical Functioning (PF). Strong correlation (0.51, $p=0.003$) was observed between KOOS sports and recreation domain with SF 36 PF. Divergent construct validity was shown in the weak correlation between KOOS pain (0.015, $p=0.93$) and symptoms (0.15, $p=0.42$) with SF 36 Social Functioning.

Conclusion: The Filipino version of KOOS is a valid and reliable instrument to measure the different aspects of disability affecting quality of life of Filipino patients with kOA.

P707

THE INCIDENCE OF OSTEOPOROSIS IN ADULT POPULATION OF KAZAKHSTAN

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Objective: Osteoporosis (OP) and associated fractures, due to the high prevalence and the severity of the socio-economic consequences represent a major public health problem. Our aim was to study the incidence of diseases of the musculoskeletal system (DMSS), including the OP in the adult population of the Republic of Kazakhstan from 2011 to 2015.

Material and methods: Analysis of DMSS, including the OP, according to official statistics of the Ministry of healthcare of Kazakhstan, during the studied period.

Results: In 2015 with DMSS have 638248 people, they were dominated by women (63.3%). Persons 60 years and older made up 179120, of them women made up 68.8%. The increase rate in persons with DMSS compared with 2011 and amounted to about 75 thousand and 35 thousand, respectively. Patients with OP in 2015 was 1264, of which women is 74.6%, and those 60 years and older - 410, including women of 75.6%. The increase rate of OP during this period totaled 111.37%, women - 134.58%. The diagnosis of OP was first installed in 2015 in 418 people, of whom 69% were women, the increase rate in comparison with 2011 - 132.2% and 133%, respectively. One third of patients with OP were persons 60 years and over, of which women prevailed (73.6%), the increase rate is 40.5% and 37.3%, respectively.

Thus, the prevalence of OP in Kazakhstan amounted to 72.05, among women 104.04 (per 100 thousand) (2015).

Conclusion: The incidence and the increase rate of OP in Kazakhstan demonstrates the importance of the problem.

P708

THE EFFECT OF ANDROGRAPHOLIDE ON OSTEOGENIC DIFFERENTIATION OF HUMAN MESENCHYMAL STEM CELLS

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Objective: A decreased in osteogenic differentiation from mesenchymal stem cells (MSCs) could at least partly account for the degenerative in musculoskeletal disorders like osteoporosis. Plant-derived compounds have been developed for the treatment of menopause-related disorders such as osteoporosis. Since estrogens enhance the risk for hormone-sensitive cancers, searching for new alternatives is needed. Andrographolide (AP), a natural product isolated from

Andrographis paniculata, exhibits several pharmacological effects including anti-inflammatory, anti-cancer, anti-asthmatic, and neuro-protective properties. AP has been recently reported to be a promising natural compound for the treatment of osteoclast-related bone diseases. However, its osteogenic differentiation effect on MSCs is unknown. We aimed to examine the proliferative and osteogenic effects of AP on human mesenchymal stem cells.

Material and Methods: Human bone marrow-derived MSCs was used to examine the proliferative and osteogenic effects of AP. MSCs were cultured in growth medium or in osteogenic condition medium with/without AP in a concentration dependent manner at dose rang 0.1-10 μ M. The proliferation of MSCs was examined by growth kinetic assay. Osteoblast differentiation and mineralization were determined by alkaline phosphatase (ALP) staining and Alizarin red staining assay, respectively. Real time PCR was employed to examine the effect of AP on the expression of osteoblast-specific genes including RUNX2, ALP and osteocalcin.

Results: AP at 0.1-5 μ M increased MSCs proliferation. At 7-21 days, AP also accelerated osteogenic differentiation of MSCs, as indicated by the increases in ALP activity and osteoblast-specific mRNA expression including RUNX2, ALP and osteocalcin. Subsequently, it promote osteoblast function, as indicated by the increases in calcium deposition in osteoblast cells.

Conclusion: Andrographolide effectively promotes MSCs proliferation and osteoblast function *in vitro*. It may have clinical relevance for prevention or treatment bone disease as well as osteoporosis.

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P709

PRIMARY HYPOPARATHYROIDISM WITH CROHN'S DISEASE

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A case report of primary hypoparathyroidism with Crohn's disease is reported being in difficulty on diagnosis. A 72-year-old woman was admitted because of tetanic seizure with hypocalcemia. She presented with 2 months of general malaise, and a month of severe myalgia. Her medical history is depression, and Crohn's disease undergoing tube feeding because of malabsorption syndrome after resection of the small bowel. Physical exams showed significant for positive Trousseau and Chvostek's sign. Laboratory data revealed the existence of hypocalcemia, hypokalemia, and slightly elevated intact PTH, showed Ca 6.2 mg/dl, Pi 3.7 mg/dl, intact-PTH

49 pg/ml, 25OHD 12 ng/ml, 1-25OHD 23.8 pg/ml. There is no evidence of hypomagnesemia, 1.9 mg/dl. These data seemed unlikely the existence of primary hypoparathyroidism and suggested vitamin D deficiency. Ellsworth-Howard test showed increased excretion of cAMP in urine after PTH injection compared with normal range of response, indicating primary hypoparathyroidism. ($U4-U3=3.1 \mu\text{mol/h}$, $U4/U3=55.2$, cAMP level of $U4:160000 \text{ pmol/ml}$). Because of chronic Vitamin D deficiency due to malabsorption syndrome, inducing Crohn's disease and after resection of the small bowel), Primary hypoparathyroidism may be overlooked. The intact-PTH level decreases after a half year, when the vitamin D3 (alfacalcidol) replacement therapy has been started. That suggested primary hypoparathyroidism. In the hypocalcemia due to chronic Vitamin D deficiency, PTH level showed apparently high in the primary hypoparathyroidism. This case gave attention to be diagnosed for hypoparathyroidism.

P710

EVALUATION OF PATIENT ADHERENCE INFLUENCING FACTORS IN CASE OF HUNGARIAN OSTEOARTHRITIC PATIENTS OF THE SOUTH PLAIN REGION

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Objective: Measurement of adherence's determining factors in case of osteoarthritic patients in a Central European Country, Hungary. In spite of the fact, that Hungary joined the "Bone and Joint Decade" program among the first countries, and 17% of the population was counted suffering from arthritic disease (European Health Interview Survey, 2014); a large population based survey is not available up to date. This indicates the necessity of the survey.

Methods: A retrospective data gathering was made according to the ethical standards, based on final reports in case of 400 patients; diagnosed and treated with hip and/or knee arthrosis within the period of 2007-2013. The WHO dimensions of adherence to long-term therapies were used for structuring and to evaluate points, where interventions should be made.

Results: Most of the patients were women (69%), the average age was ~72 year, within the range of 50-90 years. Urban and country-side citizens were represented as well. Overweight and obesity was found in 78,48% of the cases, determined by BMI index. Most frequent co-morbidities: other musculoskeletal (94,75%), cardio-vascular (76,5%), gastro-oesophageal and diabetes mellitus (36,25%) and neurological disorders (26%). The non-pharmacological therapies were used in conformity with national therapeutic guidelines, most frequently used ones were: targeted massage, aerobic activity

and exercise pool and land and therapies based on the use of electrical pulses. Evaluating the medical treatment, we found that the average number of drugs was 7/patient (Fig 1).

Conclusion: Complex and multidisciplinary approach is needed to treat osteoarthritis, and also a good therapeutic alliance with high level of patient adherence is essential for the successful therapy to handle the highly individualized pharmacological and nonpharmacological treatment in parallel. Besides providing the availability of different therapies geographically and financially; great emphasis should be put on the disease and culture specific factors affecting patient adherence in order to ensure the best therapeutic outcome. This study is going to be the basis for our further study, to develop adherence questionnaire based on the Quality by Design methodology.

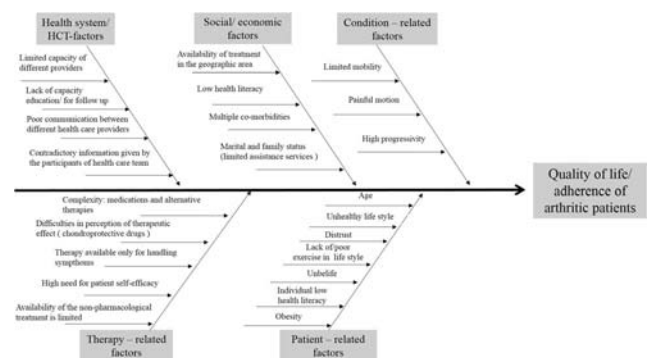


Fig. 1. Factors influencing adherence of osteoarthritic patients

P711

ECONOMIC IMPLICATIONS OF HIP FRACTURE IN THE MIGUEL SERVET UNIVERSITY HOSPITAL DURING 2014

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Objectives: To determine the incidence of hip fracture in a southern European city and set it is burden (associated direct economic costs) during 2014.

Methods: Data were collected from medical records of all patients admitted in our Hospital due to new low-energy trauma hip fracture, during the period from January 1 to December 31, 2014. Exclusion criteria were high-energy trauma, primary bone diseases and bone metastatic disease. Re-admissions for the same fracture were excluded when calculating the incidence. The estimated costs included ambulance transportation and continuous hospitalisation immediately after the hip fracture, which are covered by the Aragon healthcare system.

Results: 610 patients supporting osteoporotic hip fracture (452 female 158, male), incidence was 119 new cases per 100.000 population - year. 78% occurred in subjects older than 75 years, and the peak number of fractures occurred in individuals above 80-years of age. 70% patients suffering hip fractures were women. The global economic burden was 2.868.882 €, as a result of the sum of hospitalisations (2.424.864 €), implants Cost (411.642 €) and ambulance transportations (26.376 €).

Conclusions: Hip fracture incidence in our health area is similar than the national rate, this data will help to assess the importance of interventions in order to reduce the number of fractures and associated costs.

P712

THE 10-YEAR RISK OF OSTEOPOROTIC FRACTURES BY MEANS OF FRAX PROGRAM AND CARDIOVASCULAR RISK BY MEANS OF SCORE SCALE IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Objective: The purpose of this study was to investigate the risk of osteoporotic fractures by means of FRAX program and the cardiovascular risk by means of the SCORE scale in patients with chronic obstructive pulmonary disease (COPD).

Materials and Methods: The investigated group was made by the patients having the long experience of smoking. 212 patients with chronic obstructive pulmonary disease (COPD) were observed. Research of bone mineral density (BMD) was studied with the densitometer « Lunar DPX-NT». The risk of osteoporotic fractures was calculated by means of the computer program FRAX. The assessment of cardiovascular risk was calculated by means the SCORE scale. The comorbidity index Charlson was noted.

Results: The absolute risk of major osteoporotic fractures was minimal in patients with COPD 2 stage 4.9 (3-5.8). The maximum risk of major fractures was in the COPD 4 stage 7.4 (5.4 -9.6). The risk of hip fracture was significantly increased with the deterioration of the stage of COPD. The very high cardiovascular risk was prevailed in the overall group of COPD patients (68.9%). The high cardiovascular risk was noted in 18.3% patients, the middle cardiovascular risk was in 12.8%. The correlation coefficient between cardiovascular risk and index of comorbidity Charlson was 0.71, $p < 0.005$. The correlation coefficient between risk of hip fracture and index of comorbidity Charlson was 0.3, $p < 0.05$.

Conclusions: The comorbidity of COPD patients, which includes osteoporotic fractures and cardiovascular risk is actually very important.

P713

FALSELY INCREASED LUMBAR BONE MINERAL DENSITY DUE TO ECHINOCOCCAL CYST

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Objective: An 81-year old female with known osteoporosis was reassessed for bone mineral density (BMD) measurement. Her baseline BMD and lumbar spine T-score (L1-L4) in 2004 were 0.699 g/cm², -3.5 SD, total left hip T-score was 0.618 g/cm², -2.7 SD. For a decade, she was treated with alendronate 70 mg, cholecalciferol 7000 IE per week, and calcium supplements. Over the last two years, she was prescribed denosumab 60 mg as well as Ca and vitamin D.

Material and Methods: Recent DXA check-ups with the Hologic Explorer device showed abnormal BMD elevation in L1-L2. A strong increase (17.4%) in BMD was noted when comparing the 2016 and 2017 DXA measurements in L1-L2; however, L3-L4 appears to be stable (5.5%). Compared to baseline DXA measurements in 2004 the BMD increased by 39.8% in L1-L2 and by 7.6% in L3-L4. Over the last 13 years, the BMD increased in total by 55.8% (uncorrected). Lumbar spine T-score (L1-L4) in 2017 was 1.046 g/cm², 0.0 SD and increased by 19.3% (due to correction and L1 compression); lumbar spine T-score (L1-L4) measured in 2017 was 0.800 g/cm², -2.2 SD and increased by 4.0% in the hip; total left hip T-score was 0.665 g/cm², -2.3 SD – considering the 10-year high fracture risk (major osteoporotic fracture 19%, hip fracture 9,2%). CT scans revealed a descending Echinococcal cyst due to kyphoscoliosis overlapping vertebrae L1+2. During this time, the patient's height was decreased by 8 cm; however, a decreased in height by 14 cm was noted since her youth.

Conclusions: Several medical conditions, such as osteophyte formation, osteoarthritis, ankylosing spondylitis, vertebral fractures, and aortic calcifications can increase BMD. The study showed that calcium carbonate pills positioned lateral to the spine can change the BMD. To our knowledge, this was the first case of falsely increased lumbar spine BMD due to a calcified Echinococcal cyst. The interpretation of DXA measurements requires full attention of the examiner, who should clarify suspected cases in order to avoid false results. Measurements should be carried out in a technically correct manner with the exclusion of suspicious elements in the ROI.

P714**FORECASTING INCIDENT RADIOGRAPHIC KNEE OSTEOARTHRITIS FOR WOMEN: THE RELEVANCE OF HIP MORPHOLOGY AND BONE MINERAL DENSITY**

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Objective: To develop and internally validate a clinical risk model to predict incident radiographic knee osteoarthritis (RKO) in a population-based cohort of middle aged women.

Methods: We followed-up 649 women (1,662 knees) with x-ray at baseline (year 1) and year 5 using community based cohort of women in London, UK, 1988-1994. The outcome was incident RKO defined as Kellgren and Lawrence (K/L) grade 0-1 at baseline and ≥ 2 at year 5. Bootstrap backward logistic regression analysis identified predictors of incident RKO. Two models were generated: 1.a clinical model included patient measures, medication, wet biomarkers and knee symptoms; and 2.a model adding radiological variables. Models performance was assessed by calibration and discrimination.

Results: Univariable analysis found 33 of 105 factors associated with incident RKO ($p < 0.20$). The clinical model identified age, quadriceps circumference and cartilage degradation markers (serum cross linked C-telopeptide of type II collagen) as predictors. After including radiological variables (radiological model), the predictors of outcome were older age, higher quadriceps circumference, knee pain, knee baseline K/L grade 1 (vs. grade 0), higher hip α -angle, higher z-score bone mineral density (BMD) at the spine L1-L4, and contralateral RKO at baseline. Calibration statistics showed high level of agreement. The area under the curve (AUC) for the clinical model was 0.692, reaching 0.797 in the radiological model.

Conclusions: We have developed and internally validated two models predicting incident osteoarthritis in short term (4 years). The most powerful prediction is related to radiological variables including hip morphology and BMD as important predictors. This points to a RKO origin beyond the knee area and are potentially useful for clinical and epidemiological studies.

P715**IMMUNE –ENDOCRINE MODULATION OF BONE'S METABOLISM**

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Introduction: The similarity between Ig and hormone can extend on the functional structures: hormones include attachment part as Ig, but also function's print regions, such as fragments of Ig and Fc. It is assessed that the physiological role of sexual hormones on immune system activity is to contribute to achieve an appropriate stability regarding immune complexes. This balance is dynamic and results from antagonistic actions stability between male and female sexual hormones.

Objectives: To identify cases with hypogonadal osteoporosis, evaluation of BMD, assessment hormones on gonadotropin axis and immunological markers of bone turnover.

Method: The study were effectuated on 24 cases with hypogonadotropic and hypergonadotropic hypogonadism with ages 13 to 40, from which Turner syndrome with feminine phenotype (8), Klinefelter syndrome (5), syndrome of pauper ovaries (8) hypothalamic amenorrhea (3 cases). At all cases BMD was appreciated by dual absorptiometry with X rays and gonadotropic hormones study were assessed in the same time with immunological markers and bone turnover evaluation.

Results: At 11 cases osteoporosis was confirmed and osteopenia at 9 cases, the remnants patients (4) had BMD, biochemical, and immunological markers in normal values.

Conclusions: Estrogen stimulates the production of immunoglobulin and the conversion IgM \rightarrow IgG by increasing the number of "autoreactive" B cells and the control part of the expression phenotypic of IgM (through the X chromosome). Progesterone has the tendency to "suppress" immune reactivity, having anti-estrogenic effects. May decrease T-cell proliferation in vitro, but increase the number of CD 8 cells without disturbing nonresponder functions. Androgens have immunosuppressive effects, as decreases the production of immunoglobulin by reducing the stimulation of B cells and immune complexes. Cytokines affect the metabolism of bone cells Interleukin-1, was the first "immune" cytokine identified as the following actions on bone metabolism: enables bone cells replication, stimulates the bone resorption and attach the

resorption to bone formation, stimulates the collagen synthesis and increases the IL-6 synthesis involved in resorption. How IL-1 stimulates IL-6 production by osteoblastic and marrow stroma cells, it is possible that the interaction of these cytokines to be implicated not only in pathological bone resorption, but also in normal bone remodeling.

P716

FALL RISK ASSESSMENT IN ELDERLY PEOPLE USING HUNOVA, A ROBOTIC REHABILITATION DEVICE

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Objective: To introduce an automatic, robotic assisted sensitive quantification of balance impairments and fall risk using a new robotic system (*hunova*).

Patients and Methods: This is an observational trial that foresees the enrolment of 99 subjects, aged >65 years. According to the number of falls and/or fractures in the last 12 months, each participant is allocated to one of the following groups: low (no falls), medium (1-2 falls) and high (> 2 falls or 1 fall + 1 fragility fracture) risk of fall. All participants undergo a Comprehensive Geriatric Assessment (CGA) to calculate the Multidimensional Prognostic Index (MPI). Moreover, Tinetti Test, Time Up and Go, Walking Speed, Short Physical Performance Battery, Hand Grip, the FRAIL scale, femoral neck and total hip bone mineral density (DXA), body composition (DXA), and blood tests have been performed. The instrumental assessment session includes automatic measurements using *hunova*, a new robotic device designed to assist the sensorimotor rehabilitation process and the functional evaluation of lower limbs and trunk. *hunova* allows the evaluation of traditional stabilometric parameters as well as the implementation of different dynamic environments that stimulate postural responses. The examinations are performed on the robotic platform both in bipodalic standing and seated position.

Results: At present, a total of 36 older subjects (mean age: 77.6±6.6 years, 17 males) were enrolled in the study. Twenty two patients reported no falls in the last 12 months (76.1±5.8 years), 7 participants had a medium risk of fall (77.5±7.0 years) and the remaining 7 participants were included in the high risk group (82.7±6.9 years). Preliminary results of the robotic tests demonstrated a poorer performance in the dynamic tests in the high risk group compared to medium- and

low-risk subjects. In particular, the time needed to complete the five times sit to stand test increased while the capacity of adaptation to a random perturbation decreased in subjects with high risk of fall compared to medium or low-risk subjects.

Conclusions: The findings of our ongoing study suggest that *hunova* robotic measures are specific and sensitive to identify balance impairments and estimate fall risk in older subjects.

P717

DIFFERENTIATED THERAPEUTIC APPROACH IN HYPOGONADAL OSTEOPOROSIS

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There are many therapeutic options in osteoporosis induced by gonadal failure (ovarian or testicular), and the suitable therapy approach should be based on the following principles: efficiency, comorbidity, extraskelatal effects, cost-benefit correlation.

Objectives: For cases with late puberty-hypergonadotropic hypogonadism (gonadal dysgenesis) and hypogonadotropic hypogonadism - the major objectives of hypogonadal osteoporosis prevention were: to insure the sexualisation development process, to maintain the stability of bone mass during ontogeny, to control the factors that induce osteoporosis and its consequences (osteoporotic fractures). For cases with syndrome of pauper ovaries have focused on: assessment of patients with increased risk of osteoporosis, exclude secondary causes of osteoporosis, the selection of appropriate treatment.

Materials and Methods: Casework included in our study is represented by 57 patients, from which late puberty (26 cases) and syndrome of pauper ovaries (31 cases). Investigations target were to evaluate the bone mineral density with X-ray absorptiometry (BMD) and the assessment of biochemical markers of bone turnover (osteocalcin, CrossLaps). The treatment options are available for patients with late puberty and for cases with syndrome of pauper ovaries: non-pharmacological approach and therapeutic intervention with pharmacological agents in correlation with the pathogenetic mechanism of hypogonadal osteoporosis. Estrogen-progestogen substitution is the first therapeutic approach in syndrome of pauper ovaries to prevent osteoporosis, metabolic and visceral complications. For cases with late puberty the

therapeutic solution associate the estrogen-progestogen/ androgen substitution with antiresorptive medication (bisphosphonates) or proformatoare.

Results: In our study, we observed a decrease of the T score up to 14-16% after 6 months of treatment with bisphosphonates at patients with syndrome of pauper ovaries. At other cases with Turner syndrome (4) and syndrome of pauper ovaries (7) treated by us for 3 months with bisphosphonates in doses of 35 mg / week, we noticed a reduction of CrossLaps serum up to 38.5% and osteocalcin up to 41.3% compared to basal level.

Conclusions: Regular assessment of biochemical markers of bone turnover (osteocalcin, CrossLaps) and bone mineral density (BMD) gives useful information about the effectiveness of therapy.

P718

CHALLENGES OF OSTEOPOROSIS MANAGEMENT IN THE ELDERLY: CASE REPORT

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Objective: Osteoporosis is highly prevalent in the elderly population and disease management presents certain particularities that require a multidisciplinary approach. We describe the challenges of osteoporosis treatment in an elderly patient with multiple chronic medical conditions.

Material and Methods: We report the case of an 80 year-old female diagnosed with osteoporosis, vitamin D deficiency and secondary hyperparathyroidism. Bone profile evaluation included: dual energy X-ray absorptiometry (DXA), spinal radiography, parathyroid hormone (PTH) and serum 25-hydroxyvitamin D (25-OH D).

Results: An 80 year-old female presenting with multinodular goiter, type 2 diabetes and obesity was evaluated for asthenia, fatigue and diffuse joint pain. The patient also suffered from moderate to severe hypertension and ischemic and hypertensive cardiomyopathy. Thyroid function tests were normal. Evaluation of calcium metabolism showed high PTH (165.3 pg/ml, normal: 15-88 pg/ml), normal serum calcium (9.86 mg/dl, normal: 8.9-10.3 mg/dl) and ionized calcium (4.37 mg/dl, normal: 4-5.4 mg/dl). Low 25-OH D levels (of 13.7 ng/ml) suggested secondary hyperparathyroidism. DXA scan revealed low BMD of 0,862 g/cm³ and T score of -2.8 SD (total spine), T score -1.9 SD (femoral neck). FRAX predicted a 5% risk of major osteoporotic fracture and 1.6% risk of hip fracture. Laboratory tests showed high creatinine (1.83 mg/dl,

normal: 0.4-1 mg/dl), creatinine clearance of 42.6 ml/min (Cockcroft). Given the presence of chronic kidney disease, bisphosphonate treatment was withheld and the patient was referred to a nephrologist for further evaluation. Strontium ranelate and raloxifene were contraindicated due to high risk of thrombosis. Hyperparathyroidism and vitamin D deficiency excluded teriparatide treatment. Denosumab could be a therapeutic option, but only after adequate vitamin D and calcium status is achieved. The patient was prescribed vitamin D supplements to achieve 25-OH D level of 30 ng/ml, with careful monitoring of calcium, phosphorus and PTH levels.

Conclusions: Osteoporosis-related fractures are a major cause of morbidity and mortality in the elderly population. Due to high prevalence of co-morbid conditions that often pose a barrier to specific treatment, it is essential to balance the risks and benefits and adjust treatment according to individual factors so as to improve bone health and quality of life.

P719

BONE'S MINERAL DENSITY IN TURNER SYNDROME

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Objectives: Identification and confirmation cases with Turner syndrome, evaluation of BMD and hormone markers.

Method: The study was performed on 10 patients with Turner syndrome with female phenotype. Cytogenetic investigation (sexual chromatin, karyotype, chromosomal banding) confirmed the diagnosis of Turner syndrome. The hormonal explorations were focused on the study of: FSH, LH, estradiol, progesterone. Bone mineral density was evaluated by dual X-ray absorptiometry (BMD). The scan was made at the radius, hip and lumbar spine in anterior-posterior incidence. It is estimated that the bone mass measurements at spine and hip are suitable for fracture predictability than those at the peripheral skeleton. The result is expressed as bone mineral density (BMD) in g / cm², T and Z scores. Osteoporosis and osteopenia diagnosis is established according to recommended rules by OMS, based on the value of T score. Due to the heterogeneity of patients age with Turner syndrome, we evaluated Z score to appreciate BMD and removed the age factor.

Results: The hormonal investigations revealed insignificant values of feminine hormone (estradiol, progesterone) and the hypothalamic-pituitary deabaclu (very high LH and FSH).Is unanimously accepted that Turner syndrome, severe shortage estroprogesteronic by anovarie early puberty is becoming evident at puberty age by the absence of puberty sexualization, when the body does not receive the processing defining sexoid sexualization. Through bone densitometry, osteoporosis was confirmed at 7 cases and 3 cases with osteopenia. Z score values ranged from -1.73 DS - DS 4.44.

Conclusions:

1. Appreciate that concurrent evaluation of BMD and hormone markers at patients with Turner syndrome, provide useful information on bone remodeling process.
2. To prevent fragility fractures, hormone replacement therapy is necessary associated with the proformation medication.

P720

QUALITY OF LIFE AND PSYCHO-EMOTIONAL STATUS IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROTIC FRACTURES

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Objective: To assess the quality of life (QOL), psycho-emotional status and treatment persistence in postmenopausal women with osteoporotic (OP) fractures during a 3-year prospective study.

Subjects and methods: Main group - 196 women (mean age 66±9 years) after OP fractures of five sites (proximal femur, distal forearm, neck of humerus, vertebrae and ankle) and control group – 60 women (mean age 65±9 years) who had no history of fractures. Assessment of QOL was conducted using a questionnaire EuroQOL-5D (EQ-5D) and psycho-emotional status - questionnaire HADS. Treatment adherence was estimated by patient diary in 12, 24 and 36 months after the fracture occurred.

Results: Retrospective value of QOL using EQ-5D before fracture in women of main group was the same as among control group: 0.73±0.23 and 0.71±0.18, respectively (p>0,05). Significant deterioration of QOL was observed in 100% of women after osteoporotic fracture, and psycho-emotional disturbances on a scale HADS was diagnosed in 79% of patients. Recovery of integral value of EQ-5D up to 12 month was identified in patients with fracture of distal forearm or ankle, up to 18 - with fracture of neck of humerus or vertebrae, up to 24 - with fracture of proximal femur. However, the domains "personal care" in patients with hip fractures and "anxiety / depression" in patients with vertebral fractures has not recovered even to 36th month. Antiosteoporotic treatment during the first year was started in 62% cases: 25% of patients

took antiosteoporotic medications and 37% - took calcium supplements and vitamin D only. Patients with vertebrae fracture took osteoporosis medication significantly more often than persons with any other type of OP fracture. Only 20% of women were persistent to antiosteoporotic treatment during observational period. We found a strong negative correlation between the severity of symptoms of depression, assessed by HADS questionnaire, and adherence to antiosteoporotic treatment: r=-0.78, -0.92 and -0.78 (p<0,05) in 12, 24 and 36 months, respectively.

Conclusion: OP fractures for a long time worsened the QOL and caused psycho-emotional disturbances, which negatively influenced the adherence of patients to antiosteoporotic therapy.

P721

THE EFFICIENCY OF THERAPEUTIC MEANS IN OSTEOPOROSIS INDUCED BY GONADAL HORMONES

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In modern therapy of hypogonadal osteoporosis are discussed two distinct aspects: prevention of osteoporosis and the treatment of osteoporosis.

Objectives: The major aims of osteoporosis prevention induced by gonadal failure (ovarian or testicular) are: to insure the sexualisation development process, to maintain the stability of bone mass during ontogenesis; to decrease the incidence of osteoporotic fractures.

Material And Methods: In the study were included 43 hypogonadal cases from which: late puberty 19 cases aged between 12 -25 years, gonadal dysgenesis 11cases(8 female phenotype with Turner syndrome, syndrome Klinefelter- 3), hypogonadotropic hypogonadism 8 cases (pituitary dwarfism with sexual infantilism -2, 6 cases of genital syndrome adiposo - female 2 male 4) and syndrome of pauper ovaries 24 cases aged between 20-33 years. Paraclinical investigations palette were pointed on: LH, FSH, estradiol, testosterone, progesterone, TSH, FT4, IGF-1, cortisol, prolactin, BMD was evaluated by dual absorptiometry with X rays and the markers study of bone turnover. The administration of curative treatment aims to: increase or at least stabilize the bone mass, ensure bone quantity and quality ; prevent

fractures, therapy of complication fractures, maintain an optimum physical condition.

Results: Requires curative therapy:

- Patients with sexoid osteopenia and T score below -1.5 DS;
- Patients with sexoid osteopenia associated with fragility fractures;
- Hypogonadal patients with T score below -2.5 SD.

Currently are available many therapeutic agents that can stop or slow down the loss of bone mass, reduce bone remodeling rate and decrease the risk of fracture.

Modern osteoporosis therapy, split pharmacologic agents into two main classes:

- Antiresorptive agents (inhibitors of bone resorption)
- Proforma agents (stimulators of bone formation).

The ideal therapy should work on all forms of osteoporosis, not only on the cortical bone but also on the trabecular with a high compliance and tolerability and benefit / cost favorable correlation.

Conclusions: In today's modern medicine, osteoporosis prevention aims to remove the risk of the first fracture, so the same drugs can be used for both: prevention and treatment of osteoporosis. The therapy in hypogonadal osteoporosis is followed by: periodic evaluation (6-12 months) of BMD and biochemical markers of bone turnover.

P722

STUDY OF BONE MINERAL METABOLISM IN POSTMENOPAUSAL OSTEOPOROSIS

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Bone play an important role in the storage of calcium and other mineral salts. Normal adult bone is termed lamellar bone. The organic matrix constitutes 30-40%, and mineral salts 60-70%, of the dry weight of bone.

Objectives: The aim of this study was to evaluate levels of calcium and magnesium in serum at patients with postmenopausal osteoporosis.

Method: The study were effectuated on 97 patients with postmenopausal osteoporosis diagnosed by DXA, 75 women with natural menopause and 22 patients with surgical menopause. To all the patients taken into study were determined calcium and magnesium in serum.

Results: Serum calcium presented low values in 14 patients (9 patients with natural and 5 with surgical menopause), normal values at 80 patients (63 with natural and 17 with surgical menopause) and elevated values to 3 patients, all with natural menopause. Serum magnesium presented low values on 13 patients (8 patients with natural and 5 with surgical menopause), the normal values at 81 patients (64 with natural and 17 with surgical menopause) and elevated to 3 patients, all with natural menopause.

Conclusions: The majority of patients presented normal values of serum calcium and magnesium. In all patients with hypocalcemia has been determined the levels of serum PTH and vitamin D. To all were noted a correlation between them and was diagnosed with hypoparathyroidism after thyroidectomy. At 3 patients with hypercalcemia, serum PTH and vitamin D was elevated due hyperparathyroidism. Evaluation of renal function in 2 of these patients showed some deficiency, may explain the mood of hypercalcemia. The percentage of 82.47% of our study with normal levels of serum calcium confirm the most studies assert that, in general, in postmenopausal osteoporosis, calcium level in serum is normal. In our study, hypocalcemia is due by accidental damage of parathyroid during thyroidectomy. Recent studies have identified magnesium as an important factor in bone metabolism, correcting its deficit representing a very easy means of prevention of osteoporosis. Moreover, in recent years, it has formulated the idea that assessment of serum magnesium can help to identify patients with high risk of developing osteoporosis.

P723

STATUS OF 25 (OH) VITAMIN D IN UZBEK POSTMENOPAUSAL WOMEN

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Background: Vitamin D (25 (OH)D) – a fat-soluble prohormone, which is essential for bone metabolism through its regulatory actions on Ca and phosphate. Vitamin D deficiency is particularly frequent in women of menopausal age. Due to the high prevalence of 25 (OH)D deficiency and its adverse effects on human health, identifying its deficiency is one of the priority areas for improvement of public health.

Aim: To determine the level of 25(OH)D in women of 50 years of age and older who reside in Tashkent, Uzbekistan.

Materials and methods: The cross-sectional study included 272 women permanently residing in Tashkent. An absorptiometry method was used to determine serum total calcium

(Ca) and nonorganic phosphorous (P), and a kinetic method was used to determine alkaline phosphatase (AP) activity by the amount of liberated 4-nitrophenol. Commercially available kits (CIS Bio International, France) were used to measure levels of parathyroid hormone (PTH).

Results: The mean age of patients comprised 56.0±3.7 years (Me 56.0; IQR 53.0-59.0). The mean level of 25(OH)D in the studied group was 17.7±9.52 ng/ml (Me 16.9; IQR 10.2-22.3). The indicators of calcium-phosphorus metabolism were as following: Ca (2.22±0.21 mmol/L – Me-2.20; IQR 2.10-2.34), P (1.35±0.26 mmol/L – Me-1.33; IQR 1.18-1.51), AP (246.8±74.3 U/L–Me-240/0; IQR 189.5-290.5) and PTH (35.9±35.6 pg/ml – Me-27.8; IQR 9.9-50.6). The deficit of 25(OH)D<10.0 ng/ml was seen in 23.5% of cases, the levels >10 and <20 ng/ml – in 42.3% of patients, >20 and <30 ng/ml – in 22.4% of cases and >30 ng/ml – in 11.8%.

Conclusion: Such deficiency of 25 (OH) D as <20.0 ng/ml is not uncommon among Uzbek women and is seen in 65.8% of them, near-optimal levels – in 22.4%, the optimal content of 25(OH) D – only in a minority of patients.

P724

THE COST OF TREATMENT OF PATIENTS WITHIN ONE YEAR AFTER THE OSTEOPOROTIC FRACTURE IN RUSSIA

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Aim: The survey of costs of treatment (COT) of patients with osteoporotic fracture (OPF) within one year in municipal healthcare institutions of the city of Moscow.

Methods: 196 women were included (mean age 66±9 years) who had OPF in one of five sites: proximal femur, distal forearm, proximal humerus, vertebrae or ankle. COT assessment was performed on the basis of a standardized questionnaire that included data on inpatient and outpatient treatment, personal expenses and social benefits. The individual direct COT was estimated on the basis of healthcare service rates provided by the Fund of Obligatory Medical Insurance of Moscow for 2014 year, indirect COT (payments for temporary disability, permanent disability and early retirement) - on the basis of minimum wage amount in 2014 year. COT was reported in Russian Rubles (₽), the approximate COT in Euros (€) was also calculated.

Results: The total average COT during the first year after OPF was 61150 (1438,8€). Average direct and indirect COT were 53962 (1269,7€) and 7188 (169,1€), respectively. The mean individual COT of patients with proximal femur OPF averaged 101243 (2382,2€) was significantly higher (p<0.01) than COT for distal forearm OPF (22080 / 519,5€),

proximal humerus (39855 / 937,8€), vertebrae (51167 / 1203,9€) and ankle (43345 / 1019,9€). The highest COT in OPF of the proximal femur was related to the rather high frequency of surgical treatment (31% arthroplasty and 48% internal osteosynthesis). In women with OPF of distal forearm, proximal humerus, vertebrae or ankle surgical treatment was performed only in 5,6%, 26,2%, 2,3%, and 30,3% of cases, respectively. The cost of antiosteoporotic drugs accounted for only 7% of the total COT, due to their rare prescription, regardless of the site of the OPF. Only 25% of patients took antiosteoporotic drugs and 37% took calcium supplements and vitamin D.

Conclusion: In women with OPF the total average COT during the first year was 61150 (1438,8€). The treatment of patients with the fracture of proximal femur and of forearm was the most and the least expensive, respectively. The rate of surgical treatment makes substantial contribution to the difference between COT of different OPF.

P725

MODIFICATION OF LIPID METABOLISM IN POSTMENOPAUSAL OSTEOPOROSIS

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Osteoporotic bone loss is characterized by a marked decrease in osteoblast number and bone

forming activity, in the face of an unaltered or slightly increased osteoclastic bone resorption.

Recent evidence suggests that hyperlipidemia may contribute to osteoporosis, and that lipid oxidation may be the mechanism underlying this process.

Objectives: The aim of this study was to evaluate the lipid metabolism at patients with postmenopausal osteoporosis.

Material And Method: The study were effectuated on 97 patients with postmenopausal osteoporosis diagnosed by DXA, 75 women with natural menopause and 22 patients with surgical menopause. At all patients was determined serum levels of cholesterol, triglycerides and lipemia.

Results: Serum cholesterol levels were elevated at 62 patients (45 with natural and 17 with surgical menopause), the normal values at 19 patients (16 with natural and 3 with surgical menopause) and low values in 16 patients (14 with natural

and 2 with surgical menopause). Serum triglycerides have elevated values at 58 patients (41 with natural and 17 with surgical menopause), normal values at 23 patients (20 with natural and 3 with surgical menopause) and low values in 16 patients (14 with natural and 2 with surgical menopause). Serum lipemia presented elevated values in 59 patients (42 with natural and 17 with surgical menopause), normal values of 22 patients (19 with natural and 3 with surgical menopause) and low values in 16 patients (14 with natural and 2 with surgical menopause).

Conclusions: The menopause is associated with progressive increase of total cholesterol and especially LDL-cholesterol, triglycerides and α -lipoprotein and with decreased HDL-cholesterol, this being due to the estrogenic deficiency of postmenopausal women. The estrogenic deficiency alters the balance between free radicals and antioxidants, causing oxidative stress and thus, dyslipidemia and cardiovascular disease. Recent research suggests that there is a strong positive correlation between osteoporosis and hyperlipidemia. The mechanism by which lipids may cause osteoporosis is currently being investigated. It is believed that hyperlipidemia, increased consumption of fats and cholesterol and/or alterations in the endogenous cholesterol biosynthetic pathway, may lead to the accumulation and abnormal deposition of lipids within the vasculature, specifically (in this case) bone vasculature.

P726

CORRELATION BETWEEN BMI AND RISK OF MAJOR FRACTURE IN POSTMENOPAUSAL OSTEOPOROSIS

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Osteoporosis is characterized by bone loss and decrease of bone resistance which leads to the appearance of fragility fractures. Currently it is considered that osteoporosis present several of pathogenetic mechanisms which converge at bone loss and damage of structural skeletal microarchitecture. These factors, together with an increased risk of falls, contributes to the increasing incidence of fragility fractures in patients with osteoporosis.

Objectives: To evaluate the correlation between BMI and risk of major osteoporotic fracture, vertebral or nonvertebral.

Material And Method: Were taken in study 100 patients diagnosed with postmenopausal osteoporosis. At all patients were calculated BMI (body mass index) and via the FRAX algorithm, the risk of major osteoporotic fracture over the next 10 years.

Results: 2 patients were underweight (BMI \leq 19, 9 kg/m²), 33 patients with normal weight (BMI=20-24.9 kg/m²), 36 overweight patients (BMI=25-29, 9 kg/m²), 20 patients with obesity gr I (BMI=30 -34, 9 kg/m²), and 9 patients with obesity gr II (BMI=35-29, 9 kg/m²).

The risk of major fracture was 6.06. Based on these data we established an inverse correlation between BMI and risk of major osteoporotic fracture ($r=-0,299$; $p=0.003$ respectively $r=-0,356$; $p=0$), that is a BMI more rose is associated with a lower risk of fracture. This correlation was stronger in the case of patients with early menopause.

Conclusions: That correlation may be due to the positive role of the estrogen hormones produced at the level of body fat on skeleton, but also protective effect of fat in case of falls. In literature, the link between obesity (BMI) and risk of fracture is still controversial, some studies proving that BMI has grown protective of the risk of fracture, while others deny this fact.

P727

RELIABILITY OF MEASUREMENTS OF SERUM TOTAL AND IONIZED CALCIUM, PHOSPHATE, ALKALINE PHOSPHATASE AND PTH IN DIAGNOSING HYPOVITAMINOSIS D

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Objectives: To review the ability of routine biochemical markers in supporting the diagnosis of hypovitaminosis D.

Methods: The data of 70 adult patients with a biochemical diagnosis of hypovitaminosis D underwent assays for total and ionized serum calcium (tCa and iCa), phosphate (P), alkaline phosphatase (AP) and parathyroid hormone (PTH). Data of patients with chronic renal and hepatic disease and corticosteroid intake were excluded.

Results: Their mean age was 42.7 \pm 13.6 yrs with F:M of 1.5:1. 46 individuals (65.5%) were from Arab states. The mean of 25(OH)D was 19.8 \pm 5.01 ng/ml (N, > 30ng/ml) but only 3 had deficiency levels of <10ng/ml) $p=0.0001$. None had hypocalcemia with a mean of t Ca of 9.57 \pm 0.409 (N, 8.4-10.5 mg/dL) instead, 2 had borderline hypercalcemia of (10.6mg/dl). The mean of iCa was 1.13 \pm 0.153 (N, 1.16-1.32mmol/L). However 40 (57%) expressed low iCa vs. 30 with normal values, $p=0.12$, yet the level's mean was significantly low in the former (1.07 \pm 0.171 vs. 1.21 \pm 0.32mmol/ in others with normal iCa), $p=0.0001$. The mean of serum phosphate of 67/70 assays was also within normal of 3.6 \pm 0.32 mg/dL, (N 2.6-4.5 mg/dL). Normal values of AP were observed in the 56 tested

individuals (35-118U/L, mean 75.346 ± 23.036 U/L). 22/62 assayed for PTH had secondary hyperparathyroidism (35.5%) and 40 with normal levels, $p=0.002$. However, the mean of PTH was significantly higher in the former group, (84.8 ± 19.7 vs. 42.8 ± 11.7 ng/ml), $p=0.0001$. A possible risk factor that 58(83%) individuals have led predominantly indoors daily activity vs. 2 of predominantly outdoors activity and 12 (17%) of both activities. Clothing was partially or completely occlusive of sunlight (veiling) in 24/42 (57%) of the females.

Conclusions: Routine measurements of total calcium, phosphate and alkaline phosphatase are rather unreliable markers or predictors of hypovitaminosis D even when the insufficiency has been sufficient to produce secondary hyperparathyroidism. Nonetheless, the relevant data of the ionized calcium make it a potential predictor of the condition. This warrants studying larger number of individuals in future studies. Moreover, clinical suspicion based upon history and awareness of risk factors should remain the gold standard for requesting 25 (OH) D estimation. The poor dietary intake and inadequate sunlight exposure remain highly prevalent features of hypovitaminosis D.

P728

PREVALENCE OF OSTEOPOROSIS AMONG WOMEN LIVING IN BUKHARA REGION OF UZBEKISTAN

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Objective: to study the prevalence of postmenopausal osteoporosis and various risk factors among women of Bukhara region.

Materials and Methods: Questioning of 378 women from 50 to 80 years of age who are in menopause and live in Bukhara region.

Results: The prevalence of osteoporosis (OP) among surveyed postmenopausal women living in Bukhara region comprised 24.1%, osteopenia - 33.6%. The number of women at age of 50-59 was lower in group with OP (53.6%), than in groups with normal BMD (OR 0.06; 95% CI 0.03-0.14; $p < 0.0001$) and osteopenia (OR 0.39; 95% CI 0.22-0.71; $p = 0.003$), while the age groups 60-69 years (27.5%; OR 9.72; 95% CI 3.81-24.8; $p < 0.0001$) and ≥ 70 years (15.4%; OR 28.9; 95% CI 3.73- 223.9; $p < 0.0001$) were presented by greater number of women than in the group with normal BMD. The proportion of residents with normal BMD decreased with aging (from 50.5% at age 50-59 years to 10.9% – at 60-69 years of age, and up to 5.0% – at age ≥ 70 years). The proportions of women with body weight < 57 kg and BMI < 18.5 kg/m² were not significantly different in groups of normal BMD (respectively 23.1% and 2.5%) and the group of OP (respectively 13.2% and 2.2%). Less than half of women

(43.7%) were regular consumers of dairy products, and their number was significantly lower in the group of OP (27.5%) than in the group of normal BMD (61.9%; OR 0.23; 95% CI 0.13-0.41; $p < 0.0001$) and osteopenia (32.3%; OR 0.29; 95% CI 0.18-0.48; $p < 0.0001$). Likewise, less than half women (46.3%) responded positively on the question about daily physical activity for at least 30 minutes a day. Such women were less common in the group of OP (33.0%) than in the group of normal BMD (56.9%; OR 0.37; 95% CI 0.22-0.64; $p = 0.0004$) and osteopenia (42.5%; OR 0.56; 95% CI 0.35-0.90; $p = 0.02$). Early menopause was significantly more common among women with osteoporosis (39.6%) than in women with nBMD (20.6%).

Conclusions: Irregular consumption of dairy products, low physical activity and the duration of menopause were the risk factors in the studied group of women.

P729

CHARACTERISING ANTI-OSTEOPOROSIS DRUG USERS IN REAL WORLD PRIMARY CARE SETTINGS IN SPAIN: A DATA-DRIVEN CLUSTER ANALYSIS

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Objectives: We attempted to characterize the population of anti-osteoporosis drug users by determining groups of patients with similar features.

Material and Methods: We used data from the SIDIAP Database (anonymized primary care medical records for $> 80\%$ of the population of Catalonia, Spain). Data from 37,996 incident users of anti-osteoporosis drugs (2007-2014) with complete data on risk factors was analysed. Patient features included age, gender, body mass index, smoking, alcohol drinking, Charlson index, steroid and sedative/s use, and fracture history. We adopted a data-driven approach to derive clusters of patients with similar characteristics. Using the hierarchical clustering technique, similar patients (i.e. with the smallest pair-wise distances) were placed into the same cluster [1]. Each cluster was further divided until no further divisions could be made, or if the max number of clusters was reached. Bone mineral density (BMD) of individual clusters (available for a total of 2079 patients) was examined as an external validation.

Results: Five groups were identified, which can be summarised as: 1. elderly multi-morbid men with high prevalence of smoking and drinking; 2. elderly women with high co-morbidity; 3. systemic steroid users; 4. secondary prevention (previous fracture history); and 5. younger (early post-menopause) women with low-medium co-morbidity. Group 4 had the lowest hip BMD (Table 1).

Conclusion: Our study identified expected (clusters 1 to 4) as well as surprising (cluster 5, probably not in need for therapy according to guidelines) sub-groups of anti-osteoporosis drug users in actual practice settings. Further work should explore the cost-effectiveness of anti-osteoporosis drugs within these sub-groups.

Reference: [1] Murtagh F. A survey of recent advances in hierarchical clustering algorithms. *The Computer Journal* 1983;26:354.

Disclosure: DPA's department has received unrestricted research grants, and speaker and advisory board fees from AMGEN. Table 1. baseline characteristics of patients within the derived clusters. Units:%, unless specified.

| | Cluster 1 | Cluster 2 | Cluster 3 | Cluster 4 | Cluster 5 |
|--------------------------------|--------------|--------------|--------------|--------------|--------------|
| n. patients | 6661 | 16124 | 3721 | 4589 | 6901 |
| Age > 60 years | 0.99 | 1.00 | 0.88 | 0.85 | 0.24 |
| Female | 0.01 | 1.00 | 0.94 | 0.99 | 0.85 |
| BMI > 30 | 0.29 | 0.36 | 0.40 | 0.34 | 0.27 |
| Smoking | 0.51 | 0.00 | 0.10 | 0.12 | 0.51 |
| Drinking | 0.46 | 0.18 | 0.14 | 0.06 | 0.27 |
| Charlson index > 2 | 0.71 | 0.47 | 0.72 | 0.55 | 0.34 |
| Steroid use | 0.18 | 0.00 | 1.00 | 0.00 | 0.02 |
| Sedative use | 0.37 | 0.49 | 0.54 | 0.50 | 0.41 |
| Fracture history | 0.16 | 0.03 | 0.17 | 1.00 | 0.02 |
| Hip BMD, median (IQR) | -1.88 (1.26) | -1.90 (1.30) | -2.00 (1.33) | -2.20 (1.20) | -1.60 (1.28) |
| Spine BMD, median (IQR) | -2.50 (1.42) | -2.60 (1.44) | -2.60 (1.34) | -2.69 (0.98) | -2.10 (1.34) |

P730

CORRELATION BETWEEN BONE DENSITY AND SERUM TESTOSTERONE IN ELDERLY WOMEN

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Objectives: To evaluate the relation between bone density and serum testosterone in elderly women.

Material and Method: We studied serum testosterone, bone density and risk of osteoporotic fracture at 50 women over 70 years old.

Results: We established a significantly correlation between serum testosterone at the spine ($r=0,135;p 0,05$), the hip ($r=0,130;p 0,05$), the proximal forearm ($r=0,18;p 0,01$) and in the total body ($r=0,138;p 0,5$).

Conclusions: Total testosterone are correlated with bone density in the forearm and total body, but not with fracture history. We conclude that in elderly women, endogenous testosterone is a significant determinant of both trabecular and cortical bone density and is associated with fracture history.

P731

PERSISTENCE WITH ONCE-DAILY TERIPARATIDE 20UG IN COMMON POPULATION

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Background: Teriparatide is drug of the choice in the treatment of the postmenopausal osteoporosis, glucocorticoid induced osteoporosis and male osteoporosis for the patients in the highest risk of fracture. Usually we have data from multicentric, randomized, double blind, placebo or active comparator controlled trials. The efficacy of the teriparatide was performed on the study population, which fulfilled inclusion and exclusion criteria. Persistence with osteoporosis treatment is essential in reduction of fracture risk, optimal outcome and healthcare resource use.

Objectives: To describe persistence with once-daily teriparatide 20 ug during 24 months in common population.

Methods: Patients with postmenopausal osteoporosis, glucocorticoid induced osteoporosis and male osteoporosis who fulfil ACR criteria for these subgroups of osteoporosis, who started treatment with teriparatide between January 2011 and June 2016 were analysed.

They underwent DXA examination and laboratory examination (serum level of Ca, 25-OH-vitamin D, P1NP, beta CTX, osteocalcin, u-Ca) DXA examination was performed in the most important regions of interest: lumbar spine, total femur (hip), femur neck (neck). Our osteocentre is equipped with iDXA Lunar machine. Persistence and reasons for early termination with treatment were analysed.

Results:

| Therapy | | Altogether | | GIOP | | Postmenopausal osteoporosis | | Osteoporosis in men | |
|------------------------|------------------------|------------|-------|------|-------|-----------------------------|--------|---------------------|--------|
| | | N | % | N | % | N | % | N | % |
| still uncompleted | early completed | 23 | 23.7% | 19 | 26.4% | 4 | 18.2% | 0 | 0.0% |
| | successfully completed | 50 | 51.5% | 36 | 50.0% | 11 | 50.0% | 3 | 100.0% |
| | after 18 months | 1 | 2.0% | 1 | 2.8% | 0 | 0.0% | 0 | 0.0% |
| successfully completed | after 24 months | 49 | 98.0% | 35 | 97.2% | 11 | 100.0% | 3 | 100.0% |

Conclusion: These results of common population of patients suffering from the postmenopausal osteoporosis, glucocorticoid induced osteoporosis and male osteoporosis confirm high

persistence with teriparatide treatment. Analogous results were described in other observational studies in common population.

P732

THE MEASUREMENTS OF B-CROSSLAPS ON AGING, MENOPAUSE AND OSTEOPOROSIS WITH FRACTURE

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Objectives: To evaluate the effect of aging, menopause, and osteoporosis on the measurements of serum β -CrossLaps.

Material And Method: In 6 children, 28 premenopausal healthy women, 48 postmenopausal healthy women and 22 patients with osteoporotic fractures, β -CrossLaps was measured by RIA.

Results: The age-related changes of β -CrossLaps shows that the values were extremely high before the age of 16 years and decreased between age 16 and 29, and after the age of 40 years, the values tended to increase and to vary widely with age. In menopause, β -CrossLaps in 12 postmenopausal subjects aged 44-59 were significantly higher than those in 18 premenopausal subjects aged 44-59. There was no significant correlation between β -CrossLaps and years since menopause in 36 postmenopausal subjects. β -CrossLaps in the group with osteoporotic fracture were higher than those in the postmenopausal group.

Conclusions: β -CrossLaps is a useful bone resorption marker which well reflects an increase of bone resorption associated with the bone modeling at childhood and high bone resorption after menopause and higher bone resorption in osteoporotic patients with fractures.

P733

VERTEBRAL FRACTURES IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Diabetes mellitus type 2 (T2DM) has been associated with an increased risk of fractures. However, the study addressing vertebral fractures remains controversial

The aim was to estimate the prevalence and risk factors for vertebral fracture in patients with T2DM as compared to a control group.

Material and methods: 233 patients with T2DM from an out-patient clinic in Moscow and 233 healthy control subjects living in the same area underwent lateral X-Ray imaging from Th4 to L5 to evaluate vertebral fractures and were interviewed in relation to other low-traumatic fractures. All available vertebrae were graded by an experienced radiologist through visual inspection of lateral spinal images, without direct vertebral measurement, as either normal or deformed if visual inspection perceived at least a 20% reduction in vertebral height. In addition to this, risk factors for fractures incorporated into FRAX were evaluated. Diabetes complications, HbA1c, creatinine and glomerular filtration rate (GFR) were taken from the most recent medical documentation.

Results: the mean age of enrolled participants (66 males; 390 female) was 64 (95% CI 63-65) years old with no statistically significant difference between T2DM and control subjects. Vertebral fractures were confirmed in 36 (15%) cases with T2DM and in 37 (16%) cases of control subjects $p=0.5$. Non-vertebral fractures were more common in T2DM – 62 cases (27%) as compared to 44 in a control group (19%) $p=0.027$. Multiple fractures were also more common among subjects with T2DM – 21 (9%) cases as compared to control group – 8 (3%) $p=0.012$. Patients with T2DM and vertebral fractures fall more frequently as compared to patients with T2DM without vertebral fractures $p=0.043$. They also had multiple fractures more frequently ($p<0.001$). However, we did not find statistically significant difference in age, sex, diabetes complications, HbA1c, creatinine and CFR values or any other risk factors for fractures.

Conclusions: Patients with T2DM have similar rate of vertebral fractures as elderly people without T2DM. Frequent falls and other multiple fractures in subjects with DM2T might be the potential risk factors for vertebral fractures.

P734

THE ROLE OF B-CROSSLAPS ASSAYS IN MONITORING BISPHOSPHONATE TREATMENT AND HRT

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The β -CrossLaps marker is a specific and sensitive index of bone resorption.

Objectives: To evaluate the clinical utility of the assays by measurement of serum β -CrossLaps from women undergoing antiresorptive treatment with bisphosphonate or by hormone replacement.

Material And Method: The study were effectuated on 52 patients with bisphosphonate treatment and 18 patients with HRT. At all patients we are measured serum levels of β -CrossLaps baseline, at 3, 6, 9 and 12 months of treatment.

Results: In serum from women on treatment with the bisphosphonate the β -CrossLaps levels decreased by approximately 75% compared to baseline after 3 months of treatment, and stayed at this level for another 3 months of treatment. Significant declines in the CrossLaps levels were as well observed after 3 and 9 months of treatment with SERM. Compared to baseline these changes in CrossLaps levels were approximately 50 and 60%, respectively. The decrease in CrossLaps levels observed in serum from women treated in 28 day cycles with sequential and combined doses of 2 mg estradiol and 50 pg gestodene for 6 and 12 months were approximately 70% and 75%, respectively.

Conclusions: β -crosslaps are useful in monitoring the effect of antiresorptive therapy with bisphosphonate or hormone substitution.

P735

CONCORDANCE BETWEEN MEASURED AND ESTIMATED APPENDICULAR SKELETAL MUSCLE MASS WITH MODELS DEVELOPED IN THE WEST AND ASIA: WHAT IS BEST FOR SRI LANKAN ADULT WOMEN?

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Objective: This study was undertaken to determine the validity of two existing anthropometric models in estimating the appendicular skeletal muscle mass (ASMM) in Sri Lankan women.

Materials and Methods: A cross-sectional study was carried out with 165 women aged between 30-60 years. ASMM (kg) was quantified with DXA (ASMM_{DXA}) (Hologic Inc. Bedford, USA) and anthropometric measurements (body weight, height, circumferences and skin fold thickness at specific sites) were obtained. The limb circumferences/girths were corrected for subcutaneous adipose tissue thickness. Corrected girths respectively were: corrected arm girth (CAG), corrected thigh girth (CTG) and corrected calf girth (CCG).

Two models (ASM 1, ASM2) developed by Lee *et al* (*Am J Clin Nutr*, 2000) from the West and two models (ASM3, ASM4) developed by Wen *et al* (*Asia Pac J Clin Nutr*, 2011) from Asia were considered. ASM1 and ASM3 are based on skin fold thickness and circumferences and ASM2 and ASM4 are based on body weight and height. Gender, age and race are independent variables used in all models. Pearson correlation coefficient (r), coefficient of determination (R²) and standard error of estimate (SEE) were calculated and paired sample t test was performed.

Results: Mean (SD) age of the study group was 49.0 (8.2) years. Mean (SD) ASMM_{DXA} and ASMM estimated in kg by four models were, ASMM_{DXA}=15.39 (2.75), ASM1=18.36 (3.27), ASM2=16.46 (3.01), ASM3=15.44 (2.40) and ASM4=14.44 (2.45), respectively. Correlation of ASMM_{DXA} with ASMM estimated were, ASM1=r:0.68, R²:0.47, SEE:2.02kg; ASM2=r:0.91, R²:0.81, SEE:1.18kg; ASM3=r:0.90, R²:0.81, SEE:1.17kg; and ASM4=r:0.91, R²:0.82, SEE:1.14kg, respectively. Estimated ASMM by ASM3 was not significantly different (p>0.05) from ASMM_{DXA} but the ASMM estimated by the other three formulae were significantly different from the ASMM_{DXA} (P<0.05).

Conclusion: Correlations between ASMM_{DXA} and ASMM estimated by all models were high. Although skin fold thickness and circumferences model developed by Wen *et al* showed highest concordance with ASMM_{DXA}, weight-height models developed by both Lee *et al* and Wen *et al* also showed the higher concordance with ASMM_{DXA} with high R² and low SEE. More studies are required to validate the accuracy of the models in other age groups.

P736

ASSOCIATION BETWEEN HEPATITIS B INFECTION AND THE INCIDENCE OF HIP FRACTURE: COHORT ANALYSIS OF NATIONAL HEALTH INSURANCE DATA

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Aim: To analyze the association between hepatitis B infection, the incidence of hip fracture, and hip fracture related complications.

Method: We selected 13,022 adults aged 40 years and older diagnosed with hepatitis B using Taiwan National Health Insurance Research Database from 2000 to 2013 and 230,219 adults without hepatitis B as the comparison cohort. Hip fractures from 2000 to 2013 were identified from medical claims to evaluate the risk of hip fracture using Cox proportional hazard model.

Results: The crude incidences of hip fracture for subjects with and without hepatitis B were 2.4% and 5.4%, respectively. Cox regression analysis showed that diabetes, cancer history, chronic kidney disease, prior fracture history, alcohol hepatitis, using anti-osteoporotic drug, aged 65 years and older, and liver cirrhosis were positively associated with the incidence of hip fracture after adjusting for gender, rheumatoid arthritis, steroid use, thyroid disease, and parathyroid disease. Compared with subjects without Hepatitis B, the adjusted HR of hip fracture was 0.68 (95% CI, 0.57-0.82) for those with hepatitis B. Moreover, diabetes, rheumatoid arthritis, cancer history, chronic kidney disease, using anti-osteoporotic drug, and aged 65 years and older were positively associated with the complications of hip fracture after controlling for potential confounders.

Conclusions: Previous hepatitis B infection was inversely associated with the incidence of hip fracture, but not significantly associated with the complications after hip fracture.

P737

TREATMENT PERSISTENCE WITH DENOSUMAB AND ORAL BISPHOSPHONATES (OBPS) IN SWEDISH OSTEOPOROTIC WOMEN OLDER THAN 70 YEARS

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Objective: Osteoporosis is a common skeletal bone disorder associated with increased risk of fractures. Treatment persistence is often suboptimal in osteoporosis leaving many patients at risk of fractures. Moreover, it is known that incidence of fractures increases with age. The objective of this analysis was to estimate persistence with denosumab and oral bisphosphonates (OBPs) in Swedish osteoporotic women older than 70 years.

Methods: The study utilised data from the Swedish prescribed drug register and included women older than 70 years initiating denosumab or OBPs (alendronate or risedronate) between May 2010 and July 2012. Patients were defined as persistent from treatment initiation until discontinuation allowing for a grace period of 56 days. Patients were followed until the end of the study period (31 March 2013) or death.

Results: The study identified 1,485 and 20,456 incident users of denosumab and OBPs, respectively. Mean age was 79 years

for both treatment cohorts. A higher proportion of denosumab users compared with OBP users had received another osteoporosis treatment prior to initiating denosumab/OBPs (60% vs. 3%). 83% (CI₉₅: 81–85) of denosumab users were persistent at 12 months, 69% (CI₉₅: 66–71) at 18 months, and 62% (CI₉₅: 59–65) at 24 months. For OBP users the persistence rates were lower: 49% (CI₉₅: 48–49) at 12 months, 40% (CI₉₅: 39–41) at 18 months, and 34% at 24 months (CI₉₅: 33–34).

Conclusion: In this analysis of patients over 70 years old, those treated with denosumab were more persistent than those treated with OBPs. Higher persistence may lead to better outcomes, including fracture prevention.

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P738

BONE MINERAL DENSITY AND VITAMIN D LEVELS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Background: Rheumatoid arthritis (RA) is a chronic disease frequently associated with osteoporosis. Vitamin D plays a crucial role in the development and maintenance of a healthy skeleton and vitamin D deficiency is associated with disorders of calcium metabolism and autoimmune diseases.

Objectives: To investigate the relationship between low bone mineral density and 25- hydroxyvitamin D level in patients with RA.

Methods: We recruited 81 postmenopausal women with RA and 65 healthy postmenopausal women matched for age, body mass index, menopausal age as a control group. All patients with RA met the criteria (ACR/EULAR 2010). Vitamin D deficiency is diagnosed when 25- hydroxyvitamin D level is <20 ng/ ml. None subject in both groups were on calcium / vitamin D medication. Bone mineral density was measured in all women in both groups with dual energy X- ray absorptiometry at spine and femur. Serum levels of 25- hydroxyvitamin D and bone turnover markers were examined. All patients had a spine X-ray for vertebral fracture presence. Disease Activity Score (DAS28) including 28 joint counts was assessed for all patients with RA.

Results: Bone mineral density at lumbar spine and femoral neck were significantly lower in patients with RA compared

with controls. Bone turnover markers were significantly higher in patients with RA compared controls and the serum of 25-hydroxyvitamin D was lower. 25-hydroxyvitamin D deficiency was detected in 87.2% RA patients and 49.8% in control group ($p < 0.001$). In RA group the serum level of 25-hydroxyvitamin D was significantly correlated with bone mineral density and bone turnover markers. The vertebral fractures were found in 21 patients with RA and 18 of them have low levels of 25-hydroxyvitamin D whereas in control group, 6 patients had a vertebral fractures. DAS28 and 25-hydroxyvitamin D were significantly correlated ($p < 0.001$).

Conclusion: Our data revealed that rheumatoid arthritis patients with osteoporosis had a lower level of 25-hydroxyvitamin D. The activity disease and vertebral fractures was significant correlated with the low level of 25-hydroxyvitamin D.

P739

ASSOCIATIONS OF MEASURES OF SARCOPENIA AMONG MIDDLE AGED WOMEN WITH FOCUS ON THEIR AGE AND MENOPAUSAL STATUS

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Objective: This cross sectional study examined the association of measures of sarcopenia; appendicular skeletal muscle mass (ASMM), hand grip strength (HGS) and gait speed (GS) among middle-aged women in Sri Lanka and to determine whether the association is influenced by age and menopausal status.

Materials and methods: A sample of healthy 184 premenopausal (mean age 42.5(6.0) years) and 166 postmenopausal women (mean age 55.1(3.8) years) were studied. ASMM (kg) was measured by DXA (Hologic Inc. Bedford, USA). HGS (kg) was measured with hand held dynamometer in the right hand. GS (m/s) was measured with 4 meter customary pace walking. Association of all three measures was determined with the Pearson correlation coefficient (r) and age adjusted partial correlation.

Results: Mean (SD) ASMM, HGS and GS of pre and postmenopausal women were as follows:

ASMM – 16.06(2.51) and 14.87(2.96) kg ($p < 0.001$)

HGS – 19.06(6.06) and 15.27(4.27) kg ($p < 0.001$)

GS – 1.19(0.17) and 1.07(0.16) m/s ($p < 0.001$)

When pre and postmenopausal women were taken together, ASMM showed significant ($p < 0.001$) correlations with both HGS ($r = +0.46$) and GS ($r = +0.12$). HGS and GS were also significantly correlated ($r = +0.28$, $p < 0.05$). Adjusting above

results for age did not change them materially although the association between ASMM and GS ($r = +0.05$, $p = 0.35$) became non-significant. In subgroup analyses, ASMM showed significant correlations with HGS, in both pre ($r = +0.42$, $p < 0.05$) and postmenopausal women ($r = +0.43$, $p < 0.001$), but not with GS [premenopausal women: $r = +0.03$, $p > 0.05$ and postmenopausal women: $r = +0.05$, $P > 0.05$]. HGS showed positive correlation with GS ($r = +0.23$, $r < 0.05$) only in premenopausal women not with postmenopausal women ($r = +0.13$, $r > 0.05$).

Conclusion: This study shows a significant association between ASMM and HGS, not affected by age or menopausal status. However, age and menopause have significant impact on the association between ASMM and GS and HGS and GS. This could be due to the fact that GS is determined by factors other than ASMM such as prevalent diseases and drugs in old age.

P740

DEVELOPMENT AND CROSS VALIDATION OF TWO PREDICTIVE MODELS TO ESTIMATE THE APPENDICULAR SKELETAL MUSCLE MASS IN ADULT WOMEN IN SRI LANKA

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Objective: This study was undertaken to develop and cross validate two simple predictive models to estimate the appendicular skeletal muscle mass (ASMM) in a group of healthy adult women in Sri Lanka.

Materials and methods: The study consisted of two groups of middle age women between 30-60 years. ASMM (kg) was quantified with DXA (ASMM_{DXA}) (Hologic Inc. Bedford, USA) and anthropometric measurements; body weight (kg), height (m), circumferences (cm) and skin fold thickness (mm) at specific sites were obtained. The limb circumferences/girths were corrected for subcutaneous adipose tissue thickness. Corrected girths respectively were corrected arm girth (CAG), corrected thigh girth (CTG) and corrected calf girth (CCG). In the 1st step, ($n = 165$), two simple anthropometric models were developed based on the data obtained from multiple regression analyses (ASMM_{DXA} = dependent variable; anthropometric measurements and menopausal status = independent variables). In the 2nd step ($n = 167$), the developed models were cross validated.

Results: The developed two models were:

1. ASMM1 = 0.205(weight) + 8.728(height) - 0.722(menopausal status) - 9.166

[Menopausal status: 1 = premenopausal, 0 = postmenopausal]

2. $ASMM_2 = 0.241(CAG) + 0.179(CTG) + 0.197(CCG) + 15.858(\text{height}) - 0.033(\text{age}) - 25.770$.

The correlations between $ASMM_{DXA}$ and $ASMM_1$, $ASMM_2$ were 0.92 ($R^2=0.84$, $SEE=1.16$) and 0.84 ($R^2=0.72$, $SEE=1.29$), respectively. Intra class correlations were high (0.91, 0.79 respectively) with wide range of 95% confidence intervals. There were no significant differences between $ASMM_{DXA}$ and $ASMM$ s estimated by two models. The mean difference reported from two models were 0.09, 0.16 ($p>0.05$) showing strong concordance with the $ASMM_{DXA}$. Bland and Altman plots revealed satisfactory agreements of newly developed models with $ASMM_{DXA}$ with only few observations beyond the 1.96 SD tolerance limits.

Conclusion: Two models developed and cross validated in this study show a high measurement concordance in estimating the $ASMM$ in this group of women. It, however, has to be validated in other age groups and in both genders and also for the perimenopausal women where the menopausal status is not defined well.

P741

THE EFFECT OF THE DMOAD DIACEREIN ON MAPK PHOSPHORYLATION AND THEIR DOWNSTREAM PATHWAYS IN HUMAN CHONDROCYTES

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Objectives: Osteoarthritis (OA) is a multifactorial, complex disease affecting approximately 15% of the world's population. Worldwide the prevalence of OA is steadily increasing, leading to an ever rising economic burden. Current therapies for OA including disease modifying OA drugs (DMOADs) aim to preserve normal joint function as well as reduce disease intensity and symptoms. The DMOAD diacerein, an anthraquinone, functions as a slow-acting OA drug by exerting anti-inflammatory, anti-catabolic, and pro-anabolic properties on cartilage and synovial membranes. The ESCO regards diacerein as beneficial for the treatment of OA. Mitogen-activated protein kinases (MAPKs) are intracellular signaling proteins, which play a central role in controlling pathways that regulate production and activity of multiple mediators of joint tissue destruction. In this study, the therapeutic potential of diacerein regarding MAPK inhibition was investigated.

Material and Methods: IL-1 β stimulated C-28/I2 (OA model) and unstimulated T/C-28a2 (healthy) chondrocytes were treated with 50 μ M diacerein for 48 hours. The effect of the anthraquinone on phosphorylation status was evaluated using antibodies targeted to specific phosphorylation sites on

intracellular signaling proteins. The pharmacological input of diacerein was evaluated by Western blotting, Human Phospho-MAPK Proteome ProfilerTM Array, and the TransAM[®] STAT3 transcription factor assay.

Results: In healthy chondrocytes, diacerein treatment significantly downregulated the phosphorylation of focal adhesion kinases (FAK) FAK^{Y397} and FAK^{Y925}. However, FAK^{Y576/577} remained unchanged. In the OA model, only phosphorylation of FAK^{Y397} was significantly downregulated. Protein expression of MAPK phosphorylation targets was analysed. The Raf-MEK-ERK pathway represents one of the best characterized MAPK signaling pathway. After diacerein treatment ERK1/2 phosphorylation showed significant downregulation only in healthy chondrocytes. The strongest decrease was observed for STAT3^{Y705} phosphorylation both in healthy and OA chondrocytes. These results were confirmed using the STAT3 activity assay. The Akt downstream pathway was activated after diacerein treatment, especially in OA chondrocytes, although in healthy chondrocytes the Akt pathway remained unaffected.

Conclusions: MAPK inhibition has the potential to slow disease progression in OA and may reduce pain. Further understanding of the function of MAPK as well as upstream and downstream effectors may lead to the development of more specific inhibitors with less toxicity that could be used as structure-modifying drugs for OA.

P742

DO ANTHROPOMETRIC INDICES PREDICT THE BONE MINERAL DENSITY OF PRE AND POSTMENOPAUSAL WOMEN?

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Objective: This cross-sectional study examined the ability of predicting bone mineral density (BMD) using anthropometric measurements in a group of pre and postmenopausal women in Sri Lanka.

Materials and methods: Two groups of healthy premenopausal (PreMW) (n=136) and postmenopausal (PMW) (n=120) women were studied. Total body BMD (g/cm^2) excluding the head was measured with DXA (Hologic Inc. Bedford, USA). Height (m), weight (kg), skin fold thickness of suprailiac (SISFT), triceps (TrSFT), biceps (BiSFT), subscapular (SSSFT), thigh (ThSFT) and calf (CSFT) and circumferences of waist (WC), hip (HC) were measured.

Pearson correlation coefficient (r), coefficient of determination (R^2) and standard error of estimate (SEE) were calculated. **Results:** Mean (SD) age of PreMW and PMW were 42.0(6.2) years and 56.0(3.7) years respectively. Mean (SD) total body BMD of PreMW and PMW were 0.877(0.097) and 0.806(0.083) respectively ($p<0.001$).

The correlations between BMD and anthropometric indices among PreMW are; height: $r=+0.26$, $p<0.001$, weight: $r=+0.59$, $p<0.001$, WC: $r=+0.19$, $p<0.001$, HC: $r=+0.27$, $p<0.001$, SISFT: $r=+0.05$, $p=0.18$, TrSFT: $r=+0.10$, $p=0.11$, BiSFT: $r=+0.10$, $p=0.11$, SSSFT: $r=+0.16$, $p<0.05$, ThSFT: $r=+0.06$, $p=0.23$, CSFT: $r=+0.05$, $p=0.28$.

The correlations between BMD and anthropometric indices among PMW are; height: $r=+0.36$, $p<0.001$, weight: $r=+0.60$, $p<0.001$, WC: $r=+0.47$, $p<0.001$, HC: $r=+0.53$, $p<0.001$, SISFT: $r=+0.30$, $p<0.001$, TrSFT: $r=+0.38$, $p<0.001$, BiSFT: $r=+0.37$, $p<0.001$, SSSFT: $r=+0.47$, $p<0.001$, ThSFT: $r=+0.29$, $p<0.001$, CSFT: $r=+0.17$, $p<0.05$. Weight was the strongest predictor of BMD among both PreMW ($r:0.59$, $R^2:0.35$, $SEE:0.07$) and PMW ($r:0.60$, $R^2:0.36$, $SEE:0.06$).

The predictive models derived to estimate the BMD in both PreMW and PMW respectively are:

PreMW BMD= $1.057+0.011(\text{weight})-0.008(\text{HC})$ [$r:0.69$, $R^2:0.47$, $SEE:0.07$]

PMW BMD= $0.534+0.005(\text{weight})-0.004(\text{CSFT})+0.003(\text{SSSFT})$ [$r:0.65$, $R^2:0.40$, $SEE:0.06$]

Conclusion: Data shows the ability of selected anthropometric measures to predict total body BMD among PreMW and PMW. Correlations between measured anthropometric indices and BMD were different between the two groups. Skin fold thickness showed significant correlations only in PMW and this could be due to the contribution of fat mass to maintain circulating estrogen level in old age.

P743

SMOKING PREDICTS VITAMIN D DEFICIENCY IN A FRAGILITY FRACTURE POPULATION

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Objective: Vitamin D plays an important role in bone health. There is a paucity of literature regarding the epidemiology of vitamin D levels in a fragility fracture cohort. The aim of this study is to determine the prevalence and predictors of low vitamin D levels in a fragility fracture population.

Material and methods: All fragility fractures ($n=720$) captured over 2 years by a fracture liaison service of an academic teaching hospital were included in this cross-sectional study. Demographics, clinical data, blood tests and bone mineral density were collected. Vitamin D levels were stratified

according to international recommendations: severe deficiency $<30\text{nmol/L}$, deficiency $30\text{--}50\text{nmol/L}$, adequate $>50\text{nmol/L}$ and ideal $>75\text{nmol/L}$. SPSS was used for data analysis.

Results: The mean of available vitamin D levels ($n=144$) is $65.8\pm 31.5\text{nmol/L}$. Levels are less than 75nmol/L in 61% of patients, 34% are deficient and 13% are severely deficient. Vitamin D levels are significantly ($p<0.05$) lower in men (49.7 vs. 68.9nmol/L), patients not on supplements (57.8 vs. 76.4nmol/L), excess alcohol intake (47 vs. 68.1nmol/L), current smokers (50.9 vs. 69.1nmol/L) and low vitamin D dietary intake (58.1 vs. 74.9nmol/L). Factors predicting vitamin D deficiency include smoking (59.3% vs. 29.6% deficient, $p<0.01$, OR 3.5) or having a BMI less than 20 kg/m^2 (50% vs. 28.4% , $p<0.05$, OR 2.5). Factors protective against vitamin D deficiency are taking vitamin D supplements (45.1% vs. 21% , $p<0.05$, OR 0.32) or having a sufficient dietary intake of vitamin D (46.2% vs. 21.2% , $p<0.05$, OR 0.31). There is no association between vitamin D levels and bone mineral density or fracture site.

Conclusion: In this cohort, 61% have a less than ideal vitamin D level and 34% are deficient. Smoking predicts vitamin D deficiency. Supplementation and sufficient dietary intake are partially protective. Targeted optimisation of vitamin D levels in fragility fracture patients with these characteristics can maximise bone health.

P744

METABOLIC DISORDERS AND RELATED FACTORS SEEN IN THE FIRST TWENTY FOUR HOURS, IN PATIENTS WITH PRIMARY TOTAL KNEE ARTHROPLASTY

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Objectives: The incidences of acute kidney injury (AKI), serum electrolyte disorders and acute liver injury (ALI) in 24 hours after total knee arthroplasty (TKA) are analyzed. The relationship with these metabolic complications and the factors like age, gender, applying simultaneous bilateral TKA, using antibiotic-loaded bone cement and the type of anesthesia are assessed; and determining the patients at risk is aimed.

Material and Methods: The 1263 patients, who were undergone TKA at our clinic in the years between 2011 and 2016, and diagnosed with gonarthrosis were studied; and the incidences of AKI, serum electrolyte disorders and ALI in 24 hours after surgery and the factors that may affect these conditions are sought retrospectively. Student t test has been used

to compare continuous variables between cases and controls, and chi-square statistics have been used to compare frequency distributions. Results were considered statistically significant when p value was <0.05 .

Results: 1263 TKA cases were analysed and the mean age was 67 (42-91). AKI was seen in 0,5% of the patients right after the surgery and 5,8% of the patients 24 hours after the surgery. Elderly patients, male gender, having high creatine levels preoperatively (≥ 1.00 mg/dl) and applying simultaneous bilateral TKA were statistically significant factors for having AKI. Hyponatremia was a seldom complication whereas hyponatremia was seen in 31.7% of the patients 24 hours after the surgery. Spinal anesthesia and male gender were found to be statistically significant risk factors for developing hyponatremia. Hypopotassemia was seen in 11,8% of the patients 24 hours after the surgery and female gender and general anesthesia were found to be a risk factor. Hypocalcemia was recorded in 12.5% of the patients 24 hours after the surgery. ALI was a rare condition after TKA and seen in 0.8% of the patients right after the surgery and 1.2% of the patients 24 hours after the surgery.

Conclusion: AKI is a common complication and the incidence increases with elder patients, male gender and applying simultaneous bilateral knee arthroplasty. ALI is noted as a rare complication. Hyponatremia, hypopotassemia and hypocalcemia are found to be frequent electrolyte disorders and it is recommended to be diagnosed and treated when they are symptomatic.

P745

CORRELATION BETWEEN OSTEOPOROSIS AND IMMUNO-GENETIC DETERMINANTS AT PATIENTS WITH ANKYLOSING SPONDYLITIS IN REPUBLIC OF MOLDOVA

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Objective: Ankylosing spondylitis is an inflammatory joint disease, with unknown aetiology, associated with genetic factors and presents a heterogeneous clinical pattern, expressed by different manifestations such as axial or peripheral arthritis with mild to very severe osteoporosis. The aim of this study was to analyze:

- the clinical manifestations of arthritis and associations with osteoporosis and immunological disorders by appreciation of lymphocytes cell determinants (CD) with identifying markers for aggressive joint disease
- the clinical manifestations of ankylosing spondylitis and associations with human leukocyte antigens (HLA-antigens) and identifying markers for aggressive joint disease

Method: There were 29 primary patients with ankylosing spondylitis.

Results: We have found a high prevalence of HLA-B7, B17 and B27 which were increased in comparison with controls ($p=0.012$, $pc=0.024$, $RRf=3.1$), but the strongest predictive factors among patients with polyarthritis and axial disease of ankylosing spondylitis for an aggressive disease. An association was found between CD determinants of lymphocytes (CD2, CD3, CD4, CD8, CD19, CD20, CD22) and ankylosing spondylitis, but most important were: for peripheral form CD2, CD4, CD8 in comparison with controls ($p=0.003$, $pc=0.009$, $RRf=2.6$); for axial form CD4, CD8 and CD22 in comparison with controls ($p=0.001$, $pc=0.021$, $RRf=3.5$). The most advanced osteoporosis was found in axial forms (M T-score -2,9) and in peripheral form (M T-score -2,5), with osteopenia in peripheral form (M T-score -1.7) in 27%.

In patients with a rational $Ca > 950$ mg / day T-score was 1.95; but at 850-950 mg / day T-score was 2.25.

Conclusions:

- There were several strong association between HLA-antigens (B7, B17, B27), lymphocytes CD2, CD4, CD8, CD22 and ankylosing spondylitis.
- The strongest predictive factors among patients with peripheral and axial disease of ankylosing spondylitis for an aggressive disease were HLA-B7, B27 with a significant linkage ($p=0.0001$, $RRf=2.9$).
- Osteoporosis was imposed as nosologic unit being detected very commonly in patients with ankylosing spondylitis. In the evolution of the disease they were presented with high frequency following risk factors: genetic, intake low calcium and, in particular, depending on the version clinical disease: the most serious – axial form and light show in peripheral.

P746

THE MUSCULOSKELETAL BENEFITS OF GAIT SPEED MAINTENANCE IN OLDER MEN AND WOMEN

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Objective: Loss of mobility with age can be associated with significant morbidity in later life. In particular, there are few data on the relationships between measures of mobility, such as gait speed, and longitudinal changes in musculoskeletal parameters. We therefore investigated these associations using a well phenotyped cohort of older men and women.

Materials and Methods: We studied 172 men and 156 women from the Hertfordshire Cohort Study, each of which underwent peripheral quantitative computed tomography (pQCT) of the tibia (38%) in 2004-5 and then again in

2011–12. Gait speed was assessed for all of these at baseline (3-metre walk) and for 164 men and 147 women at follow-up (8-foot walk). percentage change per year was calculated for gait speed, muscle cross-sectional area (mCSA), fat cross-sectional area (fCSA) and diaphyseal bone parameters (total area (Tt.Ar), cortical area (Ct.Ar), cortical density (Ct.BMD), and polar stress strain index (SSI_p)). The bone, fat and muscle parameters were then transformed using the Fisher-Yates rank-based inverse normal transformation to create sex-specific z-scores. Relationships between gait speed and pQCT parameters were assessed using linear regression.

Results: The mean age of men and women at baseline was 68.9 and 69.3 years respectively. Mean (SD) follow up time was 7.17 (0.39) years. Mean (SD) baseline gait speed was higher in men than women at 0.94 (0.16) and 0.89 (0.16) m/s respectively ($p=0.01$). Rate of decline did not differ significantly by sex. A greater baseline gait speed was associated with a slower decline in diaphyseal Ct.Ar and SSI_p in men and Tt.Ar in women. In men, rate of loss of gait speed was positively associated with rate of loss of Ct.Ar. In both men and women, a slower decline in gait speed was associated with a slower increase in fCSA and slower decline in mCSA although the latter association only reached statistical significance in women. All relationships were maintained after adjustment for the corresponding baseline bone, fat or muscle parameter ($p<0.05$).

Conclusion: Maintenance of gait speed is associated with a slower increase in subcutaneous fat in the lower limb. In men, the rate of loss of Ct.Ar is associated with both baseline and rate of loss of gait speed. This suggests that interventions to optimise and maintain mobility may help to ameliorate the age-related deterioration in bone health.

P747

COST-EFFECTIVENESS OF COMPLYING WITH TREATMENT GUIDELINES IN SWEDEN

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Objective: To estimate the cost-effectiveness of improvements in the management of osteoporosis over the

treatment pathway compared to current clinical practice in Sweden.

Material and Methods: The analysis was carried out using a model that simulates the eligibility of individual patients to be considered for pharmacological treatment during one year and their projected osteoporosis treatment pathway, quality adjusted life years (QALYs) and costs over their remaining lifetime. All patients regardless of treatment or no treatment were simulated. Information on current management of osteoporosis in terms of patient characteristics and treatment patterns were derived from a Swedish osteoporosis research database based on national registers and patient records. Current (standard) clinical management was compared with alternative scenarios mirroring Swedish treatment guidelines: (1) persistence in osteoporosis treatment initiators increased by 50%; (2) non-persistent patients switch to next line treatment; (3) patients with $\geq 15\%$ 10-year fracture risk (FRAX) undergo BMD measurement and start treatment if T-score ≤ -2 ; (4) patients with hip/vertebral fracture start treatment; (5) scenario 1–4 combined.

Results: The proportion of patients treated for osteoporosis increased in scenarios 1–5 compared with current management. The maximum benefit, i.e. health gains obtained with scenario 5, was estimated at 3,864 QALYs. Costs of fractures in this scenario decreased by €133M and the cost/QALY was €21,646. The margin of investment, i.e. the maximum amount that could be invested in the healthcare system to achieve these improvements up to the limit of the willingness to pay for a QALY in Sweden, was estimated at €187M on a population level (€3,419/patient). Table 1 presents the results for all scenarios.

Conclusion: The analysis showed that better compliance to treatment guidelines is associated with better outcomes and cost-savings. From a cost-effectiveness perspective, there is also a considerable room for investment to achieve these improvements in the management of osteoporosis.

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| | Increasing persistence by 50% | Non-persistent patients switch to next line of treatment | Patients with $\geq 15\%$ undergo BMD measurement and start treatment if T-score ≤ -2.0 | Patients who sustain a hip/vertebral fracture start treatment | Scenario 1–4 combined |
|---|-------------------------------|--|--|---|-----------------------|
| Costs | | | | | |
| Treatment | 195/10.6m | 652/35.6m | 1,476/80.6m | 1,415/77.3m | 3,970/217.0m |
| Incident fractures | -153/-8.4m | -253/-13.8m | -424/-23.2 | -619/-33.8m | -1,512/-82.6m |
| Prevalent fractures | -100/-5.5m | -152/-8.3m | -293/-16.0m | -279/-15.2m | -928/-50.7m |
| Total | -59/-3.2m | 248/13.5m | 758/41.4m | 517/28.3m | 1,530/83.6m |
| QALYs | 0.007/383 | 0.012/681 | 0.024/1,314 | 0.018/1,000 | 0.071/3,864 |
| Incremental cost-effectiveness ratio | Cost-saving | 19,882 | 31,535 | 28,271 | 21,646 |
| Margin of investment | 549/30.0m | 625/34.1m | 925/50.6m | 764/41.7m | 3,419/186.9m |

P748

THE IMPACT OF IMAGE ANALYSIS ERRORS (IAE) ON LUMBAR SPINE (LS) AND PROXIMAL FEMORAL (PF) DUAL ENERGY X-RAY ABSORPTIOMETRY (DXA)C. G. Monaco¹, C. Messina¹, A. Poloni¹, A. Biacca¹, F. M. Olivieri², L. M. Sconfienza¹¹Radiology Unit, IRCCS Istituto Ortopedico Galeazzi, Milan, Italy, ²Fondazione IRCCS Ca' Granda - Ospedale Maggiore Policlinico, Milan, Italy**Purpose:** IAE in LS and PF DXA are common. We evaluated the effect of IAE on bone mineral density (BMD) and T-score.**Methods and Materials:** DXA images of patients who performed a LS/PF DXA in January-March 2015 were retrospectively reviewed. When a IAE was present, an expert radiologist made necessary corrections. For LS-DXA we considered the average L1-L4 BMD and T-score. For PF-DXA we considered the total hip (TH) and neck values of BMD.**Results:** We evaluated n=131 LS-DXA and n=142 PF-DXA in 150 patients. We found IAE in n=79 LS-DXA (60.3%) and n=93 PF-DXA (65.5%). Most frequent IEA for LS-DXA were inaccuracies in vertebral inclusion/exclusion (40/79; 50.6%) and intervertebral lines placement (ILP) (37/79; 46.8%). Most frequent IEA for PF-DXA were incorrect neck-box areas (NBA) and total-box area (TBA), 36/93 (38.7%) and 33/93 (35.4%) respectively. After re-analysis, mean L1-L4 BMD: baseline=0.885±0.165, corrected=0.863±0.162 (variation=2.6%); mean NBA BMD: baseline=0.658±0.104, corrected=0.659±0.108 (variation=-0.2%); mean TBA BMD: baseline=0.766±0.113, corrected=0.764±0.112 (variation=0.3%). Differences between LS-DXA BMD and T-score pre- and post-correction were statistically significant (p<0.01) when considering all errors as well as inaccuracies in vertebral inclusion/exclusion alone. For errors in ILP, differences were significant only for BMD values (p<0.05). No significant difference was found between baseline and corrected PF-DXA in terms of BMD and T-score, considering all errors, incorrect NBA and incorrect TBA.**Conclusion:** IAE significantly impacts only on LS-DXA and not on PF-DXA. IAE should be avoided for a proper diagnosis and therapy.

P749

HEMATOLOGICAL INDICES IN PATIENTS WITH FIBROMYALGIAS. Hira¹, M. Gem²¹Department of Clinical Biochemistry, Tatvan State Hospital, Bitlis, Turkey, ²Department of Orthopaedic Surgery and Traumatology, Dicle Medical School, Diyarbakir, Turkey

Fibromyalgia syndrome (FMS) is a common rheumatologic disorder characterized by generalized musculoskeletal pain

with widespread tender points in specific areas, easy fatigability and sleep disorder. Recent studies revealed several markers of inflammation in FMS, but the role of inflammation on the development or progression of FMS is still uncertain and controversial. Mean platelet volume (MPV), red blood cell distribution width (RDW), neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte ratio (PLR), monocyte-to-lymphocyte ratio (MLR) and RDW-to-platelet ratio (RPR) may reflect the systemic inflammatory response associated with many diseases, but their roles in FMS are unclear. The aim of the present study was to evaluate the routine hematological parameters on FMS and to explore their clinical significance. The study included 213 patients with FMS and 113 healthy individuals. Medical records, Erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), white blood cell count (WBC), platelet count (PLT), RDW, NLR, PLR, MLR, RPR and MPV levels were retrospectively recorded from patient files. There were no significant differences in WBC, PLT, RPR, MLR levels between two groups (all $p>0.05$). MPV, RDW, NLR, PLR and CRP values were significantly higher in the FMS group than in the control group (all $p<0.05$). CRP was positively correlated with NLR and MLR in FMS patients. Our study showed that hematological markers especially NLR might be used as markers that show inflammation in patients with FMS.

P750

PREVALENCE OF VERTEBRAL DEFORMITIES IN TYPE 1 DIABETIC PATIENTSO. V. Vodyanova¹, A. P. Shepelkevich², N. S. Korytko², N. A. Vasileva³¹Belarusian Medical Academy of Postgraduate Education, Minsk, Belarus, ²Belarusian State Medical University, Minsk, Belarus, ³Republican Medical Rehabilitation and Balneotherapy Centre, Minsk, Belarus**Aim:** To assess the prevalence of vertebral deformities, bone mineral density in type 1 diabetic patients.**Materials and methods:** we examined 103 type 1 diabetic patients (37 males, 66 females, age: 31 [24,9;38] yrs, duration of DM: 12 [7;19] yrs, HbA1c: 8,7±2,1%, BMI: 23,1 [21,8;25,8] kg/m²). The control group consisted of 62 health age- and BMI-matched persons (14 males, 48 females). Bone mineral density (BMD) was measured with DXA with lateral vertebral assessment (LVA). We used the Genant classification to assess a grade of vertebral deformity. Spinal deformity index (SDI) proposed as surrogate marker of bone quality, was calculated by summing the severity and the number of the vertebral fractures.**Results:** BMD was lower in type 1 diabetics either at spine (Z-score -0,55+1,21 vs. 0,25+1,1, $p<0,001$) and at femoral neck (Z-score -0,65+1,09 vs. 0,2+0,95, $p<0,001$) in comparison

with control group. 16,4% of type 1 diabetic patients had vertebral deformities (n=27) (4 patients had 2-3 deformities of different types at the same time) that was statistically higher than in control group (3,6% (n=6), $p=0,0177$). 21% of diabetics showed vertebral fractures in spite of Z-score BMD higher than -2. SDI had the tendency to be higher in type 1 diabetics comparing with controls (0 [0; 1] vs. 0[0; 0], $p=0,007$).

Conclusions: Type 1 diabetics showed an increased prevalence vertebral deformities ($p=0,0177$), regardless of BMD. A possible reduction of bone quality may play a role in the increased prevalence of vertebral deformities. A larger study had to be performed to confirm these data.

P751

EVALUATION OF DENOSUMAB PERSISTENCE IN POSTMENOPAUSAL WOMEN AFFECTED BY SEVERE OSTEOPOROSIS: A MULTICENTER OBSERVATIONAL REAL PRACTICE STUDY

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Objective: To evaluate persistence to denosumab treatment in osteoporotic postmenopausal women.

Material and Methods: In this multicenter observational real practice study we recruited postmenopausal women affected by osteoporosis. We included women aged >50 years, able to receive a prescription according to the Italian reimbursement criteria in force during the study period for anti-osteoporotic pharmacological treatment. They initiated a treatment with subcutaneous denosumab 60 mg/every 6 months between November 2011 and May 2016. Women who had received aromatase inhibitors were excluded. Patients were evaluated at baseline and every 6 months for all treatment length. Persistence data were evaluated for a total of 36 months.

Results: Eight hundred seventy women (with a mean age of 70 years and a mean body mass index of 24.8 ± 4.1 kg/m²)

were enrolled. At the Dual-energy X-ray absorptiometry assessment, the mean lumbar spine T-score was -2.76 ± 1.14 standard deviations (SD) and the mean femoral neck T-score was -2.49 ± 0.80 SD. During the study, the persistence was 91.4% and the total dropouts were 75 (8.6%). After 12 months of treatment, persistence to therapy was over 99% that was maintained during all the study. The 4% of study population, who had started earlier therapy, reached 56 months of treatment with a persistence of 100%.

Conclusion: This multicenter observational real practice study showed that persistence to denosumab treatment in our cohort of postmenopausal women was very high. High persistence to therapy could be particularly linked to the pharmacological schedule, but also to other factors such as frequency of visits, and opportunity to call the doctor could play a role in the persistence to treatment in these patients.

P752

PAIN AND HEALTH RELATED QUALITY OF LIFE IN PATIENTS WITH PRIMARY OSTEOPOROSIS

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Osteoporosis, often overlooked and undertreated, is one of the most common metabolic bone disease and can result in devastating physical, psychosocial, and economic consequences.

Objective: The study has proposed to highlight the influence of pain status in quality of life for patients with primary osteoporosis (type 1 and also type 2) and the importance of complex health care.

Patients and methods: 81 patients with osteoporosis (bone T scores < -2.5SD; BMD was measured by means of dual energy X-ray absorptiometry of hip) completed questionnaires detailing lifestyle factors and co-morbidities before (T0) and three month after a complex rehabilitation program (T1) associated with osteoporosis medication. Each patient was evaluated using 100mm VAS pain (by spinal compression fractures), SF-36 and EQ-5D questionnaires.

Results: The mean age was 63.7 ± 6.6 years; the mean duration of pain was 3.51 ± 0.23 years. The SF36 was significantly correlated with the level of pain ($p < 0.01$). For all patients, the presence of pain had repercussions on SF-36-physical health (correlation: 0.629). After rehabilitation program was performed, the SF-36 and EQ-5D improved, with statistically significant differences between initial and final average.

Conclusion: The principal goals of health care for these patients are to maintain independence and preserve good quality of life; the results of study support the idea that the general health and functional status are strongly influenced by the level of pain.

P753

COMPARISON OF ASSOCIATION BETWEEN APPENDICULAR SKELETAL MUSCLE MASS AND BONE MINERAL DENSITY AT DIFFERENT SITES OF PRE- AND POSTMENOPAUSAL WOMEN

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Objective: This cross sectional study examined the association between appendicular skeletal muscle mass (ASMM) and bone mineral densities (BMD) at different skeletal sites of healthy pre- and postmenopausal women.

Materials and methods: The study included a randomly selected sample of healthy premenopausal (n=184) and postmenopausal women (n=166). ASMM (kg) and BMDs (g/cm²) were measured with DXA scanning (Hologic Inc. Bedford, USA). Associations between ASMM and total body BMD (TBBMD), total spine BMD (TSBMD), total hip BMD (THBMD), femoral neck BMD (FNBMD), trochanter BMD (TroBMD) were determined with Pearson correlation coefficient (r). Coefficient of determination (R²) and standard error of estimate (SEE) were also observed.

Results: Mean (SD) age of pre and postmenopausal women were 42.5(6.0) years and 55.1(3.8) years, and mean (SD) ASMM of pre and postmenopausal women were 16.06(2.51) kg and 14.87(2.96) kg (p<0.001), respectively. BMDs of all sites were significantly higher among premenopausal women compared to the postmenopausal women (p<0.001). ASMM showed significant correlations with total and all regional BMDs in both pre and postmenopausal women (p<0.001) in both age unadjusted and age adjusted correlations.

The correlations between ASMM and BMDs among premenopausal women are; TBBMD: r=+0.23, R²=0.05, TSBMD: r=+0.25, R²=0.06, THBMD: r=+0.41, R²=0.16, FNBMD: r=+0.33, R²=0.10, TroBMD: r=+0.31, R²=0.09.

The correlations between ASMM and BMDs among postmenopausal women are; TBBMD: r=+0.41, R²=0.16, TSBMD: r=+0.42, R²=0.17, THBMD: r=+0.56, R²=0.31, FNBMD: r=+0.58, R²=0.33, TroBMD: r=+0.46, R²=0.21.

Conclusion: Premenopausal women, compared to postmenopausal women had higher ASMM and BMDs in all sites studied. ASMM has positive and significant associations with total as well as regional BMDs in both pre and postmenopausal

women. However correlations appear stronger in postmenopausal women compared to premenopausal women. The reason behind such correlations needs to be explored in future studies.

P754

EFFECT OF MINODRONATE ON VERTEBRAL BONE MICROARCHITECTURE AND STRENGTH IN VIVO ASSESSED BY CLINICAL COMPUTED TOMOGRAPHY

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Objective: Minodronate (MIN) is one of the most potent bisphosphonates, and has been reported to increase bone mineral density (BMD) and reduce fracture risk. The purpose of this study was to clarify the effect of MIN in vivo on the vertebral microarchitecture and strength estimated by finite element analysis (FEA).

Material and Methods: Treatment-naïve MIN-treated female osteoporosis patients (n=10) and non-treated age-matched historical control (n=10) were retrospectively evaluated. Areal BMD (aBMD) scanned by DXA, and 3D data of 3rd lumbar spine scanned by quantitative computed tomography (qCT) at a spatial resolution of 351 x 351 x 500µm were repeatedly evaluated. Bone volume fraction (BV/TV), trabecular thickness (Tb.Th), trabecular number (Tn.N), and connectivity density (CD) were calculated by custom-made software. In addition, vertebral fracture load defined as the vertebral strength index was estimated by FEA (Mechanical Finder, Tokyo, Japan).

Results: After 1 year, non-treated control lost -2.9% of aBMD, and the MIN group gained 6.3%, while BV/TV changed -14.6% and +15.3%, respectively. Tb.Th and Tb.N in non-treated control were severely decreased over 1-year period (-4.7%, -10.0%, respectively), whereas MIN could reverse changes in those parameters (+5.5%, +9.2%, respectively). CD, however, could not be improved by the treatment (-27.9% vs. -3.2%). FEA revealed severe strength loss in the non-treated control and gain in the MIN group (-15.3%, vs. 10.0%).

Conclusion: Our results indicate that evaluation of aBMD by DXA would underestimate both changes in bone microarchitecture and strength. Despite the apparent increase in bone volume by MIN, it might be difficult to reestablish trabecular connectivity. In order to prevent connectivity loss, earlier therapeutic intervention would be necessary before the connectivity has been lost.

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P755

THE USE OF VITAMIN D IN PREVENTION AND TREATMENT OF OSTEOPOROSIS: OUR EXPERIENCE

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Vitamin D is known as liposoluble vitamin found in food, but is also produced endogenously. This initial form of vitamin D is actually an inert form that must undergo two hydroxylation processes to become active. Serum concentrations of 25 (OH) D, active form of vitamin D, are the best indicator of vitamin D status in the body and reflect the endogenous production of vitamin D as well as the food and supplement intake. 25 (OH) D is a biomarker for the presence of vitamin D in human body, but has not yet fully clear to what extent 25 (OH)D also serve as biomarker of efficiency. Based on data from the U.S. Institute of Medicine in 2010. it has been concluded that serum 25 (OH) D levels less than 30nmol / L (<12ng/ml) are vitamin D deficiency, and values 30-50 nmol / l (12-20ng/ml) represent the values of insufficiency of vitamin D. Today is practically a world pandemic of vitamin D insufficiency/ deficiency in the general population. High prevalence of vitamin D deficiency was confirmed in all parts of the world. In Bosnia and Herzegovina, there are little data on vitamin D intake and 25 (OH) D serum levels used both in prevention or treatment. We have conducted few small researches in order to evaluate the serum levels of 25(OH)D as well as to establish whether the substitution of D vitamin and Ca is sufficient.

In a small research at our department and Orthopedic clinic on 30 patient with hip fracture, 89.7% had low values of 25 (OH)D vitamin, and only 10% of patients were taken substitution therapy with vitamin D.

In 50 patient with lupus erythematosus on steroid therapy we have found that 14 (41.1%) did not take any prophylaxis, and 16 (47.05%) were subdosed with Ca and D vitamin.

In our patients treated for postmenopausal osteoporosis with Pamidronate we have found 12 out of 30 with fragile fractures (4 with multiple fractures), and 97.5% of patient were subdosed, and 78.45% had vitamin D deficiency (<30mol/l). In conclusion it can be said that in the majority of patients insufficiency / deficiency of vitamin D was found, and that patients who are on substitution therapy were often subdosed.

P756

CLUSTER ANALYSIS OF BONE MICROARCHITECTURE FROM HIGH RESOLUTION PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY (HR-PQCT) AND FRACTURE IN THE GLOW STUDY

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Objective: A recent study in the Hertfordshire Cohort Study (HCS) reported two separate micro-architectural bone phenotypes associated with high fracture rates, as assessed by HR-pQCT. We aimed to replicate these findings in the Southampton arm of the Global Longitudinal Study of Osteoporosis in Women (GLOW) study.

Material and methods: Women recruited from local practices completed annual questionnaires, including fracture events, for 5 years. Data were available for 220 women, mean age 70.2 (5.6) years at time of scanning. Participants underwent HR-pQCT (XtremeCT) imaging (voxel size 82 µm) of the distal radius. Standard image analyses were performed for assessment of macrostructure, regional densitometry and trabecular microarchitecture. Linear regression was used to examine the relationships between individual HRpQCT parameters and fracture history. K- means partitioning cluster analysis was used to identify 4 clusters. Mean total hip aBMD and differences between fracture vs. non fracture groups were determined for each cluster.

Results: Fifty two women reported a fracture after the age of 45. In unadjusted analyses, history of fracture was associated with lower intra-cortical porosity (p=0.033), trabecular density (p=0.002) and trabecular number (p<0.001), and higher trabecular separation (p<0.001). Whilst 2 clusters (Cluster 3 and 4) had a significantly lower hip aBMD (p<0.001) compared to Cluster 1; only individuals in Cluster 4 had a significantly higher risk of fracture (Relative risk [95% CI] compared to Cluster 1: 2.68 [1.31, 5.48], p=0.007). In Cluster 4, there were differences in HRpQCT-measured trabecular parameters: lower trabecular density and number and higher trabecular separation compared to the analysis sample, whereas Cluster 3 had higher trabecular area and lower cortical area, thickness and density compared to the analysis sample.

Conclusion: A cluster analysis of HRpQCT parameters in GLOW derived one cluster (4) with a significantly higher fracture risk. However 2 phenotypes (3- cortical parameters and 4

– trabecular parameters) were very similar to previously reported results from the HCS, where both were associated with higher fracture risk. The different findings between the two studies may reflect the younger mean age at scan in GLOW.

P757

BONE METABOLISM IN PSORIATIC ARTHRITIS

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Introduction: Skeletal manifestations as a result of abrupt bone metabolism may be predominant in psoriatic arthritis (PsA).

Patients and materials: A total of 118 PsA patients were recruited from the out-patient unit of the Department of Rheumatology between September 2015 and June 2016. Psoriasis severity was assessed by the PASI score, severity of arthritis and axial symptoms was determined by the DAS28 and BASDAI indexes. Blood samples were drawn to measure 25 hydroxyvitamin D (25OHD), parathyroid (PTH), osteocalcin (OC) and C-terminal telopeptides of type-I collagen (CTx) levels. Lumbar spine (LS) and femoral neck bone mineral density was measured using DXA and peripheral qCT was used to measure distal radius BMD. FRAX questionnaire was also administered to determine the risk of fractures in the consequent 10 years.

Results: The mean (range) age of the PsA patients was 53 (25–85) years. The mean (range) 25OHD level was 53 (6–120) nmol/L. Disease activity correlated significantly with age ($p=0.043$), psoriasis activity ($p=0.031$), ten year probability of a major osteoporotic fracture as per the FRAX questionnaire ($p=0.005$) and 25OHD levels ($p=0.020$). LS BMD showed a non-significant negative correlation with disease activity. Both FRAX calculated major and hip fracture risk correlated significantly with qCT measured BMD values.

Conclusion: The disease activity in PsA is directly correlated with FRAX related fracture probabilities.

P758

THE EFFICACY OF KINESIO TAPING, LOCAL STEROID INJECTION AND LOW LEVEL LASER THERAPY IN PATIENTS WITH LATERAL EPICONDYLITIS

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Objectives: The aim of this randomized-prospective-controlled and single blind study was to compare the effects of low-level

laser therapy, local steroid injection and kinesio-taping in the treatment of lateral epicondylitis with regard to clinical variables and functional status.

Materials and Methods: 90 patients with lateral-epicondylitis were included. Mean age of the patients (68 women and 22 men) was 47.53 years. Patient-rated tennis-elbow evaluation (PRTEE) scores and positivity of Maudley test, Cozen's test and Millis test were recorded before the treatments and one month after the treatments. The patient's elbow range of motion (ROM) degrees and elbow pain intensity at rest, movement and night which was evaluated with visual analog scale (VAS) were recorded. Patients were randomized by sealed envelope method into 3 groups; kinesio taping ($n=30$), local steroid injection ($n=30$) and low-level laser treatment ($n=30$). The first group received 5 sessions of kinesio taping with 3 or 4 days intervals, second group was treated with one dosage of local steroid and local anesthetic injection, and third group was treated with low-level laser five sessions per week for two weeks duration.

Results: At the evaluation of first month after treatment, rest pain, night pain, PRTEE-pain scores and PRTEE-functional scores were significantly better than pre-treatment scores in all groups ($p<0.05$). Additionally Maudley test, Cozen's test and Mills test's positiveness were significantly decreased ($p<0.05$) in all groups. There were no significant differences between groups in terms of VAS pain scores, Cozen's test, Maudley test and Mills test positivity. In local steroid injection group, improvement in PRTEE-daily-activities-sub-group scores, which indicate functional status, were significantly higher than in kinesio taping and low-level laser treatment groups ($p<0.05$).

Conclusion: As a conclusion, all three treatment methods (local steroid injection, kinesio-taping and low-level laser therapy) have similar efficacy on reducing symptoms in lateral epicondylitis; but after first month, better functional improvement was determined with local steroid injection treatment.

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A CASE OF ASSOCIATION OF OSTEOGENESIS IMPERFECTA AND GRAVE'S DISEASE

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Introduction: Osteogenesis imperfecta is very rare genetic disorder that has various comorbidities. One of them is autoimmune thyroid disease.

Aim: To describe a clinical case of Grave's disease (GD) in a patient with osteogenesis imperfecta.

Results: A 19-year old woman was referred to our tertiary care endocrine medical center for radioiodine treatment of GD. Her appearance was otherwise unremarkable except for pronounced blue sclerae and hypermobile joints. Her anamnesis was remarkable for repeated fractures since 3 years old till present which mostly appeared at low trauma conditions: left tibia, right tibia, left elbow, left radius, right knee, cranial bones. She was not officially diagnosed with osteogenesis imperfecta but was empirically treated in the right way by antiresorptives for a bit more than 2 later years (2 months with 150 mg ibandronate *per os* followed by 4 *sc* injections of denosumab 60 mg every 6 months). The treatment was started because of bone loss (DXA Z-criteria -3.4 SD at the spine and -2.8 SD at the proximal femur sites) and high bone resorption assessed by CTX (beta-crosslaps). During antiresorption treatment she received 500 mg of calcium a day and her labs were as follows: Ca total – 2.36 mmol/l (2.15-2.55), Ca ion – 1.32 mmol/l (1.03-1.32), PTH – 38 pg/ml (15-65), ALP – 58 U/l (0-270), osteocalcin – 17.53 ng/ml (11-35), CTX – 0.061 ng/ml (<0.580). GD is an autoimmune endocrine disorder in which autoantibodies are able to activate thyroid stimulating hormone receptor in the thyroid gland inducing gland's hyperplasia and thyroid hormone excess with the later responsible for high bone turnover osteoporosis. Autoimmunity is postulated to be driven by low quality collagen predisposing to increased autoantigen presentation. The autoimmune thyroid pathology, Hashimoto thyroiditis, is thought to be associated with osteogenesis imperfecta but to this date GD was not described.

Conclusions: GD may be one of the presentations of thyroid autoimmunity in the setting of osteogenesis imperfecta.

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VITAMIN D LEVELS, BMD AND FRACTURES IN PATIENTS WITH DIABETES MELLITUS TYPE 2

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The authors examined a group of 1998 diabetes patients which included 1278 females and 720 males. Only 109 patients suffered from diabetes mellitus type I (DMT1) and 1889 patients from diabetes mellitus type II (DMT2).

Patients were divided into six age categories: 18-25, 26-39, 40-54, 55-65, 66-80, 81 and more. Vitamin D level, osteocalcin, CTx and hip T score was measured in all patients. Age categories were selected according to the age groups in the control group of 2900 patients without diabetes where DXA measurement was previously

performed. Authors examined further only 3 age groups 55-65, 66-80 a 80 and more due to low number of DMT1 patients. DMT1 group of 109 patients (75 women and 34 men) had average vitamin D level 55.6 nmol/l (median 48.6 nmol/l), DMT2 group of 1889 patients (1203 women and 686 men) had average vitamin D level 53.8 nmol/l, (median 51.5 nmol/l). All patients from the control group had repeatedly checked level of vitamin D and basic parameters (weight, height, BMI and supplementation with calcium and vitamin D). Results were compared with a set of newly measured patients without diagnosis of E10 and E11. DM patients had significantly lower vitamin D level than the control group. The group was divided into 2 groups. One received supplementation with calcium and vitamin D and the second group was without supplementation, and according to the season of blood samples examination - summer and winter. Level of vitamin D was related not only to the age group, but also to the time of blood sample tests, supplementation and BMI.

Due to low number of patients there was no correlation found in DMT 1.

There was no significant difference between the level of vitamin D in DMT 2 in summer and winter and no significant difference among type of supplementation. Only BMI had a significant effect on vitamin D level in different types of supplementation and age. T score surprisingly did not correlate with type of supplementation but with BMI. There was no correlation in osteocalcin but a significant difference was found in CTx in DMT2 patients experienced a significantly higher number of nonvertebral fractures than the control group.

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RELATIONS BETWEEN MAXIMAL HALF SQUAT STRENGTH AND BONE VARIABLES IN A GROUP OF YOUNG OVERWEIGHT MEN

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Aim: The purpose of this study was to explore the relationships between maximal half squat strength and bone variables (BMC, BMD, hip geometric indices and TBS) in a group of young overweight men (BMI > 25 kg/m²).

Materials and methods: 76 Lebanese young overweight (BMI > 25 kg/m²) men whose ages range from 18 to 32 years participated in this study. Body composition and bone variables were measured by DXA. Maximal half squat strength was measured by a classical fitness machine (Smith machine) respecting the instructions of the national association of conditioning and muscular strength (NCSA).

Results: Maximal half squat strength was positively correlated to whole body BMC ($r=0.37$; $p=0.001$), whole body BMD ($r=0.29$; $p=0.01$), L1-L4 BMD ($r=0.42$; $p<0.001$), total hip BMD ($r=0.26$; $p=0.02$), femoral neck BMD ($r=0.32$; $p=0.004$), femoral neck cross-sectional area ($r=0.44$; $p<0.001$), femoral neck cross-sectional moment of inertia ($r=0.27$; $p=0.01$) and femoral neck section modulus ($r=0.37$; $p<0.001$). Using multiple linear regressions, positive correlations between maximal half squat strength and several bone variables measured (whole body BMC, whole body BMD, L1-L4 BMD, femoral neck BMD, femoral neck cross-sectional area and femoral neck section modulus) persisted after adjustment for lean mass.

Discussion: These results highlight the positive influence of maximal strength of the lower limbs on bone variables in young overweight men. Our results have practical implications in the field of the prevention of osteoporosis in men.

Conclusion: This study suggests that maximal half squat strength is an independent determinant of bone mass, bone mineral density, and geometric indices of femoral neck in young overweight men.

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THE KINESIO TAPING; LOCAL ANESTHETIC/STEROID INJECTION AND SPLINTING IN THE TREATMENT OF PATIENTS WITH CARPAL TUNNEL SYNDROME: A CLINICAL AND ELECTROPHYSIOLOGICAL STUDY

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Objectives: The aim of this study was to investigate the efficacy of local anesthetic/steroid injection (S/LA), kinesiоtaping (KT) and splinting in patients with carpal tunnel syndrome (CTS) with regard to pain, disability and nerve conduction studies.

Materials and Methods: 60 patients with CTS were enrolled. Visual analog scale (VAS) was used to assess the intensity of pain. Symptom severity and functional status were evaluated by Boston-Questionnaire and scores were

defined as symptom severity score (SSS) and functional status score (FSS). Electrophysiologic studies comprised motor and sensory latencies (CMAPL, SNAPL) and amplitudes (CMAPA, SNAPA) of median nerve. The patients were randomized into three groups receiving either KT performed three-times by intervals-of 4-day (Group 1); a single S/LA injection to carpal-tunnel (Group 2); or splinting alone for three-weeks (Group 3). The clinical and electrophysiologic studies were performed at baseline and at third week.

Results: 58 female and 2 male patients (mean age, 48.2 ± 8.9 years; disease-duration, 2.8+3.5 months) were included. There were no differences between the groups regarding demographic variables on entry. Compared to baseline; post treatment VAS-pain and FSS scores improved significantly in the KT and splint groups at third week. According to nerve conduction studies, electrophysiological variables were improved in both KT and injection groups but the difference was not statistically significant ($p>0.05$; Table 1).

Conclusion: We imply that three-times of KT by 4-day intervals and splinting have favorable effects on pain and functional status in the early period (up to one month) in patients with CTS. As the improvement in pain-intensity was more significant with KT than in splinting; we suggest that KT may be an alternative non-invasive method, instead-of splinting, for CTS patients in the early period.

Table 1. The clinical/electrophysiologic properties of patients according to groups

| | | Baseline | After therapy | P | After-Before Difference p |
|----------|---------|-------------|---------------|--------|---------------------------|
| VAS-pain | Group 1 | 64.5±23.72 | 50.0±18.91 | <0.001 | 0.051 |
| | Group 2 | 61.0±25.11 | 57.5±19.43 | 0.286 | |
| | Group 3 | 60.0±18.63 | 50.5±15.71 | 0.005 | |
| | P | 0.805 | 0.349 | | |
| FSS | Group 1 | 1.94±1.06 | 1.43±0.87 | 0.026 | 0.392 |
| | Group 2 | 1.92±0.79 | 1.54±0.98 | 0.088 | |
| | Group 3 | 1.96±0.99 | 1.15±0.81 | 0.001 | |
| | P | 0.993 | 0.378 | | |
| SSS | Group 1 | 1.98±1.26 | 1.49±1.10 | 0.983 | 0.316 |
| | Group 2 | 2.21±1.02 | 1.59±1.33 | 0.983 | |
| | Group 3 | 2.19±0.72 | 1.32±0.96 | 0.055 | |
| | P | 0.739 | 0.741 | | |
| CMAPL | Group 1 | 3.70±0.67 | 3.66±0.82 | 0.889 | 0.591 |
| | Group 2 | 4.47±1.91 | 4.10±1.03 | 0.175 | |
| | Group 3 | 4.56±1.25 | 4.17±0.54 | 0.158 | |
| | P | 0.106 | 0.121 | | |
| CMAPA | Group 1 | 11.83±2.72 | 13.61±3.88 | 0.398 | 0.232 |
| | Group 2 | 11.73±4.57 | 14.27±6.18 | 0.229 | |
| | Group 3 | 10.25±6.41 | 12.49±14.40 | 0.291 | |
| | P | 0.957 | 0.060 | | |
| SNAPL | Group 1 | 3.63±0.85 | 3.60±0.93 | 0.846 | 0.834 |
| | Group 2 | 3.82±0.91 | 3.67±1.05 | 0.381 | |
| | Group 3 | 4.38±1.09 | 4.19±0.55 | 0.284 | |
| | P | 0.074 | 0.102 | | |
| SNAPA | Group 1 | 28.07±11.22 | 29.47±15.71 | 0.586 | 0.375 |
| | Group 2 | 23.94±15.27 | 20.38±12.25 | 0.168 | |
| | Group 3 | 19.89±9.14 | 19.83±8.85 | 0.979 | |
| | P | 0.113 | 0.051 | | |

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SELF-MANAGEMENT EXERCISE PROGRAM ASSOCIATED TO SPA THERAPY INCREASED THE PHYSICAL ACTIVITY LEVEL OF PEOPLE WITH SYMPTOMATIC KNEE OSTEOARTHRITIS: A QUASI-RANDOMIZED CONTROLLED TRIAL

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Objective: To assess effectiveness of self-management exercise program associated to spa therapy at 3 month on the improvement of physical activity (PA) level, disability, pain, anxiety, fears and believes in symptomatic knee osteoarthritis (OA) people.

Material and Methods: Prospective, multicentric, quasi-randomized controlled trial with alternate month design method (one month periods). People with symptomatic knee OA people (stage I-IV, Kellgren-Lawrence scale) with low and moderate PA level were included in 3 spa therapy resorts. Intervention group (IG) received 5 self-management exercise sessions (1h30; education, aerobic, strength training, range of motion) + information booklet + 18 sessions (1h) of conventional spa therapy (STC). Control group (CG) received information booklet + 18 sessions of STC. The primary outcome was changes at 3 months in PA level (IPAQ short form score) and secondary outcomes were WOMAC function, pain, HAD anxiety/depression, KOFBeQ fears and believes changes.

Results: 131 subjects were included. Both groups significantly increased PA level measured with continuous IPAQ total score (MET-minutes/weeks), with superiority for IG (+77.8%, $p=0.0062$) than CG (+50.7%, $p=0.0099$). Disability (-12.8%; $p=0.0032$) and pain (-15.2%; $p=0.0370$) also decreased significantly for both groups. Anxiety (-11.6%; $p=0.0195$) and fears and believes (-18.2%; $p=0.0146$) decreased significantly only in intervention group. Other data will be presented later.

Conclusions: This study confirms the impact of STC on disability and pain and gives news data's on physical activity level. Self-management exercise program improve anxiety, fears and believes. Complex educational strategies comprising information booklet with or without self-management exercise program can be proposed and adapted to OA phenotypes.

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THE INFLUENCE OF LIFE STYLE RISK FACTORS ON BONE MINERAL DENSITY

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Objective: The life-style risk factors for osteoporosis in the female population differ from country to country. Our objective was to find out the relationship between life style factors and bone mineral density (BMD) in women of Banjaluka region.

Material and Method: The study included 1164 Caucasian women (age 36 –75; mean age 58.3) free of medications affecting bones. BMD was measured at lumbar spine and left hip by DXA (Lunar Prodigy). According to the WHO definition of osteoporosis, the participants were divided into three (3) groups: normal BMD (N): 144 (12.37%); osteopenia (OPN): 356 (30.58%) and osteoporosis (OP): 664 (57.04%). Data about lifestyle factors was collected by standardized numerical questionnaires. The accepted level of significance was sat at $p<0.05$.

Results: In total sample correlation analyses indicated significant association between low BMD and: increased caffeine intake ($c^2_{gr}=9.210$; $p<0.01$), low calcium intake ($c^2_{gr}=5.991$; $p<0.05$) and inadequate physical activity ($c^2_{gr}=9.210$; $p<0.01$). In comparison between N and OP groups, the significant association was found but at greater significance.

Conclusion: The results show the specifics of our population regarding the life style factors causing the changes in BMD. This could be useful in screening the patients for DXA.

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IS THERE A RELATIONSHIP BETWEEN AUTONOMIC NERVOUS SYSTEM ACTIVITY AND BONE MINERAL DENSITY IN NON MEDICATED PERIMENOPAUSAL WOMEN?

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Introduction: Osteoporosis is a skeletal disorder characterized by a low bone mass and structural deterioration

of bone tissue. Its consequences are compromised bone strength and an increased risk of fracture. There are findings reported that leptin, a hormone produced by fat, inhibited bone formation in mice, this effect was mediated by the sympathetic nervous system (SNS). Since these discoveries, the autonomic nervous system (ANS) has attracted attention as a newly recognized regulator of bone remodeling, and a number of clinical and experimental studies have shown that SNS activation is associated with reduced bone mineral density (BMD).

Materials and Methods: The present study involved 120 premenopausal women (47.9 ± 4.0 years) and 156 postmenopausal women (53.4 ± 6.0 years). After height and weight measurements had been obtained, BMD was measured at the lumbar spine by dual-energy X-ray absorptiometry and the data were expressed as a T-score. ANS function was evaluated by analyzing the electrocardiogram (ECG) R–R interval variability. ECG data were digitized with a sampling rate of 1 kHz and the R–R intervals were stored sequentially. The spectral powers were calculated for the following respective frequency bands—the low frequency (0.03–0.15 Hz) power (LP), an indicator of both SNS and PNS activity; the high frequency (0.15–0.5 Hz) power (HP), which reflects solely PNS activity; and total (0.03–0.5 Hz) power (TP) representing the overall ANS activity. In order to assess the balance between SNS and PNS activities, we used LP/HP and HP/TP as indicators of SNS and PNS activities (SNA and PNA). Statistical differences between groups were assessed using Student's unpaired t test for parametric measures and the Mann–Whitney U test for non-parametric measures, and p values ≤ 0.05 were considered statistically significant. Data are expressed as mean \pm SD or medians (range). Statistical differences between groups were assessed using Student's unpaired t test for parametric measures and the Mann–Whitney U test for non-parametric measures, and p values ≤ 0.05 were considered statistically significant. Data are expressed as mean \pm SD or medians.

Results: There were no significant differences between pre- and postmenopausal subjects in height, weight, body mass index (BMI). BMD was significantly higher in premenopausal than in postmenopausal subjects ($105.4 \pm 16.5\%$ vs. $91.3 \pm 15.3\%$, $p < 0.01$). In premenopausal subjects, no significant difference was observed in BMD between the SNS- and PNS-dominant groups ($103.5 \pm 18.4\%$ vs. $107.2 \pm 14.6\%$). However, in postmenopausal subjects, BMD was significantly higher in the SNS-dominant group than in the PNS-dominant group ($94.1 \pm 16.3\%$ vs. $88.4 \pm 18.8\%$, $p < 0.05$); BMD was also significantly different even after adjustment for age and BMI (93.5 ± 15.5 vs. 89.1 ± 12.0 , $p < 0.05$).

Discussion: One of the noteworthy findings of our study was that higher overall ANS activity was associated with higher BMD. Difference was also found between pre- and postmenopausal subjects, with overall SNS activity and BMD both being significantly decreased in the postmenopausal as compared to the premenopausal subjects.

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EFFECT OF RITUXIMAB ON QUALITY OF LIFE WITH RHEUMATOID ARTHRITIS MEN TO BASELINE BONE MINERAL DENSITY

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Objective: On the results of a prospective four-year observation to evaluate the effect of rituximab on the quality of life with rheumatoid arthritis (RA) men with different bone mineral density (BMD) to baseline.

Material and Methods: We observed 36 men with documented diagnosis of RA (criteria ACR, 1987) with the combined therapy of methotrexate (mean dose of 13.56 ± 0.34 mg / week) and rituximab to standard scheme (1000 mg intravenously in the 1st and 15th days, the course - 2 infusion, the average number of courses - 3.65 ± 0.09). All patients were randomized into two groups according to the level of BMD and T-score: patients with osteopenia (group 1, n=15) and with osteoporosis (group 2, n=21). To assess bone mineral density was performed dual-energy X-ray absorptiometry. To assess Life Quality (LQ) questionnaires EQ-5D and HAQ were used. All patients completed questionnaires on the baseline and then every 12 months to 4 years follow-up.

Results: When calculating a quantitative index for health questionnaire EQ-5D established that baseline in patients with osteoporosis health index indicator was lower than in patients with osteopenia - 0.22 ± 0.06 and 0.37 ± 0.04 ($p = 0.038$). After 4 years of therapy there was a statistically significant increase in the index in both groups of patients relatively baseline data - 0.47 ± 0.02 and 0.62 ± 0.04 ($p < 0.001$ and $p < 0.001$, respectively). Similar relationships observed in the analysis of the dynamics of the index HAQ. Baseline in patients osteopenia HAQ index was 1.86 ± 0.11 , in patients with osteoporosis - 1.91 ± 0.16 ($p = 0.82$), which corresponds to moderate functional impairment in patients of both groups. During therapy HAQ index was significantly decreased in both groups (HAQ group 1 - 1.31 ± 0.12 , HAQ group 2 - 1.44 ± 0.14 , $p = 0.0006$ and $p = 0.004$).

Conclusion: According to the results of a four-year observation noted a positive effect of rituximab on the quality of life of men with osteopenia and with osteoporosis.

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FRACTURE RISK AND RISK FACTORS OF FRACTURES IN ANKYLOSING SPONDYLITIS

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Aims: We conducted a meta-analysis to examine the risk of fractures in patients with ankylosing spondylitis (AS). Additionally, we evaluated the risk factors of vertebral fractures (VFs) in AS.

Methods: Two authors independently searched Embase and Medline for studies that had assessed the risk of fractures in AS.

Results: 21 studies were eligible. Patients with AS had high frequency of VFs (OR (95% CI): 1.96 (1.52-2.51)). Major risk factors for VFs include low BMD at the femoral neck and total hip, male gender, disease duration, BASDAI, BASRI and inflammatory bowel disease. The risk of non-vertebral fractures (OR (95% CI): 1.0 (1.04-1.15)) was 10% higher in AS patients than controls. The risk of hip fractures in AS patients was not statistically significant (OR (95% CI): 1.17 (0.71-1.92)) (Figure)

Conclusion: We found that patients with AS are at high risk of VFs. Male sex, duration of AS, mSASSS, BASRI and low BMD at the hip were associated with the risk of VFs. Current evidence on the risk of hip fractures in AS is inconsistent. Data on the effect of NSAIDs and TNF inhibitors on fracture risk in AS is limited.

Fig.2A: Risk of vertebral fractures in AS

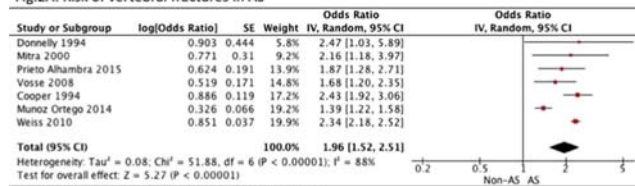


Fig.2A.1: Risk of clinical vertebral fractures in AS

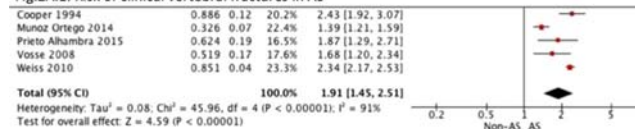


Fig.2A.2: Risk of morphometric vertebral fractures in AS

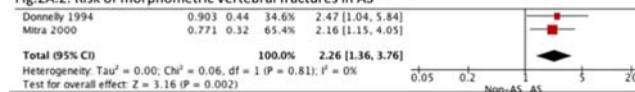


Fig.2B: Risk of hip fractures in AS

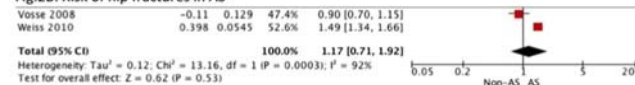
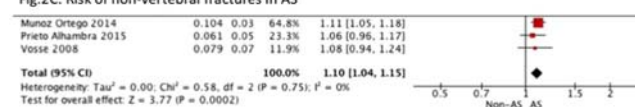


Fig.2C: Risk of non-vertebral fractures in AS



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HYPOVITAMINOSIS D IN OSTEOPOROTIC PATIENTS PRESENTING WITH VERTEBRAL FRACTURE IN A TERTIARY LEVEL HOSPITAL IN BANGLADESH

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Introduction: Hypovitaminosis D is widespread and is re-emerging as a major health problem globally leading to bone pain, muscle weakness, increased risk of osteoporosis, falls and fractures. Hypovitaminosis D remain in two forms as deficiency (Serum 25 OHD level <10 ng/ml) and insufficiency (serum Vitamin D3 10-30 ng/ml). Causes of osteoporosis(OP) are multifactorial, vitamin D insufficiency can be an important etiological factor in elderly.

Materials and Methods: A total number of 468 osteoporotic patients with vertebral compression fracture were included in this study. Patient with osteomalacia was excluded considering clinical and radiological criteria. OP was assessed by bone mineral density(BMD) estimation using GE Healthcare Lunar Prodigy densitometer. After confirmation of OP and vertebral compression fracture by X-ray, serum Vitamin D3 level was measured using enzyme linked fluorescent assay.

Results: Majority patients in age group 40-60 years which was 260(55.6%) followed by 60-80 years of age which was 185(39.5%) and 16(3.4%) cases were above 80 years. Female vs. male was 449(95.9%) vs. 19(4.1%) respectively. Hypovitaminosis D was in 85.14% patients and sufficient in 14.96% patients. BMD was 4.744 ±.9626gm/cm² in deficient group and -3.274±.7502gm/cm² in sufficient group (p=0.0001). Vitamin D deficiency was found in 55 patients- male 1(1.8%) and female 54(98.2%), Vitamin D insufficiency was in 343 patients- male 13(3.8%) and female 330(96.2%), sufficient level in 84 patients. Vitamin D3 level was high in patients living in rural areas than patients living in urban area which was 23.842±8.2157 ng/dL and 19.479±8.7441 ng/dL respectively (p=0.0001). The mean vitamin 25OHD level was high among the patients with adequate sunlight exposure than inadequately exposed patients- 37.253±5.4884 ng/dL and 19.318±6.6483 ng/dL respectively (p=0.0001). Hypovitaminosis D showed statistically significant correlation on vertebral fracture and lower BMD level.

Conclusion: Hypovitaminosis D was associated to more osteoporotic vertebral fracture. Exposure to sunlight and vitamin D supplementation is recommended to preserve bone health and reduce fracture.

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PREDICTIVE ABILITY OF BIOMARKERS LINKED WITH SYNOVITIS FOR FUTURE INCIDENCE OF KNEE OSTEOARTHRITIS IN THE COMMUNITY BASED COHORT OF MIDDLE-AGE WOMEN

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Objective: Recent studies have suggested that knee synovitis precedes development of radiographic knee osteoarthritis (RKO) and is associated with knee pain. Less than half of middle-aged individuals with RKO will report any concurrent knee pain. Matrix metalloproteinase (MMP)-generated collagen type III (C3M) fragments and resistin are both associated with knee synovitis in knee osteoarthritis (KO). Our aim was to evaluate the association between the serum levels of these two biomarkers and future incidence of either painful RKO or RKO without pain, in a community-based cohort of middle-aged women with no RKO at baseline.

Methods: We studied 582 participants (mean age 53.2, mean BMI 25) from the Chingford Women Study who had a Kellgren Lawrence (KL) score of 0 in both knees at baseline and we measured serum levels of C3M and resistin 1-2 years later. Ten years after the baseline x-ray, we determined the incidence of RKO defined as KL ≥ 2 and painful RKO defined as knee pain present on any number of days in the preceding month in the knee with RKO. Each log-transformed normalised biomarker results were utilised in a separate logistic regression model adjusted for age and BMI with depended variable defined as either the painful RKO or RKO without pain.

Results: 25% of women developed RKO 10 years after the recruitment, but only 37% of these affected reported any concurrent knee pain. Statistically significant associations were found between higher level of C3M and the risk of developing painful RKO (odds ratio (OR) equal 3.4, 95% confidence interval(CI) of 1.4 to 8.1) and between higher levels of resistin and RKO without pain (OR=0.59 95% CI: 0.38, 0.91).

Conclusion: In a population of middle-aged women without KO, selected serum biomarkers, can identify high-risk individuals for developing painful RKO and those at lower risk of developing RKO without pain. These findings will potentially facilitate the targeted recruitment of participants to primary and secondary preventive intervention trials.

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KNEE OSTEOARTHRITIS PATIENTS ARE LESS ACTIVE THAN THE GENERAL POPULATION

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Objective: Describing the level and factors affecting the physical activity practices of knee osteoarthritis (OA) patients.

Materials and Methods: In total, 548 knee osteoarthritis patients were interviewed via self-administered anonymous questionnaires between September and November 2014, in nine spa therapy resorts (France). The main outcome was physical activity level, evaluated by the International Physical Activity Questionnaire (short version) (IPAQ). Secondary outcomes included sociodemographic and clinical data, comorbidities, as well as barriers to and facilitators of practicing regular physical activity, evaluated over 24 specific elements.

Results: The study population's mean age was 67.6 years (SD 7.9), including 73.9% women and 30.9% obese individuals with a mean body mass index (BMI) of 28.2 kg/m² (SD 5.7). Multi-joint osteoarthritis (OA) affected 92%, 71.6% of whom had comorbidities. The mean Visual Analogue Scale (VAS) pain intensity score was 4.5/10 (SD 2.5), 51.4% better than the Patient Acceptable Symptom State (PASS). Mean WOMAC function was 36.6/100 (SD 20.7), 57.5% better than PASS; 67% of patients used analgesics, half of them at least once a week. According to the IPAQ, 42.6% of patients reported high activity levels, 38.6% moderate, 18.8% low, and the median IPAQ total activity score was 2628 metabolic equivalent of task (MET)-min/week. Only a third of patients received non-pharmacological treatment corresponding to the latest recommendations. Variables significantly related to inactive/minimally active physical activity levels were obesity ($p=0.0181$), gender ($p=0.0041$), and biomedical barriers, related to self-efficacy.

Conclusions: The OA study population was less active, more sedentary, and had more comorbidities and more

barriers to physical activity practice than the overall population. This study could help better adapt health care measures, while taking into account patients' overall status, including symptoms of OA pathology and comorbidities, providing tailored educational strategies with respect to physical activity.

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GENDER FEATURES OF MORTALITY IN OSTEOPOROTIC HIP FRACTURES

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Objective: To investigate gender-specific mortality in the osteoporotic hip fractures in older adults.

Materials and Methods: tracked mortality in osteoporotic fractures of the proximal femur in 432 patients (328 women and 104 men) aged 50 years and over in different periods of observation: 0-6 months, 7-12 months, 13-24 months. Information about fractures and their outcomes obtained according to the archives of trauma care, logs municipal registry office, a telephone survey of patients and their relatives. The study included patients with radiographic evidence of hip fractures that occurred with minimal trauma.

Results: It was found that after 6 months after injury died 95 out of 432 patients are under observation. Overall mortality was 22,0%. In the group of patients who died was dominated by females: 73 women (16,5%) and 22 men (5,1%) ($p < 0,0001$). However, in the structure of mortality statistically significant differences by gender are not obtained by: of 328 women died 73 (22,26%), of 104 men - 22 (21,15%) ($p = 0,9$). Within 12 months after the fracture mortality rose to 137 cases (total mortality rate - 31,8%), for women - 104 (24,1%) cases, men - 33 (7,7%) ($p < 0,0001$). In the structure of mortality by gender statistically significant differences were found: of the 328 died 104 women (31,78%), of 104 men - 33 (31,73%) ($p = 1,0$). After 24 months after hip fracture 184 cases of death were recorded (total mortality rate - 42,6%). In the group of patients who died were women and 140 cases among women (32,4%) and 44 - for men (10,2%) ($p < 0,0001$). Mortality indicators by gender in 24 months also did not differ significantly: from 328 died 140 women (42,68%), of 104 men - 44 (42,31%) ($p = 1,0$).

Conclusions: It was found that in all periods of observation in the structure of mortality by gender statistically significant differences were obtained.

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MRI CARTILAGE COLOR MAPPING AND THE EFFECTIVENESS OF OSTEOARTHRITIS TREATMENT

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Objective: to evaluate the efficacy of different groups of drugs on the clinical course of osteoarthritis (OA) of the early knee joint and biochemical status of cartilage tissue using magnetic resonance imaging (MRI) with T2-color mapping.

Patients and methods: 153 patients with knee OA were studied: in 74,6% women and 25.3% men; mean age 46,2±4,3 years; mean disease duration was 2,3±1,4 years. All patients were randomized into three groups, matched for sex, age and disease duration: group 1 (n=60) received oral etoricoxib 30 mg QD, group 2 (n=60) - oral glucosamine sulfate 1500 mg QD, group 3 (n=33) - intraarticular injections of 2 ml of 1.5% hyaluronic acid three times every 7 days. All subjects had 0-I radiographic stage of OA according to Kellgren-Lawrence. At baseline, after 6 and 12 months we assessed the severity of OA using WOMAC index, VAS global and pain. In addition, to determine the biochemical status of cartilage at baseline and after 12 months performed MRI with an indication of T2 relaxation time.

Results: After 24 weeks of therapy in all groups there was a significant decrease ($p < 0,05$) WOMAC index. The positive dynamics persisted by the end of the study, but in group 2, this trend was significantly better ($p < 0,05$) compared with 1 and 3 by treatment group. The intensity of pain according to VAS in group 1 by the end of the study was 31±7.6 mm, in group 2 - 17±4,7 mm and group 3 - 25±5,4. The dynamics of VAS (global) was significantly better ($p < 0,05$) in the group 2. The tolerability of therapy until the end of the observation remained satisfactory and was not significantly different in all groups. Qualitative analysis of the dynamics of destruction of cartilage was performed by measuring the time T2 relaxation area of the medial condyle of the femur and tibia. The initial data before treatment in group 1 was 33,3±10,4 ms, in group 2 - 32,8±12,2 ms, in group 3 - 32,9±11,8 ms ($p > 0,05$) (fig.1). After 56 weeks of treatment the absence of cartilage tissue degeneration according to T2 relaxation time (35,7±10,2 ms, $p < 0,05$) in patients receiving glucosamine sulfate (group 2). The most significant values to change the structure of cartilage observed in the group 1 - 47,1±10,4 ms, ($p < 0,05$). In patients treated with intraarticular injections of hyaluronic (group 3) T2 relaxation time was 41,2±10,6 ms, ($p > 0,05$) (fig. 2).

Conclusions: The use of the technique T2 mapping color of cartilage allows the recognition of OA in the earliest stages, and helps to control the influence of drugs at the disease from

a position before the onset of knee x-ray changes. In patients glucosamine sulfate marked positive effect in reducing levels of pain, WOMAC index compared with baseline and in comparison with patients treated with etoricoxib and hyaluronic acid. The use of glucosamine sulfate gives you the ability to provide long lasting symptomatic effect and a structural-modifying effect.

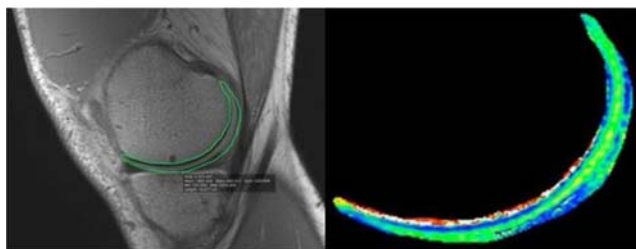


Figure 1. Biochemical status of normal cartilage tissue using MRI with T2-color mapping

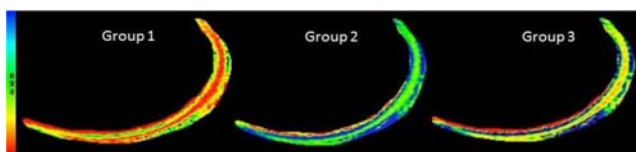


Figure 2. Biochemical status of cartilage tissue using MRI with T2-color mapping in clinical groups

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MOTIVATORS AND BARRIERS TO PHYSICAL ACTIVITY IN KNEE OSTEOARTHRITIS PATIENTS: A QUALITATIVE STUDY

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Objectives: To explore the barriers and motivators to regular physical activity in knee osteoarthritis patients

Materials and Methods: A cross-sectional, qualitative study based on 20 semi-structured individual interviews and two focus groups. The interviews continued until data saturation. Data collection was carried out by interviews recorded, then transcribed and coded. The analysis was performed according to the researcher triangulation method. Patients suffering from knee osteoarthritis according to criteria of the American College of Rheumatology (ACR) were recruited from spa therapy resorts (France, Royat).

Results: Of the 27 patients, 19 were women and eight men, with a mean age of 67 years (SD 7.8) and mean body mass index (BMI) of 29.2 (SD 8.2). The motivators were identified as physical (well-being, decreased pain, surrounding view of them), personal (lifestyle, psychological well-being), societal (relationships, view of them), and environmental (living). They differed by gender, with the concept of performance predominant for the men, other people's views for the women. The barriers were psychological (fear of pain, lack of motivation), physical (knee pain, asthenia), and were also potentially related to life events (depression, hospitalization).

Conclusions: The study population had an overall positive idea of the value of physical activity for knee osteoarthritis. The patients expressed beliefs and knowledge broadly in line with current recommendations. Compliance with these recommendations remains moderate. An educational support for progressive adapted physical activity and identification of barriers and motivators could help improve adherence. In the absence of validated tools, developing and validating a questionnaire on specific knee osteoarthritis motivators and barriers would be judicious.

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EARLY DIAGNOSTICS OF THE HETEROTOPIC OSSIFICATION IN PATIENTS WITH SPINAL CORD INJURY

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Aim: To define the peculiarities of bone turnover markers and identify specific parameters of the heterotopic ossification (HO) development in patients with spinal cord injury (SCI).

Methods: In the study were included 23 patients with SCI – first group (average age 26.4±0.9 yrs, duration of SCI 3 to 12 months) and 23 healthy subjects appropriate age and gender (average age 29.4±1.4 yrs.). In the first group included 11 patients with SCI and HO (average age 25.5±1.3 yrs, duration of SCI - 6.4±1.3 mos) and 12 patients with SCI without HO (average age 27.2±1.4 yrs, duration of SCI - 6.0±0.8 mos). Serum markers of bone formation (osteocalcin, procollagen type 1 N-terminal propeptide (P1NP)) and bone resorption (collagen type 1 cross-linked C-telopeptide (β-CTX)) were determined by the electrochemiluminescence method “ECL technology” by Elecsys[®] assay.

Results: SCI patients had significantly higher bone turnover markers than control group: P1NP (264.9±47.0 ng/ml vs. 48.3 ±3.8 ng/ml, p<0.001), serum β-CTX (1.51±0.11 ng/ml vs.

0.48±0.04 ng/ml, $p<0.001$), osteocalcin (54.8±8.6 ng/ml vs. 24.2±1.52 ng/ml, $p<0.001$). There were obtained that levels of bone remodeling markers in patients with HO were significantly higher in comparison with SCI patients without HO: P1NP (408.5±76.9 ng/ml vs. 133.2±15.7 ng/ml, $p<0.001$), serum β -CTx (1.75±0.14 ng/ml vs. 1.28±0.14 ng/ml, $p<0.001$), osteocalcin (82.4±13.6 ng/ml vs. 29.4±3.1 ng/ml, $p<0.001$). Receiver operating characteristic curves were used to identifying specific bone turnover markers of HO formation. Youden's index for P1NP was equal to 187.3 ng/ml (sensitivity=94%, specificity=90%, AUROC=0.97, $p<0.000$) and for osteocalcin level - 49.6 ng/ml (sensitivity=97.1%, specificity=90.1%, AUROC=0.99, $p<0.000$).

Conclusion: The study showed P1NP level above 187.3 ng/ml and osteocalcin level above 49.6 ng/ml should be considered as an early predictor of heterotopic ossification formation in patients with spinal cord injury.

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EFFECT OF 12 MONTHS TREATMENT WITH TERIPARATIDE ON INTIMA-MEDIA THICKNESS OF CAROTID ARTERY IN PATIENTS WITH SEVERE POSTMENOPAUSAL OSTEOPOROSIS

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Objective: Daily administration of teriparatide/PTH1-34 is an established therapy for severe osteoporosis because it decreases the risk of fractures and increases vertebral and femoral bone mineral density. Evidence suggests that PTH is involved in arteriosclerosis and cardiovascular risk. The intima-media thickness of the carotid artery (CA-IMT) is an early quantitative marker of generalized atherosclerosis. The purpose of this study was to investigate whether 12 months treatment with teriparatide may affect CA-IMT as well as osteoprotegerin (OPG) and osteopontin (OPN), biochemical factors involved both in bone metabolism and vascular calcifications.

Patients and Methods: this observational, prospective study investigated 9 patients (aged 70, 62.5-73.5 years, median, range interquartile) with osteoporotic fractures treated with 20 microg/die sc teriparatide; 11 patients (aged 73, 65.7-74.2 years) with osteoporotic fractures treated with 5 mg/years ev zoledronate and 10 age-(70.5, 65.7-74.2 years), BMI-, glyce-mic and lipid profiles-matched, non-fractured, free from anti-osteoporotic drugs, patients. Patients and controls were all females, non-active smokers, with no overt carotid disease or risk factor, and supplemented with 100000 U/month of oral cholecalciferol. They were evaluated at baseline and after 12 months. CA-IMT was measured at right common carotid artery. Circulating OPG and OPN were also measured by ELISA.

Results: at baseline, mean CA-IMT was similar in the 3 groups; though mean CA-IMT increased after 12 months, the increase was statistically significant only in teriparatide-treated patients (1.0, 0.8-1.2 vs. 1.1, 0.9-1.5 mm, $P=0.04$), where CA-IMT increase positively correlated with alkaline phosphatase levels ($r=0.767$, $P=0.008$) and negatively with HDL cholesterol levels ($r=-0.65$, $P=0.03$), suggesting an involvement of both active bone remodeling and lipid profile. At baseline, mean serum OPG and OPN levels did not differ among the groups; at 12 months, OPG levels were lower in the teriparatide and zoledronate groups than in controls (6.3, 5.4-6.9 and 6.4, 5.5-8.4 vs. 9.5, 7.6-12.7 pmol/L; $P=0.008$), while OPN levels were not affected. Both OPG and OPN did not correlate with changes in CA-IMT.

Conclusions: Treatment with teriparatide may be associated with increase of CA-IMT and low circulating OPG, a protective factor against vascular calcification; these changes have likely poor clinical relevance in patients without overt vascular disease.

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IMPACT OF PHYSICAL ACTIVITY ON THE MUSCULOSKELETAL HEALTH EVALUATED WITH BONE DENSITY, BONE TEXTURE AND BODY COMPOSITION: THE OSTÉOLAUS STUDY

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Introduction: Osteoporosis is a systemic and progressive disease leading to an increased risk of fragility fractures. According to the mechanostat theory, bones and muscles are considered as a common functional unit. The bone marrow mesenchymal stem cells differentiate into osteoblasts if they receive appropriate mechanical stress. A diminution of muscle mass, called sarcopenia, is associated with a reduction of bone strength and poor physical performances.

Objective: To evaluate the impact of the sedentarity on bone mineral density (BMD), microarchitecture assessed indirectly by trabecular bone score (TBS), and body composition.

Method: OsteoLaus is a population-based cohort of 1500 randomly selected Caucasian women (50 to 80 y old) living in Lausanne, Switzerland. For this study all participants had: FRAX® questionnaire, PAFQ (Physical Activity Frequency Questionnaire), BMD, TBS and body composition. Exclusion criteria: corticosteroids/immunosuppressors, Cushing, hyperparathyroidism, malabsorption, respiratory/cardiac insufficiency, anticancer drugs and antidepressants. 1,026 women were included. Sedentarity was defined by: $\leq 10\%$ physical activity in 4+BMR (Basal Metabolic Rate). All the results were adjusted for age and BMI except for body

composition parameters where results were adjusted only for age.

Results: 63.7% of the subjects were sedentary. Between the 2 groups the following results were all statistically significant ($p < 0.05$): active women were younger (63.30 vs. 65.03), had lower BMI (24.71 vs. 25.99). They had a higher BMD at the femoral neck and total hip (0.732 vs. 0.723 and 0.858 vs. 0.848 respect.), a higher spine TBS (1.366 vs. 1.357), a lower FRAX TBS (10.31% vs. 11.15%). They had less fat mass (61.44 kg vs. 64.07 kg). However BMD at the spine, visceral fat mass and ALMI showed no difference.

Conclusion: The active postmenopausal women have a better bone health and less total fat mass. We did not see differences in term of lean mass and ALMI. Prevention, including physical activity, could have a positive influence on chronic diseases: by reducing the body mass index and visceral fat mass which are deleterious for cardiovascular health, and by delaying the emergence of osteoporosis.

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ASSOCIATION BETWEEN METABOLIC SYNDROME AND VITAMIN D LEVEL IN VITAMIN D-SUFFICIENT OLD PEOPLE LIVING IN SOUTHERN TAIWAN

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Background/Purpose: The vitamin D deficiency may not only impair the bone metabolism, but also play as the mediator in several chronic diseases including type 2 diabetes mellitus, cardiovascular disease, and metabolic syndrome (MetS). Whether it is true in vitamin D-sufficient old people is rarely investigated.

Method: In 2012, the cross-sectional survey was conducted with whole district random sampling of 1,966 community-dwelling old people in Tian-Liao District, Kaohsiung city, Taiwan—a tropical, agriculture-based, hyper-aged community. A total of 549 subjects were enrolled with the response rate of 50% (549/1098). Structured questionnaires including basic characteristics, life style, and medical history along with non-invasive assessment tool including International Physical Activity Questionnaires, mini-nutrition assessment and 10-item Short Portable Mental Status Questionnaire were interviewed face-to-face by well-trained staffs individually.

The laboratory data were obtained from blood samples after an overnight fast. Metabolic syndrome is defined according to modified ATP-III criteria. Vitamin D sufficiency is defined as serum 25-hydroxyvitamin D concentrations ≥ 20 ng/mL. The homeostatic model assessment (HOMA) index is used to quantify insulin resistance. Basic demographic and laboratory data are compared between groups with and without MetS. Binary multivariate logistic regression model for independent factors of MetS is analyzed.

Results: Of the 523 vitamin D-sufficient subjects (M/F=269/254, mean age=76.0 \pm 6.2 y/o, range=65-102 y/o), prevalence of MetS is 46.5%. The average vitamin D level is 44.0 \pm 11.1 ng/ml. Serum vitamin D is negatively associated to osteocalcin, HOMA index, and body mass index. Subjects with more components of MetS criteria tend to have relatively lower serum Vitamin D. Logistic regression model showed that serum vitamin D level (OR=0.97, CI=0.958-0.998), physical activity (OR=0.45, CI=0.25-0.85) and osteocalcin level (OR=0.29, CI=0.1-0.82) were negatively independent factors, as well as female (OR=2.3, CI=1.2-4.2) and HOMA index (OR=33.8, CI=14.9-76.8) were positively independent factors of MetS.

Conclusions: Relatively lower vitamin D level is still an independent risk factor for metabolic syndrome, even in old people without vitamin D deficiency. The vitamin D may be a surrogate of insulin resistance linking to metabolic syndrome and warrant for further study.

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FAT MASS IS A STRONGER DETERMINANT OF BONE MASS THAN SKELETAL MASS INDEX IN A GROUP OF YOUNG WOMEN

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Aim: The purpose of this study was to explore the relative importance of fat mass and skeletal mass index on bone variables in a group of young women.

Methods: 50 young women (12 obese, 30 overweight and 8 normal-weight) whose ages range between 18 and 32 years participated in this study. Weight and height were measured, and body mass index (BMI) was calculated. Body composition, bone mineral content (BMC) and bone

mineral density (BMD) were measured by DXA. Appendicular skeletal mass (ASM, in kg) was calculated by summing the muscle masses of the four limbs, assuming that all non-fat and non-bone mass is skeletal muscle. SMI was defined as ASM/height². Lumbar spine trabecular bone score (TBS), femoral neck cross-sectional area (FN CSA) and femoral neck cross-sectional moment of inertia (FN CSMI) were also measured by DXA.

Results: fat mass was positively correlated to WB BMC ($r=0.30$; $p=0.02$), WB BMD ($r=0.39$; $p=0.002$), FN BMD ($r=0.26$; $p=0.04$), FN CSA ($r=0.45$; $p=0.0001$) and FN CSMI ($r=0.46$; $p=0.0004$). SMI was only correlated to WB BMD ($r=0.35$; $p=0.009$), TH BMD ($r=0.29$; $p=0.02$) and FN CSA ($r=0.36$; $p=0.007$).

Conclusion: This study suggests that fat mass is a stronger determinant of bone mass and geometric indices of femoral neck strength than skeletal mass index in young women.

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PERSISTENCE WITH TREATMENTS FOR OSTEOPOROSIS: A REAL-WORLD STUDY IN THE PHARMO DATABASE NETWORK

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Objectives: To describe persistence with treatments for osteoporosis in a real-world setting in The Netherlands.

Material and Methods: From PHARMO's General Practitioner Database, patients newly treated with an osteoporosis (OP) drug between 2007-2013 were selected and included in one or more of the following drugs cohorts: daily or weekly oral alendronate, 6-monthly subcutaneous injection denosumab, intravenous [IV] or oral quarterly or weekly ibandronate, daily, weekly or monthly risedronate, raloxifene, teriparatide, or yearly IV zoledronic acid. Persistence was defined as the number of days of uninterrupted use (gap between prescriptions <60 days) of the OP treatment defining the cohort. Persistence rates were determined after one and two years (for patients with complete follow-up).

Results: The study included 37,018 patients. The majority of patients were female (74-99% across cohorts) and mean age ranged between 63-72 years. Approximately half of the patients had at least two years of follow-up. After one year, daily and weekly drugs had a persistence rate of 21-35% and 55-56% respectively. Persistence with denosumab was 79% and zoledronic acid 100%, per yearly dosing frequency (table 1). At two years, the persistence rate for zoledronic acid cohort

was 65%, and denosumab 59%. The persistence rate was 41-43% for weekly vs. 12-16% for daily OP treatments. Median time until treatment change ranged from 133 days for daily alendronate to 664 days for quarterly IV ibandronate. Zoledronic acid and denosumab had a median time until treatment change of >730 days. Similar results were found for older patients.

Conclusion: This study showed that less frequent dosing of OP treatments results in better persistence. This is also applicable for elderly patients using OP treatments. **Disclosure:** Funded by Amgen EUROPE (GmbH)

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| | at day 365 | | at day 730 | |
|----------------------------------|----------------------|-------------|----------------------|------------|
| | N _{at risk} | n (%) | N _{at risk} | n (%) |
| 1. Half-year injection denosumab | 983 | 772 (79) | 512 | 300 (59) |
| 2. Yearly IV zoledronic acid | 236 | 236 (100) | 162 | 106 (65) |
| 3. Quarterly IV ibandronate | 40 | 28 (70) | 29 | 13 (45) |
| 4. Monthly Oral ibandronate | 1,742 | 907 (52) | 1,575 | 619 (39) |
| 5. Daily risedronate | 230 | 69 (30) | 205 | 32 (16) |
| 6. Weekly risedronate | 10,483 | 5,815 (55) | 8,943 | 3,699 (41) |
| 7. Monthly risedronate | 171 | 97 (57) | 140 | 58 (41) |
| 8. Daily alendronate | 661 | 140 (21) | 532 | 78 (15) |
| 9. Weekly alendronate | 22,165 | 12,417 (56) | 17,645 | 7,658 (43) |
| 10. Daily Raloxifene | 153 | 60 (39) | 139 | 41 (29) |
| 11. Daily Teriparatide | 154 | 54 (35) | 116 | 14 (12) |

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CORRELATION OF SOME OXIDANT AND ANTIOXIDANT ENZYMES IN FIBROMYALGIA

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Objective: Despite significant effort done in the research of fibromyalgia, it remains an obscure entity. To study the correlation of some indices of oxidant and antioxidant systems with Tender Point Index (TPI) in fibromyalgia.

Methods and Materials: 30 patients with established fibromyalgia and duration over 12 months, based on 2010 ACR Diagnostic criteria were assessed according to a comprehensive plan, including some indices of the oxidant and antioxidant systems' activity, particularly: early,

intermediate and late lipid peroxides (u/l), serum malondialdehyde (mkmol/l), serum total antioxidant activity (mmol/l), serum total prooxidant activity (mkmol/l), superoxide dismutase (u/l), serum catalase (mkmol/l) and serum nitric oxide (mkmol/l). In an attempt to objectivize the musculoskeletal findings in fibromyalgia patients, the Tender Point Index was used. To assess the relevance of these assays in fibromyalgia patients, correlation analysis was performed.

Results: Although most patients displayed some sort of anomalies of the oxidant and antioxidant systems, not much of a correlation with TPI could be observed for most indices, except for nitric oxide, for which we established a moderate negative correlation (-0.47, $p < 0.05$).

Conclusion: Although the results displayed a negative correlation (the higher the value of TPI, the lower the value nitric), the established correlation is quite unspecific and further analysis should be performed.

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PHYSICAL EXERCISE PROGRAM IN PATIENTS WITH SCAPULOHUMERAL PERIARTHRITIS

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Objective: to examine the effects of a 3 weeks kinetic program on pain and the functional status of patients with scapulohumeral periarthritis.

Material and Method: We conducted an observational, prospective, randomized study on a sample of 80 patients with scapulohumeral periarthritis. The patients were randomly assigned to a control group (40 patients) who received electrotherapy, physical therapy and massage (group 1) and a study group (40 patients) whose therapeutic program also included daily physical exercise (group 2). Evaluation of patients was done on day 1 and after 3 weeks of rehabilitation treatment. The clinical and functional parameters assessed were: pain on a visual analogue scale (100 mmVAS), physical impairments (muscular strength and mobility of shoulder joint) and disabilities (ADL 24 and movement capacity).

Results: The scores for functional parameters improved: pain- 43.5% (group 2) and 32.9% (group 1) ($p = 0.000054$); physical impairments: muscular strength- 9.7% (group 2), without improving by group 1, mobility: 34.8% (group 2) and 23.2% (group 1); disabilities: ADL- 53.6% (group 2) and 40.2% (group 1), movement capacity- 45.7% (group 2) and 32.7% (group 1). The results were statistic significant ($p < 0.05$).

Discussion and Conclusions: Improvement of pain, physical impairments and disabilities for the study group

certifies the efficacy of the rehabilitation program including physical exercise for the patients suffering from scapulohumeral periarthritis and motivates the continuation of the study on a longer period of time and on a larger number of patients.

P782

COLD STRESS IN MICE INCREASES NERVE GROWTH FACTOR ACTIVITY IN BROWN FAT AND OSTEOCALCIN EXPRESSION IN BONE

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Brown adipose tissue (BAT) is controlled by the Sympathetic nervous system (SNS) and has the ability to dissipate energy through uncoupling protein-1 (UCP-1), influencing energy expenditure. SNS influences bone and recent studies have demonstrated a positive correlation between BAT activity and bone. Nerve Growth Factor (NGF) genes are expressed in brain, BAT and bone where they coordinate brain and body reactions to challenges. Similarly Osteocalcin (Ost) acts on bone, glucose metabolism and brain. We previously showed that NGF and its receptor p75NTR genes are highly expressed in BAT vs. brain in mice, suggesting that NGF acts as a regulator of energy. To investigate the role of NGF and Ost in bone and energy regulation we analyzed NGF, p75NTR and Ost mRNA from 3 months old mice after cold exposure with UCP-1 as positive control. Mice were divided into three groups ($n = 5/\text{group}$): room temperature ($RT = 23^\circ\text{C}$), cold stress for 6h and 5 days. Mice as control group were all placed at RT for 5 days, while the cold groups were placed at 4°C for the above mentioned times. The mice were sacrificed and the interscapular BAT, bone and brain were analyzed for mRNA content. The exposure to 6h of cold stress enhanced mRNA levels of UCP-1 and NGF genes in BAT by 3 and 2.5-fold vs. controls, respectively, reducing mRNA of p75NTR by 19-fold. The UCP-1 gene was still up-regulated after 5 days of cold stress, the NGF gene was not affected and mRNA of the p75NTR gene was reduced by 7-fold vs. controls. The mRNA levels of Ost in bone were upregulated following 6h and 5 days cold exposure vs. controls and downregulated in brain. In sum, NGF mRNA expression significantly increases after short term cold stress in BAT with no change in brain or bone. Ost gene was instead upregulated in bone following cold stress. These results suggest that during cold stress BAT-dependent thermogenesis is associated with NGF activity and Ost may exert local long-term protective effects on bone.

P783

BALNEO-PHYSIOTHERAPY EFFECTS ON FUNCTIONAL VARIABLES IN PRIMARY AND SECONDARY HIP OSTEOARTHRITISM. L. Cevei¹, A. I. Gasparik², R. N. Suci¹, D. L. Stoicanescu³¹University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania, ²University of Medicine and Pharmacy, Târgu Mures, Romania, ³University of Medicine and Pharmacy, Timisoara, Romania

Hip osteoarthritis impact on functional capacity and hence on walking may be assessed by gait analysis performed with BTS-G walk device that measures 17 parameters grouped in 3 dimensions. Due to numerous information that provides, it allows a comprehensive analysis for evaluating the influence of rehabilitation therapy on gait parameters.

Objective: proving balneo-physiotherapy efficiency by comparing initial walking test values with those obtained after medical rehabilitation.

Material and Method: The study included 165 patients hospitalized in Medical Rehabilitation Clinical Hospital Baile Felix, Romania, during January 2016 - June 2016. Patients were diagnosed with primary or secondary hip osteoarthritis. On Kellgren Lawrence radiographic grading they all were grade II. Mean age was 59.63±10.63 years. Patients were divided into two groups: lot I included 87 cases with primary hip osteoarthritis and lot II included 78 cases with secondary hip osteoarthritis. Patients followed a complex medical rehabilitation therapy with painkiller, functional re-education, stability improvement, joint mobility improvement purposes. Hydrotherapy with thermal water at 36°C, electrotherapy, kinetotherapy, massage, occupational therapy were applied over a period of 14 days.

Results: In lot I there was a minimal increase in speed, left step length, gait cycle duration, left stance phase duration, left single support duration and double support duration and right step duration. Right single support duration, right and left swing phase duration have moderately improved. In lot II there was a minimal improvement of left stance phase duration, the other investigated parameters remained unchanged.

Conclusions: Balneo-physiotherapy improved walking, as evidenced by the parameters investigated in the gait test. Comparison of the mean parameters values at initial gait evaluation with those obtained after rehabilitation showed a slight improvement. The study draws attention to the impact of grade II hip osteoarthritis on the functional capacity and consequently gait, forcing the early diagnosis and rehabilitation therapy.

P784

ONE-YEAR CHANGES IN BONE MINERAL DENSITY WITH HIGH-DOSE PREDNISONE IN PATIENTS WITH RHEUMATOID ARTHRITISL. A. Rasch¹, L. H. D. van Tuyll¹, M. Kremer¹, I. E. M. Bultink¹, M. Boers², W. F. Lems¹¹Amsterdam Rheumatology and immunology Center | VU University Medical Center, Amsterdam, Netherlands, ²Department of Epidemiology and Biostatistics, VU University Medical Center, Amsterdam, Netherlands

Background: Recently, we showed that treatment with COBRA-light therapy including prednisone with initially 30 mg/day, was as effective as the original COBRA scheme, with initially 60 mg/day [1], in the treatment of rheumatoid arthritis (RA). Since high-dose glucocorticoids are associated with bone loss, we investigated the differences in bone mineral density (BMD) after one year of treatment in both arms.

Objectives: To determine whether there is a significant difference in BMD between COBRA and COBRA-light, and to determine the difference in change in BMD between baseline and 52 weeks between these groups, at the lumbar spine (L1-L4), total hip, and femoral neck.

Methods: An open-label, randomised controlled, non-inferiority trial of patients with active, newly diagnosed RA following a treat-to-target protocol.

Results: BMD data were determined in 144 out of 164 included RA patients, all randomized to either COBRA (n=71) or COBRA-light (n=73) therapy. Both at baseline and after 52 weeks, no significant difference in BMD was found between COBRA and COBRA-light, at all sites. Changes between baseline and week 52 are shown in *Table 1*. No significant difference in change in BMD between COBRA and COBRA-light was found, at all sites. However, COBRA-light showed a significant decrease in BMD in the lumbar spine and total hip after 52 weeks, whereas the femoral neck and the COBRA group did not.

Conclusions: No difference in change in BMD between COBRA and COBRA-light was found. The overall bone loss was small, which suggests that the negative effects of (high-dose) prednisone on bone might be counteracted by the large reduction in disease activity as a result of combination therapy and tight control treatment.

References: [1] Ter Wee MM, et al. Ann Rheum Dis 2015

Disclosures: This research was performed within the framework of project T1-106 of the Dutch Top Institute Pharma, and was additionally funded by an unrestricted grant from Pfizer.

| | COBRA (n=71) | | | COBRA-light (n=73) | | |
|--------------|--------------|-------------|--------|--------------------|-------------|---------|
| | baseline | week 52 | change | baseline | week 52 | change |
| Lumbar spine | 1.12 (0.17) | 1.12 (0.17) | 0.01% | 1.10 (0.15) | 1.09 (0.15) | -1.02%* |
| Total hip | 0.95 (0.14) | 0.95 (0.14) | 0.05% | 0.95 (0.12) | 0.94 (0.13) | -1.16%* |
| Femoral neck | 0.90 (0.16) | 0.89 (0.17) | -0.59% | 0.88 (0.12) | 0.87 (0.11) | -0.98% |

* Significant change between baseline and week 52 ($p < 0.05$). Values are reported as mean (SD), unless otherwise specified.

P785

SURVEY ON THE USE OF COMPLEMENTARY THERAPIES AMONG FILIPINOS WITH ARTHRITISE. Vista¹, L. Hamijoyo², S. Navarra²¹St. Luke's Medical Center Rheumatology Section, Taguig City, Philippines, ²University of Santo Tomas Hospital, Manila, Philippines

Introduction: Use of complementary and alternative medicine (CAM) for chronic conditions has been part of the Philippine healthcare setting. There is little information, however, on CAM use among adults with clinic-confirmed diagnoses, particularly rheumatic diseases that are treated by rheumatologists.

Objective: To assess the frequency and types of CAM therapy used by Filipinos with chronic arthritic conditions including osteoarthritis (OA), rheumatoid arthritis (RA) and spondyloarthropathies (SpA).

Methods: A total of 83 participants were randomly selected from the clinic population of rheumatologists at 2 tertiary care centers – University of Santo Tomas Hospital and St. Luke's Medical Center. The patients were classified within strata defined by age, sex, and diagnostic group, educational background, occupation and average annual salary income. Personal interviews were conducted by appointment in participants' homes or in a clinic and during lay forums. Respondents completed an interviewer-administered survey including quality of life and visual analog pain scale written in English and Filipino. The selected CAM items were based on a review of the literature and feedback from members of Special Interest Groups of the Philippine Rheumatology Association. CAM items were included in the survey if they were locally used for arthritis. Participants were further asked to describe other therapies they were using for their arthritis.

Results: Among the 83 patients included in the study 32 were diagnosed with RA (38.6%), 40 with OA (48.2%) and 11 with SpA (13.3%). Sixty seven (80.7%) were women and nearly half of them were housewives or unemployed (43.4%). Majority of the group finished until high school (39.8%) with 43.4% belonging to the group with an annual income between 30,000-70,000 pesos. Among the CAMs, a total of 66 (79.5%) used vitamins and minerals, 54 (65.1%) used topical medications, 50 (60.2%) employed massage therapists/ "hilot", 40 (48.2%) used nutraceuticals, 28 (33.7%) used movement therapies and 16 (19.3%) used diet. Only 12 (14.5%) used herbal medicines, 10 (12%) used items worn, 10 (12%) used mind body therapies and 5 (6%) used energy therapies. Most of the patients had their disease diagnosed for more than five years before they tried using CAMs (61.4%) and 66 (79.5%) claimed to have improved pain scores and quality of life during the period that they are using CAM's. Seventy three (88%) used conventional treatments together with CAMs and nearly half (47%) of the total population visit their doctors each

quarter of the year. Further evaluation of the kind of arthritis (OA vs. RA vs. SpA) there was no significant difference among the study population using nutraceuticals ($p=0.604$), vitamin and minerals ($p=0.488$), mind body therapies ($p=0.163$), energy therapies ($p=0.428$), diet ($p=0.588$) and movement therapies ($p=0.257$); however it showed that more rheumatoid arthritis patients use herbal medicines ($p=0.053$), topical medications (0.019) and items worn (0.014).

Conclusion: Filipino arthritis patients used CAM to supplement conventional treatments. Health care providers should be aware of the high use of CAM and incorporate questions about its use into routine assessments and treatment strategies.

P786

ADVANTAGES AND DISADVANTAGES OF PERCUTANEOUS FOREFOOT SURGERYV. Lopez-Fernandez¹, N. Muñoz-García²¹Orthopaedic Surgery and Traumatology - University Hospital Torrejon, Torrejon de Ardoz (Madrid), Spain, ²Universidad Autónoma de Madrid, Facultad de Medicina, Madrid, Spain

Objective: To review the recent literature on the evaluation of advantages and disadvantages of percutaneous forefoot surgery against open surgery for common pathologies such as hallux valgus or metatarsalgia.

Material and Methods: This article is based on a PubMed search with the keywords "percutaneous", "forefoot" and "surgery". The advantages and disadvantages proposed by the authors of the 37 articles identified from 2010 to 2016 were evaluated.

Results: For less severe cases, hallux valgus percutaneous surgery presents results similar to the traditional one surgery (similar correction of the intermetatarsal and metatarsophalangeal angles) and could be used in patients with previous surgery since it damages to a lesser extent the soft tissues, causing more aesthetic scars. Regarding to the osteotomies of the lesser metatarsal bones, the efficacy is comparable, patient satisfaction is higher with AOFAS score >85/100 and the procedure is less expensive. Current practice recommends a mixed strategy combining traditional open surgery with percutaneous technique for hallux valgus: open surgery with minimally invasive incision for Chevron osteotomy with 2-screw implant and percutaneous surgery for P1 osteotomy. However, there are some disadvantages: the possibility of skin burns, the need for special equipment, the exposure to ionizing radiation and a long learning curve. One limitation of the review is that there are few studies of high level of evidence comparing open vs. percutaneous surgery.

Conclusion: Following a review of the current literature on the subject, it is concluded that, despite some disadvantages, percutaneous forefoot surgery seems to be a useful technique

for selected patients because it has similar results to open surgery but with lower postoperative morbidity. But, since there are few level 1 evidence studies, we could not conclusively recommend this technique for all patients, and a case-by-case evaluation is necessary.

P787

RELATIONSHIP BETWEEN OBESITY, METABOLIC SYNDROME, AND OSTEOPOROSIS AMONG THE ELDERLY AGRICULTURAL AND FISHING POPULATION IN TAIWAN

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Purpose: To explore the relation between obesity, metabolic syndrome, and osteoporosis amongst the elderly agricultural and fishing population in Taipei, Taiwan.

Methods: The study participants were conducted with a total of 4,360 (2,758 men and 1,602 women) healthy elderly subjects voluntarily admitted to a teaching hospital for a physical check-up in 2010. Osteoporosis was defined as bone mineral density is 2.5 SD or more below the young adult mean (-2.5 SD or lower).

Results: The prevalence of osteoporosis for this elderly study population was found to be 34.4%. The prevalence of osteoporosis for metabolic syndrome proved to be substantially greater (p-value for χ^2 test < 0.0001) than it was for one or two metabolic factors. Using multinomial logistic regression analysis, age, sex, metabolic syndrome, higher BMI, and higher uric acid appeared to be statistically significantly related to osteoporosis.

Conclusion: The prevalence of osteoporosis was related to obesity, uric acid, and the degeneration of metabolic syndrome. Promoting this population with controlled obesity, uric acid, and health improvement for metabolic function are essential.

P788

SARCOPENIA IN AN OSTEOPOROTIC CASE

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We present the case of a 72 years-old woman, diagnosed with osteoporosis in 2005 who followed treatment with

bisphosphonates during 2005-2012. Personal medical history was significant for non-insulin dependent diabetes and hypertension. Physical examination revealed flat foot, dorsolumbar dextroconcave kyphoscoliosis, lumbar spine and bilateral hip joint mobility limitation, crackles with knee mobilization, arthritic changes of both hands, varicose hydrostatic legs. Forefoot bilateral radiographs revealed bilateral valgus flat foot, tibial-tarsal osteoarthritis and intertarsal and metatarsophalangeal osteoarthritic changes. Lumbar X-ray revealed advanced spondylosis. DXA investigation showed T score values within normal limits. Lean Body Mass (LBM) whole body was 6.642 g/cm². BTS G-walk device was used to assess physical performance, which was reduced when performing Timed up and Go test. Evaluation of handgrip strength with Jamar dynamometer revealed low values: 19.66 for the right hand and 16.66 left hand. Laboratory tests showed abnormal values of total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides revealing the existence of a metabolic syndrome. 10 Meter Walk Test was performed in 10.87 s, very high value. Treatment objectives: maintaining blood pressure and blood glucose level within normal ranges. Medical rehabilitation targets painkilling, combating contracture, increasing stability of the lower limb joints, maintaining joint mobility within normal limits, correcting spine posture foot statics. Therapeutic means: salt restriction, low carbohydrate and hypolipidic diet, calcium-rich foods. Pharmacologic therapy used antihypertensive, oral antidiabetic, cholesterol lowering medication, calcium supplements, C, D₃ and K vitamins. Rehabilitation therapy included hydrothermotherapy with thermal water at 36°C, painkiller electrotherapy (TENS), kinetotherapy, occupational therapy to reduce the risk of falls. Low rib T-score values highlighted by DXA whole body T-score -2.6 indicates an increased risk of rib fractures. We investigated the patient to detect sarcopenia, values from DXA whole body were normal, but dynamometry and Timed Up and Go test revealed decrease of physical performance, thus she has also sarcopenia.

P789

THE EFFECTS OF RH-PTH (1-34) ON BONE METABOLISM IN HYPOPARATHYROID PATIENTS

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Objectives: The aims of the study, conducted on hypoparathyroid subjects not adequately controlled with conventional therapy, were to evaluate the effects of rhPTH (1-34), as replacement therapy, on reduction of calcium and calcitriol supplements, calcium-phosphate (Ca-P) homeostasis, bone turnover markers (BTMs), and parameters of quality of life (QoL).

Material and Methods: The Phase III, open-label, non-comparative, single-center, pharmacological-experimental study included 10 patients (aged 18-65 years) of both sexes with refractory hypoparathyroidism. The recruited patients were treated with subcutaneous injections of rhPTH (1-34) (starting dose 20 µg once daily for 2 weeks, followed by 20 µg twice daily for 10 weeks).

Results: Seven out of ten patients reduced or at least 50% calcium supplement, of these six patients were able to stop this supplement completely; eight out of ten patients reduced or at least 50% supplementation of calcitriol, and of these seven patients were able to stop this supplement completely. Biochemical exams, showed that mean values of serum albumin-corrected Ca increased rapidly and remained stable over time, within the normal range, except few cases of hypocalcemia, while mean values of serum P decreased, remaining within the normal range (no statistically significant difference, between baseline and the end of treatment period). Average values of Ca-P products remained within the normal range (no statistically significant difference, between baseline and the end of treatment period). The mean 24-h urinary Ca excretion showed a slightly increasing trend (no statistically significant difference, between baseline and the end of treatment). The slight average increment in 24-h urinary Ca excretion, within the normal range, and some episodes of hypercalciuria, were justified by the initial rise in BTMs. The analysis of BTMs showed, indeed, a significant increase in markers of bone formation and resorption. No fractures were described, and the baseline mean values of bone mineral density at baseline were normal-high. The analysis of SF-36 (36-Item Short Form Survey) showed that rhPTH (1-34) improved the QoL in terms of "social activities" and "vitality".

Conclusions: The study showed that rhPTH (1-34) was effective in maintaining the mean serum albumin-corrected Ca levels within the normal range, allowing a significant reduction of calcium and calcitriol supplements, with an improvement of some parameters of QoL. The levels of BTMs showed a significant increase during the treatment period, probably, to reverse the typical state of over-mineralized bone of hypoparathyroidism. No fractures were reported.

P790

ADENOSINE RECEPTOR STIMULATION IMPROVES GLUCOCORTICOID-INDUCED OSTEOPOROSIS IN A RAT MODEL

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Glucocorticoid-induced osteoporosis (GIO) is a secondary cause of bone loss.

Bisphosphonates approved for GIO, might induce jaw osteonecrosis; thus additional therapeutics are required. Adenosine receptor agonists are positive regulators of bone remodeling, thus the efficacy of adenosine receptor stimulation for treating GIO was tested.

In a preventive study GIO was induced in Sprague-Dawley rats by methylprednisolone (MP) for 60 days. Animals were randomly assigned to receive polydeoxyribonucleotide (PDRN; 8mg/kg), or PDRN and DMPX (3,7-dimethyl-1-propargylxanthine, an A₂ antagonist), or vehicle (0.9% NaCl). Another set of animals was used for a treatment study, following the 60 days of MP-induction rats were randomized to receive (for additional 60 days) PDRN, or PDRN and DMPX, or zoledronate (7.5 µg/kg), or vehicle. Control animals were administered with vehicle for either 60 or 120 days. MP treatment determined severe bone loss, the concomitant use of PDRN prevented the developing of osteoporosis. In rats treated for 120 days, PDRN restored bone architecture and bone strength; increased B-ALP, osteocalcin, osteoprotegerin and stimulated the Wnt canonical and non-canonical pathway. Zoledronate reduced bone resorption and ameliorated the histological features, without significant effects on bone formation. Our results suggest that adenosine receptor stimulation might be useful for preventing and treating GIO.

P791

ULTRASTRUCTURE OF BIOMINERAL OF BONE REGENERATE IN RATS AFTER 60-DAY APPLICATION OF SODIUM BENZOATE

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Objective: To examine ultrastructural features of biomineral of bone regenerate in rats after 60-day sodium benzoate (SB) intake of various concentrations.

Material and Methods: The experiment involved 210 male thoroughbred rats with initial body weight of 200-210 grams. The 1st group (K) comprised animals that received daily *per os* 1 ml of 0.9% solution of NaCl, the 2nd and the 3rd groups (SB1 and SB2) received *per os* 1 ml of SB in dosage of 500 or 1000 mg per kg of body weight daily, the 4th group (D) comprised animals with defect in both tibiae made when in groups 2 and 3 SB was discontinued. The 5th and the 6th groups (DSB1 and DSB2) comprised the rats who received SB and had defects in tibiae also made after SB discontinuation. Observation terms constituted 3, 10, 15, 24, and 45 days after discontinuation of experimental influences. For the purposes of testing of bone regenerate biomineral taken with corresponding bone fragment we used X-ray scatter analysis.

Results: In DSB1 group, size of elementary cells of regenerated bone tissue along c-axis as well as crystallites size was

larger than those of D group in the period from the 15th to the 24th days by 0.23% and 0.17% and by 14.34% and 6.08% respectively. Microtexture coefficient was lower than that of the controls in the period from the 15th to the 45th day by 4.68%, 5.75%, and 4.70% respectively.

In DSB2 group, size of elementary cells along c-axis and crystallites size were larger than those of D group in the period from the 10th to the 45th day by 0.18%, 0.23%, 0.21% and 0.12%, and by 4.01%, 15.24%, 7.06%, and 4.11% respectively. Size of elementary cells along a-axis was also larger than that of D group in the period from the 15th to the 45th day by 0.28%, 0.15%, and 0.13%. Microtexture coefficient was also lower than that of the controls in the period from the 3rd to the 45th day by 6.61%, 6.57%, 8.16%, and 5.67% respectively.

Conclusion: SB intake thus slows down formation of crystal lattice in bone regeneration zone. Intensity and duration of alterations depend directly on dosage of SB and last from the 15th to the 45th day of observation with daily dosage of 500 mg per kg of body weight and from the 3rd to the 45th day of observation with daily dosage of 1000 mg.

P792

METATARSAL ALIGNMENT FOLLOWING LELIÈVRE TECHNIQUE FOR METATARSALGIA IN A POST-MENOPAUSAL WOMAN

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Objective: Case report of successful management of forefoot pathology in an osteoporotic postmenopausal woman following Lelièvre Technique.

Material and methods:

A 86 year-old woman, diagnosed with osteoporosis among other comorbidities and who had previously undergone hallux valgus surgery more than 10 years ago (arthrodesis of the first metatarsophalangeal joint), complained of lesser toe metatarsalgia. Although she used especial bandages to be able to wear shoes, she could not walk more than 10 minutes without stopping due to forefoot pain. Physical examination revealed painful callosities under the metatarsal heads and deformities of the lesser toes (crossover second toe and 2nd and 3rd hammer toes) could be found in addition to a pair of protruding screw heads from the previous surgery. After trial for months with the application of a plantar orthosis and a protective padding as a first line of treatment, she was not relieved so she enquired about alternative treatment. The option of a surgical approach was explained and the patient accepted, so second weight-bearing foot radiographs (X-rays) were taken in order to decide the best technique. We performed metatarsal

alignment according to Lelièvre and the protruding screws were removed.

Results: 5 Weeks later, the patient was seen again and her wounds had healed perfectly. She had improved clinically, not feeling pain while walking with normal shoes, and callosities had almost disappeared. X-rays were satisfactory with a correct metatarsophalangeal joint space of the lateral toes.

Conclusion: The metatarsal alignment following Lelièvre Technique could be a useful salvage procedure for metatarsalgia appearing after an arthrodesis of the first metatarsophalangeal joint. It could be an alternative to Weil osteotomy with high risk of pseudarthroses in osteoporotic patients.

P793

CLINICAL INVESTIGATION OF PREVALENCE AND ASSOCIATED METABOLIC FACTORS OF OSTEOPOROSIS AMONG THE FEMALE ELDERLY AGRICULTURAL AND FISHING POPULATION IN TAIWAN

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Purpose: To explore the prevalence and associated metabolic factors of osteoporosis among the female elderly agricultural and fishing population in Taiwan.

Methods: Subjects (n=1,602) aged 65 years and over voluntarily admitted to a teaching hospital for a physical checkup were collected in 2010. Osteoporosis was defined as bone mineral density is 2.5 SD or more below the young adult mean (-2.5 SD or lower).

Results: Among these subjects, the estimated prevalence of osteopenia and osteoporosis were 35.7% and 48.1%, respectively. From the multiple logistic regression, age (OR=1.08, 95%CI: 1.02-1.15), waist circumference (OR=1.04, 95%CI: 1.01-1.09), total cholesterol (OR=1.04, 95%CI: 1.02-1.07), and uric acid (OR=0.92, 95%CI: 0.85-0.96) were statistically significantly related to osteoporosis after adjustment for confounding factors.

Conclusion: Several clinical factors were indicated pertaining to the prevalence of osteoporosis in the female elderly among fishing and agricultural population.

P794

WHAT FACTORS DEFINE THE EFFECT OF THERAPY WITH DENOSUMAB IN WOMEN WITH RHEUMATOID ARTHRITIS AND OSTEOPOROSIS?

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Objective: To define a contribution of various factors (anamnesis, clinical/laboratory markers, glucocorticoids (GC) intake, etc.) on the response to therapy with denosumab in women with rheumatoid arthritis (RA) and osteoporosis (OP).

Material and Methods: 66 postmenopausal women (mean age $59,6 \pm 7,4$) with RA (mean duration of RA $17,7 \pm 10,4$ years) and OP received s/c denosumab 60 mg every 6 months pro 1 year. RF- positive were 72%, ACCP – 74% of patients. 34 (49%) continued GC. At baseline and after 12 months of therapy it was carried out the dual energy x-ray absorptiometry at 3 sites: lumbar spine (L1-L4), hip neck (HN) and distal forearm (DF) and x-ray of hands and feet (Sharp/van der Heijde (SVH) score). After 12 months it was noted the increase of BMD in L1-L4 and HN, a tendency to increase ($p=0,0529$) in DF. Positive dynamics (increase or stabilization of BMD) was noted in 89% patients at L1-L4, 67% - at HN and 60% - at DF. The Statistica 6.0 was used.

Results: Negative response on therapy in L1–L4 is associated with GC intake (> 3 months in anamnesis) ($p=0,034$) and the beginning of GC intake after menopause onset ($p=0,023$). In HN positive response on therapy is associated with higher concentration of the RF (initially and in dynamics) ($p < 0,05$) and the beginning of menopause later than RA onset ($p=0,024$), the negative response – with GC intake (> 3 months in anamnesis) ($p=0,024$). In DF positive response on therapy is associated with RF-positivity ($p=0,02$), the negative response back correlates with increase in erosion score and total SVH score: $r=-0,360$ ($p < 0,05$).

Conclusions: Positive response on therapy with denosumab in NH and DF is associated with RF-positivity. The particular contribution to the negative response in L1-L4 and HN is associated with GC intake (previous intake more than 3 months in the anamnesis), purpose of the GC after menopause onset.

P795

TREATMENT OF OSTEOPOROSIS WITH TERIPARATIDE IN ANOREXIA NERVOSA PATIENTS

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Introduction: Osteoporosis is one of the common complications in anorexia nervosa (AN) patients. Bone mineral density (BMD) in AN patients are low due to the shortage of nutrition and the low level estrogen. As a result, 50% of

AN patients at the first visit are diagnosed as osteopenia. The best way to treat osteoporosis in AN patients is to take enough in nourishment and increase their weight, but actually it is very difficult. We have successfully treated osteoporosis of AN patients with fragility fractures in by Teriparatide.

Objectives: The objective of this study is to evaluate the effect of Teriparatide for osteoporosis in AN patients.

Material and Methods: We have treated 2 female patients, with their age 42 and 59 respectively. They were diagnosed as restricting type AN and received therapy with psychosomatic medicine. Their period of amenorrhea is 9 and 18 years, respectively. Their BMD of lumber spine are 0.58 and 0.61g/cm², respectively. The initial treatments of both patients were Vitamin D, raloxifene and bisphosphonate. Fragility fractures occurred in both patients during the treatment, so we had switched the treatment to Teriparatide. The blood exam, X-ray (the thoracic and lumber vertebra) and BMD (the lumber spine and proximal femur) were checked during treatment on a routine basis.

Results: Their BMD of lumber spine increased 16.7% and 15.6% respectively from base line within 2 years. There was no additional fracture in one patient and no complication has occurred.

Conclusion: Teriparatide is one of the most effective medical agents for treating osteoporosis in AN patients, and we strongly recommend it if the patients have any fragility fractures.

P796

THE USE OF TRABECULAR BONE SCORE(TBS) IN THE FRAX FRACTURE RISK PREDICTION IN ASIAN TYPE 2 DIABETIC SUBJECTS

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Objective: Type 2 diabetes mellitus (DM) is associated with an increased fracture risk but at greater bone mineral density (BMD). The TBS is a novel gray scale analysis of BMD as obtained by BMD which gives information on microarchitecture and bone quality. This study compared the performance of TBS, BMD, and original and TBS-adjusted FRAX scores in T2DM patients compared with their non diabetic (nonDM) control.

Methodology: This retrospective study enrolled consecutive patients who had a BMD measured in the facility between 2014 and 2016. The subjects were divided into DM and nonDM; and the 2 groups were compared with

one another. All those with conditions that could affect bone and calcium metabolism e.g. primary hyperparathyroidism, active thyrotoxicosis; or on medications that could affect bone e.g. steroid, bisphosphonate are excluded. Lumbar spine and femur neck BMDs were obtained using dual-energy X-ray absorptiometry (DXA). TBS was obtained using the TBS iNsight software program (Med-Imaps, Pessac, France) with BMD DXA images.

Results: There were 30 DM and 35 nonDM subjects with a mean (+SE) age (67.9+1.41 vs. 57.7+1.34; $p<0.01$) and BMI (26.8+0.8 vs. 24.3+0.8; $p<0.05$). There is a difference in the FRAX major fracture risk between the DM and nonDM subjects without TBS (11.4+2.0 vs. 6.2+1.4, $p<0.05$) and with TBS incorporated (12.2+1.9 vs. 6.6+1.4, $p<0.05$). There is no difference in the hip fracture risk in both groups with or without TBS. The incremental risk of major fracture risk ascribed by TBS is not different between the DM and nonDM subjects (0.81+0.28 vs. 0.38+0.15, $p=0.16$).

Conclusion: This study showed that the FRAX major fracture risk was higher in DM compared to the nonDM but this could be due to the DM being significantly older. The failure to find a significant difference in the FRAX fracture risk with or without TBS incorporated in the fracture risk assessment may be due to the small number of subjects in the study. A larger number of subjects and using matched controls would assess the use of TBS in fracture risk assessment better.

P797

SHORT-TERM PRECISION ASSESSMENT AND MONITORING TIME INTERVAL TO ASSESS BONE STATUS IN POSTMENOPAUSAL WOMEN BY 3D-DXA

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Objective: To evaluate the short-term precision and monitoring time interval to assess bone status in postmenopausal women by 3D-DXA.

Material and Methods: The 3D-DXA software algorithm (Galgo Medical, Barcelona, Spain) provides 3D subject-specific models of the proximal femur from DXA projections. The algorithm registers a 3D appearance model of the femoral shape and density onto the DXA image of the hip of the patient, and quantifies the cortical thickness and the volumetric BMD (vBMD) of the integral, trabecular, and cortical bone. Study participants were collected at CETIR Centre Mèdic (Barcelona, Spain). 33 participants (67±11 years [52 – 93]) were included to evaluate the

short-term precision and scanned twice, with repositioning for duplicate hip scans. Least significant changes (LSC) were computed for aBMD and 3D-DXA measurements. 67 postmenopausal women (66±5.7 years [55 - 76]) were included to measure monitoring time intervals for bone status assessment. DXA scans were collected at baseline and 12 months. Monitoring time intervals were computed for aBMD and 3D-DXA measurements by dividing LSC by the median change per annum. All DXA scans were performed using a Lunar iDXA scanner (GE Healthcare, Madison, WI).

Results: LSC for total hip aBMD was 0.009 g/cm². LSC associated with the 3D-DXA measurements were 0.057 mm for the mean cortical thickness, 16.8 mg/cm³ for the integral vBMD, 15.5 mg/cm³ for the trabecular vBMD, and 16.6 mg/cm³ for the cortical vBMD (total hip). Median annual changes for the postmenopausal women included in this study were -0.006 g/cm² (aBMD), -0.017 mm (mean cortical thickness), -5.7 mg/cm³ (integral vBMD), -3.9 mg/cm³ (trabecular vBMD), -6.1 mg/cm³ (cortical vBMD). This resulted in monitoring time intervals of 4.1 years (aBMD), 3.3 years (mean cortical thickness), 2.9 years (integral vBMD), 4.0 years (trabecular vBMD), and 2.7 years (cortical vBMD).

Conclusion: Monitoring time intervals were similar or shorter for 3D-DXA measurements than for standard aBMD measurements, indicating that the 3D-DXA measurements might be precise enough for monitoring bone status in postmenopausal women in clinical routine practice.

P798

EFFECTIVENESS OF HIP LAVAGE FOLLOWED BY INJECTION OF TRIAMCINOLONE WITH OR WITHOUT HYLAN G-F20 IN MODERATE HIP OSTEOARTHRITIS

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Objective: To evaluate the effects of adding different doses of hylan G-F20 to hip joint lavage and triamcinolone in moderate hip osteoarthritis (HOA)

Methods: Eighty-two patients with grades II and III Kandel HOA were randomized to one of four groups: Lavage and triamcinolone (group 0); Lavage, triamcinolone and 2mL of hylan G-F20 (group 1); Lavage, triamcinolone and 4mL of hylan G-F20 (group 2); Lavage, triamcinolone and 6mL of hylan G-F20 (group 3). WOMAC questionnaires and range

of motion (ROM) measures were taken at baseline, one, three, six and 12 months postoperatively.

Results: Groups were similar at baseline for age, BMI, KandL, WOMAC (pain, stiffness, function and total) and ROM ($p>0.05$). Sixty-seven patients completed the study. All groups improved between baseline and the first month maintaining results through the study period ($p<0.001$). At one month Pain improved 35.1% (Group 2) to 47.6% (group 1). At one year, pain results remained improved between 17.5% (group 2) and 42.3% (group 0) with no differences between groups ($p>0.5$). WOMAC function improved 32.6% to 46.3% in the first postoperative month. One-year function remained improved between 19.9% (group 2) to 36.8% (group 0). WOMAC stiffness results showed more consistent improvements through the study period in groups 2 and 3 ($p<0.05$ for group 3). Flexion improved mostly in group 3 in respect to group 0 at one year ($p<0.001$). Internal rotation improved also in hylan group 1 ($p<0.001$).

Conclusion: Lavage and triamcinolone improve function and pain of patients with moderate HOA. Results can be improved by adding Hylan G-F20.

P799

BONE LOSS IN WOMEN WITH BREAST CANCER TREATED WITH AROMATASE INHIBITORS

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Objective: Hormone therapy with aromatase inhibitors (AIs) is a vital part of treatment for hormone receptor-positive breast cancer (BC) and is taken for a total of five years and more. Treatment for BC that decrease estrogen levels even further can add to the risk of osteoporosis and breaks. The aim of the present study was to determine bone mineral density (BMD) in women with BC treated with AI to prevent and reduce side effect, of this well-documented and beneficial therapy, as it is bone loss.

Material and Methods: We have studied 45 postmenopausal women with new case histories of BC aged 40 - 65 years. All patients were treated with anastrozole 1mg per day; ibandronate 3mg intravenous injection every 3 months and calcium 1200 mg per day with Vitamin D. Patients were divided in four age-matched groups. I

group women (n-21, 40-50 years) before and II group two years later after treatment; III group women (n-24, 50-65 years) and IV group respectively. BMD was measured at three sites (distal radius, midshaft tibia and proximal phalanx) using the ultrasound bone sonometer (Sunlight, Omnisense).

Results: The mean data for T score in the I group was: distal radius -1.4 ± 0.02 ; tibia -1.3 ± 0.05 ; proximal phalanx -1.5 ± 0.11 ; in the II group T score: -1.0 ± 0.05 ; -1.1 ± 0.15 ; -1.2 ± 0.03 ; in the III group T score: -2.3 ± 0.13 ; -2.2 ± 0.11 ; -2.6 ± 0.04 ; and in the IV group T score -1.5 ± 0.14 ; -1.3 ± 0.08 ; -1.7 ± 0.11 at the same measurement sites respectively.

Conclusions: In both groups before treatment BMD was decreased. However in the group of the aged women BMD was lower as estrogen levels decline naturally at the time of menopause and they are at particular risk of osteoporosis. BC treatment with AI can lead to weakening of the bones. After therapy with Bonviva BMD increased in both groups and was at the same level during two years. Women who have had an early menopause and are taking AI therapy are most likely to benefit from bisphosphonates. In conclusion, AIs related bone loss appears to be manageable and, therefore, any risk to bone health should be weighed against its overall efficacy and tolerability profile for the treatment of hormone-sensitive postmenopausal BC.

P800

SEX-DIFFERENCES IN SOCIO-DEMOGRAPHIC CHARACTERISTICS AND RISK FACTORS AMONG PRIMARY HEALTH CARE USERS DIAGNOSED WITH OSTEOARTHRITIS IN TRANSITIONAL ALBANIA

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Objective: To assess sex-differences in the distribution of socio-demographic characteristics and risk factors among primary health care users diagnosed with osteoarthritis in Albania, a post-communist country in the Western Balkans which is currently undergoing a rapid political and socioeconomic transition.

Material and Methods: This study included all individuals who were diagnosed with osteoarthritis during January 2013 – December 2014 in several primary health care centers in Tirana, the capital city of Albania. Overall, during this two-year period, 1179 individuals were diagnosed with osteoarthritis. Of these, 521 were men (mean age: 60.1 ± 10.6 years) and 658 were women (mean age: 58.1 ± 9.6 years). Diagnosis of osteoarthritis was based on the history

of the disease, physical examination, laboratory findings and radiological findings – in line with the criteria of the American College of Rheumatology. Binary logistic regression was used to assess the sex-differences related to the socio-demographic characteristics (age, place of birth, employment, marital status, educational attainment, income level, social status) and risk factors (smoking, alcohol intake, body mass index, genetic factors, accidents, weight lifting, heavy physical exercise and preexisting inflammatory diseases) among individuals diagnosed with osteoarthritis.

Results: In multivariable-adjusted logistic regression models controlling simultaneously for all socio-demographic characteristics and risk factors, female gender was inversely associated with older age (OR=0.47, 95%CI=0.28-0.79), rural origin (OR=0.31, 95%CI=0.17-0.62), smoking (OR=0.35, 95%CI=0.23-0.52), alcohol intake (OR=0.04, 95%CI=0.02-0.06) and weight lifting (OR=0.22, 95%CI=0.12-0.42). Conversely, female gender was positively related to a lower education attainment (OR=5.43, 95%CI=2.85-10.33), genetic factors (OR=2.04, 95%CI=1.41-2.95) and preexisting inflammatory diseases (OR=1.71, 95%CI=1.01-2.89). No sex-differences were noted for marital status, employment, income level, social status, overweight and obesity, accidents involving major trauma, or heavy physical exercise.

Conclusion: This study provides valuable evidence about the distribution of socioeconomic characteristics and risk factors for osteoarthritis in adult individuals diagnosed with osteoarthritis in transitional Albania. Our findings should support rheumatologists, but especially policymakers and decision-makers in Albania in order to design and implement rationale programs and interventions for an effective management and control of the burden of osteoarthritis in the overall population.

P801

GENICULAR NERVES RADIOFREQUENCY NEUROTOMY IN RELIEVING CHRONIC KNEE OSTEOARTHRITIS PAIN

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Background: Osteoarthritis (OA) is one the most common chronic forms of arthritis affecting patients usually aged above 45 years. OA decreased health-related quality of life and increased economic costs. Radiofrequency (RF), was used for the treatment of chronic pain unresponsive to conservative therapies. RF has been used for several painful conditions.

There have been a few attempts to use RF current for the treatment of painful conditions of joints of the extremities. It was also used for the treatment of painful conditions of the hip joint.

Objective: The aim of this study to evaluate the efficacy of radiofrequency (RF) application to sensory nerves for the management of chronic pain in patients with knee OA.

Patients and methods: A prospective interventional study conducted at Assiut university hospital in Egypt between July 2014 and December 2015 thirty patients with chronic knee OA were included in the study. RF neurotomy of the genicular nerves was done. The outcome measures included a pain scale (visual analog scale, VAS) and Western Ontario and McMaster Universities (WOMAC) Index.

Results: There was a highly significant correlation ($p<0.01$) between pre and 2weeks, and 6 months in all parameters except for the stiffness. In the case of comparison between 3months and 6 months, we found a significant correlation ($p<0.05$) in Likert scale and VAS and highly significant correlations ($p<0.01$) in pain, difficulties and WOMAC and no correlation in stiffness.

Conclusion: RF applied to chronic knee OA appears to be a safe and effective intervention for pain relieve.

P802

TIMING OF EATING POTENTIATES THE EFFECT OF MECHANICAL LOADING ON BONE

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The effect of exercise is to strengthen bone or reduce bone loss where it would otherwise occur. However, in older people or those with bone-wasting diseases, it is hard to exercise with sufficient intensity to influence bone strength directly. As it is known that there are changes in a wide range of gut-derived hormones before and after eating, and that many of those hormones have effects on bone, we hypothesised that the timing of eating affects bones response to loading.

Using a well-established tibial loading model in mice, we subjected groups of mice to osteogenic loading of one tibia following different dietary interventions. Loading consisted of 40 cycles of axial compression over 6 minutes on every other day for 2 weeks. Overnight fasting did not alter the response of bone to loading compared with mice fed ad lib, but if an overnight fast was followed by 2 hours of feeding (by which time the animals

were replete), the response of the tibia to loading as assessed by microCT and histomorphometry was that there was a significant 10% greater increase in cortical thickness than in animals fed ad lib ($n=7$, $P<0.05$). Fasting followed by feeding for 1 or 3 hours before loading resulted in a small increase in cortical thickness that was not significant. In order to determine the effect of the potentiating feeding regimen on submaximal loading and sub-threshold loading, we compared the effect of three different peak forces of dynamic loading. In each case, fasting followed by loading increased the cortical thickness significantly when compared to the effect of loading in ad lib fed animals.

These results demonstrate the possibility of a lifestyle change that could impact upon the effectiveness of exercise interventions. Naturally as humans are not nocturnal it may not be simple to translate these findings into a programme for those with osteoporosis, but our data show clearly that this intervention can change an ineffective loading stimulus into an effective one and increase the benefit of already effective loading regimens.

P803

AN ALGORITHM TO IMPROVE KNEE ORTHOSIS PRESCRIPTION FOR OSTEOARTHRITIS PATIENTS

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Objective: To develop an algorithm to help orthosis prescription for knee osteoarthritis patients.

Material and Methods: Systematic review of the literature using a qualitative analysis on PubMed databases, Cochrane Library and Pedro from 1966 to 2015, using the keywords "knee osteoarthritis", "orthosis" with recommendations and highest quality trials. Development of a preliminary version of the algorithm using data from the literature and taking into account experience of different health professionals involved in the management of osteoarthritis patients. The algorithm has then been validated by an international multidisciplinary expert college (PMR and sport medicine physician, rheumatologist, general practitioner, orthopaedic surgeon, physiotherapist, methodologist). This version has then been adapted to obtain an acceptable final version.

Results: Elastic braces may be proposed in addition to the first-line non-pharmacological treatment (information/education, exercise and physical activity, weight reduction). Secondary a biomechanical analysis may be needed to provide a more rigid brace taking into account: the topography of pain, the lower limb static (varus/valgus), stability, any deformation reducibility. For unicompartmental OA, one can propose an unicompartmental discharge brace; a hinged stabilizing brace for bicompartamental OA with or without instability. For patellofemoral OA we can offer an orthotic with specific patellar device.

Conclusion: Using an original methodology has produced an applicable algorithm in routine. A prospective validation in primary and secondary care to thirty patients is needed followed by an evaluation of the implementation of a wide range of health professionals in order to definitely validate the algorithm.

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P804

VITAMIN D CORRECTION IMPROVES APOLIPOPROTEIN LEVELS IN A SEX-SPECIFIC MANNER

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Numerous studies have identified several extra-skeletal health outcomes to be associated with vitamin D deficiency, yet a definitive causal link is yet to be discovered. Our recent 3D LC-nESI-FTMS proteomic analysis among normal and overweight but apparently healthy adult Saudis identified apolipoproteins, a known independent cardiovascular risk factor, as one of the 110 serological molecular signatures that modulate vitamin D levels. The present interventional study aims to compare and validate the identified apolipoproteins among vitamin D deficient subjects that have achieved full vitamin D status correction. 199 Saudi adults [89 males, mean age 42.0±10.4; Body Mass Index (BMI) 28.6±4.4kg/m²; 110 females, mean age 39.1±12.0; BMI 30.7±5.3] (with vitamin D deficiency [25(OH)D <50nmol/l] were recruited and given 50000IU cholecalciferol (VitaD50000®) weekly for 2 months, then twice a month for 2 months, followed by daily 1000IU

(VitaD1000®) until month 6. Blood samples were taken at baseline and after 6 months. Serum 25(OH)D was measured using electrochemiluminescence and apolipoproteins (AI, AII, B, CI, CII, CIII and E) using commercially available kits. In all subjects, serum 25(OH)D increased significantly from baseline and after 6 months (32.6 ± 11.1 vs. 63.4 ± 16.4 nmol/l; $p < 0.001$). In parallel, a significant increase in apolipoproteins B, CI, CII, CIII and E (p -values < 0.05) after 6 months compared to baseline was observed. After stratification according to sex, only apolipoproteins CII and CIII were significantly increased in males (p -values < 0.001), and only apolipoprotein CI was significantly increased in females ($p < 0.001$), showing sexual dimorphism in the effects of vitamin D with regards to apolipoprotein levels. The rest of the apolipoproteins were not significantly different pre- and post-vitamin D correction. The present study partially explains the effects of vitamin D correction in the reduction of cardiovascular risk through significant modification of apolipoproteins, particularly the apolipoprotein C class. These effects differ according to sex.

P805

ANTIOXIDANT STATUS IN PATIENTS WITH TENDINOPATHY

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Tendinopathy is a painful chronic condition that occurs in and around tendons in response to overuse. Various intrinsic and extrinsic risk factors have been identified, but the molecular pathogenesis and etiology of the disease remains unclear. However, the presence of oxidative stress in the development or progression of tendinopathy is unknown. Paraoxonase-1 (PON1) is an important antioxidant enzyme that prevents lipids and cell membranes from peroxidation. Vitamin A and vitamin E have antioxidant properties against oxidative stress-induced cellular damage. The aim of this study was to investigate relationship between serum antioxidant status markers and tendinopathy disease. 34 tendinopathy patients and 31 healthy volunteers were included for this prospective observational study. Serum PON1 enzyme activities were measured using enzyme-linked immunosorbent assay. Serum vitamins A (retinol) and E (α -tocopherol) levels were measured simultaneously by high performance

liquid chromatography. Serum PON1 activity were significantly lower in the patient groups than the control group ($p = 0,020$). Vitamin A and vitamin E were significantly decreased in tendinopathy patients than the controls (all $p < 0,01$). There was a significant positive correlation between vitamin A and vitamin E in patients with tendinopathy. These findings showed that serum antioxidant levels decreased in patients with tendinopathy. A decrease in PON1 activity and vitamins A and E levels in patients may indicate the importance of oxidative stress in tendinopathy disease. Oxidative stress could be considered as factors in the pathogenesis of tendinopathy disease and may provide a target for preventing tendinopathy.

P806

BEHCET DISEASE: A CASE STUDY

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Introduction: Behcet disease (BD) is a vasculitis of undetermined causes, progresses in flare-ups with ocular involvement, joint and central nervous system damages. The diagnosis is made in front of bipolar aphthosis, cutaneous events and posterior uveitis. The treatment remains symptomatic with colchicine, corticosteroids and immunosuppressive drugs.

Patients and methods: We report a cross-sectional and multicentric study in a series of 70 cases followed in rheumatology since 1986 to date. The diagnosis of BD was made on international criteria (ICBD).

Results: 70 cases reported: 51 male for 19 female, index ratio=3, the average age of diagnosis is 37 years (18-72), the juvenile onset seen in 5 cases. Mucocutaneous disorders are reported as buccal aphthosis in 38% (bipolar aphthosis 62%), pseudofolliculitis in 55%, erythema nodosum in 16%, vasculitis in 9%, positive pathergy test in 10%, joint disorders reported in 95%, thrombophlebitis in 11% and ocular involvement in 39%, neurologic damage in 18%, inflammatory syndrome seen in 49%, HLA B5 in 23%. On the treatment side: 88% are taking colchicine, 28% on anticoagulant drugs, 56% on corticosteroids, 11% cyclophosphamide, 5 on azathioprine, 2 chloraminophene. Good results have been reported for 52 cases and 2 deaths.

Conclusion: Behcet disease needs attention for its multi-organ involvement. The takeover depends in severity of disease, often needing to have recourse to use: corticoids, immunosuppressive drugs, less than interferon alpha, thalidomide or anti TNF alphas.

P807**THE HISTOLOGICAL STRUCTURE OF THE MANDIBULAR CONDYLAR CARTILAGE IN RATS OF VARIOUS AGES AFTER APPLYING PERFORATED TIBIAL DEFECTS**A. M. Pilavov¹, V. I. Luzin¹, E. Y. Shutov¹, I. Y. Kozhemyaka¹¹SE Lugansk State Medical University, Lugansk, Ukraine

Objective: To analyze histological structure of the mandibular condylar cartilage (MCC) in rats of various ages after applying perforated tibial defects and finding possibility of medication with quercetin.

Material and Methods: The experiment involved 252 male rats (young, adult, and senile): the 1st control group; the 2nd group - animals with 2.2 mm defect in the both tibiae; the 3rd group animals with defect in the tibia that received *per os* quercetin in dosage of 0.32 g per kg daily. The animals were withdrawn from the experiment by the 7th, the 15th, the 30th, and the 90th day after applying tibial defects by means of anaesthetized decapitation. Upon expiration of observation terms the frontal sections of the MCC were hematoxylin-eosin stained and put to light microscopy for measurements of mandibular condylar cartilage zones.

Results: A plain defect in the tibia had inhibiting effects on activities of MCC. In young rats peak of alterations was registered by the 15th day when zones of proliferation (ZP) and osteogenesis (ZO) were narrower than controls by 6.72% and 7.51%. In adult and senile rats peak of alterations was registered by the 30th day when ZP and ZO were narrower than of controls by 5.40% and 8.36%, and by 6.05% b 9.60%. Restoration of registered alterations also depended on age of animals: in young rats by the 90th day after applying tibial defects significant differences from the control values some differences were still observed, in adult rats in the same period most differences were still observed, and in senile rats histological structure of the MCC did not restore.

Application of quercetin significantly reduced negative effects of experimental conditions (increase of width MCC zones and primary spongiosa content). In young and adult rats restoration signs manifested in the period from the 7th to the 90th day, and in senile animals – from the 30th day to the 90th day.

Conclusion: A plain defect in the tibia had inhibiting effects on structure of MCC. Deviations degree and recovery rate depend on age of animals. Faster recovery rate was observed in young animals while senile animals exhibited few signs of recovery. Application of quercetin in dosage of 0.32 g per kg of body weight reduced negative effects of experimental conditions on structure of MCC.

P808**FACTORS ASSOCIATED WITH GOOD TOLERANCE AND INTOLERANCE OF METHOTREXATE IN PATIENTS WITH INFLAMMATORY JOINT DISEASE**B. Bengana¹, A. Boukabous¹, M. Moussa Mebarek¹, Y. Heddi¹, H. Hamzaoui¹, N. Bahaz¹, S. Mostefai¹, S. Lefkir Tafiani²¹Department of Rheumatology Beni-Messous Hospital, Algiers University Medicine Faculty, Algiers, Algeria, ²Rheumatology, University Hospital Centre, Beni-Messous, Algiers, Algeria

Background: The methotrexate (MTX) is by far the most prescribed drug in the treatment of various inflammatory conditions, the data on assessment of factors associated with its intolerance or better tolerance in patients with inflammatory joint disease (IJD) is lacking. The aim of this study was to appreciate the frequency of MTX intolerance and to define the factors linked to it in people followed for IJD.

Methods: We have identified all patients treated by MTX only (oral or subcutaneous administration) for all IJD taking this DMARD at least since three months, we have evaluated the adverse events by laboratory monitoring and Methotrexate Intolerance Severity Score (MISS), we selected all people with MTX intolerance but also everyone with good tolerance and we compared the both groups, we have deduced the factors associated with a better tolerance of this treatment.

Results: One hundred twenty five patients was included, 95 women and 30 men, mean age was 45±13.3 years; 65 Rheumatoid Arthritis (RA), 21 Ankylosing Spondylitis (AS), 15 Psoriatic Arthritis (PA) et 24 Sjogren Syndrome (SS) among them, 51% have showed an intolerance with MTX (with 19% cessation of therapy) against 49% of better tolerance. Factors linked to a bad tolerance was: patients with advanced age (p <0.001) and MTX dose given once weekly (p=0.02)

Conclusion: The frequency of intolerance of MTX is relatively high (half of our population), this is particularly true for advanced age patients and the absence of splitting the oral dose of MTX.

P809**THE EFFECTS OF 60-DAY SODIUM BENZOATE INTAKE AND IONIZING RADIATION ON GROWTH RATE OF THE MANDIBLE IN RATS**I. G. Stepanenko¹, V. I. Luzin¹, L. I. Chystolinova¹, M. G. Gryshchuk¹¹SE Lugansk State Medical University, Lugansk, Ukraine

Objective: The study is aimed at investigation of growth rates of the mandible in rats in readaptation period after 60-day

application of sodium benzoate (SB) and exposure to ionizing radiation (IR), and finding possibility of medication with sea buckthorn oil (SBO).

Material and Methods: The experiment involved 240 rats with initial body weight of 180–200 g. The animals were distributed into 8 groups as follows: intact animals for the controls, animals that received *per os* SB in dosage of 1500 mg per kg daily for 60 days, animals exposed to IR (total 4 Grey in 4 sessions), received SBO in dosage of 300 mg per kg, combined SB and IR, SB and SBO, IR and SBO, and all three agents simultaneously. The animals were withdrawn from the experiment by the 1st, the 7th, the 15th, the 30th, and the 60th day after cessation of experimental influences by means of anaesthetized decapitation. The mandibles were excised and put to gross measurements (V.I. Luzin, 2004).

Results: Upon SB discontinue, ramus height, alveolar buttress width, and width of lower incisor decreased as compared to the controls by 7.13%, 5.93%, and 7.70%; after IR discontinue same values decreased by 12.41%, 7.98%, and 9.96%. After combined action of SB and IR those values were lower by 13.49%, 10.02%, and 12.80%. Restoration of growth rate also depended on influence: by the 30th day after SB discontinue some differences were still observed, and after cessation of combined action growth rate did not recover.

Application of SBO reduced negative effects of experimental conditions on growth rate of mandible. The best recovery outcome was observed in animals that received only SB and the lowest recovery outcome was yielded in rats exposed to combined action of IR radiation and SB.

Conclusion: 60-day application of SB in dosage of 1500 mg per kg of body weight, exposure to IR and combined action result in marked decrease of growth rate that expands even to readaptation period. This fact urges searching for medication and prophylactic measures for such a state. According to our findings SBO well satisfies this demand.

P810

FACTORS INFLUENCING END OF LIFE COST AND SURVIVAL IN ELDERLY OSTEOPOROTIC FRACTURE COHORTS

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Objective: To study the trends and factors influencing end of life cost in elderly fracture cohorts by comparing the

differences in the trajectories among cohorts with different types of fractures, regional [1] and patient factors.

Materials and Methods: Insurance claims for three prospective cohorts of patients with hip fracture, wrist fracture and proximal humerus fracture among US Medicare beneficiaries age 66 and older with an index fracture occurring during 2007–2011. Several types of standardized costs are included for each participant. Standardized costs per beneficiary are accumulated in each 30-day period from time of enrollment until death or end of follow up.

We used a joint modeling approach [2,3,4] for survival and cost data to study individual level trajectories of Medicare cost data and survival in the fracture cohorts. Our approach includes patients whose death times are censored. We use two regression sub models: a piecewise exponential model for survival time, and a retrospective spline regression model for costs. This allows for examination of factors affecting survival, the terminal trend, and time trends in the cost among surviving individuals.

Results: Through simulations, we demonstrate that our approach produces accurate estimates and confidence intervals.

Conclusion: Our method is effective for estimating survival and end of life cost trends in elderly fracture cohorts.

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P811

THE ROLE OF MYOFASCIAL SYNDROME OF THE CERVICAL PART IN DEVELOPMENT OF CHRONIC BRAIN ISCHEMIA

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Objective: One of the most common diagnoses in neurology practice is chronic brain ischemia. The prevalence of cephalgic syndrome in this disease varies from 37 to 74%. The aim of the study was to determine biomechanical disorders of the spine and their influence on the development of chronic brain ischemia.

Material and methods: The study involved 68 patients with the diagnosis of the chronic brain ischemia aged from 38 to 68 years. Clinical examination included neurological and kinesiological examinations. Specific original test: map of headache localization. To assess the condition of statodynamic muscles and symmetry of the spine and extremities we used the method developed by us, based on visual and optical analysis.

Results: Headaches were localized as follows: frontal pain - 20.6%, frontotemporal pain - 36.8%, parietal pain - 10.3%, occipital pain - 32.3%. The results of visual and optical examination yielded a common combination of scoliotic spinal deformity: it was a violation of posture and symmetry changes in the shoulder girdle and shoulder blades. During the palpation of the spine trigger points were found in the lower oblique muscle of the head - 14.7%, trapezoidal muscle - 60%, muscle lifting the shoulder blade - 45.1%, scalene muscle - 32.4%. Almost every examination demonstrated "the phenomenon of recognition": when the trigger point was pressed, the pain the patient had originally presented to the doctor with was reproduced.

Conclusions: When the diagnosis of patients with chronic brain ischemia is made, the vascular aspect is generally taken into account but other aspects are not differentiated. The examination showed that patients with chronic brain ischemia suffer a violation of the musculoskeletal system, which leads to abnormalities in the cervix. These facts clearly prove the significance of development of muscolofascial reactions with biomechanical abnormalities in locomotor field and points to the importance of the further study of etiopathology of chronic brain ischemia.

P812

THE INFLUENCE OF OSTEOARTHRITIS ON CLINICAL, BIOLOGICAL AND ULTRASOUND PARAMETERS OF PATIENTS WITH EARLY RHEUMATOID ARTHRITIS

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Objective: To evaluate the possible impact of osteoarthritis on the clinical, biological and ultrasound parameters currently evaluated in patients with early rheumatoid arthritis (ERA).

Material and Methods: We have evaluated the data obtained from patients with ERA referred to the Early Arthritis Research Center (EARC) of "Dr. I. Cantacuzino" Hospital. 43 patients were diagnosed with ERA in the EARC between 2010 and 2016 and were enrolled in this study. Only data from patients who fulfilled EULAR/ACR 2010 criteria for RA (1) and had a symptom duration of less than 12 months were analyzed. Patients were evaluated at baseline and after 12 months.

Results: There was a clear predominance of women (62.8%). The mean age was 55.47±13.71 years. At baseline, 21 patients

(48.8%) were diagnosed with osteoarthritis. 15 patients (34.9%) presented hand osteoarthritis and 9 patients (20.9%) presented knee osteoarthritis. Hand osteoarthritis did not influence the values of DAS28, SDAI, patient's and physician's visual analogue scale (VAS) or ultrasound scores ($p>0.05$). For patients with knee osteoarthritis, significantly higher values for DAS28 were observed at baseline ($p=0.018$) and were maintained significantly higher after 12 months of observation ($p=0.031$). All the other parameters were not influenced by the presence of knee osteoarthritis ($p>0.05$).

Conclusions: Significantly higher values of DAS28 were observed in patients with ERA who associated knee osteoarthritis, while the values of SDAI were not influenced, suggesting that SDAI may be superior to DAS28 in evaluating patients with ERA and knee osteoarthritis. Not the same tendency was observed in patients with ERA and hand osteoarthritis. The values of patient's VAS were not influenced by the presence of hand or knee osteoarthritis suggesting that these types of osteoarthritis do not influence the patients' perception of the disease activity. Moreover, the values of ultrasound scores were not influenced by the presence of osteoarthritis.

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P813

OFFICE-BASED PRESCREENING OF CORTICAL BONE THICKNESS IN FEMALE HIP ARTHROPLASTY PATIENTS

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Objectives: Female hip arthroplasty patients over 65 years of age are at highest risk for periprosthetic fractures of uncemented stems probably because of poor bone quality. Dual-energy X-ray absorptiometry (DXA) screening for low bone mineral density (BMD) of the proximal femur may help in risk assessment of this complication. We asked if office-based measurement of cortical bone thickness could be useful for prescreening of female arthroplasty patients.

Material and Methods: Sixty-one postmenopausal women with primary hip osteoarthritis and without diseases or drugs affecting bone metabolism underwent preoperative measurement of apparent multi-site (tibia and radius) cortical bone thickness using a mobile pulse-echo ultrasound device. The cortical bone thickness index obtained from the measurements takes into account the patient's age and body characteristics (weight and height). An index below 0.876 g/cm² was applied according to the previously defined 90% sensitivity threshold as indication for DXA screening (1). The normalized cortical bone index was validated against local BMDs measured by standard DXA.

Results: The normalized cortical bone index was below the threshold value in 23 women (38%), who were considered to require DXA screening. The index correlated significantly ($r=0.558$, $p<0.001$) with the BMD of the femoral neck. The approach showed 68% sensitivity, 80% specificity, 65% positive predictive value and 82% negative predictive value in the identification of patients with osteoporotic or osteopenic BMD of the index hip. Applying T-score <-2.0 of the femoral neck as the discriminator, the index showed 100% sensitivity and 84% specificity.

Conclusion: The normalized cortical bone index reduced the need of preoperative DXA for identifying female hip arthroplasty patients with low BMD of the proximal femur.

Reference: 1. Karjalainen et al. *Osteoporos Int* 2016;27:971.

P814

ULTRASTRUCTURE OF DENTIN BIOMINERAL OF THE LOWER INCISOR IN RATS OF VARIOUS AGES AFTER EXCESSIVE PALM OIL INTAKE

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Objective: To analyze ultrastructure of dentin biomineral of the lower incisor (DB) in rats of different ages after excessive palm oil (PO) intake and administration of *Garcinia cambogia extract* (GE) as medication.

Material and Methods: The experiment involved 216 rats of three ages: immature, mature and elderly animals. The animals were split into the groups as follows: the 1st group comprised intact animals (the controls), the 2nd group comprised the animals that received intragastric PO in dosage of 30 mg per kg of body weight, and the 3rd group PO and intragastric GE in dosage of 0.25 mg per kg of body weight. The animals were withdrawn from the experiment by the 1st, the 10th, the 30th and the 60th day after 6-week of PO intake. Burned and powdered DB were taken to X-ray scatter analysis.

Results: Excessive intake of PO resulted in derangement of the crystal lattice of DB; deviations degree depends on age of animals. The alterations started manifesting from the 1st day of observation and continued growing throughout the whole experiment. In immature animals crystallites dimensions increased as compared to the control values from the 1st to the 60th days of observation by 4.39%, 5.36%, 5.58% and 5.45% and microtexture coefficient decreased by 3.38%, 4.19%, 4.16% and 4.49% respectively. In mature animals the same values changed in the same way by 0.16% ($p>0.05$), 0.89% ($p>0.05$), 6.05% and 6.67% and by 2.65%, 3.55%, 4.04% and 4.44% and in old animals – by 4.41%, 4.82%, 4.77% and 4.92% and by 3.32%, 4.00%, 5.13% and 5.73%. Administration of GE reduced negative effects of PO as compared to the 2nd group (diminishing of elementary cells and

crystallites and increase of microtexturing coefficient). After GE administration on the 60th days of observation in immature rats crystallites dimensions decreased as compared to the 2nd group by 5.34% and microtexture coefficient increased by 3.95%, in mature rats by 5.51% and 4.50%, and in elderly rats – by 2.04% ($p>0.05$) and 4.31% respectively.

Conclusion: Long-term excessive intake of PO results in derangement of the crystal lattice of DB. Terms and intensity of alterations depend on age of experimental animals. Administration of GE reduced negative effects of palm oil on the crystal lattice of DB. Faster recovery rate was observed in young animals, slower - in senile animals.

P815

THE IMPACT OF VERTEBRAL FRACTURES ON HEALTH RELATED QUALITY OF LIFE IN OSTEOPOROTIC PATIENTS ATTENDING A BONE HEALTH SERVICE

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Objective: Vertebral fractures are a common complication of osteoporosis and are associated with back pain and functional impairment, which can influence mood and lead to depression. This can have a negative impact on patient health related quality of life (HRQOL). We investigated the effect of vertebral fractures on HRQOL in osteoporotic patients.

Materials and Methods: A cross sectional study was carried out amongst patients attending a bone health service for osteoporosis assessment. 50 patients with vertebral fractures and 50 patients with no vertebral fractures were included. All patients completed the Quality of Life Questionnaire of the European Foundation for Osteoporosis (QUALEFFO) on first attendance. Each patient received a Dual Emission x-ray absorptiometry (DXA). Vertebral fractures were diagnosed by a lateral vertebral assessment (LVA). The QUALEFFO is a disease specific HRQOL questionnaire targeting fracture assessment specific to patients with vertebral fractures. It comprises 41 questions in 5 domains: Pain; Physical Function; Social Function; General Health Perception and Mental Function.

Results: 50 community dwelling patients in each group. 5:1 female to male ratio. Mean age 71years (Range 31-92). 62% patients had previous fractures with 69% taking bone health medication on presentation. 14% were treatment naive and 21% were on calcium and vitamin D supplements only. Vertebral fracture patients were older, had a higher prevalence of non vertebral fractures. They experienced more pain ($m=42$ v 32), reduced physical ($m=36$ v 23) and social function ($m=50$ v 45) and poor mental health ($m=41$ v 34) when compared to those with no vertebral fractures but not significantly ($p=.4$) Overall HRQOL was reduced in patients with vertebral fractures, however not significantly.

Conclusion: Our results support previous findings that HRQOL is decreased in patients with vertebral fractures. The nonsignificant nature of our results might be explained by the relatively low numbers involved in this study and the inclusion of a significant cohort of younger people with osteoporosis who tend to be healthier and fitter than older patients. It highlights the importance of preventing and treating vertebral fractures to reduce their impact on HRQOL.

P816

THE ORTHOGERIATRIC COMANAGEMENT IMPROVES CLINICAL INDICATORS IN HIP FRACTURE PATIENTS COMPARED WITH CONSULTANT GERIATRIC SERVICE AND TRADITIONAL ORTHOPAEDIC CARE

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Objective: To compare clinical indicators of hip fracture patients treated in accordance with orthogeriatric comanagement (OGC), consultant geriatric service (CGS) and traditional orthopaedic care (TOC).

Material and Methods: this is a single-centre, prospective intervention study in which hip fracture patients admitted to the acute traumatological ward of a teaching hospital were assigned to the orthogeriatric comanagement or geriatric consultant service and both branches were compared with a retrospective control group managed in accordance with a traditional orthopaedic model of care. 430 hip fracture patients

were enrolled. 112 taken in charge by the orthogeriatric comanagement team and 108 by the orthopaedic team with a consultant service as support. Both groups were compared with 210 hip fracture patients consecutively enrolled in the same period of the previous year and managed in accordance with a traditional orthopaedic care model. Measurements were several clinical indicators, including time to surgery, length of stay, in-hospital and 1-year mortality.

Results: Patients in the OGC (OR 2.62; CI 95% 1.40-4.91) but not those in the CGS (OR 0.74; CI 95% 0.38-1.47) showed a higher probability of undergoing surgery within 48 hours compared to those in the TOC. Moreover, the OGC (β : -1.08; SE: 0.54, $p=.045$) but not the CGS (β : -0.79; SE: 0.53, $p=.148$) was inversely associated with length of stay (LOS). Ultimately, patients in the OGC (OR 0.31; CI 95% 0.10-0.96) but not those in the CGS (OR 0.37; CI 95% 0.10-1.38) experienced a significantly lower 1-year mortality rate compared to those in the SOC. All analyses were independent of several confounders.

Conclusion: Older persons managed by the OGC showed better clinical indicators, including time to surgery, LOS and mortality rates, than those managed in accordance with the consultant geriatric service or traditional orthopaedic care.

P817

METABOLIC SYNDROME IN PATIENTS WITH GOUT

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Objectives: To determine the prevalence of metabolic syndrome in patients with gout, and study its manifestations depending on the nature of renal disease.

Methods: One hundred and forty five patients with gout have been examined (according to ACR criteria, 2014). 117 of them were diagnosed with chronic gout, and 28 with acute gout. Age of the patients ranged from 17 to 79 years old. The patients were monitored in the period 2007-2016. Disease duration in these patients was between 1 and 40 years. All patients were examined by instrumental and laboratory methods.

Results: The mean age of patients with gout was 48 years. At onset, the following distribution of joint involvement was noticed: the lower limbs were affected more frequently, particularly the first MTP joint – 134 (92%), followed by ankle joints in 86 (59%), and knee joints in 59 (41%) respectively. To a lesser extent the joints of the upper limbs were involved - in 19 (13%) patients. In the study group, patients with chronic gout

prevailed - 117 (81%) while relapsing evolution was registered in 28 (19%) patients. With regard to kidney involvement – 74 (51%) patients had tubular-interstitial nephritis with uric acid diathesis, and 62 (42%) patients had nephrolithiasis. Metabolic syndrome (MS) was diagnosed in 89 (61.4%) patients with gout. According to the frequency of MS components, Systolic BP > 135mmHg was recorded in 132 (91%) patients, a Waist Circumference of > 94 cm was seen in 89 (61.4%) patients, triglycerides > 1.7mmol/l in 78 (54%), and glucose > 6.1 mmol/l in 61 (42%) patients. Decreased glomerular filtration rate below 60 ml/min was detected in 64 (44%) of gout patients with MS and in 28 (19%) patients without MS.

Conclusion: All of the above results correspond to data from international studies pointing to the fact that the presence of the metabolic syndrome in patients with gout leads to organ damage, regardless of geographic location, but depends on disease duration.

P818

FEMORAL NECK T-SCORE IN POSTMENOPAUSAL WHITE WOMEN AND ITS RELATION WITH THE MONTH OF THE YEAR OF THE DXA EXAMINATION

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Objectives: The aim of this study was to analyze whether the femoral neck T-score and osteoporosis or lack thereof in postmenopausal white women might depend by the month of the year when the DXA is executed.

Material and Methods: 9,619 different postmenopausal white women who had a single hip DXA scan, were retrospectively analyzed. Age range was between 19 and 98 years, age of menopause was between 15 and 65 years. Femoral neck T-score was calculated using the NHANES database (2005-2008). The subjects were also classified according to their bone mineral density category (normal, osteopenic, osteoporotic status), deducted by their femoral neck T-score. DXA scans were executed in all months of the year. Statistical analysis was performed using the Bartlett test, one-way ANOVA and Pearson's chi-squared test.

Results: A statistically significant difference between any month of the year was observed neither on the base of the T-score (one-way ANOVA, $p=0.5601$) nor on the base of the bone mineral density category (Pearson's chi-squared test, $p=0.6436$). T-score histogram approximated a Gaussian curve in all months.

Conclusions: Our study results showed that a DXA scan could be performed on postmenopausal white women in any month of the year without obtaining significantly different results.

P819

ULTRASTRUCTURE OF DENTIN BIOMINERAL OF THE LOWER INCISOR IN RATS AFTER IMPLANTATION OF MANGANESE ENHANCED HYDROXYAPATITE IMPLANTS INTO TIBIA

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Objectives: The study is aimed at analysis of ultrastructure of dentin biomineral of the lower incisor in rats after implantation of manganese enhanced hydroxyapatite into the tibia.

Material and Methods: The study involved 252 male rats. The 1st group comprised intact animals, the 2nd group - animals with 2.2 mm defect in the tibia, and the groups 3 through 6 - the animals with the defects filled with hydroxyapatite enhanced with 0.0%, 0.1%, 0.25%, and 0.5% share of manganese. Burned and powdered dentin was taken to X-ray scatter analysis and calculated crystallographic parameters of the dentine biomineral.

Results: Fracture modeling (2.2 mm defect in tibia shaft) leads to instability of ultrastructure of dentin biomineral of the lower incisor (enlargement of elementary cells and crystallites, and micro texture coefficient decrease) the 15th to the 180th days of observation. Implantation of pure hydroxyapatite into defect also affects stability of crystal lattice of dentin biomineral of the lower incisor; alterations are observed from the 15th to the 60th days of observation and after that crystal lattice began to restore. Manganese enhanced implants significantly reduce negative effects of fracture on stability of ultrastructure of dentin biomineral; the most effective were the implants with 0.25% of manganese. With manganese concentration increase up to 0.25% micro texture coefficient on the 30th and the 90th day was higher than those of the 3rd group by 2.61% and 1.74%, and sizes of crystallites from the 30th to the 60th day were lower than those of the 3rd group by 4.60% and 5.7% respectively (from here and on, all numeric values are significant with $p<0.05$). Implants with 0.5% of manganese cause manganese intoxication observed as decrease of micro texture coefficient on the 7th, the 60th, the 90th and 180th days of observation with intensity peak at the 90th day of observation as compared to the control values of the 3rd group by 2.89%, 2.91%, 3.88%, and 3.09% respectively.

Conclusions: Application of manganese enhanced implants significantly reduces negative effects of bone fracture on ultrastructure of the dentin biomineral. Implants with 0.25% share of manganese proved to be the most effective while implants with 0.5% share of manganese produced signs of manganese intoxication.

P820**ALTERATIONS IN DNA METHYLATION MIGHT EXPLAIN THE IMPAIRED BONE REMODELING IN DIABETIC PATIENTS**

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Objective: The aim of this study was to assess whether bone turnover markers were associated with global DNA methylation levels in diabetic patients.

Material and methods: The 5-methyl cytosine content was assessed by reverse phase high pressure liquid chromatography (RP-HPLC) of peripheral blood leukocytes obtained from 174 type 2 diabetes patients to determine individual global DNA methylation status. The biochemical and metabolic parameters and bone turnover markers were assessed in all diabetic patients.

Results: Our findings showed serum levels of at least one of the studied bone turnover markers that include osteocalcin (OC), carboxyterminal collagen crosslinks (CTX), procollagen I aminoterminal propeptide (PINP) and PTH were affected by age, sex, BMI, duration of diabetes, Michigan diabetic neuropathy scale, estimated-glomerular filtration rate (e-GFR), liver function tests, 25(OH)D and global DNA methylation levels. There were no significant correlations between serum levels of studied bone turnover markers and FBS, HbA1c, insulin, lipid profile, hs-CRP and HOMA index. In a general linear model, after adjusting for age, sex, BMI, and duration of diabetes, there was significant association between levels of global DNA methylation and PINP ($p=0.001$) independent of Michigan diabetic neuropathy scale, eGFR, and serum levels of liver function tests and 25(OH) D.

Conclusion: Our findings demonstrate for the first time that alteration of global DNA methylation levels in type 2 diabetes patients plays an independent role in bone turnover. This relationship might explain a possible mechanism of impaired bone remodeling that induced by chronic hyperglycemia condition in diabetic patients.

P821**ULTRASTRUCTURE OF BIOMINERAL OF THE MANDIBULAR RAMUS IN RATS OF VARIOUS AGES AFTER 60-DAY EXPOSURE TO EPICHLOROHYDRIN VAPORS**

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Objectives: The aim of the study is to analyze ultrastructure of biomineral of the mandibular ramus in rats of different ages after 60-day inhalation of epichlorohydrin vapors (EV) and administration of thiotriazolone (T) and *Echinaceae tinctura* (ET) as medication.

Material and Methods: For the purposes of study we selected 420 male rats of three ages. The 1st group comprised intact animals, the 2nd group comprised the animals that received inhalations of EV in dosage of 10 MPC as a single 5-hour exposure per day, the 3rd group received EV and intraperitoneal T in dosage of 117.4 mg per kg of body weight, and the 4th group comprised the animals that received EV and intragastric ET in dosage of 0.1 mg of active substance per 100 grams of body weight. The animals were withdrawn from the experiment by the 1st, the 7th, the 15th, the 30th, and the 60th day after EV discontinue. Burned and powdered mandibular rami were taken to X-ray scatter analysis.

Results: By the 1st day upon EV discontinue, crystallites dimensions (CD) in young animals increased as compared to the control values by 9.93% and microtexture coefficient (MC) decreased by 9.89%. In adult animals the same values changed in the same way by 7.16% and 11.28% and in old animals – by 6.90% and 7.04%. In readaptation period by the 60th day of observation in young and adult animals MC decreased by 3.44% and 5.22%, and in old animals CD increased as compared to the control values by 6.61% and MC decreased by 6.21%. Administration of T or ET reduced negative effects of EV as compared to the 2nd group during inhalation and after it (diminishing of elementary cells and CD and increase of MC). After T administration, deranged features of the crystal lattice restored in young rats by the 30th day, adult animals exhibited restoration signs throughout the whole observation period and in old animals signs of restoration were observed by the 15th and to the 60th days. After ET administration, in young animals restoration of the crystal lattice was observed by the 1th to the 60th days, in adult by the 7th to the 60th days, and in old animals – by 60th day of observation.

Conclusions: 60-day inhalation of EV results in derangement of the crystal lattice of bone mineral. Deviations degree and recovery rate depend on age of animals. Faster recovery rate was observed in young animals while old animals exhibited few signs of recovery. Application of T or ET reduces negative effects of EV. We proved T to be more effective than ET.

P822**PREVALENCE OF MORPHOMETRIC DEFORMITIES IN PATIENTS WITH LUMBAR OR DORSAL ACUTE PAIN**

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Objective: To determine the prevalence of morphometric deformities in vertebral bodies of postmenopausal women radiologically assessed due to lumbar or dorsal acute pain in a urgency and emergency environment.

Methods: A simple randomization of registries of women of 65+ years old who consulted in our AandE department in 2015 and 2016 were performed. The registries collected were 120% of the amount of the sample size calculated for a not finite population of urgent consultation, with a 3% precision and a theoretical estimated prevalence of 7% based on local studies about vertebral fractures. Metrical studies on the radiographic charts were performed in every registry on D9 to L5 vertebral bodies from the lateral approach using the Genant scale recommendations. The study were performed by an expert rheumatologist blinded to the clinical AandE report.

Results: Two hundreds and seventy five registries were included with dorsal and lumbar acute pain. Grade I, II and III Genant deformities were identified among 62 (22.5%), 30 (10.9%) and 18 (6.5%) of radiological studies from patients assessed due to dorsal acute pain, respectively. Grade I, II and III Genant deformities were identified among 31 (11.2%), 49 (17.8%) and 33 (12.0%) of radiological studies from patients assessed due to lumbar acute pain, respectively. Prevalence of at least one dorsal vertebral body deformity was 40.0% (95% CI 34.39-45.89%). Prevalence of at least one lumbar vertebral body deformity was 41.09% (95% CI 35.44-46.99%). Lumbar deformities grade I and II counted as much as 70.7%. Dorsal deformities grade I and II counted as much as 83.6%. From all the 93 grade I deformities, 6.4% were reported as fractures in the clinical report. Grade II deformities were recognized in 20.2% of all the cases and Grade III deformities were recognized in 92.1% ($P < 0.001$).

Conclusions: Although this is an study focused in symptomatic patients, it presents the prevalence of grades I and II Genant deformities that are usually clinically ignored. Since the consideration of morphometrical vertebral deformities is relevant in order to choose how to treat a patient with osteoporosis, it is highly important to take into account that many of these fractures are ignored on AandE environment even in symptomatic patients.

P823

OSTEOGENIC LOADING FOR IMPROVED BONE MINERAL DENSITY IN ADULTS WITH LOW BODY MASS INDEX

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Objective: The benefits of osteogenic loading (OL) for improved bone health are documented but not previously studied in individuals with anorexia nervosa (AN), in part due to

concerns regarding possible bone weakness and injury risk. The purpose of this study was to examine if OL was 1) safe and 2) effective for individuals having low body mass index (BMI). and to consider potential benefits for individuals with a diagnosis of AN.

Methods: Adults with BMI of 14.0 - 18.5 were drawn from an electronic database of all adults (N=21,096) using OL weekly for a minimum of 24 weeks (n=260). Numbers of participants meeting or surpassing minimal compressive force associated with bone formation (a multiple of body weight >4.2) were assessed.

Results: Ninety five% of participants (n=247) created OL forces associated with bone reformation without report of injury. Mean force generated for the subject population were 5.96 MOB with sd 2.94. A greater percentage of subjects with low BMI were able to achieve the minimal MOB than those in the average and high BMI categories.

Discussion: Individuals with low BMI had sufficient strength to create compressive forces associated with bone formation. OL may have restorative potential and low risk of injury in a population with low BMI - a group historically plagued by higher injury risk than those with normal BMI. Results may be relevant in addressing bone health concerns among individuals with history of AN. Additional research is needed to validate OL with AN in bone reformation.

P824

IN-OFFICE PROTEOMIC PLATFORM FOR BONE MARKER MEASUREMENT

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Objectives: Current trends towards theranostics and provision of personalized diagnostic therapy tailored to an individual has emphasized the need for inexpensive point-of-care and in-office devices, capable of performing rapid analysis, with small volumes of sample, minimum number of assay steps, and no need for highly skilled personnel for routine checkup and patient screening. In this work, we report a microfluidic proteomic platform that can easily be translated into an in-office biomarker diagnostic tool to be used by clinicians. This platform integrates microfluidic technology with electrochemical sensing to measure serum levels of different biomarkers with comparable accuracy with the current state-of-the-art, electrochemiluminescence (ECLIA) and ELISA, but in shorter time and probably cheaper.

Material and Methods: Microfabricated Au electrodes encased in a microfluidic chamber were functionalized to immobilize the antibodies, which can selectively capture the

corresponding antigen. The magnitude of the response current varied linearly with the concentration of the relative biomarker, and thus was used to quantify the concentration of the relative biomarker in serum samples.

Results: We demonstrated the implementation, feasibility and specificity of this platform (Osteokit), the first in its kind, in assaying serum levels of bone turnover markers using osteocalcin (Oc) and C-terminal telopeptide of type 1 collagen (CTX). The detection limit of osteocalcin was 1.94 ng/mL, whereas that of CTX was 2.77 pg/mL. Our results also showed the sensitivity of Osteokit to be comparable with ECLIA when human serum samples were used. According to the results, the coefficients of variation for the ECLIA and Osteokit were calculated to be 4.6% and 3.7% for Oc, and 6.4% and 7.7% for CTX. The high correlation between our sensor results and that of ECLIA was also reported (Figure 1).

Conclusion: Our results show that Osteokit could some day be used as an alternative for ELISA/ECLIA, especially in the developing countries and rural areas. The device may also be used to monitor the osteoporosis treatment more efficiently and probably help identify high turnover patients in an earlier phase.

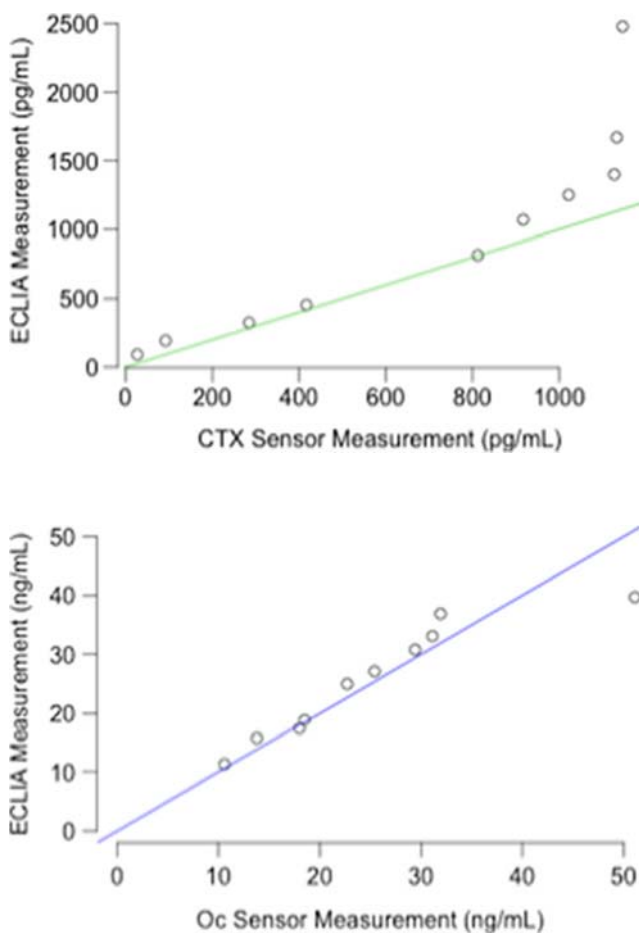


Figure 1. Correlation plot comparing ECLIA vs. Osteokit in CTX and Oc measurement.

P825

FACTORS ASSOCIATED WITH FIVE-YEAR MORTALITY RATE IN OLDER POST HIP FRACTURE ADULTS

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Objective: Hip fractures are associated with high risk of death during the immediate post fracture years. We investigated if a Nurse-led care package, incorporating early bone health clinic access at 3 months, with a multidisciplinary approach to falls risk and bone health, reduced post fracture mortality.

Methodology: Consecutive hip fracture patients admitted to the study site were invited to participate in a RCT. 226 patients were included and randomised into intervention (114) and control (112) groups. Inclusion criteria were ≥ 60 years and MMSE ≥ 18 . These patients were followed up for 5 years. Mortality information was obtained from; hospital's electronic patient's records system (EPR); Registrar's Office of Births Deaths and Marriages and online death notice site (rip.ie). Randomisation carried out by computerised minimisation programme. Data analysed using SPSS.

Results: 396 patients attended study site. Mean age; 77 years, (40 -96 years). 69% female. Overall mortality rates were 14%, 22%, 29%, 37% and 44% at 1,2,3,4 and 5 years respectively. Study population (Intervention and Control groups) mean age 81 years ($+/-$ 8 years), female and 76 years ($+/-$ 8 years) male. Mortality rates were 8%, 14%, 25%, 33% and 40% at 1,2,3,4 and 5 years respectively. Significant difference noted at 1 and 2 years.

Intervention group mortality rates were 5%, 9%, 23%, 30%, 37% and in Control group 10%, 20%, 27%, 36% and 43% at 1,2,3,4, and 5 years respectively. Significant difference noted at 2 years ($p=0.02$). Risk factors for increased mortality were male gender ($p=0.02$), older age ($p=0.04$), reduced cognition ($p=0.001$), admission from nursing homes ($p=0.001$), delay of >24 hrs to surgery ($p=0.008$), increased length of stay ($p=0.001$), discharge to LTC ($p=0.001$), reduced pre-fracture mobility ($p=0.001$), reduced ability to self-care ($p=0.001$), reduced Amended Barthel Score at 15 months ($p=0.001$), HADS depression at 15 months ($p=0.001$), at risk of malnutrition at 15 months ($p=0.003$).

Conclusion: Intervention improved mortality rates in year 1 and 2 post fracture. Mortality was dependent on; pre and post fracture physical and psychological health status; and time to surgery.

P826**USE OF TERIPARATIDE THERAPY IN OSTEOPOROTIC PATIENTS: AN ESI EXPERIENCE**K. Malik¹, S. Gupta², A. Gupta³¹Orthopaedics /ESI Hospital, New Delhi, India,²Orthopaedics / ESI hospital, New Delhi, India,³Orthopaedics/ ESI Hospital, New Delhi, India

Objective: To conclude the results of Teriparatide therapy on Osteoporotic patients reviewed after DXA scan (3 sites). **Body:** In recent years there has been an explosion in the development of new drugs for the treatment of osteoporosis. Recombinant human parathyroid hormone(20 µg/day) is a recent addition to this armamentarium with a novel mechanism of action, which was approved by the US FDA for the treatment of postmenopausal osteoporosis and male osteoporosis secondary to hypogonadism in November 2002. This anabolic drug influence processes associated with bone formation to a greater extent and earlier than bone reabsorption. Also, it positively affect a number of skeletal properties besides bone density, as intermittent administration of parathyroid hormone (PTH) results in an increase in the number and activity of osteoblasts leading to an increase in bone mass and improvement in skeletal architecture at both the trabecular and cortical bone. Human recombinant parathyroid hormone (hrPTH 1-84) and human recombinant PTH peptide 1-34 (teriparatide) belong to this group. It is the first osteoporosis treatment that leads to the formation of new bone with architecture similar to normal bone. The objective of this paper is to review PTH actions, indications, benefits and adverse effects at our hospital reviewed after DXA scan.

Materials and methods: Inclusion criterion postmenopausal women and males above 50 years with polyarthralgia and atraumatic collapse fractures

Results: Postmenopausal women and males having polyarthralgia with no clear indications of spinal pain and radiological testing (x-rays) showing thinned vertebral end plates and cortices, after DXA proved to be osteoporotic patients and with DXA scan reading of more than -3.5 (according to WHO standards >-2.5) treated with teriparatide therapy, out of which > 80% patients were pain relieved. Total patients studied were 100, out of which 80 were female and 20 were males.

Conclusion: Teriparatide therapy proves beneficial in the osteoporotic patients and has increase in the number and activity of osteoblasts leading to an increase in bone mass and improvement in skeletal architecture at both the trabecular and cortical bone. Out of 100 patients, 20 lost in follow up due to various reasons, 3 had side effects and discontinued therapy.

Disclosure: Patients in our hospital undergone the therapy are all insured patients under ESI scheme and in any way has no financial burden on their pockets.

P827**WHAT AN ORTHOPEDIC SURGEON SHOULD KNOW ABOUT SCREW CUT OUT AND BONE QUALITY**B. Limousin Aranzabal¹, E. Fernandez Tormos¹, C. Arraiz Diaz¹, D. Guzman Domenech¹, F. Brañas Baztán², O. Marín Peña¹, R. Larrainzar Garijo¹¹Hospital Universitario Infanta Leonor, Madrid, Spain,²Geriatric and Internal Medicine Department. Infanta Leonor University Hospital, Madrid, Spain

Introduction: The hip fracture is one of the XXI century epidemics. The most common treatment for pertrochanteric hip fractures is the intramedullary nailing, although other types of devices are used also like the nail-plate. The objectives of this work are: to identify the type indecency of screw "cut-out" in our series; analyze the potential mechanical or biological origin; and study the functional significance in those patients.

Method: We analyzed retrospectively a case series of patients with pertrochanteric hip fracture. In our series are 589 cases treated between 2009 and 2013 in our hospital. We selected cases of complications with subsequent reoperation grouped by DRGs. We found 9 cases of "cut out" reoperation. We analyzed demographics data, functional parameters (BARTHEL Index), laboratory parameters (Vit. D), radiological parameters (Tip-Apex Distance (TAD) and Parker Ratio (PR)).

Results: With a comparable groups of cases and controls with respect to demographic data; We found a higher rate of BARTHEL in the series of cases (10%). The analytical parameters indicated a clear hypovitaminosis D in patients with pertrochanteric hip fracture, being more marked in our case series. In our cases the radiological parameters analyzed indicated a TAD> 25 in 50% and 50% TAD <25. In 100% the screw was in a middle position as PR. The incidence of screw cut-out was 1.35%. We detected a possible mechanical origin in 50% of cases and biological in the remaining 50%. We detected a reduction in the functional parameters of 18.75% in the BARTHEL Index.

Conclusion: Even though we have a low incidence of screw cut-out in our series in comparison to the literature, this has not less importance. This phenomenon has a significant impact on the functional parameters of patients. Two important routes of improvement for reducing the incidence are: improve the surgical technique (SBP <25mm and PR> 66%) and improve the biological environment, placing great importance to vitamin D.

P828**RELATIONSHIPS BETWEEN DNA METHYLATION AND MUSCULOSKELETAL HEALTH FROM AN EPIGENOME WIDE ASSOCIATION STUDY: THE HERTFORDSHIRE COHORT**

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Objectives: We investigated epigenome-wide DNA methylation in the peripheral blood of older adults in relation to bone indices.

Methods: Femoral neck (FN) bone mineral content (BMC) and bone mineral density (BMD), lumbar spine (LS) BMC and BMD and grip strength were assessed using DXA (Hologic QDR 4500) in 49 men and 50 women from the Hertfordshire Cohort Study (mean age 64.4 years). DNA methylation in these subjects was analysed using the Infinium HumanMethylation450 BeadChip (450k). Standard quality control and removal of ambiguous and co-locating SNP probes resulted in the assessment of 383,230 CpGs. The results were adjusted for age, sex, plate position, chip, and white blood cell composition.

Results: We found differentially methylated positions (DMPs) at epigenome-wide statistical significance (p -value $\leq 1.305 \times 10^{-7}$), including 9 DMPs associated with FN BMC, 10 DMPs with FN BMD, 3 DMPs with LS BMC, 47 DMPs with LS BMD and 36 DMPs with grip strength. Of note was the identification of DNA methylation changes associated with both femoral neck BMD and grip strength in *DTWD2*, a gene previously associated with BMI and subcutaneous adiposity, and *SKI*, a proto-oncogene associated with skeletal, muscular and arterial morphology. A DMP in the Marfan-syndrome related *FBN1* gene was strongly associated with both LS BMC and LS BMD. Gene Ontology (GO) pathway analysis (FDR ≤ 0.25 , and corrected for array bias with missMethyl) for determinants of LS BMC was enriched for

differentially methylated genes associated with negative regulation of osteoclast development ($p=2.617 \times 10^{-5}$).

Conclusions: We identified a set of differentially methylated genes involved in muscular, connective tissue, adiposity and vascular function in late adulthood that were related to musculoskeletal outcomes. Our findings potentially indicate tissue-independent epigenetic mechanisms in the pathogenesis of poorer bone health in later life, or the identification of passive biomarkers of this process.

P829

DIET QUALITY AND HRPQCT IN OLDER COMMUNITY-DWELLING ADULTS FROM THE HERTFORDSHIRE COHORT STUDY.

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Background: Few studies have examined the association between dietary patterns and bone microarchitecture, size and volumetric density. No studies have previously investigated this relationship using high resolution peripheral quantitative computed tomography (HRpQCT). We investigated the relationship between diet quality and HRpQCT measures in older adults from the Hertfordshire Cohort Study.

Methods: Data were available for 184 men and 166 women. Dietary data was collected at baseline (1998-2003) using an administered food frequency questionnaire. A prudent diet score (PDS), a dietary pattern indicating high consumption of fruit, vegetables, oily fish and whole grain cereals, with higher scores reflecting a greater quality of diet, was identified using principal component analysis. HRpQCT images were acquired, at follow up in 2012, from the non-dominant distal radius and tibia using a Scanco XtremeCT scanner. Relationships were investigated using linear regression analysis and were adjusted for age, smoking status, alcohol intake, social status, physical activity and height. Additional adjustments of years since menopause and HRT use were made for women.

Results: The mean (SD) PDS was -0.24 (1.23) for men and 0.62 (1.14) for women. In women, a SD change in PDS was positively associated, after adjustments, with radial total area and trabecular area $\beta=7.14$, $P<0.05$ and $\beta=7.77$, $P<0.05$, respectively. Similar positive associations were observed with PDS and total area and trabecular area at the tibia $\beta=15.96$, $P<0.05$ and $\beta=16.22$, $P<0.05$, respectively. Negative, non-significant associations were observed for cortical and trabecular density at both the radius and tibia. No significant associations were observed between PDS and HRpQCT measures in men.

Conclusions: Our data suggest that diets high in fruit, vegetables, oily fish and whole grain cereals in early old age are associated with greater bone size but not volumetric bone density or microarchitecture in later life in women.

P830

KINESIOTAPING IN RECOVERING OF THE MOVEMENT PATTERNS IN PATIENTS WITH MYOFASCIAL PAIN SYNDROME IN THE LOWER BACK

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Objective: To determine the effect of kinesiотaping (KT) in the decreasing of myofascial pain syndrome (MFPS) in the lower back.

Material and methods: The study involved 67 patients with MFBS in the lower back. Patients were randomly allocated into two groups: experimental (kinesiотaping and pharmacological treatment) - 34 patients and control (only pharmacological treatment) - 33 patients. Clinical examination included: classic neurological examination with kinesiological tests. Stato-dynamic violation of the spine were evaluated by the method based on visual and optico-visual biomechanical analysis. The pain assessed using a visual analogue scale (VAS). In order to correct muscle imbalance and biomechanical disorders the original complex of relaxing and fascial techniques were used (I-shaped and Y-shaped tapes). Patients received treatment included 3-4 applications lasting 4-5 days.

Results: Initial data of biomechanical examination: 1) the center of gravity offset sagittal axis was $10,5 \pm 0,2^\circ$; 2) the frontal axis - $10,1 \pm 0,2^\circ$; 3) violation of the parallel region boundaries (PRB) at biacromion line was $11,9 \pm 0,87^\circ$; 4) at bikristoiliacal line - $10,5 \pm 0,6^\circ$; 5) at the upper bikondill line - $8,6 \pm 0,3^\circ$. Biomechanical data at the end of the treatment course: the center of gravity on the frontal and sagittal axis significantly decreased in the second group to $4,3 \pm 0,4^\circ$ and $5,1 \pm 0,5$, compared with the first group to $5,9 \pm 0,4$ and $6,1 \pm 0,3^\circ$ respectively ($p \leq 0,5$). Deviation of PRB: biacromion line to $4,9 \pm 0,3^\circ$ in the main group and $6,1 \pm 0,5^\circ$ in the control group, bicristoiliacal line to $5,0 \pm 0,2^\circ$, in the second group (with pharmacotherapy) - $6,2 \pm 0,4^\circ$.

There was noted the repositioning of the upper bicondillar line in the second and the first group ($3,3 \pm 0,6^\circ$ and $4,1 \pm 0,7^\circ$, respectively, $p \leq 0,5$).

Conclusions: 1) KT application for the treatment of myofascial pain syndrome should be an alternative treatment choice. 2) Complex treatment including kinesiотaping and pharmacotherapy more effective than the use of a combination of pharmacotherapy and classic physiotherapy. This data points to the importance of this issue.

P831

VIRTUAL ORTHOPEDIC-REHABILITATION-METABOLIC COLLABORATIVE MANAGEMENT FOR OSTEOPOROTIC HIP FRACTURE

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Purpose: Osteoporosis treatment for hip fracture patients can reduce the risk of additional fractures; yet, most post-fracture patients do not receive it. We reported that multi-disciplinary team management increased osteoporosis treatment rates; however, only 50% of hip fracture patients came to the metabolic clinic for evaluation. To improve adherence, we conducted a prospective "closed-loop" virtual collaborative study where patients were evaluated without formal clinic visits.

Methods: An Orthopedic-Rehabilitation-Metabolic hip fracture team was established. Interventions included vitamin D loading in the orthopedic and rehabilitation departments and individualized osteoporosis treatment. Osteoporosis drug recommendations were approved by the HMO administration and relayed to the family physician. Primary endpoint was drugs issued to patients. Secondary endpoints were vitamin D measurement in the orthopedic and rehabilitation departments, vitamin D levels >65 nmol/l in rehabilitation, and osteoporosis diagnosis and metabolic clinic referral in discharge letters.

Results: Two hundred-six hip fracture patients (81 ± 12.2 years-of-age, 69.5% women) were operated April-September 2016; 154 (74%) were excluded because they were not HMO members, had pathologic or high-energy fractures, died peri-operatively or had post-loading vitamin D level <65 nmol/l. Treatment was recommended for 52 (25.2%) patients: 7 were declined for administrative reasons, 3 died before treatment was administered and 13 of 42 prescriptions (30%) were filled. Zoledronic acid, teriparatide and denosumab injections were recommended to 67%, 19% and 13% of patients, respectively. Vitamin D was measured in 78% in the orthopedics and 82% in rehabilitation departments. Orthopedic discharge letter included osteoporosis diagnosis in 73% and metabolic clinic referral in 91%.

Conclusions: Virtual Orthopedic-Rehabilitation-Metabolic collaboration led to disappointing results, as 30% of recommended prescriptions were issued. Further research is required to remove barriers to osteoporosis care for hip fracture patients, such as providing drug therapy directly to patients during rehabilitation.

P832**ASSESSMENT OF BONE QUALITY WITH TRABECULAR BONE SCORE (TBS) IN TYPE 2 DIABETES MELLITUS (T2DM)**

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Patients with T2DM present an increased risk of fracture, despite the observation that bone mineral density (BMD) from DXA is often higher in T2DM compared with nondiabetic population. The paradoxical increase in fracture risk suggests that there are diabetes-associated alterations in material and structural properties. Because BMD is central to fracture prediction, a consequence of this paradox is a lack of suitable methods, including FRAX, to reliably predict fracture risk in patients with T2DM. TBS provides an indirect measure of bone quality by evaluating pixel gray-level variations in DXA images of the lumbar spine.

Objective: To compare DXA and TBS values between patients with T2DM and control subjects with similar FRAX scores.

Design and settings: We performed a cross-sectional analysis using BMD results from subjects participating in FRISBEE study, an ongoing prospective epidemiological study in a population-based cohort (Brussels, Belgium) of 3560 postmenopausal women aged 60–85 years. We investigated 260 subjects with baseline DXA examinations (Hologic) from the FRISBEE cohort among whom 65 had known T2DM at inclusion. Subjects were separated into 2 groups based on the presence of T2DM. We studied 3 controls for each diabetes case. Subjects were matched on age and baseline FRAX score for major osteoporotic fractures (with BMD). TBS (TBS iNsite software, MedMaps, France) was derived for each spine DXA examination.

Results: Age and FRAX scores were similar between the 2 groups: 69.9±5.8 years and 9.5±6.7 in T2DM vs. 69.8±5.6 years and 9.9±6.7 in controls. We found no significant difference between mean T score values in T2DM vs. controls: -0.39±1.29 vs. -0.61±1.50 at the lumbar spine (p=0.15), -0.75±1.04 vs. -0.86±1.03 at the femoral neck (p=0.2) and -0.25±1.02 vs. -0.45±0.98 at the total hip (p=0.06). However, mean TBS was significantly lower in T2DM (1.185±0.172; 1.14 to 1.22) compared with nonT2DM group (1.267±0.132; 1.24 to 1.28; p=0.005).

Conclusion: Despite similar DXA values, we found a lower TBS score in diabetic compared with nondiabetic subjects.

These results are in line with the current view that T2DM induces microarchitectural deteriorations of bone tissue. Moreover, our data suggest that TBS may be a useful tool in the assessment of bone quality in T2DM.

P833**IMPACTS OF USING CHRONIC DRUGS WITH ANTI-INFLAMMATORY EFFECTS ON SKELETAL MUSCLE AND INFLAMMATION (DRUGS INDEX FOR MUSCULAR FATIGABILITY) IN THE SPRINT PROJECT PARTICIPANTS**

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Objective: Frailty in older population has dragged the attention due to its associated risks including falls, incident disability, hospitalisation, and mortality. Many regular or chronic drugs are taken by elderly which may show a favourable or unfavourable effects on their skeletal muscles. Here we aim to investigate the predictive effects of using chronic medication on skeletal muscle and inflammation in 160 participants aged 64–87 years.

Methods: One hundred sixty participants (female=103, male=57) were recruited. Each participant was assessed including the health status, maximal handgrip strength (GS), muscle fatigue resistance (FR, time for GS to drop to 50% of its maximum during sustained contraction) and grip work (GW, integrating GS and FR), the 6 min walk test (6MWT), the 30-Second Chair Stand Test and muscle mass. A serum sample was drawn to test C-reactive protein (CRP). Each participant was given Drug Index (DI) scores based on the use of drugs that can affect positively or negatively on skeletal muscle and/or its effects on inflammation (higher scores reflects beneficial effects on muscle), participants were categorized into a stratified six-level classification system according to their health status, going from A (completely healthy) to C (cardiovascular pathology or abnormal ECG).

Results: Participants with a worse health status showed significantly higher DI scores than the other healthy participants (p=0.005). In addition, participants with better health status showed significantly higher GW and better outcomes in the 6MWT than the least healthy group (p=0.043 and, p=0.023). There was no significant difference between these two groups for the CRP values (p=0.156). Men with lower DI score (score <0) showed significant greater values for the 30-Second Chair Stand test (p=0.037) while CRP values did not differ significantly.

Conclusions: Chronic diseases and chronic use of drugs can influence muscular outcomes in elderly. However, in our cohort, the chronic use of drugs did not reflect beneficially on

their physical nor the C-reactive protein results. In contrast to our hypothesis, we have noted that these drugs did not aid for better muscular outcomes. Nevertheless, future studies are necessary for exploring and determining their possible beneficial actions.

P834

PECULIARITIES OF BONE MINERAL DENSITY AND BODY COMPOSITION IN WOMEN WITH RHEUMATOID ARTHRITIS COMPARED TO WOMEN WITHOUT RHEUMATOID ARTHRITIS

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Objective: To establish specific features of bone mineral density (BMD), body composition and skeletal muscle changes in middle-aged and elderly women with rheumatoid arthritis (RA) compared to women without RA.

Material and Methods: The study included 86 women with RA aged 59.06±7.52 years and 81 women without RA aged 57.4±5.3 years. BMD in spine and femur and body composition was assessed using Lunar Prodigy device (General Electric). BMD was estimated according to T-score. Osteopenia was defined as T-score -1 to -2.5 σ ; osteoporosis was defined as T score \leq -2.5 σ . Obesity was detected if fat mass estimate was \geq 32%. Sarcopenia was defined as lean mass index (LMI) $<$ 5.64 kg/m². Descriptive characteristics (means, percentages, etc.) were used to summarize characteristics of the cohorts. Comparisons of characteristics between cohorts were made with Chi-square and Fisher tests.

Results: We have detected significantly lower femoral BMD ($p<0.001$), fat ($p=0.005$) and muscle ($p=0.003$) in women with RA compared to their non-RA counterparts. Both, women with RA and those without RA had high prevalence of low BMD meeting criteria for osteopenia or osteoporosis. There was no statistically significant difference in the prevalence of osteopenia in women with and without RA (52% and 61%, respectively; $p=0.614$). Osteoporosis was somewhat more common in RA compared to the non-RA group (39.5% and 25.9%, respectively; $p=0.062$). Over 90% of women in both groups were obese. However osteopenic obesity was less common in women with RA (50%) than in those without RA (67.5%, $p=0.019$). Based on LMI findings, sarcopenia in the form of osteopenic sarcopenia and sarcopenic obesity was more prevalent in women with RA (13.95%) than in those without RA (4.94%, $p=0.047$).

Conclusions: Women with RA have higher prevalence of osteoporosis and sarcopenia compared to women without RA. Assessment of the body composition by radiographic densitometry in female RA patients with osteopenia or

osteoporosis may be used to detect sarcopenia and its phenotypes in order to inform prognosis and adjust the management plan.

P835

LOW BONE MINERAL DENSITY IS THE MAIN CONTRIBUTOR TO FALLS-RELATED HEALTH BURDEN IN THE ELDERLY

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Objectives: Falls are the leading injury type in population 70 years and above and a major health burden and cause of death globally. Most of such burden is due to bone fractures. In the Global Burden of Diseases (GBD) Initiative, the worldwide attributable burden of falls due to low bone mineral density (BMD) was analysed through its relationship with fractures.

Methods: The estimates followed the Counterfactual Risk Assessment Methodology used in the GBD study (1). Systematic review was performed seeking population-based studies with femoral neck (FNBMD) measured by Dual-X-Ray-Absorptiometry in people 50 years and over. Age- and sex- specific levels of mean \pm SD FNBMD (g/cm²) were extracted from eligible studies, and this was used as the exposure variable. The age and sex-specific 99th percentile from non-Hispanic whites in the National Health and Nutrition Examination Survey (NHANES) 2009-2010 was used as theoretical minimum risk factor exposure distribution, to estimate the potential impact fraction (PIF) of FNBMD for fractures. Relative risks of FNBMD for fractures were obtained from a previous meta-analysis (2). Coded hospital data was used to calculate the fraction of falls-related deaths due to fractures. Disability levels were established by applying disability weights to each type of fracture. Then, PIFs were applied to obtain attributable deaths and disability due to low BMD.

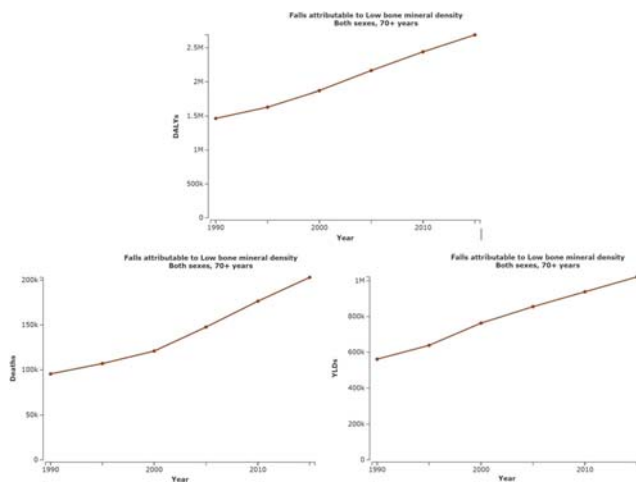
Results: The absolute global health burden for falls in the population 70 years and above almost doubled between 1990 and 2015. More than 50% of such burden was attributable to low BMD. Low BMD could explain more than three quarters of all deaths due to falls and two fifths of all falls-related disability in this age group. Mortality and disability

due to low BMD doubled during the 25-year period. Low BMD ranked 9th for contributions to worldwide disability among 79 preventable risks factors.

Conclusions: In those aged 70 and over the importance of low BMD as a preventable risk factor for falls health burden is a growing concern, given the global population trajectories, and requires urgent attention.

References: 1. Forouzanfar M et al, Lancet 2016; 2. Johnell O et al, JBMR 2015

Figure 1. DALYs, Deaths and YLDs caused by falls attributable to low BMD among 70 years and older (Available from <http://vizhub.healthdata.org/gbd-compare/>).



P836 INDICATORS OF BONE TISSUE METABOLISM IN PATIENTS WITH OSTEOARTHRITIS AND ITS COMBINATION WITH TYPE 2 DIABETES MELLITUS

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Objective: To investigate the level of osteocalcin, calcitonin, alkaline phosphatase, as well as the level of Ca, P, Mg and their correlation with carbohydrate metabolism in patients with osteoarthritis (OA) alone and in those with combination of OA with type 2 diabetes mellitus (T2DM).

Methods: A total of 70 patients were examined (22 males, mean age 54.68±0.84 years) in Regional Hospital of Kharkov, control group included 20 healthy volunteers. All patients were divided into 3 groups: group 1 (n=21) - with OA, group 2 (n=20) - with T2DM, group 3 (n=29) - with combined course of OA and T2DM. The survey plan included indices of carbohydrate exchange (insulin, glucose, HbA1C, HOMA-IR). The level of HbA1C was <7.5% in all patients. The level of alkaline phosphatase (ALP) was determined by colorimetric

method, levels of Ca, P, Mg were determined by biochemical method. The levels of osteocalcin (Oc), calcitonin (Ct) were determined by ELISA. The level of C-reactive protein (CRP) was determined by using of a latex test. The X-ray examination of knees was performed for all patients with OA.

Results: A statistically significant relations were found between the degree of diagnosis complexity and radiological changes by Kellgren (M-L $c_2=14.69$ $p=0.0032<0.05$). We found significant negative correlation between the level of Oc and glucose ($r=-0.56$, $p=0.010464$), HbA1C ($r=-0.51$, $p=0.022.004$). The group 2 demonstrated moderate positive correlation between the level of P and the following indices: HOMA ($r=0.64$, $p=0.002409$), glucose ($r=0.54$; $p=0.013150$), IRI ($r=0.46$; $p=0.040257$). In group 3, the level of Oc negatively correlated with glucose ($r=-0.57$; $p=0.001492$) and HOMA ($r=-0.57$; $p=0.001557$), another negative correlation was determined between level of Mg and HbA1C ($r=-0.376405$, $p=0.048356$). Also, the negative correlation between CRP and Oc was determined in the 1st group ($t=-0.41$, $p=0.010151<0.05$) and in the 3rd group as well ($t=-0.33$; $p=0.014710<0.05$).

Conclusion: The study demonstrates that changes of bone metabolism and their relationships to carbohydrate metabolism in patients with OA and comorbid T2DM may indicate the impact of carbohydrate metabolism disorders on bone tissue remodeling, which can lead to progression of osteoarticular changes in patients with OA.

P837 OSTEOPOROSIS AND FRACTURES IN THE REAL WORLD SETTING

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Introduction: Osteoporosis is a bone disease which predisposes to bone fragility. Nowadays, the population is screened for osteoporosis and measures are taken for fracture prevention. Additionally, in the western world of food abundance people are urged to have a diet rich in calcium, are given calcium supplements and are being treated for vitamin D deficiency. Moreover, osteoporosis treatment is administered. Therefore, the relationship between osteoporosis and fractures in the real world setting is very interesting.

Aim: To study the prevalence of fragility fractures in a cohort of patients being followed up and treated for osteoporosis in a center of excellence for the management of osteoporosis in Athens.

Methods: A cohort of 91 patients, 82 female and 9 male, who were followed up and treated as needed for osteoporosis in a

center of excellence for osteoporosis management in Athens was studied. The age of the patients was 69.71 ± 1.09 years. Bone mineral density was measured in the spine and in the hip. The number of fractures having occurred in the cohort studied was recorded.

Results: Bone mineral density in the spine as assessed by T score was -1.9 ± 0.11 (mean \pm SEM) and in the left hip -2.6 ± 0.11 . In the cohort of patients studied 19 patients (20.88%), 15 female and 4 male, suffered a fracture. The fractures which were recorded were 8 vertebral fractures, 7 distal radius fractures, 2 tarsal joint fractures, 1 fracture of the calcaneus and 2 rib fractures. Within the cohort studied 1 patient had suffered both a distal radius and a vertebral fracture and 1 patient had suffered both a rib and a vertebral fracture.

Conclusions: It appears that in the modern real world setting despite the measures taken for osteoporosis prevention and management in a cohort of patients being followed up within a center of excellence in Athens, fractures tend to occur especially in the female population. However, interestingly, within the cohort studied many patients with osteoporosis remained free of fracture at the point of time of the study.

P838

MENOPAUSAL HORMONE THERAPY IS ASSOCIATED WITH REDUCED FAT MASS AND IN PARTICULAR A SIGNIFICANT DECREASE OF INTRAVISCERAL ABDOMINAL FAT: THE OSTEOLAUS COHORT

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Objectives: We previously showed that menopausal hormone therapy (MHT) favorably affects both bone density and microarchitecture with persistent benefit after its withdrawal (1). Looking for indirect factors contributing to bone effects, we investigated the relation between MHT and changes on fat and lean (muscular) tissue. Existing results on MHT and body composition are conflicting and large cohort studies are lacking.

Material and Methods: The OsteoLaus cross-sectional population-based study includes 1'500 women aged 50 to 80 years (Lausanne, Switzerland). Current or past MHT use was assessed by questionnaire. Body composition evaluation by DXA was performed in a subgroup (n=1094). After exclusion of participants with hormone modifying treatments, the remaining women were divided in 3 groups based on MHT status: Never (NU, n=505), Current (CU, n=205) and Past (PU, n=262) Users.

Results: The 3 groups differed in age: 66.6 ± 6.2 , 62.5 ± 6.7 and 61 ± 7.8 years for PU, CU and NU respectively (CU vs. NU: $p=0.08$, PU vs. NU: $p<0.001$). BMI was 26.1 ± 4.2 , 25.9 ± 4.5 and 25.2 ± 4.1 kg/m² for PU, NU and CU respectively (CU vs. NU: $p=0.09$, PU vs. NU: $p=0.45$). Average time since MHT withdrawal in PU was 8.4 years. All the results were age-adjusted. Total fat mass was lower for CU (CU<NU<PU, $p=0.05$). Trunk fat mass was 10.35 ± 4.05 , 10.83 ± 4.35 and 11.35 ± 4.14 kg in CU, NU and PU respectively ($p=0.04$). CU had significantly less android fat mass (CU<NU<PU, $p=0.05$). There was no difference between groups regarding gynoid fat mass. A marked decrease of intravisceral fat was found in CU compared to both NU and PU ($p<0.01$). Both CU and PU showed no benefit regarding total or regional lean mass in comparison to NU.

Conclusion: MHT is associated with less adiposity, due to reduction in android fat mass. The significant decrease of intravisceral fat mass in CU is of particular interest, given the strong link of the latter with cardiovascular risk. The benefit of MHT for fat mass reduction is not preserved in PU with an average 8 years after MHT cessation. Further analysis of confounding factors (physical activity, nutrition, adipokines level) is ongoing.

Reference: (1) Papadakis G et al. J Clin Endocrinol Metab 2016;101:5004

P839

FRAGILITY FRACTURES IN PATIENTS ADMITTED TO ASSAF HAROFEH MEDICAL CENTER: CLINICAL CHARACTERISTICS AND PRE-FRACTURE RISK ASSESSMENT

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Objective: Timely diagnosis and optimal treatment of osteoporosis prevents fractures. However, the majority of people presenting with a fragility fracture are neither assessed for osteoporosis nor appropriately managed. The goal of the study was to investigate the pre admission screening process and pre fracture risk assessed by FRAX with no BMD data, with the aim of improving primary prevention.

Methods: A retrospective analysis of prospective data collection of new fragility fracture cases admitted to the orthopedic ward at Assaf Harofeh Medical Center from March to December 2016.

Results: We enrolled 103 patients, 81.6% female, mean age 78.4 yr, mean BMI 26. Comorbidities included: diabetes 35%, steroids use 7.8%, and active smokers 9.7%. History of previous fracture was recorded in 33% patients. Fracture location

was hip 74.8%, spine 13.6%, humerus 3.9%, tibia 2.9%, radius and ribs 1% each. In 78% the fracture occurred in-doors. Treatment at admission included surgery in 76.2% (89.6% for hip, 14.3% for spine).

Only 35 patients (34%) had a previous diagnosis of OP, 26 of them were treated at any point, only 17 were treated at admission. Comparison of naïve vs. known OP groups revealed that males are less likely to have OP diagnosis while fracture site did not differ between groups.

Excluding OP active treated patients (n=86), the pre-fracture risk in males and females was 7.6 and 9.5% for the hip (p=ns), with 82.4 and 80.9% of the male/female above the 3% cut off. The major osteoporotic pre-fracture risk in males and females was 12 and 19% (p<0.01), with 12 and 50% above the 20% cut off.

Conclusion: Patients presenting with fragility fracture have a pre fracture risk high enough to be used to tag them for thorough OP evaluation and possible treatment. Our small cohort supports a wider use of no-BMD FRAX score system as a tool for primary prevention.

P840

PREDICTION AND PROPHYLAXIS OF INFECTIOUS COMPLICATIONS OF ARTHROSCOPIC SURGERY FOR TREATMENT OF KNEE OSTEOARTHRITIS

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Introduction: Knee arthroscopy like any surgery manipulation has a number of possible complications. The percentage of complications ranged from 0.5% to 5.7% of all cases of knee arthroscopy. This fact motivates to search for prognostic criteria of infection at the area of surgical intervention and the development of an algorithm preventing these complications.

Objective: The purpose of this study is to develop and include a model for prediction and prophylaxis of infectious complications of arthroscopic surgery for treatment of knee osteoarthritis that can improve the results of the operation.

Materials and methods: 614 patients aged from 18 to 80 years were operated from 2010 to 2014 with an average age 41,3±7,2 years. The majority number of patients were male (498 persons - 81.1%). Besides pathology of the knee joint 87.9% patients had one or more comorbidities (the most common are hypertension, rheumatoid arthritis), which had the influence on the postoperative period. All of these operations were performed without death cases. 26 patients (4.2%) had complications associated with surgery, such as: reactive synovitis (7 patients - 1,1%), hemarthrosis (16 patients - 2,6%). Suppuration in postoperative wound were diagnosed in 6 patients - 0.9% (in all cases it was superficial).

Results: It was revealed that the next criteria such as: age, sex, character and degree of severity comorbidities, quality of pre-operative preparation, conditions and duration of the operation had an influence on postoperative complications. All these criteria had quantitative assessment. Further we created the algorithm, which helps to predict complications in early postoperative period. Using it in a prospective study (108 operations in 2015) allowed us to predict complications with probability 80%. In the postoperative period local complications were diagnosed in 3 patients (2.7%), so we managed to achieve a reduction of the frequency of postoperative complications in 1.6 times.

Conclusion: The prediction of the local complications in postoperative period and detection risk factors in the treatment of knee osteoarthritis should be based on the quantitative assessment of the prediction criteria. It allows to predict complications in early postoperative period and prevent them purposefully before, during and after operation.

P841

ANALYZING THE CORTICAL AND TRABECULAR BONE OF TENOFOVIR-TREATED HIV PATIENTS USING 3D-DXA

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Objective: The purpose of this study was to analyze the changes in cortical and trabecular bone in HIV patients after one year of treatment with tenofovir using 3D-DXA.

Material and Methods: 34 HIV patients (27 men and 7 women) were included in this study. DXA scans (QDR 4500 SL, Hologic, Waltham, MA, USA) were acquired at baseline and after a 1-year treatment with tenofovir. The 3D-DXA software (Galgo Medical, Barcelona, Spain) was used to analyze the changes in cortical and trabecular bone after 1-year of treatment (Figure 1). 3D-DXA registers a 3D appearance model of the femoral shape and density onto the DXA projection to obtain a 3D subject-specific model of the femur of the patient and quantify the volumetric BMD (vBMD), volume (for trabecular and cortical regions) and cortical thickness distribution [1]. The 3D-DXA measurements at baseline and after treatment were compared using paired samples Student's t-test.

Results: Mean age at baseline was 36.5 ± 7.5 years. A statistically significant decrease of the integral vBMD (-11.9 mg/cm³, -3.0% , $p=0.001$) and cortical vBMD (-4.0 mg/cm³, -0.4% , $p=0.004$) was observed at the neck. The cortex at the neck was also significantly thinner after 1-year of treatment (-0.05 mm, -3.2% , $p=0.006$). No significantly significant difference was observed for the trabecular vBMD at the neck.

Conclusion: The 3D-DXA analysis of the 34 HIV patients included in this study showed that treatment with tenofovir induces significantly significant changes at the cortex (thickness and density).

Reference: [1] Humbert L et al. IEEE Trans Med Imaging 2017;36:27.

P842

DO JUMPING MECHANOGRAPHY ASSESSED MUSCLE FORCE AND POWER PREDICT FALLS? RESULTS FROM THE HERTFORDSHIRE COHORT STUDY

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Background: Jumping mechanography is a method to quantify parameters of muscle strength (force and power) from normal daily movements. Previous studies have shown associations between bone outcomes and age with jump force and power, however less is known about whether these measurements predict falls. Falls are common in later life, and often lead to loss of confidence and independence. We aimed to determine whether a novel measurement to quantify lower limb muscle force and power is related to falls in the elderly.

Methods: Data were available for 166 participants who originally participated in the Hertfordshire Cohort Study. Participants performed a two-leg countermovement jump on a ground reaction force platform. From this jump force and power are quantified. In addition the efficiency of movement (how much force is expended to generate power) and the Esslinger Fitness Index (EFI), an age and gender matched Z-score, is derived. Jump force and power were normalised for body weight before analysis. Falls history (falls in the last year) was recorded at follow-up 2 years later, and logistic regression analysis was used to determine which jumping mechanography measurements predicted falling status.

Results: The mean (SD) age was 75 (2.5) years, 55% ($n=92$) were males and 23% ($n=39$) reported having fallen. As power increased and EFI decreased, the risk of falling decreased (odds ratio (OR)=0.37, $P=0.01$ and $OR=0.97$, $P \leq 0.01$ respectively). No statistically significant association was found between force or efficiency of movement with falls risk.

Conclusions: For the first time we have shown that muscle power, from jumping mechanography, is predictive of falls in an elderly cohort. Jumping mechanography is precise and easy to perform, measuring lower limb muscle strength; chair rise speed had a similar OR in this cohort but did not distinguish between faller and non-fallers. Jumping mechanography provides an alternative tool to assess frailty, sarcopenia and fall risk.

P843

VITAMIN D LEVELS IN A RHEUMATOLOGY OUTPATIENT CLINIC

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Introduction: Vitamin D is a hormone known to play a fundamental role in phosphocalcic metabolism, however in recent years has shown an association between vitamin D deficiency and different rheumatic diseases.

Purpose: To evaluate vitamin D levels in patients at a rheumatology center during a period of 2009-2015.

Methods: A retrospective study of patients who attended a rheumatology center, who had an initial study of 25(OH)D serum. Vitamin D levels were classified as: Ideal: 30-40 ng/dL, deficiency: 30-20 ng/dL, insufficiency: 20-10 ng/dL and severe insufficiency: <10 ng/dL.

Results: 279 patients with a mean age of 58 years [8-93], 86% women [58.4 years] and 14% men [59.8 years] were included. The mean value of vitamin D in general was 29.09 ng/mL, 41.2% (115) of patients with values >30ng/ml and 58.8% (164) below this range. The most frequent primary diagnoses were: osteoarthritis, rheumatoid arthritis, fibromyalgia and osteoporosis, of which the lower levels of vitamin D ≤ 30 ng/dL were identified in 53.8%, 69.7%, 76.5% and 42.9%, respectively.

Conclusion: There is a high incidence of hypovitaminosis D in Ecuadorian patients who came to a rheumatology outpatient clinic.

P844

TERIPARATIDE AND DENOSUMAB COMBINATION TREATMENT IN A BONE HEALTH CLINIC

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Objective: Recent studies have demonstrated combination teriparatide and denosumab treatment to be effective and well

tolerated in improving Bone Mineral Density (BMD) in both the lumbar spine and hip compared with monotherapy(1). We set out to evaluate the utilisation of this combination treatment for severe lumbar spine and hip osteoporosis in a specialist bone health clinic.

Material and Methods: We identified individuals via our hospital's Bone Health Clinic database who had been commenced on this combination treatment over 1 years 2015 Data was collected on their pre-treatment Bone Mineral Density (BMD), pre-treatment and where available, 6-month follow-up bone markers and treatment compliance.

Results: Seven patients were identified with an average age of 80 (range 70 to 88). All patients have completed at least 6 months combination treatment at the time of data analysis. Average baseline T-score for the lumbar spine was -4.9 (range -3.5 to -5.9) and for right hip was -3.8 (range -3.5 to -4.4). Bone Marker levels for Carboxyterminal collagen Crosslinks (CTX) and procollagen type 1 amino-terminal propeptide (P1NP) at pre-treatment for the 4 patients was 0.039 and 106.5. Three patients had follow-up bone marker levels following 6 months of treatment with an average CTX and P1NP of 0.081 and 16.9. All patients tolerated the combination treatment without any reported side effects.

Conclusion: Our data outlines the characteristics of the individuals selected for the treatment with both teriparatide and denosumab in our clinic. We expect the use of this combination treatment for a small number of select patients with both severe lumbar spine and hip osteoporosis to continue.

Reference: 1. Leder BZ et al. J Clin Densitom 2016;19:346

P845

MEASURING PATIENT SATISFACTION WITH COMPREHENSIVE HEALTH PROGRAM FOR KNEE OSTEOARTHRITIS

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Aim: To assess the level of knee pain in patient with knee osteoarthritis and the measuring patient satisfaction with complex pain management. We also aimed to ascertain the association between socio-demographic and medical status of patients with knee OA and their quality of life.

Methods: 21 patients who fulfilled the ACR criteria for knee osteoarthritis were included in the study; the patients were observed over 3 month. Each patient was fully evaluated in two moments: T1 – initial, at inclusion in the study; T2 - after an average period of 3 months; during this period the patients followed a comprehensive healthcare program. The rehabilitation program included: igieno-dietary and patient education,

electrotherapy and thermotherapy, kinetic program, massage. Also the most used medications was anti-inflammatory therapy. Parameters chosen as representative of the evaluation were: index of severity for OA of the knee by Lequesne, The Health Assessment Questionnaire (HAQ) for physical performance measures of function, pain severity (VAS) and Short Form-36 (SF-36) questionnaire (assessing the quality of life).

Results: The mean age was 64.4±8.3 years; the mean duration of knee pain was 4.08±1.27 years and the mean duration of knee OA was 6.47±0.51 years. Almost half of the patients were overweight and majority, 17 patients, had at least one co-morbidity, the commonest being hip osteoarthritis. The physical health status showed lower score as compared to mental health component. The domain concerning physical health components showed positive correlation with age. We found a significant negative correlation between age and physical functioning (p=0.001). The better scores in SF36 (especially in the physical functioning domain) were observed in male responders (p=0.01). There was significant association between SF36 and education level (correlation 0.69). Patients with higher body mass index (BMI) and existence co-morbidities scored lower in both of the SF36 domains.

Conclusions: The patients with knee OA need a complex, medical and rehabilitation treatment to improving the level of pain and finally the quality of life.

P846

HEALTH RELATED QUALITY OF LIFE IN YOUNG PATIENTS WITH KNEE OSTEOARTHRITIS

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Traumatic knee injury strongly contributes to knee osteoarthritis (OA) development in the young adult. When chronic excessive loads are applied to the knee joint, especially in a joint with altered kinematics, the mechanical demand eventually exceeds the ability of the joint to repair itself, setting the stage for OA development.(1)

Objective: The aim of the study was to evaluate the impact of the clinical and functional status on the quality of life in young patients with knee OA; to investigate the disabilities and how they affect the patient's perception of their condition; to establish the type of index that is most valuable in these matters.

Material and methods: we observed 63 patients with established secondary knee OA (ACR criteria), aged between 37 and 58 years (an average of 43,64). We used visual analog scale for rating the pain by the patient (VASp) and disease status by the physician (VASph), Modified Health Assessment Questionnaire (MHAQ), WOMAC questionnaire.

Results: VASp scale was significantly higher in the male population (p<0,05) and was strongly correlated with WOMAC

value ($r=0,711$) and a reverse correlation between VASp, VASph and MHAQ was noted ($r=0,600$). Correlations were found for all indices according to BMI but the most significant being for the physical function subscale of WOMAC ($r=0,627$). Patients residing in urban areas have higher values for all subjective indices taken into account and differ from the physician's evaluation.

Conclusion: With no known therapies that can prevent the course of disease, knee OA is one of the leading causes of chronic disability in younger adults. Our findings constitute a strong rationale for increasing efforts aimed at better treatment of knee injury.

Reference: 1. Stiebel M et al. J Sports Med 2014;5:73

P847

INCREASED RISK FOR BREAST CANCER IN POLYOSTOTIC FIBROUS DYSPLASIA AND MCCUNE-ALBRIGHT SYNDROME

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Introduction: Fibrous dysplasia (FD) is a rare bone disorder, caused by mutations of the GNAS-gene, also identified in associated tumours such as myxomas (Mazabraud syndrome) and other malignancies.

Objective: To explore a possible relationship between breast cancer (BC) and FD in two well-characterized FD cohorts from the Netherlands (LUMC) and the USA (NIH).

Method: Data on age at diagnosis, localisation of FD and breast cancer were retrieved from hospital records of 134 (LUMC) and 121 (NIH) female FD patients and the prevalence of BC was calculated for the combined cohorts. The prevalence of BC was validated in the Dutch cohort using histology reports data on 645 female FD patients from the National Dutch Pathology database (PALGA). Standardized-morbidity-ratios (SMR) were calculated by comparing BC data in FD with those of general population registries. GNAS-mutation analysis was performed on 9 available breast cancer biopsy specimens.

Results: A combined total of 15 patients (6 polyostotic FD, 9 MAS) had BC. 87% had thoracic FD lesions. In the LUMC

cohort BC prevalence was 7.5% and median age at diagnosis 46 (32-54)years. In the PALGA database BC prevalence in FD was 6.5% at 51 (27-75)years. BC risk was 3.4-fold increased (95%CI:1.6-5.9) compared to the Dutch general population and 13.2-fold (95%CI: 6.2-22.8) in thoracic FD. In the NIH cohort BC prevalence was 4.5% and median age at diagnosis 36 (27-46)years. BC risk was 3.9-fold increased (95%CI:1.2-8.2) and 5.7-fold (95%CI:1.4-13.0) in thoracic FD. A GNAS-mutation was found in four of nine BC specimens(44%).

Conclusion: We demonstrate an increased risk of developing breast cancer at a younger age in polyostotic FD and MAS particularly with thoracic FD lesions suggesting that that screening for BC should be advocated at a younger age in these patients, especially in case of thoracic localisations of FD lesions

P848

DOES PHYSICAL PERFORMANCE TESTING PREDICT FALLS? RESULTS FROM THE HERTFORDSHIRE COHORT STUDY

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Background: Falls are common in later life, and many result in fractures. In addition to loss of confidence and independence, they are also associated with significant health economic burden. Falls clinics are widespread in clinical practice, but referrals are typically only made after a significant fall history. We considered whether simple physical performance (PP) testing might predict falling in a community dwelling older population.

Methods: Data were available for 267 study subjects who participated in the UK component of the European Project on Osteoarthritis (EPOSA) and, who originally participated in the Hertfordshire Cohort Study (HCS), UK. PP testing included 6m timed up and go (sec), grip strength (kg), gait speed (m/s) and chair rise time (secs). An overall assessment of low PP was determined from assessments of walking speed, chair stands and balance (tandem stand). Falls history (falls in the last year) was recorded at follow-up 3 years later, and logistic regression analysis was used to determine which PP measures predicted falling status.

Results: The mean (SD) age was 75.6 (2.6) years, 50.6% (n=135) of subjects were women and 27% (n=72) reported having at least one fall in the previous year. As grip strength increased, the risk of falling decreased (odds ratio (OR)=0.97, P=0.03); the longer it took a participant to complete the 6m timed up and go the greater the risk of falling (OR=3.31, P=0.02). An overall assessment of low PP was associated with an increased risk of falling (OR=1.92, P=0.03). No statistically significant association was found between gait speed or chair rise time with falls risk.

Conclusions: Our data suggests that simple PP testing could predict the risk of falling in the elderly. Further studies could be completed to further assess whether these PP measures could be incorporated into screening tools to identify patients who may be at risk of falling.

P849

BENEFITS OF REHABILITATION TREATMENT AFTER HIP SURGERY TO OLDER PATIENTS

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Objective: The increase of hip surgery in older patients is seen in departments of rehabilitation. Regular exercises to restore the normal hip motion and strength and also a gradual return to everyday activities are important for full functional recovery.

Patients and methods: The benefits of rehabilitation treatment after hip surgery (osteoarthritis of the hip and hip fractures) in 43 patients aged 66-84 were evaluated. All the patients were evaluated using VAS (visual analogue scale) for pain level, ROM (range of motion), muscular strength for hip and knee and SF-36 scale.

Results: At the time when patients were admitted for rehabilitation there were marked reductions of strength in the injured limb of muscles acting at the hip and knee. The main benefit was relief of symptoms, almost 28% of patients being pain free after the rehabilitation program. Range of hip movement was improved moderately in most patients. Marked improvement of strength occurred during rehabilitation (but still significant differences between the limbs at the time of discharge from the rehabilitation unit).

Conclusion: After rehabilitation program performed, most patients were better able to perform certain activities of daily life, even if they were not completely independent requiring aids or help from others.

P850

A NURSE-LED FRACTURE LIAISON SERVICE HAS POTENTIAL TO MAXIMISE THE DIAGNOSIS AND TREATMENT OF OSTEOPOROSIS: RESULTS OF THE HOOF PROJECT

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Objective: To evaluate the effectiveness of a CNS-led fracture liaison service for improving the diagnosis and treatment of

osteoporosis among patients 50 years and older admitted to our orthopaedic service: Preliminary Results of The HOOF Project.

Materials and Methods: We introduced a specialist nurse-led, physician-supported fracture liaison programme in our hospitals in 2009 for patients admitted with a fragility fracture of the hip and spine: The HOOF (Hospital Outcomes following Osteoporotic Fracture) Project. We compared the effectiveness of this programme between a historical cohort of hip fractures from 2005 to 2008, and an educational intervention cohort from 2008 to 2009 and a fracture liaison cohort: 2010 and 2015. Data were obtained retrospectively by chart review of all patients over 50 years admitted with a fragility fracture.

Results: Data have been validated for more than 1,076 patients, median age: 83 years (R: 50-105), 74% female. Very few patients received additional treatment for osteoporosis prior to, or at the time of discharge and <10% were diagnosed with osteoporosis. The educational intervention had little effect on diagnosis or treatment rates. A CNS-led fracture liaison programme resulted in a substantial increase in the number of patients diagnosed and treated for osteoporosis on discharge, see table.

Conclusion: A nurse-led, physician-supported fracture liaison service is an effective way to improve the diagnosis and treatment of older patients admitted with a fragility fracture of the hip. Educational initiatives had little impact in our hospitals.

P851

DOES TERIPARATIDE IMPROVE FUNCTIONAL OUTCOME BY REDUCING PAIN IN POST TRAUMATIC AVASCULAR NECROSIS OF HUMERAL HEAD?

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Objective: Post traumatic avascular necrosis is one of the most common complications of the humeral head fracture. Although literature shows some beneficial effect of teriparatide treatment on other osteonecrosis locations there is no evidence yet in those cases.

Materials and methods: a 56-year-old female patient, cook by profession, with a medical history positive for low back pain, presented with a right multifragmentary proximal humeral fracture with shoulder dislocation and left proximal and shaft humeral fracture, after a fall from standing height. Two surgeries were performed: proximal humeral plate on the right and intramedullary fixation with long nail on the left shoulder. Physical therapy with emphasis on kinesiotherapy was

performed. Six months after the start of the outpatient rehabilitation, she complained of severe pain and worsening of the right shoulder function. Right humerus X-ray verified avascular necrosis of humeral head. This prompted surgical metal extraction and continuation of rehabilitation. We performed dual-energy X-ray absorptiometry (DXA) which showed osteoporosis with T-scores as follows; Total Spine -2.1, L1 -3.1, L2 -1.3, L3 -0.9, L4 -2.9, Total Hip -0.5, Neck -1.3. X-ray of thoracic and lumbar spine was performed and verified a grade 1 fracture on the third lumbar vertebrae. Due to the verified osteoporosis, teriparatide injections were introduced into therapy, as well as 1200 mg of calcium and 1000 IU vitamin D daily.

Results: After 24 months of teriparatide treatment and approximately 3 years after initial trauma she reported mild pain in right shoulder and low back just during heavy activity. A new DXA showed improvement in T scores: Total Spine -1.4, L1 -2.2, L2 0.5, L3 -1.2, L4 -2.1, Total hip -0.6, Neck -1.5. She achieved right shoulder active abduction of 100°, forward flexion 110°, extension 60°, both rotations 60°. Patient is satisfied with functional outcome and has been working for 18 months, feeling well with no limitation in her regular daily activities and her work.

Conclusion: Authors believe that although repeated x rays scans showed radiologically worsening of humeral head osteonecrosis, functional outcome and reducing pain could be improved due to teriparatide treatment.

P852

PREVALENCE OF SARCOPENIA IN VERY OLD HIP FRACTURE PATIENTS

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Introduction: This is a substudy of an ongoing study that aims to identify biological markers (inflammatory and neuromuscular markers) for the early diagnosis of sarcopenia in patients older than 80 years hospitalized for the surgical treatment of a hip fracture. The aim was to assess the prevalence of sarcopenia (defined as low muscle mass and strength).

Methods: Patients admitted to an orthogeriatric unit who gave the informed consent for the biomarker's study. Muscle mass was assessed preoperatively using bioimpedance analysis, Janssen's (J) and Masanés (M) Spanish reference cutoff-points were used to define low muscle mass. Strength was assessed with handgrip strength (Jamar's dynamometer). Assessment included socio-demographic data, cognitive status (Pfeiffer, GDS-Reisberg), functional status (Barthel,

Lawton, FAC), nutrition (MNA, BMI), number of falls, medications.

Results: N=87. Mean age: 88.0±4.7. Women: 82.8%. Sarcopenia prevalence varied from 8.8% (FJ) to 33.7% (FM). 74.5% had independent ambulation before the fracture, 69% reported two or more previous falls. 30% had dementia, 18.8% moderate to severe dementia. 75.3% had mild to moderate dependence before admission, only 12.9% were independent for BADL. MNA: 10.4±2.7. BMI=25.6±14-7. 83.7% were on 4 or more drugs before admission.

In multivariate analysis, only the type of fracture was associated to the presence of sarcopenia (subcapital fractures more frequent, p=0.018).

Conclusions: The prevalence of sarcopenia in our patients with hip fracture varies according to the muscle mass reference cutoff-points used, been more frequent with national references. Most hip fracture patients do not have pre-fracture sarcopenia. Subcapital hip fractures were more frequent in sarcopenic patients.

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P853

FOREARM GRIP STRENGTH IS MAINTAINED BY 1000 IU OF SUPPLEMENTAL VITAMIN D OVER 6 MONTHS AND MODERATELY CORRELATED TO MUSCLE AREA IN MEN >80 Y OF AGE IN LONG-TERM CARE

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Objective: To test for the effect of maintaining healthy vitamin D status on skeletal muscle function in advanced aging.

Material and Methods: Men (n=60, > 80 y) in a long-term care facility received a supplement of 2000 IU/d of vitamin D for 8 weeks followed by a trial using 0 IU/d (placebo), 500 IU/d or 1000 IU/d of vitamin D administered in foods (e.g., pudding) for 6 months (NCT01437696). Exclusion criteria: minimal state examination (MMSE) score <18, end-stage renal disease, and hyperparathyroidism. At baseline and 6 mo, serum 25-hydroxyvitamin D (25(OH)D) was measured using a chemiluminescent assay (Liaison, Diasorin Inc. USA). Age, body mass index (BMI), medications and MMSE values were obtained from chart review. Rheumatoid arthritis was assessed using a disease activity score based on 28 joints and erythrocyte sedimentation rate (DAS28); hydroxychloroquine was prescribed to n=1 and acetaminophen to n=34. Grip strength of the non-dominant forearm was assessed using a dynamometer (Jamar, Patterson Medical, USA). Forearm soft tissue composition was assessed at the 66% site using peripheral quantitative computed tomography (XCT2000, Stratec,

Germany). Differences among groups over time were tested using mixed model ANOVA with least square means post-hoc testing. Relationships were tested using Pearson correlation analyses.

Results: At baseline, average (\pm SE) age 89.9 ± 0.4 y, BMI 26.3 ± 0.6 kg/m², DAS28 3.3 ± 0.1 , serum 25(OH)D 68.2 ± 1.6 nmol/L, and grip strength (18.3 ± 0.7 kg) were not different among groups. Serum 25(OH)D declined in the placebo group and increased in the 500 and 1000 IU groups (difference \pm SE placebo: -13.9 ± 2.6 ; 500 IU: 9.7 ± 4.5 ; 1000 IU: 9.7 ± 2.7 nmol/L, $p<0.05$). Grip strength was maintained only in the 1000 IU group (placebo: -1.3 ± 0.5 ; 500 IU: -1.8 ± 0.5 ; 1000 IU: 0.3 ± 0.6 kg, $p<0.05$). Forearm muscle area (3138.6 ± 70.4 mm²), density (68.3 ± 0.7 mg/cm³), fat area (1108.9 ± 66.3 mm²) and the ratio of fat:muscle area (36.0 ± 2.3) did not differ among groups. Only muscle area declined over time (-111.3 ± 29.1 mm² $p=0.0002$), and was associated with grip strength (endpoint $r=0.31$, $p=0.026$).

Conclusion: A dosage of 1000 IU/d of vitamin D in advanced aging appears beneficial to muscle function based on grip strength. Whether this aids in prevention of falls needs further study.

P854

SECULAR TRENDS OF INPATIENT MORTALITY AMONG OLDER PERSONS HOSPITALISED WITH A HIP FRACTURE IN THE WEST OF IRELAND

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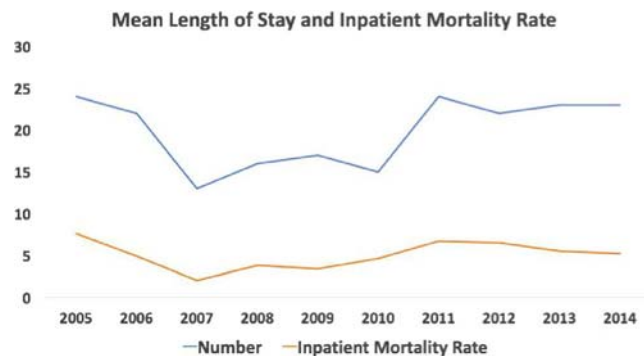
Objective: To examine the trend in demographics, hospital length of stay, treatment rates and mortality among hip fracture patients admitted to our hospitals over the past decade.

Materials and Methods: We performed a retrospective cohort study of hip fracture patients admitted to Galway University Hospitals over the past decade. We identified patients from the hospital fracture liaison programme, and the Hospital Inpatient Enquiry System (H.I.P.E.). Patients demographics were reviewed for details of age, gender, prior fracture status, treatment on admission and discharge, inpatient, 30 day and 1 year mortality. We have only included patients 50 years and older in our current study.

Results: 3583 patients were admitted with a confirmed or suspected hip fracture between 2005 and 2014. 2483 had a confirmed fragility fracture, were ≥ 50 years, and had validated data available for analysis. (some files for subjects between 2007-2009). The mean number of validated fracture admissions annually for 7 complete years was 304 (R: 199-404),

median age 83 years (R: 50-105), 71% female. 20-39% had a prior fracture, 22% were smokers, 10% were taking corticosteroids and less than 20% were on osteoporosis treatment historically. Inpatient length of stay and mortality decreased until health cuts were imposed in Ireland in 2010.

Conclusions: Demographics of people who experience an osteoporotic hip fracture in the West of Ireland are similar to other European cohorts. There is an association between healthcare funding, length of stay and mortality which requires further study.



P855

AN INTERPRETATION TEMPLATE REDUCES DXA REPORTING ERRORS

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Objective: DXA is widely used in osteoporosis care. High-quality DXA requires excellent acquisition, analysis and interpretation. However, errors in clinical practice are common. We evaluated the effect of a DXA reporting template based on an ISCD model on DXA error rates at two medical centers.

Methods: We crafted a DXA reporting template that contained standard text for indication, comparison, findings (BMD and T- or Z-score), impression, FRAX calculation and least significant change. The template was implemented at 2 clinical sites. Anonymized DXA images and reports from prior to and following template implementation were independently reviewed by 3 ISCD-certified physicians who assessed compliance with reporting guidance and recorded errors. Subsequently, all physicians met to reach error consensus. Major errors were defined as provision of inaccurate information that could potentially lead to incorrect patient care decisions. Post-template implementation, equal numbers of scans from the 5 interpreters at site A and 2 interpreters at site B were evaluated.

Results: Here we report major errors from 398 clinical patients; 298 before and 100 after template implementation. Overall, major errors were present in 37% before and 19% after template implementation (Table). The template reduced the odds of major error by 60% (odds ratio 0.40 for major error, 95% CI 0.22, 0.71, $p=0.0008$).

| | Major Errors Before Template | Major Errors After Template |
|-----------------|------------------------------|-----------------------------|
| Clinical Site A | 19% (37/197) | 12% (6/50) |
| Clinical Site B | 72% (73/101) | 26% (13/50) |
| Both Sites | 37% (110/298) | 19% (19/100) |

Data as: % (# of patients with major errors/total # of patients)

Before the template, the most common major errors were incorrect information on BMD change over time and an incorrect diagnosis. Following template implementation, these errors remained most common at site B, while incorrect diagnosis became the most common major error at site A.

Conclusion: DXA interpretation errors are extremely common and likely adversely affect patient care. Implementation of an interpretation template reduced major DXA interpretation errors, but did not entirely eliminate them. Additional interventions, potentially including requiring evidence of initial plus ongoing DXA training and/or certification are necessary to provide high-quality DXA reports.

P856

VASCULAR REMODELING MARKERS AND BONE STATUS IN PATIENTS WITH END-STAGE COPD

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Background: Systemic inflammation and vascular dysfunction could play a role in the development of bone loss in COPD. Little is known about a contribution of the vascular remodeling in bone damage.

Role of serum and tissue vascular remodeling markers in bone loss related to end-stage COPD

Objective: To determine associations between the vascular remodeling markers and bone composition in end-stage COPD patients with osteopenic syndrome.

Methods: The expression of vascular endothelial growth factor (VEGF), endothelin-1, and transforming growth factor beta-2 (TGF β 2) in the blood vessels of striated muscle specimens of 20 subjects were assessed by immunohistochemistry method with using immunoperoxidase reaction with monoclonal and polyclonal specific antibodies. Bone mineral density (BMD) at the lumbar spine (LS) and left femur neck (FN), bone mineral content (BMC), skeletal muscle mass, expressed as lean mass (LM), serum endothelin-1, VEGF, and E-selectin levels were assessed in 48 male patients with end-stage COPD and in 36 male healthy volunteers.

Results: The intensity of endothelin-1, TGF β 2 and VEGF expression in the blood vessels was higher in COPD patients with osteoporosis than in healthy. Serum endothelin-1 and E-selectin levels were higher in COPD group than in control whereas VEGF levels were lower. Serum E-selectin and endothelin-1 inversely correlated with LS and FN ($p<0.001$), BMC ($p<0.05$); there was negative relation between endothelin-1 and LM ($p=0.003$). Serum VEGF directly associated with LM ($p<0.05$). The multivariate regression analysis revealed that BMC and serum E-selectin levels were independently associated with bone loss at the FN (adjusted $R^2=0.679$) whereas LM and serum E-selectin (adjusted $R^2=0.524$) were independent predictors of osteoporosis at the LS. Increased serum endothelin-1 and lowered serum VEGF levels independently related to reduced skeletal LM (adjusted $R^2=0.396$).

Conclusion: Change tissue and serum markers of the vascular remodeling, correlations with body composition in end-stage COPD confirms their contribution to bone damage.

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P857

OBSERVATION OF RESPONSE TO DENOSUMAB IN PATIENTS ATTENDING A SPECIALIST BONE CLINIC

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Background: Denosumab has been available for the treatment of severe osteoporosis since October 2010. It is an anti-resorptive agent which reduces fracture risk and increases bone mineral density (BMD). It is indicated in postmenopausal women with osteoporosis at high risk of fracture. It has been shown to reduce the incidence of vertebral, non-vertebral and hip fractures.

Method: Using an electronic database we reviewed records of those prescribed denosumab at our bone health clinic. 227 patients were commenced on denosumab between October 2010 and January 2013. Of these, 171 patients had a repeat DXA between the date they commenced and Jan 2017. 68 further patients had a second repeat DXA. We recorded the change in T-score in the AP spine and the total hip.

Results: Looking at the 171 follow up DXAs available; mean age was 72 \pm 10.3 years and mean time to follow-up DXA was

24.5 months. 165 subjects had spinal results and 168 had hip results. Mean T-scores at baseline in spine and total hip were -2.86 and -2.3 respectively. First repeat DXA showed an average improvement of 0.42 SD at the spine and 0.27SD at the hip. Overall T-scores improved by 15% and 12% respectively. Subanalysing those with further DXAs over an average 44.5 mths T-scores at the spine improved from mean of -2.82 to -2.46 at second DXA and -2.14 at third DXA i.e. an apparent improvement of 25%. T-scores at the spine improved from -2.14 at first DXA to -1.93 at second DXA with plateauing on third DXA to a mean of -1.92.

Conclusion: In a group of 68 patients on denosumab attending a specialist bone clinic, the serial DXAs show there is sustained improvement in spinal T scores over 44.5 months. They show initial improvement at the hip which plateaus. Reasons for different response will require further analysis of factors such as previous treatment as well as bone turnover markers, vitamin D and fracture history.

P858

QUALITY OF LIFE IN ADULTS WITH X-LINKED HYPOPHOSPHATAEMIA (XLH): PRESERVATION OF EMOTIONAL WELL-BEING DESPITE SIGNIFICANT LIMITATIONS IN PHYSICAL DOMAINS

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Objective: To describe the quality of life of adult patients with X-linked hypophosphataemia (XLH) using the SF-36 measure and to compare it to patients with osteoarthritis (OA) and United Kingdom population norms.

Methods: We analysed data from 32 individuals aged 16 or above, registered in the Rare UK Diseases Study (RUDY) platform, diagnosed with XLH completing the SF-36 questionnaire (vs. 1). Responses to all 36 questions were used to produce scores for the eight physical and emotional dimensions. Dimensions are scored between 0 and 100 with higher values representing better health. Scores were compared to those reported by a sample of patients with symptomatic, radiographic OA from England[1] and to the UK population norm[2].

Results: One subject was excluded because 17 responses were missing. The 31 subjects included were aged 16 to 79 (median of 48 years) and 65% were women. Higher mean scores were reported for emotional well-being (73.7), role limitations due to emotional problems (71.0) and social functioning (65.3), and

lower scores for bodily pain (49.6), physical functioning (45.6), general health perceptions (45.8), energy/vitality (41.3), and role limitations due to physical health (45.6). Compared to this group, a sample of OA patients previously reported higher scores in all dimensions except role limitations due to emotional problems (57.7) and bodily pain (42.3), and essentially the same in emotional well-being (73.9). General UK population norms were higher in all dimensions, especially in physical functioning (81.0), role limitations due to physical health (80.0) and bodily pain (77.0), and hardly any difference in emotional well-being (75.0).

Conclusion: Quality of life in adults is affected most negatively by the physical dimensions of health, more than for symptomatic OA patients. However, their emotional wellbeing is preserved and not much different from that of the general population, indicating a robustness to physical complaints.

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P859

DETERMINANTS OF IMPAIRED QUALITY OF LIFE IN PATIENTS WITH FIBROUS DYSPLASIA

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Introduction: Fibrous dysplasia (FD) is a rare bone disorder, commonly associated with pain, deformity and fractures, which may significantly impact on quality of life (QoL). In this study we evaluate QoL in FD using the Short Form-36 and the Brief Pain Inventory (BPI) questionnaires. Data were compared with those of the general Dutch population.

Patients and Methods: 138 patients from the 255-strong Leiden cohort of FD patients, who were aged ≥ 16 years, and were seen at the Out-patient Clinic at least once in the previous 3 years, were invited to take part in the study. Data on age, gender, type of FD, skeletal burden score (SBS) and biochemical parameters of bone turnover, were retrieved from patients' records.

Results: Response rate was 70.3%, with 97 patients, predominantly female (65%) completing the questionnaires.

Monostotic FD was predominant (n=62, 64%). FD patients had significantly lower QoL outcome scores than the general Dutch population for all tested domains of the SF-36 except for the “Mental health” and the “Role emotional” domains. More severe forms of FD, had the more severe SF-36 QoL outcomes, but there was no significant difference in BPI domains between different subtypes of FD. QoL impairment was greater with higher disease burdens, as reflected by high SBS (p=0.003) and high levels of P1NP (p=0.002).

Conclusion: We demonstrate an impairment in all domains of quality of life, except for ‘Mental health’ and ‘Role emotional’ domains, in patients with a wide spectrum of FD including its milder forms. We find that high skeletal burden scores, reflecting disease severity, represent the most consistent predictor of impaired quality of life. Our findings hold significant clinical implications as they draw attention to the clinically unmet need to address quality of life issues in the management of all subtypes of FD, including its milder forms.

P860

A NOVEL STRATEGY TO TARGET CHLOROQUINE TO BONE TO INCREASE ITS ANTI-RESORPTIVE ACTIVITY AND REDUCE SIDE-EFFECTS

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Nitrogen-containing bisphosphonates and Denosumab are powerful anti-resorptive drugs, which reduce postmenopausal- and age-related bone loss and fractures. However, fears about atypical fractures and bone necrosis associated with these drugs are limiting patient and physician enthusiasm for their use. Thus, other treatments to reduce bone loss and rebuild bone without adverse skeletal effects are highly desirable. We discovered that Chloroquine (CQ), a widely used anti-malarial drug, which is still used to as an anti-inflammatory drug to treat rheumatoid arthritis in some parts of the world, inhibits osteoclast formation and prevents ovariectomy-induced osteoporosis in mice. However, side-effects, including retinal toxicity and blindness, are a concern with long-term treatment of patients with CQ. To address this concern, we have developed a strategy to administer CQ in a form that targets it to bone to determine if this allows it to be given at reduced doses with a lower risk of side-effects, while delivering effective concentrations preferentially to bone. We synthesized a novel bone-targeted CQ (BTCQ) by linking CQ to a bisphosphonate with high affinity for bone, but no anti-OC activity. We found that BTCQ inhibits OC and resorption pit formation at 3–4-fold lower concentrations than CQ. A form of BTCQ designed such that the linker was non-cleavable had no significant effect on resorption pit formation. Importantly, BTCQ inhibited PTH-induced increased OC formation in mice at 25-

fold lower concentrations than CQ. Thus, BTCQ can efficiently bind to bone matrix and release sufficient CQ to inhibit OC formation and bone resorption both in vitro and in vivo at much lower concentrations than CQ. We conclude that BTCQ is a novel and potentially safe bone-selective anti-resorptive agent for the prevention of bone loss in diseases characterized by increased OC formation. This strategy could be used to target other drugs, such as antibiotics and chemotherapeutic agents, to bone and away from other tissues to increase their efficacy and reduce side-effects.

P861

THE CHANGING FACE OF PRIMARY HYPERPARATHYROIDISM

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Introduction. Primary hyperparathyroidism is a disease which nowadays is being diagnosed with increasing frequency. The diagnosis of primary hyperparathyroidism is based on routine calcium measurement, which if detected abnormally elevated leads to the screening of the patient for primary hyperparathyroidism. Therefore, primary hyperparathyroidism is frequently detected early in the course of the disease. Consequently, severe musculoskeletal manifestations may be lacking in the modern world setting in patients with primary hyperparathyroidism.

Aim: The aim was to describe musculoskeletal manifestations in patients with primary hyperparathyroidism being followed up in a center of excellence in Athens.

Methods: A cohort of 38 patients, 33 female and 5 male, with primary hyperparathyroidism aged 62.31±1.87 years, being followed up within a center of excellence in Athens was studied. Musculoskeletal manifestations were recorded in the cohort of the patients studied.

Results: Within the cohort of 38 patients with primary hyperparathyroidism being followed up within a center of excellence in Athens, 12 patients (31.58%) had osteoporosis, 2 (5.26%) had osteopenia, 7 (18.42%) had diffuse bone pain, 2 (5.26%) had diffuse myalgia and 1 (2.63%) had suffered a wrist fracture. Within the cohort studied 18 (47.37%) patients did not have any musculoskeletal manifestations.

Conclusions: It appears that primary hyperparathyroidism does not have severe musculoskeletal manifestations, such as osteitis fibrosa cystica, in the real world setting in patients followed up for the disease within a center of excellence in Athens. However, patients with primary hyperparathyroidism appear to have diffuse bone pain as well as osteoporosis, which may be complicated by a fracture in some of the cases. Early detection and diagnosis of the disease seems to have altered the face of primary hyperparathyroidism in the real modern world setting.

P862**RELATION BETWEEN THE GRADE OF LUMBAR SPONDYLOLISTHESIS AND OSTEOPOROSIS**E. Scapin¹, A. Mereu¹, L. Saba¹¹P.O. Duilio Casula - A.O.U. di Cagliari - Università degli Studi di Cagliari - U.O.C. di Radiologia, Monserrato (CA), Italy**Objectives:** To analyze whether the grade of lumbar spondylolisthesis might be related to the osteoporotic status.**Methods and Materials:** 123 lumbosacral spine XRs (29 males (23.6%), 94 females (76.4%), age range 28-100 years) were retrospectively analyzed.

Inclusion criteria were an XR diagnosis of lumbar spondylolisthesis (SPL) in absence of trauma or any kind of cancer. Incidentally, in all cases the SPL was grade 1 or 2. Osteoporosis was mainly diagnosed evaluating the XRs. Included patients were separated according to their gender and were subsequently categorized into four groups each: osteoporotic and non-osteoporotic patients and subjects with grade 1 or 2 SPL. We compared grade 1 or 2 SPL between osteoporotic and non-osteoporotic subjects using a two-tailed Fisher's exact test. This evaluation was made separately for males and females.

Results: In males, 12 patients had osteoporosis (41.4%), 17 did not (58.6%). Of those patients who had osteoporosis, 9 cases had grade 1 SPL (75%) and 3 cases had grade 2 SPL (25%). Among male patients who had not osteoporosis, 14 cases had grade 1 SPL (82.4%) and 3 cases had grade 2 SPL (17.6%). In females, 62 patients had osteoporosis (66%), 32 did not (34%). Of those patients who had osteoporosis, 55 cases had grade 1 SPL (88.7%) and 7 cases had grade 2 SPL (11.3%). Among female patients who had not osteoporosis, 27 cases had grade 1 SPL (84.4%) and 5 cases had grade 2 SPL (15.6%). A statistically non-significant dependence between the grade of SPL and the osteoporosis or lack thereof was produced, either in males ($p=0.6693$) or females ($p=0.5347$) patients. A statistically non-significant dependence was produced between the grade of SPL and gender in osteoporotic patients ($p=0.3505$).**Conclusions:** In our results, grade 1 or 2 SPL are not observed significantly more frequently in osteoporotic patients. Grade 1 or 2 SPL was not observed more frequently either in osteoporotic males or osteoporotic females.**P863****INSUFFICIENT CALCIUM INTAKE IN PEDIATRIC POPULATION WITH RISK FACTORS FOR OSTEOPOROSIS**B. Magallares¹, J. Betancourt², G. Fraga², A. Marin³, S. Herrera³, J. Malouf⁴¹Rheumatology. Hospital de la Santa Creu i Sant Pau, Barcelona, Spain, ²Pediatrics. Santa Creu i Sant Pau Hospital, Barcelona, Spain, ³Internal Medicine. Santa Creu i Sant Pau Hospital, Barcelona, Spain, ⁴Hospital de la Santa Creu i Sant Pau, Barcelona, Spain**Objectives:** To study the characteristics of the pediatric population with at least one risk factor for developing low bone mass / osteoporosis and to measure their calcium intake.**Material and Methods:** Demographic and clinical data were prospectively collected from patients aged 2 to 20 years that met at least 1 risk factors for bone fragility, including: inflammatory diseases, treatment with Immunosuppressants and/or corticosteroids, gut diseases, chronic systemic disorders, etc. The average daily calcium intake was collected through the Spanish INDICAD 2001 survey study, together with a comprehensive anamnesis.**Results:** Data were collected from 50 patients, with a mean age of 9.2 years (2-20), 28 (56%) female, 86% Caucasian, 6% Arab, 2% Asian and 6% Latin. The most frequent diagnoses were: Food intolerances / malabsorption: 32%, nephropathies: 22%, JIA: 16%, vasculitis: 10%, other inflammatory diseases: 8%. 42% had received systemic corticosteroids at some point, and 16% were receiving corticosteroids at present. Average daily calcium intake was 718 mg/d. They were divided by age groups, attending to daily calcium needs per group. In Table 1 we can observe the Recommended Daily Amount (RDA) of calcium by the Spanish Association of Pediatrics and the consumption collected, by age group. Only 3 children with low calcium intake were taking supplements. A decrease in calcium CDR adherence was observed with increasing age, statistically significant ($p=0.009$). There was also a lower calcium intake in the non-Caucasians compared to Caucasians statistically significant ($p=0.044$), which was not associated with age.**Conclusions:** Calcium intake in the population under 21 years old with at least 1 risk factor for developing low bone mass / osteoporosis is lower than recommended. Larger studies are needed to ratify these results.

| Age group | % age group | RDA (mg/d) | Average intake (mg/d)± SD | Range: min- max (mg/d) | % that reaches RDA |
|----------------------|-------------|------------|---------------------------|------------------------|--------------------|
| Pre-escholar (2-3 a) | 14% | 700 | 819 ± 280 | 513-1346 | 57.1% |
| Escholar (4-9 a) | 32% | 1000 | 702 ± 240 | 254 - 1075 | 18.8% |
| Teenagers (10-17a) | 48% | 1300 | 689 ± 350 | 350 - 1925 | 8.3% |
| Young (18-20 a) | 6% | 1100 | 797 ± 182 | 621 - 985 | 0% |

P864**DO THE PROTEINS IN A FINGERNAIL OFFER INSIGHT INTO THE BONE HEALTH OF THEIR DONOR?**M. R. Towler¹, J. R. Beattie²¹Ryerson University, Toronto, Canada, ²Exploristics Ltd, Belfast, United Kingdom**Objective:** Do the proteins that constitute human fingernail offer a window into their donor's bone health?

Materials and Methods: A cross-sectional, multi-centre study, 'Fracture Risk Assessment by Nail correlation study' (FRAN) was designed to test the link between nail keratin and bone health of the nail donors. Raman spectroscopy was applied to nail clippings from 633 postmenopausal British and Irish women, from six clinical sites, of whom 42% had experienced a fragility fracture. The Raman spectra were recorded by a Sierra Reader (Snowy Range, WY, USA) using 785 nm excitation.

Results: The differences identified in the Raman spectra of nails sourced from non-fracture and fracture groups can be attributed to changes in the order of the keratotic proteins. Nails sourced from donors who have not experienced a fracture contain highly organised alpha helical structures with ample intra-chain disulphide bonding whereas those sourced from donors who have experienced a fracture exhibit less ordered, 'random' secondary structures with a breakdown in intra-chain disulphide bonding.

Conclusions: Raman spectra of human fingernails may present a surrogate marker of bone protein structure status.

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Disclosures: Both RB and MT are shareholders in Crescent Ops Ltd, who own intellectual property rights on the relationship between nail structure and fracture risk.

P865

ELECTROMAGNETIC FIELD AND TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION IN THE TREATMENT OF LUMBAR PAIN IN PATIENTS WITH OSTEOPOROSIS

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Introduction: Pulsed electromagnetic field (PEMF) and transcutaneous electrical nerve stimulation (TENS) are used as physical procedures in the treatment of lumbar pain in patients with osteoporosis.

Objective: To analyze the effects of PEMF and TENS in the treatment of lumbar pain in patients with primary postmenopausal osteoporosis as single physical modalities, as well as to analyze the overall effect of both therapies.

Materials and methods: a prospective, comparative study included 60 female patients with primary postmenopausal

osteoporosis and lumbar pain, who have underwent 10 outpatient physical treatments at the Clinic of Physical Medicine and Rehabilitation, in the period from January to July 2016. The first group of patients (n=30) was treated with PEMF, and the second group (n=30) was treated with TENS at the region of lumbosacral spine. Pain and its impact on activities of daily living were evaluated with visual analogue scale (VAS) for pain, and with Oswestry questionnaire (OSWI), at the beginning and at the end of the treatment cycle.

Results: Analysis of the total sample showed the difference in OSWI score of 9,97±2,03 (range 6-15). In the group of patients treated by PEMF the difference was significantly better 11,1±1,83 (range 7-15), than in the group treated by TENS 8,83±1,56 (range 6-13) (t=5,176; p=0,0001). Significant reduction of pain according to VAS was found in the total sample 3,05±0,87 (range 1-5), with significantly higher average reduction of pain in the group treated with PEMF 3,53±0,82 (range 2-5) compared to group treated with TENS 2,6±0,63 (range 1-4) (t=5,135; p=0,0001). No positive correlation was found in relation to age (VAS - r=-0,055; p=0,677; OSWI - r=-0,106; p=0,418) and DXA densitometry finding (VAS - r=0,026; p=0,843; OSWI - r=-0,091; p=0,490).

Conclusion: Both pulsed electromagnetic field and transcutaneous electrical nerve stimulation showed significant analgesic effect and functionality improvement in patients with primary postmenopausal osteoporosis and lumbar pain. In both effects pulsed electromagnetic field proved to be a superior method among these patients.

P866

DIFFERENCES OF TOTAL AREA, PERIOSTEAL AND ENDOSTEAL CIRCUMFERENCE OF THE TIBIA BETWEEN WOMEN OF DIFFERENT AGE GROUPS AS MEASURED BY PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY (PQCT): WHICH RADIOLOGICAL SITE TO USE?

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Introduction: pQCT is a safe and useful tool for the study of long bones in vivo; however, there is currently no consensus as to which radiological sites are preferable for the study of geometrical properties such as total area (TOT_A, mm²),

periosteal circumference (PERI_C, mm) and endosteal circumference (ENDO_C, mm).

Material and Methods: We assessed 319 Caucasian ambulatory women 20-79y using pQCT of the tibia. Exclusion criteria: 1) Bone metabolic disorders 2) previous use of medication for osteoporosis 3) systematic diseases or use of medication known to affect bone 4) fragility fractures of the axial and appendicular skeleton including the tibia. Women were studied in 6 different age groups per decade of age: 20-29y N=23, 30-39y N=20, 40-49y N=52, 50-59y N=69, 60-69y, N=82, 70-79y, N=73. For each subject 3 radiological sites were obtained (XCT-2000 scanner, Stratec Medizintechnik) at the 4%, 14% and 38% of tibia length measured from the tibiotalar joint to the median tibial condyle, as suggested by the manufacturer. We assessed differences of TOT_A (all sites), cortical area (CRT_A), cortical thickness (CRT_THK), PERI_C and ENDO_C (14%, 38%) between women of the different age groups and performed statistical analysis of the results.

Results: Differences of TOT_A among study groups were found to be statistically significant only at the 14% site ($p=0.003$) and not at the 38% site ($p=0.678$). PERI_C and ENDO_C presented greater values at the 14% site vs. the 38% site in all study groups, and differences of PERI_C were statistically significant among groups only at the 14% site ($p=0.002$), while differences of ENDO_C were significant both at the 14% and 38% sites ($p=0.000$ at both sites).

Conclusions: Based on our results, the 14% site may be preferable when comparing geometric parameters of bone between subjects of different age-groups.

P867

OSTEOPOROSIS AND VITAMIN D VALUES IN BREAST CANCER PATIENTS

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Introduction: Tissue structure of cancer diagnosed patients has been impaired not only due to the principal diagnosis but also due to the applied therapy protocols affecting metabolism of individual tissues. The structure of bone tissue of breast cancer diagnosed patients may also be considerably changed and impaired due to the quoted reasons.

Objective: Show osteoporosis frequency, D vitamin and calcium values in serum in breast cancer diagnosed patients.

Materials and methods: The research covered 63 breast cancer diagnosed patients referred to CBR- Saraj Polje in the period from 1st of November 2015 to 1st of November 2016 for oncological rehabilitation. All the patients' bone mineral density (lumbar spine and proximal femur DXA), total

concentration of D vitamin and calcium in serum as well as body mass index were measured.

Results: Targeted group consisted of 63 white women, average age of 58.07 years, the variables ranging from 32 to 78 years. Average body mass index value amounted to 25.4 kg/m² with the variables ranging from 17.4 to 39.5 kg/m². Referential values of mineral bone density were registered in 14.3% (9) patients, average L spine T score value amounted to -0.2 SD; whereas average proximal femur T score amounted to +0.1 SD. Osteopenia was registered in 49.2% (31) patients, average value of L spine T score was -1.7 SD; whereas average proximal femur T score amounted to -1.3 SD. Osteoporosis was registered in 36.5% (23) patients, average T score L spine values amounted to -3.3 SD; whereas average proximal femur T score value amounted to -1.9 SD. Bone tissue mineral density changed in 85.7% (54) patients. Average D vitamin value in the targeted group amounted to 15.6 µg/ml with its variables ranging from 3.2 µg/ml to 45.5 µg/ml. D vitamin within the referential values was found in 6.3% (4) patients, the average value of 34.5 µg/ml. Insufficient values of D-vitamin were found in 93.7% (59) patients with average values of 14.4 µg/ml. No patients were registered with D vitamin values beyond referential values. Average calcium values in serum of the targeted group amounted to 2.38 mmol/L with the variables ranging from 2.07 to 2.72 mmol/L. Referential calcium values in serum were found in 98.4% (62) patients with average value of 2.38 mmol/L. Insufficient values of calcium in serum were found in 1.6% (1) patients, with the value of 2.07 mmol/L. Hypercalcemia was not registered in the targeted group.

Conclusion: In the above research it was shown that breast cancer diagnosed patients exhibit considerably impaired bone tissue structure resulting in either osteopenia or osteoporosis with highly insufficient D vitamin values requiring intervening therapy adjusted to the specific individual needs of patients with a strict follow up of each and every one of them.

P868

ASSOCIATION OF SERUM ANGIOPOIETIN-2 WITH CLINICAL AND RADIOGRAPHIC SEVERITY IN OSTEOARTHRITIS PATIENTS

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Objective: To assess serum Angiotensin-converting enzyme 2 (Ang-2) levels in knee osteoarthritis (OA) patients and to evaluate its relationship with OA clinical and radiographic severity and inflammatory markers.

Material and Methods: We recruited 72 knee OA patients and 30 healthy controls. Western Ontario and McMaster

Universities Osteoarthritis (WOMAC) questionnaire was used to assess clinical severity. Radiographic severity was evaluated according to Kellgren-Lawrence scale (KL). Serum Ang-2 was measured using enzyme-linked immunosorbent assay (ELISA). Serum CRP and ESR were measured to assess inflammation.

Results: Patients mean age was 57.2 ± 12.4 years and mean disease duration was 5.4 ± 4.1 years. Females constituted 79% ($n=57$) of patients. Mean total (WOMAC) score was 66.3 ± 14.08 , mean pain score was 13.9 ± 2.3 , mean stiffness score was 4.9 ± 1.06 and mean physical function score was 47.5 ± 11.7 . The predominant KL grades were 3 and 4 (33.3% each, $n=24$) and only 12.5% ($n=9$) of our patients were classified in KL grade 1. Low grade inflammation was observed in OA patients; mean serum CRP was 3.02 ± 1.1 mg/L and mean ESR was 25.4 ± 11.07 mm/hr. Serum Ang-2 level was significantly higher in OA patients (13.18 ± 5.97 ng/ml) compared to controls (8.65 ± 5.13 ng/ml), ($P < 0.001$). There was a positive correlation between serum Ang-2 and total WOMAC score ($r=0.642$, $P < 0.001$), and WOMAC subscale categories: pain ($r=0.462$, $P < 0.023$), stiffness ($r=0.449$, $P < 0.028$) and physical function ($r=0.633$, $P < 0.001$). There was a positive correlation between Serum Ang-2 and radiographic severity of OA ($r=0.622$, $P < 0.001$). Moreover, there was a strong positive correlation between Serum Ang-2 and ESR ($r=0.776$, $P < 0.001$) and moderate positive correlation with CRP ($r=0.435$, $P < 0.034$). No correlation was found between serum Ang-2 levels and age, disease duration or body mass index.

Conclusion: Serum Ang-2 level was significantly elevated in knee OA patients and positively correlated with OA clinical and radiographic severity and inflammatory markers. Therefore, angiogenesis could contribute to the structural damage and pain in OA. Inhibition of angiogenesis may represent a potential therapeutic target to control pain, radiographic progression and inflammation in OA patients.

P869

CHANGING TRENDS IN CAUSE OF MORTALITY IN FRACTURE NECK OF FEMUR OVER FEW YEARS AT A TEACHING HOSPITAL IN UK

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Objectives: It is well recognised that fractured neck of femurs (NOFs) can be terminal events. The British Orthopaedic Association and British Geriatrics Society recommend that a multidisciplinary service be offered to the Neck of Femur fracture patients. This should include daily clinical input from Orthopaedic Surgeons and Geriatricians. This study aims to compare 30 day mortality for NOF inpatients at a teaching

hospital to the national data and mortality before and after regular Orthogeriatric input. It also looks at causes of death and the impact in the care of these patients with regular review.

Material and Methods: Data was collected from the local hip and bereavement office databases between; October 2010-September 2011; and November 2014-December 2015. This data was then compared to the national hip fracture database figures.

Results: In October 2010-September 2011, there were 24 deaths from a total of 343 fractured NOFs (7.00%; national average 8.0%¹) with an average time until death of 10.66 days. In Nov 2014-Oct 2015, there were 34 deaths from a total of 480 fractured NOFs (7.01%; national average 7.5%²) with an average time of death of 8.24 days. There was also a statistically significant difference in pre-morbid status; in the first study period the ASA grade was 2.81 compared to 2.95 (students T-test 0.002). This was also reflected in the AMTS, as in October 2010-September 2011 it was 6.93 compared to 8.05 in November 2014-October 2015; which was also statistically significant (< 0.0001). Assessments revealed that most of the deaths had medical origins with pneumonia remaining the most common but the incidence of death due to pneumonia was much less during the period of 2014 to 2015.

Conclusion: Mortality rates were below the national average in both time periods examined.

There was a shift in the trend of the cause of death from avoidable towards the unavoidable causes. We found that there was a more widespread cause of death in 2015. There was a reduction in avoidable deaths in patients with increasingly complex co-morbidities due to regular multidisciplinary input. This highlighted potential problems early, through in depth assessment that minimised avoidable complications and death

P870

DOES VITAMIN D AFFECT THE SEVERITY OF THE DISEASE IN PATIENTS WITH ANKYLOSING SPONDYLOARTHRITIS?

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Introduction: Vitamin D has been found to have a role in the function of the immune system. There have been many studies on the relationship between vitamin D and disease activity in ankylosing spondyloarthritis (AS). However, the studies carried out concerned only the groups according to vitamin D levels and determined the differences between these patients in terms of disease activity, functional status, quality of life, and others Clinical parameters. The aim of this study was to compare 25-hydroxy-vitamin D (25 (OH) D) in patients with

SA as well as healthy subjects and to determine the relationship between 25 (OH) D levels and Disease, functional status and quality of life. **Patients and Methods:** 125 patients with ankylosing spondylitis and 76 healthy volunteers were included in this study. A first comparison was made between the group of patients and the control group, a second comparison was made in the group of patients according to their vitamin D status subdivided into 3 subgroups: normal, inadequate and deficient in 25 (OH) D. **Results:** Differences in level (OH) D between patients and controls were statistically significant. The number of patients with SA whose levels (OH) D were classified as normal, insufficient and deficient were respectively 32, 51, and 42. Sedimentation rate (SV), C-reactive protein (CRP) and Bath AS Disease Activity Index (BASDAI) scores were higher in the subgroup in insufficiency and 25OHD deficiency ($P < 0.05$). Functional Bath scores (BASFI) and quality of life (ASQoL) were significantly different between the subgroup with normal 25OHD and the deficient subgroups ($P < 0.05$). Finally, the level of pain, BASDAI, ESR and CRP were inversely correlated with 25OHD ($P < 0.05$). **Conclusion:** Plasma levels of 25 (OH) D may be decreased in patients with ankylosing spondyloarthritis and this may negatively affect disease activity, functional status and quality of life.

P871

CALCIUM AND VITAMIN D INTAKE IN TYPE 1 DIABETICS AND IMPACT ON BONE HEALTH

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Objective: To compare dietary intake of calcium and vitamin D among healthy Type 1 Diabetics and control subjects and identify association with bone mineral density.

Material and Methods: A cross sectional study of 108 male and female subjects (median 37 yrs), 41 with Type 1 Diabetes and 67 healthy controls. Dietary data was collected via Bloch self-administered food-frequency questionnaires (FFQ) specific to calcium and vitamin D intake. Bone mineral density (BMD) and bone mineral content (BMC) measures were obtained using dual-energy x-ray absorptiometry (DXA, Hologic). Mann-Whitney U tests were used to compare the distribution of dietary intake of calcium and vitamin D and food groups between diabetics and healthy controls. Correlations between dietary intake and DXA results were analyzed using Spearman's rho.

Results: Relative frequency of intake for dairy products was greater in the control subjects as compared to the diabetic subjects, though not statistically significant ($P=0.056$). Significant differences in intake of specific foods was found only for ice cream ($P=0.025$). Total calcium from both food and supplement sources was not different between the two groups ($P=0.116$), but supplemental calcium intake was slightly higher in the control group ($P=0.055$).

The overall intake of calcium was well below the RDA in both the diabetic and control group with median calcium intake at 550 mg/day for all subjects and 80.6% of subject falling below the RDA of 1000 mg Ca/day. No significant correlations were found between dietary calcium intake and DXA scan results. A positive correlation was found between diet vitamin D and whole body BMC ($P=0.01$) and hip BMC ($P=0.038$).

Conclusion: Intake of calcium is not different between healthy Type 1 Diabetics and control subjects, with both groups not meeting RDA for calcium. Dietary vitamin D is significantly associated with BMC for whole body and hip.

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P872

SEASONAL INCIDENCE OF HIP FRACTURE IN LITHUANIA

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Objective: To analyze the influence of year seasons to hip fractures in Lithuania, during the years 2001 – 2010.

Methods: Inclusion criteria were: residents of Lithuania aged 40 and over, with primary hip fracture (ICD-10 codes S72.0, S72.1 and S72.2) occurred during 2001 – 2010 years. Data were collected from patient charts at all 43 orthopaedic-traumatology inpatient departments in Lithuania. Fractures were analysed according to the year season in which they have occurred – winter (December, January, February), spring (March, April, May), summer (June, July, August) and autumn (September, October, November).

Results: During the period of 2001 – 2010, a total of 23 160 hip fractures occurred in Lithuania. Majority of patients were female – 68.5% (95% CI: 67.9 – 69.1%, $n=15\ 856$). Most of the fractures occurred in winter – 28.5% (95% CI: 27.9 – 29.1%, $n=6\ 596$), the least in summer – 23.2% (95% CI: 22.7 – 24.5%, $n=5\ 383$). Low energy traumas accounted for 89.6% (95% CI: 89.2 – 90%, $n=20\ 756$). In winter, low energy traumas accounted for 92.9% of hip fractures (95% CI: 92.2 – 93.47%, $n=6\ 126$), and in summer – 86.7% (95% CI: 85.8 – 87.6%, $n=4\ 669$). High energy hip fractures more frequently occurred in summer than in other seasons, and accounted for 11.2% of hip fractures (95% CI: 10.4 – 12.1%, $n=603$). In January, 10.7% of all fractures were suffered (95% CI: 10.3 – 11.1%, $n=2\ 482$), which is the highest percentage among all months, while April holds the lowest number – 7.6% (95% CI: 7.25 – 7.9%, $n=1\ 756$). The least fracture incidence per day was indicated in July – 5.8 hip fractures a day.

Conclusions: In Lithuania, in the years 2001 – 2010, more hip fractures occurred in winter, less – in summer. Low energy fractures occurred mostly in winter.

P873**BONE TURNOVER MARKER LEVELS IN OSTEOPOROSIS PATIENTS TREATED WITH HORMONE REPLACEMENT, DENOSUMAB OR BISPHOSPHONATE THERAPY**S. D. Vasikaran¹, S. A. P. Chubb¹, I. Samsudin¹, P. Glendenning¹¹PathWest-Fiona Stanley Hospital, Murdoch, Australia

Objectives: Interpretation of plasma N-terminal propeptide of type I collagen (PINP) and urine N-terminal telopeptide of type I collagen (NTX) in osteoporosis patients treated with anti-resorptive therapy is uncertain as fracture outcome based targets for bone markers are not available. We proposed a target for PINP of 32 ug/L in bisphosphonate treated patients, based on an NTX target of 21 nmol BCE/mmol [1]. We examined PINP and NTX levels in a cohort of osteoporosis patients in routine care treated with hormone replacement (HRT), bisphosphonate or denosumab therapy to evaluate these target values.

Materials and methods: Postmenopausal patients had blood and urine samples collected for the measurement of PINP and NTX following treatment for osteoporosis as part of routine care, between February 2015 and December 2016. PINP was measured on an E170 immunoassay analyser (Roche Diagnostics). NTX was measured on a VitrosECi analyser (Ortho Clinical Diagnostics) and was corrected for creatinine concentration. Statistical analysis was by Analyse-it version 3.70.1

Results: Two hundred and fifty six women aged ≥ 50 y had measurements of PINP and NTX; 42 were treated with HRT, 29 with bisphosphonate and 34 with denosumab. The median [inter-quartile interval (IQI)] PINP was 30.0 [26.0, 40.0] ug/L, 24.0 [16.3, 33.3] ug/L and 15.0 [11.0, 24.3] ug/L for HRT, bisphosphonate and denosumab treated patients, respectively. The median and IQI NTX was 24.7 [19.7, 35.4] nmol BCE/mmol, 21.1 [14.4, 36.8] nmol BCE/mmol and 15.7 [10.4, 28.5] nmol BCE/mmol for HRT, bisphosphonate and denosumab treated patients. 55% of patients on HRT had PINP ≤ 32 ug/L and 31% had NTX ≤ 21 nmol BCE/mmol. 72% of patients on bisphosphonate therapy had PINP and 52% had NTX values below these targets; 88% of patients on denosumab had PINP and 68% had NTX below these targets. Medication compliance was not assessed.

Conclusions: Patients in routine care require different therapeutic targets for bone turnover markers according to the medication they are prescribed. Therapeutic targets based on fracture outcomes from randomised clinical trials with compliance data are needed.

Reference: Chubb SA et al. Clin Biochem 2016; doi: 10.1016/j.clinbiochem.2016.09.010 [Epub ahead of print]

P874**RISK FACTORS OF LOW BONE MINERAL DENSITY IN FEMALE PATIENTS WITH SYSTEMIC SCLEROSIS AND ITS CORRELATION WITH DISEASE ACTIVITY AND SEVERITY: A PILOT STUDY**M. Radić¹, D. Martinović Kaliterna²¹Division of Rheumatology and Clinical Immunology Center of excellence for Systemic Sclerosis in Croatia University Hospital Sple, Split, Croatia, ²Division of Rheumatology and Clinical Immunology Center of excellence for Systemic Sclerosis in Croatia University Hospital Split, Split, Croatia

Introduction: Although articular manifestations are frequent and well described in SSc, the suggestion that SSc may be associated with bone loss and osteoporosis (OP) is still debated. In this pilot study we aimed to evaluate the bone mineral density (BMD) and body composition in women with SSc and the relationship between reduced BMD with activity and severity of the disease.

Methods: Consecutive SSc female patients who fulfilled criteria of the ACR and/ or criteria of LeRoy and Medsger for SSc and age-matched healthy women were recruited for measurement of BMD and body composition by DXA scan. Risk factors for low BMD in SSc patients were evaluated. We evaluated the disease severity using clinical and laboratory parameters according to the Medsger Severity Scale. The level of SSc activity was evaluated according to Valentini activity score.

Results: 41 postmenopausal SSc patients were studied (age 44.29 \pm 15.90 years; disease duration 94.75 \pm 88.56 months). The two groups of SSc patients and control group in our study were well matched in terms of both demographic and clinical characteristics. Compared with 40 controls, SSc patients had a significantly lower BMD at the lumbar spine (0.96 \pm 0.16 vs. 1.03 \pm 0.11 g/cm²; p=0.02) and the hip (0.87 \pm 0.14 vs. 0.94 \pm 0.12 g/cm²; p=0.04). At the spine, 13 (31.7%) SSc patients had T score ≤ -2.5 SD and 3 (7.3%) had osteoporotic fractures. At the hip, 3 (7.3%) patients had T score ≤ -2.5 SD but none had hip fractures. The BMD T scores at the femoral neck and/or spine were significantly lower in SSc patients than controls (p<0.05). The total lean body mass was also lower in patients than control subjects (46.40 \pm 7.35 vs. 50.50 \pm 5.93 kg; p=0.01). Multiple regression revealed increasing age, habitual drinking, lower BMI were unfavorably associated with lower BMD at the spine in SSc patients. The T scores were significantly lower in SSc patients with active disease (activity score ≥ 3 , 4.45 \pm 1.25) compared with patients with inactive disease (activity score <3, 1.52 \pm 0.67; p<0.05) Furthermore, the lower T score had a significant correlations with the skin involvement (p=0.04, r=-0.24). Finally, severity score according to Medsger was higher in the SSc patients with osteoporosis than in the SSc patients with osteopenia or normal BMD status (p <0.01).

Conclusion: Reduced BMD and lean body mass are prevalent in women with SSc. The SSc patients with more active and/or sever disease had lower BMD, which suggest possible association between disease activity and severity and a reduced BMD. Appropriate measures against osteoporosis should be undertaken, especially in older patients with low BMI. Bone health in SSc deserves awareness and is far from fully explored. This lack of knowledge should trigger prospective studies on the mechanism involved as well as prophylaxis and treatment.

P875

PTH REFERENCE VALUES IN A POPULATION OF ALGERIAN CHILDREN

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Background: The measurement of parathyroid hormone (PTH) has become common in everyday practice ever since the availability of different high-performance controllers.

In children during growth, disturbances of macro and bone microarchitecture may occur through a secondary hyperparathyroidism in hypovitaminosis D. The definition of the upper limit of normal (ULN) PTH is critical to the management of asymptomatic hyperparathyroidism reference values of the Parathyroid Hormone (PTH) valid are useful for a better interpretation thereof.

Objectives:

Primary objective: Determine the values of reference of PTH in a population of Algerian children.

Secondary objective: To establish the influence of calcium dietary intake of the PTH.

Methods: This is a prospective cross-sectional population-based study that involved 435 school children aged between 5 and 15 years in Daira of Tizi-Ouzou (Algeria).

Inclusion criteria: Children whose age is between 5 and 15 years old. Schooled in the Daira of Tizi-Ouzou and resident informed consent (parent or legal guardian).

Exclusion criteria: School children in Daira Tizi-Ouzou but not resident there. Situations that can increase or decrease serum PTH (thyroid, kidney, liver, intestines, cardiovascular, pulmonary, epilepsy, tumor).

Consuming treatments hindering PTH metabolism: vitamin D, calcium, anticonvulsants, lithium.

Any situation inducing vitamin D deficiency Parathyroid Hormone Assay: intact PTH: sampling conditions: 50 cc of venous blood (usually at the elbow crease). It is necessary to be fasting. Reference Standards Laboratory: 15-65 pg / ml. Laboratory tests including a calcium and phosphate, renal assessment, liver and thyroid dietary calcium intakes were

assessed with Fardelonne of questionnaire adapted to local food

Results: The average age is 10.23±0.27 years, the median is 10 years (5-15).The sex ratio is 203 boys / girls 232. The average vitamin D is 25.8 and 21.6 respectively in summer and winter with a 30% failure rate in summer and 41.4%in winter. the average calcium intake is 668±18 mg / day with a median of 613 mg / day (387-1271). In summer, the average rate of parathyroid hormone is 36±1.25 pg / ml, the median was 33 (6-75). (P <0.001). In winter, the average rate is 48 ±1.65 pg / ml, the median is 49. (9.7 to 84.5) (P <0.001). There is an inverse correlation between vitamin D levels and the levels of parathyroid hormone (r=- 0.43, p <0.001), namely that PTH decreases vitamin D increases we observed that for an optimal threshold 25OHD greater than 30 ng / ml, the upper limit of PTH corresponding to the 97th percentile is 49 pg / ml, it is 25 -35% lower than the standard provided by the laboratory that is 65 pg / ml. We had the opportunity to demonstrate that, for a certain category of 25VTD rate (children regardless of their rates, those with levels> 20 ng / ml and those with levels> 30 ng / ml), low calcium intake was significantly associated with an average level of PTH higher than in those with a daily intake of calcium more consistent.

Conclusions: The PTH reference values are highly dependent characteristics in particular the reference population of the vitamin D status and renal function. The ULN of PTH our study to refine the diagnostic sensitivity of asymptomatic HPT in the order of 25 to 35%. Other studies on the establishment of PTH reference values are helpful in taking other factors such as age into account, BMI and ethnic group.

P876

GAIT DEFICIT ASSESSMENT IN PATIENTS WITH KELLGREN-LAWRENCE GRADE II HIP OSTEOARTHRITIS

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The present study aimed to assess the impact of hip osteoarthritis on gait and quality of life using a gait analysis device, BTS G-walk, and the standardized, validated test MOS SF-36. We conducted an observational study on 165 patients hospitalized in Medical Rehabilitation Clinical Hospital Baile Felix, Romania, during January 2016 - June 2016. Patients were diagnosed with primary or secondary hip osteoarthritis. On Kellgren-Lawrence radiographic grading all were grade II and their mean age was 59.63±10.63 years. Lot I included 87 cases with primary hip osteoarthritis and lot II was formed by 78 cases with secondary hip osteoarthritis. Mean value of

SF-36 score was 45 ± 20.46 in lot I and 44 ± 13.25 in patients from lot II, difference not statistically significant. In cases with primary hip osteoarthritis assessment of spatial-temporal gait parameters with the gait analysis device revealed severe changes of cadence, duration of the gait cycle, both right and left step lengths, left and right stance phase duration, left and right swing phase duration, double support duration-right AVG value. Speed, double support duration-left AVG value, single support duration for the right foot were moderately affected. In secondary hip osteoarthritis cases stride length for both left and right steps, left swing phase duration, right single support duration and double support duration were severely affected. Left stance phase duration was moderately affected. The average score MOS - SF36 Health Survey revealed a moderate impairment of quality of life, present in all patients. In cases with primary hip osteoarthritis severe changes of gait phases were found in most variables investigated with BTS G-walk device. In cases with secondary hip osteoarthritis, gait phases were within normal parameters for more than half of the studied variables.

P877

EVALUATION OF THE DAILY ACTIVITIES IN PATIENTS WITH THORACIC OUTLET SYNDROME

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Objective: Because of the patho-anatomical structure of thoracic outlet syndrome (TOS), caused by compressing cervical circulation and neural structure, patients develop broad specter of the health problems which influence the daily activities. Aim of the study was to evaluate the influence of patient's problems with TOS on the daily activities.

Material and Method: In the study was included 181 participants: 82 patients with diagnose TOS and 99 healthy volunteers. All participants were filled out the questionnaire about performing daily activities.

Results: Patients reported many statistically significant different health problems caused by TOS which influenced on their daily activities. On the question "Place an object on a shelf above your head" TOS patients rated 2.80 and control group 1.08 ($t=-12.40$; $p=0.00$). On the question "Change a light bulb overhead" TOS patients rated 3.02 and control group 1.26 ($t=-12.36$; $p=0.00$). On the question "Wash or blow dry your hair" TOS patients rated 2.63 and control group 1.21 ($t=-11.15$; $p=0.00$). On the question "Wash your back" TOS patients rated 2.80 and control group 1.30 ($t=-10.20$; $p=0.00$). On the question "Put on a jumper" TOS patients rated 1.99 and

control group 1.13 ($t=-8.13$; $p=0.00$). On the question "Open a tight or new jar" TOS patients rated 2.38 and control group 1.15 ($t=-6.47$; $p=0.00$). On the question "Write" TOS patients rated 1.49 and control group 0.75 ($t=-5.83$; $p=0.00$). On the question "Turn the key" TOS patients rated 1.43 and control group 0.70 ($t=-5.42$ $p=0.00$). On the question "Prepare a meal" TOS patients rated 1.87 and control group 0.97 ($t=-7.15$; $p=0.00$). On the question "Cary a shopping bag or briefcase" TOS patients rated 2.48 and control group 1.20 ($t=-9.18$; $p=0.00$).

Conclusion: Our research definitively pointed on existence influence of the patient's problems with TOS on the daily activities performed as over as under head and shoulders level and required patient's education and training how on the appropriate way perform daily activities as well as modification and planning further rehabilitation process.

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HEALTH RELATED QUALITY OF LIFE IN FRAIL ELDERLY WOMEN

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Objective: To analyze the health related quality of life in elderly women with different stages of frailty.

Methods: Women aged ≥ 60 years were included. Frailty status was defined using Fried's criteria: weakness, low walking speed, low physical activity, weight loss, exhaustion. Participants were classified as robust, prefrail and frail if they scored 0, 1–2 or 3 points, respectively. Health related quality of life was assessed by the EQ-5D questionnaire using five dimensions: mobility, self-care, usual activities, pain or discomfort, anxiety or depression, and a subjective visual analogue scale (VAS) of health state between 0 and 100. For statistical analysis, one-way ANOVA with post hoc test was used to determine the differences between groups.

Results: The data of 161 women were analyzed: 103 (64%) of them were robust, 30 (18.6%) prefrail, and 28 (17.4%) were frail. Robust women were statistically significantly youngest (mean age – 69.43 ± 6.22 years). In prefrail women, the mean age was 70.79 ± 7.92 years. The oldest women were in frail group (75.8 ± 5.98 years). After statistical analysis of health related quality of life, statistically significant differences were found in EQ-5D dimensions ($p=0.055$), except anxiety and depression. Robust women were more mobile ($p=0.016$), had less difficulties with self-care ($p=0.002$), doing usual activities ($p<0.001$), and were in less pain or discomfort ($p=0.001$) than frail women. No statistically significant differences were found between robust and prefrail or prefrail and

frail women. It was found that robust women were more satisfied with their health than prefrail ($p=0.011$) or robust ($p<0.001$) women. No differences were found in health status VAS score comparing prefrail and frail women.

Conclusion: Health related quality of life is statistically significantly better in robust rather than in frail women. There were no difference in EQ-5D anxiety/depression dimension between robust and frail women.

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SURGICAL NUANCES IN THE MANAGEMENT OF ANKYLOSING SPONDYLITIS SPINE TRAUMA

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Objective: Ankylosing spondylitis (AS) with traumatic fractures are extraordinary challenges for spine surgeons. Just a trivial trauma to the rigid and brittle spine may give rise to grave neurological complications that requires early intervention in the form of surgical fixation. The authors wish to apprise regarding the problems and surgical nuances in management of such highly unstable deformity.

Material and Methods: Four patients of AS with traumatic spine fractures underwent CAT scan and MRI to evaluate the extent of injury and plan the line of management. All the patients presented with ASAIA A neurological grade and underwent instrumentation for deformity reduction and stabilization. The perioperative adversities confronted by the spine surgeons were analyzed.

Results: Three column fractures with deformity and displacement was seen in all patients. Intubation during induction is challenging due to rigid spine and fiberoptic intubation is preferable. Pre op positioning to achieve reduction and sagittal alignment is the mainstay especially in cervico-thoracic junction fractures wherein 360 degree fusion is to be performed. The surgery is associated with higher blood loss (mean 1500 ml). Due to brittleness of spine with associated osteoporosis and poor bony purchase of screws, long segment fixation is desirable with at least 3 levels above and below the fracture segment. The anatomical bony landmarks are obscured which makes screw placement very tedious. Image guidance system especially O-arm is of immense help in such cases.

Conclusions: AS patients are highly vulnerable and even a meager trauma can cause immense neurological deficits and spinal deformity. The gravity of injury in such patients must not be underestimated and demand utmost care while handling them in emergency or operating rooms. Surgical management is technically very challenging but with identification of likely perils that may be encountered, best possible care can be rendered to this arduous community.

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MEDICAL COMPLICATIONS AND OUTCOMES OF POSTOPERATIVE NECK OF FEMUR FRACTURE PATIENTS AT A MAJOR TRAUMA CENTRE IN THE UK: A RETROSPECTIVE STUDY

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Background: Postoperative complications affect 20% of neck of femur fracture (NOFF) patients. The variety in aetiology of complications affect length of stay, the financial burden on the service and perioperative mortality.

Aim: To analyse the frequency and prevalence of medical complications occurring in patients with NOFFs.

Method: A retrospective study reviewing the hospital records of 332 hip fracture patients between January and December 2015. Primary outcome: To assess how the comorbidities and postoperative complications impact the outcomes of patients with NOFFs. Inclusion criteria: 1. Inpatients. 2. Over the age of 60. 3. Admitted with a NOFF.

Results: The study found 62 different postoperative complications in our cohort of 332 patients. The most common was anaemia, which occurred in 91 patients (27%) and myocardial infarction being the lowest common complication with 7 (2%). The highest incidence of postoperative complications occurred in March with 40 patients (12%) and the least in November with 20 (5%). Although the majority of the admissions were aged between 81-90 (145 (44%)), the 91+ age group had the highest mortality of 49 (10%) irrespective of comorbidities. The highest death percentage was in June: 18%, with no mortalities in October, May or November. Cardiac comorbidities were most prevalent, with 221 patients (67%) and gastrointestinal was the least: 56 (17%). Pre-morbid ASA classification showed 209 patients (63%) were classed as ASA III, indicating severe systemic disease. Postoperatively 191 (57%) became 'dependent for care', whilst 122 (37%) achieved 'equivalent status or better'. No relation between number of comorbidities, mortality or morbidity was seen. A positive correlation was found between the number of complications and mortality rates: 1% of patients with no complications died, whereas 100% died with 10. 177 patients (55%) were prescribed delirium-inducing drugs, 140 (42%) were prescribed hypotensives and 124 (37%) were taking nephrotoxic drugs.

Conclusion: In this study more than 60 complications were recorded, most commonly anaemia. The number of complications had a positive correlation with mortality, however no relationship between number of comorbidities, mortality or morbidity was seen. Increasing age was found to increase mortality post-operatively.

P881**ANKYLOSING SPONDYLITIS COEXISTING WITH BEHCET'S DISEASE: SUCCESSFUL TREATMENT WITH CT-P13 INFlixIMAB**

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Rheumatic diseases are a spectrum of disorders with overlapping manifestations and altering characteristics in the course of the disease. Ankylosing spondylitis (AS) is a systemic inflammatory disease, its pathogenesis still being investigated. Behcet's disease is an inflammatory disease affecting primarily young males.

Aim: To describe two cases of patients who developed AS and Behcet's disease. The patients were successfully treated with infliximab and CT-P13, an infliximab biosimilar.

Methods: A male patient, aged 48 years, presented with low back pain and arthralgias of the wrists and lower extremities since his young adulthood. The diagnosis of AS with HLA-B27 positive was made. In the course of the disease the patient developed mouth and genital ulcers, anterior uveitis, arthritis of upper extremities and gastrointestinal manifestations. Behcet's disease was diagnosed and the disease exhibited a fluctuating course, until after 22 years it went into remission. The patient had a flare of AS with decreased spine mobility and increased inflammation indices. The second patient, a male aged also 48 years, presented with relapsing episodes of anterior uveitis and mouth ulcers. The diagnosis of Behcet's disease was made. In the course of the disease he developed inflammatory low back pain with increased inflammation indices. The diagnosis of AS was made.

Results: In the course of the disease both patients received local treatment for the manifestations of Behcet's disease. The first patient was treated with infliximab for a period of two years with a very good response, the treatment being stopped afterwards. Due to a disease relapse CT-P13, an infliximab biosimilar was initiated. The second patient was treated with CT-P13 and cyclosporine with very good response. Both patients are on treatment with CT-P13, the disease being in remission.

Conclusions: The coexistence of AS with Behcet's disease is being described. Nowadays an autoinflammatory etiology of Behcet's disease is discussed, while in the pathophysiology of AS both autoimmune and autoinflammatory factors may be involved. In one of the cases infliximab administration and in both cases the administration of CT-P13, an infliximab biosimilar induced remission.

P882**BONE MINERAL DENSITY IN OSTEOARTHRITIS**

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Background/Aim: The literature data suggest a negative correlation between osteoarthritis (OA) and osteoporosis (OP), implying rare simultaneous existence in the same patient and the fact that OA and OP represent two extremes, i.e. two different patient populations. The data about the association of increased bone mineral density (BMD) and osteoarthritis, and increased bone loss in long-lasting OA during aging are still controversial. The aim of this paper was to investigate if there was any association of OA of different sites and increased BMD, as well as to investigate the correlation between BMD on one hand, and body mass index (BMI), radiologic grade of OA and duration of postmenopausal status, on the other.

Methods: We studied 235 postmenopausal women aged 50-79 years, with 48 of them with hand OA, 28 with hip OA, 39 with knee OA, 55 with GOA, and 65 controls. The studied groups were comparable by the factors of age and duration of postmenopausal period. BMD was measured in the lumbar spine (L1-L4) on DXA densitometer Lunar DPX and presented in absolute values in g/cm².

Results: In the groups with hand, hip and knee OA, significantly higher values of BMD were found compared to controls in the age subgroups of 50-59 and 60-69 years, while this difference was not significant in the age subgroup 70-79 years. In the GOA group, significantly higher values of BMD were found in all age subgroups. Between BMD and BMI, a positive correlation was found only in the control group (p<0.01) and GOA group (p<0.05). There was no correlation of radiologic OA grade and BMD in the studied groups. A negative correlation was found between the duration of postmenopause and BMD in all investigated groups (p<0,01).

Conclusion: OA of different anatomic sites is associated with increased bone mineral density, and the association is more conspicuous in younger age groups. The main predictor of the bone mineral density is the duration of postmenopause, with longer postmenopause associated with lower bone density.

P883**THE IMPORTANCE OF EXERCISE IN PATIENTS WITH OSTEOARTHRITIS OF THE HIP**

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Objectives: To investigate the importance of exercise on the pain and quality of life in patients with osteoarthritis (OA) of the hip.

Material and Methods: This was a prospective clinical study consisted of 30 patients with primary hip OA treated stationary at the Center for Physical Medicine and Rehabilitation from 2011 to 2012 year. On receipt of all the respondents was filled out the social survey, quantification of pain was assessed by visual analogue scale (VAS) and quality of life was measured by the three-level version of the EuroQol five-dimensional questionnaire (EQ-5D-3L). After that participants received exercise program for 21 days. Exercise included balance and proprioception activities, isometric, isokinetic exercise with or without resistance, flexibility exercises, core stabilization exercises and aerobic/endurance exercise for 30 minutes daily. After one month, patients were tested again.

Results: The sample consisted of 75% women and 25% men, mean age was 62.64 ± 6.06 years. The most represented were retirees 80%, followed by workers and housewives 13.33% and 6.66%. Quality of life measured by the EQ-5D-3L questionnaire at the baseline and end of the study showed no statistically significant changes ($p > 0.05$) in the domains of self-care, the anxiety / depression and into common activities of daily living. There was a statistically significant improvement in quality of life ($p < 0.05$) in the field of mobility, pain / discomfort, EQ VAS. There was a statistically significant reduction in pain measured by VAS pain scale (7.67 ± 1.06 ; at the end of 3.73 ± 1.78 , $p < 0.001$).

Conclusion: Recent clinical practice guidelines for the management of hip OA had strongly recommended that people with OA exercise regularly, based on evidence that aerobic and strengthening programs improve pain, function, and quality of life; facilitate weight management; and may slow the progression of the disease. Our study showed that exercise led to a statistically significant reduction in pain as measured VAS pain scale and improve the quality of life (in the fields of mobility, pain / discomfort, EQ VAS) measured by the EQ-5D-3L.

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DIRECT COST OF HOSPITAL ADMISSIONS DUE TO HIP FRACTURES: PRIMARY ANALYSIS OF A NATIONAL DATABASE IN IRAN

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Objectives: This study is an investigation into the epidemiologic and economic cost of hip fractures in Iran.

Material and methods: We determined the incidence rates of hip fractures for all patients treated in teaching hospitals from October 2014 to October 2016 and calculated mortality rates, hospitalization days and direct costs of hospitalization. The hip fractures report data were obtained from an electronic health records that called SEPAS. This nationwide health information system established by Information Technology and the Statistics Department of the Ministry of Health and covered all teaching Hospitals in Iran. International Classification of Diseases ICD-9 and 10 will be used as diagnostic codes. Inclusion criteria were patients aged ≥ 50 with a diagnosis of a single fracture located at the neck, head, or intertrochanteric region of the femur treated with total/hemiarthroplasty, screw or nail methods. We examined the demographics, location of fracture, treatment type, length of hospital stay (LOS), direct cost, mortality and early complications during hospitalization.

Results: A total of 35,451 hip fractures taken from patient records in all teaching hospitals connected to SEPAS during the study period. Hospital care of patients with hip fractures required an overall 246,379 bed-days with an average of 7 days. The total cost of hospital treatment of hip fractures in Iran was IRR 2,066,440,433,765 (US\$ 51,661,011), with average costs per patient of IRR 58,290,046 (US\$ 1,457) in teaching Hospital.

Conclusion: The data obtained from SEPAS, the largest scale nationwide health information system in Iran. Thus, current study presents the first and largest nationwide data analysis of osteoporotic hip fracture and detailed information about their treatment costs in Iran. Our primary results indicated that the incidence rate and direct cost of hip fracture in Iran are significant among Middle Eastern countries.

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CLINICAL CHARACTERISTICS OF PATIENTS WITH FRACTURES DUE TO FRAGILITY IN A HOSPITAL POPULATION AT HOSPITAL SAN JOSE IN BOGOTA D.C., COLOMBIA

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Introduction: The prevalence of osteoporosis increases as the population ages (1). It can be considered a benign pathology, but it generates considerable morbidity and mortality secondary to fragility fractures, which increases costs to the different health systems of the world (2). Different strategies have been

created for the detection and management of these fractures with good results (3). As such, its implementation is necessary in our setting for the creation of policies and local strategies that allow a better approach to this pathology in our population.

Objective: To describe the clinical characteristics of patients with fragility fractures and their management at San José Hospital in Bogotá during 2015 and up to July 2016.

Methods: Descriptive cross-sectional study. Clinical histories of patients from the endocrinology and orthopedics services of the San José Hospital in Bogotá with diagnosis of severe osteoporosis were evaluated from 2015 to July 2016. The demographic and clinical characteristics, as well as the treatment received, were analyzed.

Results: A total of 621 patients with a main diagnosis of osteoporosis and fractures associated with osteoporosis were found, of which 184 met inclusion criteria (30% fragility fractures). The mean age was 71.5 years (SD: 11.6), the ages ranged from 35 to 99 years. The most frequent fractures were vertebral fractures followed by distal radius, proximal femur and others at 71 (38.6%), 65 (35.3%), 36 (19.6%) and 34 (18.5%), respectively. Thirty% of the patients had a previous diagnosis of osteoporosis. Only 30% received complete treatment before fracture and 57.6% received post-fracture treatment.

Conclusion: Fragility fractures are very frequent pathologies in our population. However, these are underdiagnosed and undertreated, which makes it necessary to implement education, detection, diagnosis and early management programs to avoid complications in the short and long term. We need programs that improve the quality of life of the patients and decrease the associated morbidity and mortality.

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THE INCREASING INCIDENCE OF LOW ENERGY TRAUMA FRACTURES IN SITES OTHER THAN THOSE RECOGNISED AS FRAGILITY FRACTURES

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Objectives: Hip, vertebral and distal radius fractures are established as predictors of future osteoporotic fractures. With increasing longevity there is an increasing number of low energy trauma fractures. The incidence of foot and ankle fracture is as high as 3 per 1000 woman years and are the most common fractures in the over 50s. Proximal humeral fractures are the 4th most common fracture in the elderly and are now becoming accepted as a predictor of possible osteoporotic fractures at other sites. Retrospective study to look at the incidence and aetiology of low energy limb fractures, other than

the well-recognised fragility fractures in the elderly population attending fracture clinics at a teaching hospital in UK.

Method: We looked at the notes of patients (aged 50 years and above) who attended the fracture clinic of university hospital in the UK. Patients with limb fractures following low energy trauma were included. Patients with fractures of the hip, distal radius or vertebra were excluded as well as fractures as a result of high energy trauma. We looked at the records 972 patients.

Results: Of the 972 records reviewed, 225 patients with low energy fractures were included in this study. The results were grouped as follows; 30 patients had pelvic ring and femoral fractures (other than neck of femur fractures (13.3%), 12 had fractures of the tibia (5.3%), 72 had foot and ankle fractures (32%), and 54 patients had humerus fractures (24%). 21 patients suffered with radius and ulna fractures (excluding distal radius fractures) (9.3%) and 36 patients had other fractures (16%). There were 6 (2.6%) patients who had suffered with two or more fractures as a result of the same fall. Age range 50 to 82 years. 62% were female and 38% were males.

Conclusion: Despite the small study population, it reflects the present trend of fractures occurring in the older population in the UK that is noted in the literature. The greater incidence of fractures in this age group observed particularly in the femur, humerus, foot and ankle after low energy injury should be given their due recognition as possible predictors of future fractures at other anatomical sites. Starting bone protection treatment should be considered as a means of reducing the risk of morbidity and mortality due to incidence of hip and vertebral fractures in these patients.

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MODERN METHODS OF ESTIMATION AND CORRECTION OF STRUCTURAL AND FUNCTIONAL CHANGES OF SKELETAL AND MUSCULAR SYSTEM

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Aim: To increase the effectiveness of therapy and prevention of structural and functional changes of the musculoskeletal system in workers of sea-economic complex by using seeking drugs in combination with kinesotherapy.

Methods: During the work we have examined 76 employees of sea-economic complex of the South of Ukraine with different severity of osteoporosis and osteopenia. All patients were divided into two groups: the main clinical group – has been used for the treatment of bone-seeking therapy and kinesotherapy; clinical control group – only applied bone seeking therapy. The algorithm of the examination included: history taking, the dynamics of the clinical condition of the patients, instrumental (ultrasound densitometry) and functional

(system for registration and processing of biosignals «Insight TM») research methods. The dynamics of the parameters were evaluated before treatment, after 3 and 6 months.

Results: The study found that the more rapid improvement in mineral bone density and NSF Index is defined in the main clinical group compared to the control group.

Conclusions: The most effective method of treatment of osteoporosis and osteopenia is a bone-seeking therapy in combination with kinesiotherapy. The used complex of medical physical exercises gives the chance to select physical activity depending on initial indicators strictly individually for each patient. A screening examination of employees allows to identify osteoporosis or osteopenia in the early stages and provide the necessary complex treatment, which consequently prevents the risk of complications, decrease of work capacity, disability and mortality.

P888

PATIENT WITH SEVERE KYPHOSCOLIOSIS AND SYGMOID CARCINOMA – A MEDICAL CHALLENGE IN AN EMERGENCY SETTING: A CASE REPORT

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Objective: Untreated congenital kyphoscoliosis can in adulthood lead to low back pain, osteoarthritis, spinal stenosis, different neurological and cardiopulmonary problems. It also exerts secondary effects on gastrointestinal system.

Materials and methods: A 74-year-old male patient presented with symptoms of low-grade fever, constipation, tachycardia, dyspnea and oliguria. Plain films and multi-sliced computed tomography (CT) of the chest revealed aero-liquid levels within dilated small and large intestine loops, occupying the right thoracic cavity, distended cecum up to 8.6cm, stenotic process of the sigmoid colon and a heavy lumbar scoliosis. Due to the physical state deterioration, i.e. acute abdomen, the patient was immediately operated on. The subtotal colectomy with unipolar ileostoma was performed, due to a visible sigmoid tumorous process - later pathohistologically confirmed as adenocarcinoma. The primary suspicion of a huge diaphragmatic hernia, was later eliminated during surgery and by finding out the patient's history of long-running, surgically untreated severe kyphoscoliosis, which affected a position of the thoracic viscera, further worsened by stenotic colonic process that lead to dilated and shifted bowel loops.

Results: Patient was discharged on the 14th postoperative day, returning on the regular follow-up two months later.

Due to severe kyphoscoliosis and the resulting concavity of abdominal wall, the stomal bag did not adhere well to the abdominal wall. The result was a peristomal dermatitis caused by a leaking bowel content.

Conclusion: This case presents a medical challenge, especially when the primary diagnosis wasn't completely obvious. Although we noticed an irregular patient's posture, we were initially misled and believed that bowel loops herniated diaphragmatic muscle. After the surgical verification of colonic carcinoma, it was obvious that dilated bowel loops only shifted diaphragmatic muscle. Unfortunately, heavy vertebral pathology disqualified our patient from a possible second surgery, which would include ileostomy closure.

P889

SHOULDER PAIN IN HEMIPLEGIC STROKE PATIENTS AND CORRELATION TO REHABILITATION OUTCOME

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Objective: To analyze the incidence of shoulder pain in hemiplegic stroke patients and the correlation between motor function of affected upper limb and scores of daily living activities with pain levels.

Material and methods: Patients in the initial 6-month period after stroke who went through in-hospital rehabilitation treatment were included in the study. Demographic and clinical features and medical data of the patients were recorded. Upper extremity Fugl-Meyer Motor Assessment (FMA), Frenchay Arm Test (FAT), and Barthel Index (BI) were applied to the patients on admission, at discharge, and after 3 months of follow-up. For statistical analysis we used statistical program IBM SPSS Statistics 22.0 (Statistical Package for the Social Sciences). Results were presented using standard statistical measures of central tendency and range of results. To determine the difference between variables Chi-square analyses and t-test for independent samples were used.

Results: At the initial evaluation 65 (47.1%) patients had shoulder pain, at discharge 32 (24.2%) had decreased shoulder pain and at 3 months of follow-up 27.4 (17.3%) had shoulder pain of decreased or persistent intensity. Average values of all three scales showed significant improvement after 3 months follow up. The FMA, FAT, and BI scores both at admission, discharge and follow up showed strong correlation with pain levels.

Conclusions: Shoulder pain in hemiplegic stroke patients has significant impact on functional outcome and motor recovery of the affected upper limb.

References:

- Simić-Panić D et al. *Ann Indian Acad Neurol* 2015;18:484.
- Tomasević-Todorović S et al. *Ann Indian Acad Neurol* 2016;19:286.

P890

USING SMARTPHONE HARDWARE TO DETERMINE IF ACTIVITY BASED TREATMENT OF LOW BMD ACHIEVES PROPER DOSE RESPONSE FOR OSTEOGENIC ADAPTATION

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Objectives: To apply existing smartphone hardware via application to monitor and educate patient populations on the minimum dose response for multiple-of-bodyweight (MOB) compressive force osteogenic loading. The resulting application can be a cost effective method for educating patient populations on their ability to generate bone mass increases with physical activity.

Materials and Methods: Forces that compress bone via impact activity can stimulate adaptive response of BMD growth beyond 4.2 MOB.¹ Further, more rapid growth in BMD has been seen in magnitudes of loading beyond the minimum dose response of 4.2 MOB.² A novel software application that allows impacts through the lower extremities to be recorded and examined has been developed for educational purposes. Instances of engaging in impact protocols, which include holding the smartphone against the hip joint while jumping and absorbing impact.

Results: Tests showed 40 consistent results (20 heel and 20 hip) of 4.57MOB at the heel, and 2.91MOB at the hip (ANOVA $p < 0.0001$).

Conclusion: As the accelerometer in a smart phone can be placed near the hip joint, a more accurate representation of loading into this joint can be seen with a simple Application and the standard Smart phone that many people have. These data also reflect the known level of deceleration seen with the musculoskeletal system when reviewing the difference between heel and hip loading events.

References:

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2. Hunte B et al. *J Osteoporos Physical Activity* 2015;3:2.

P891

OSTEOPOROSIS IN HEMIPLEGIC STROKE PATIENTS: A LONGITUDINAL STUDY

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Objectives: The aim of this study was to compare bone mineral densities (BMDs) of the affected and unaffected limbs in stroke patients at two sites, as well as to assess changes in BMD during a 6-month rehabilitation program. Additional objective of this was to discover whether there is a correlation between BMD and impairment in stroke patients.

Material and Methods: 65 consecutive hemiplegic inpatients, 32 men, age 53.2±11.3 years, and 33 women age 56.1±13.7 were enrolled in this study. BMDs of femoral neck and third lumbar vertebra measured by dual-energy x-ray absorptiometry (DXA), were compared between affected and unaffected sides at admission and discharge. Patients underwent evaluation of motor recovery of the affected extremities by the Brunnstrom stages of stroke recovery, and determination of the functional status on the basis of scores of functionality in activities of daily living (ADL): Barthel Index (BI) and Rivermead Mobility Index (RMI)

Results: Rivermead Mobility Index (RMI), Barthel Index (BI) and motor recovery of the affected extremities evaluated by the Brunnstrom stages of stroke recovery improved significantly at discharge. Affected/unaffected limb BMD ratios were 82.6% to 94.1% at admission and 73.6% to 96.1% at discharge, lowest for the femoral neck. Discharge/admission ratios were 87.3% to 95.8% for the affected and 92.1% to 100% for the unaffected side. BMDs correlated significantly with age, body weight, RMI, BI and Brunnstrom stages of stroke recovery for affected extremities.

Conclusions: BMD of the affected side were lower in the femoral neck. Over time, not only the affected but the unaffected BMDs decreased. Age, sex, duration of stroke, anthropometric measurements, motor impairment, and disability level contributed significantly to bone loss according to the site and time of DXA evaluation.

References:

- Simić-Panić D et al. *Ann Indian Acad Neurol* 2015;18:484.
- Tomasević-Todorović S et al. *Ann Indian Acad Neurol* 2016;19:286.

P892

IS OSTEOPOROSIS A CURABLE DISEASE?

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Osteoporosis may be a disease of unknown etiology, or a degenerative disorder in the context of aging. Nowadays, the availability of multiple forms of effective drug treatment for osteoporosis have raised the hypothesis that osteoporosis may be not only a treatable but moreover a curable disease.

Aim: The aim was to describe the case of a patient with osteoporosis who after treatment with alendronate for 6 years had

osteopenia and remains in the state of osteopenia for a long period after drug cessation.

Methods: A patient, female, aged 65 years, postmenopausal, presented with osteoporosis, T score in the spine being -3.2. Alendronate 70 mg once weekly was administered along with calcium and vitamin D. The patient also had hypothyroidism on treatment with L-thyroxine, TSH levels being within the normal range.

Results: Bone mineral density measurement was performed yearly while the patient was on treatment with alendronate, calcium and vitamin D. Six years later bone mineral density measurement in both the spine and the hip revealed osteopenia, T score being -1.3 and -1.1 in the spine and the hip, respectively. Alendronate was discontinued, while calcium and vitamin D were administered to the patient. The patient is being followed for her osteopenia yearly, T score in the hip being -1.1 five years after treatment cessation.

Conclusions: In the case presented alendronate appears to have had a long lasting beneficial effect on the bone in a patient with osteoporosis. The state of osteopenia appears to be stable in the presented patient. This case of persistent improvement of osteoporosis after long lasting treatment with alendronate raises the question of whether osteoporosis may be a curable disease, not being merely a manifestation of aging. This case raises the hopeful hypothesis that osteoporosis with the emergence of novel effective forms of therapy may be cured.

P893

A DECADE OF MISSED OPPORTUNITIES: THE DIAGNOSIS GAP AMONGST OSTEOPOROTIC FRACTURE ADMISSIONS IN IRELAND

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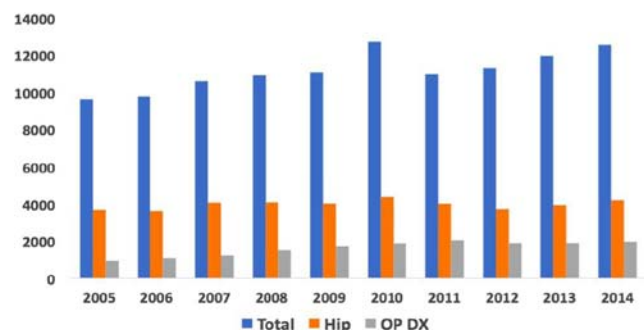
Objective: Recent studies show a large diagnosis gap persists amongst elderly people admitted with osteoporotic fractures in North America. We investigated whether such a problem exists among older men and women admitted to Irish Hospitals over the past decade.

Methods: We extracted data from the *Hospital InPatient Enquiry* system (H.I.P.E.) for all potential osteoporotic fractures for men and women aged 50 years and older. We then extracted data for all admissions where osteoporosis was listed as either a principle diagnosis, or any diagnosis. We compared the proportion of fragility fracture admissions with osteoporosis admissions to identify the "diagnosis gap" for our hospitalised fracture population.

Results: The number of fracture admissions has risen over the last decade: 2005 Vs 2014: +30%, and the number of hip fractures may be stabilizing (Figure 1), while the number of patients with a diagnosis of osteoporosis has more than doubled (+106%) during that time period. However the majority of patients admitted with a fragility fracture are not diagnosed with osteoporosis, figure 1, although the gap is closing (2005: 10% total, 26% hip Vs 2014: 16% total, 47% hip). Our study has important strengths including use of HIPE which captures information on the majority of Irish Hospitals, but also has limitations including lack of detailed clinical data, outpatient records, DXA and treatment data.

Conclusions: The majority of patients admitted to Irish hospitals with an osteoporotic fracture are not diagnosed with osteoporosis by the clinicians taking care of them. This "diagnosis gap" is one reason such patients may receive sub-optimal osteoporosis care.

Figure 1. Secular trend in fracture admissions and osteoporosis admissions for Ireland.



P894

LEG ELEVATION DOES NOT SUBSTANTIALLY AFFECT TBS RESULTS

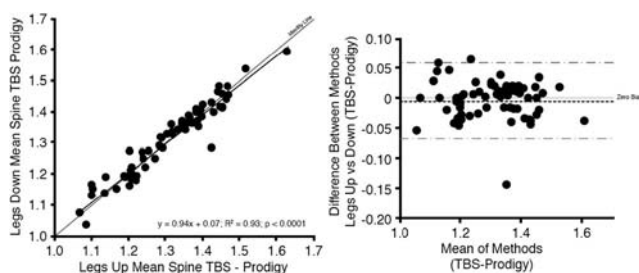
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Objective: Lumbar spine dual energy X-ray absorptiometry (DXA) scans are typically acquired with the patient's legs elevated on a positioning block thereby flattening the normal lumbar lordosis. With GE densitometers it is also possible to

acquire lumbar spine scans with the legs down. BMD values obtained with legs down vs. legs elevated does minimally differ, however it is unknown if leg elevation affects trabecular bone score (TBS) results. The purpose of this study is to assess the effect of leg position on TBS.

Methods: Lumbar spine (L1-L4) DXA scans acquired in legs up and legs down positioning using GE Healthcare Prodigy and iDXA densitometers. The “OneScan” feature mode was not used. These scans were analyzed with enCORE software v 12.3 or 14.1. All scans were re-processed using MediMaps TBS Calculator v2.3 or TBS iNsiight v3.0.2 to obtain TBS results. Linear regression and Bland-Altman analyses were performed to compare TBS results in the legs up vs. legs down position.

Results: Sixty-four women, mean age and BMI 65.1 years (range 28.2-86.6) and 26.4 kg/m² (range 18.1-34.8) were studied on three Prodigy densitometers. Fifty women, mean age and BMI 68.6 years (range 15.2-92.5) and 26.2 kg/m² (range 19.9-35.1) were studied on an iDXA densitometer. With Prodigy and standard legs up positioning, the L1-L4 BMD ranged from 0.738-1.549 g/cm² and was highly correlated with legs down positioning, R²=0.99. TBS results ranged from 1.072-1.632 and were also highly correlated, R²=0.93 with a mean bias of -0.005 TBS units between leg positions (Figure). With iDXA and standard legs up positioning, the L1-L4 BMD ranged from 0.753-1.622 g/cm² and was highly correlated with legs down positioning, R²=0.97. TBS results ranged from 1.040-1.455 and were also highly correlated, R²=0.90 with a mean bias of 0.00 TBS units between leg positions (data not shown).



Conclusion: Leg positioning minimally affects TBS results with GE Healthcare Prodigy and iDXA densitometers but the difference from legs up to legs down is likely of no clinical significance.

P895

EFFECTIVENESS OF 3D-DXA AS A TOOL TO DIFFERENTIATE BONE COMPONENTS IN TWO MODELS OF DIABETES COMPARED TO CONTROLS

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Background: Both type 1 (DM1) and type 2 (DM2) diabetes increase long term fracture risk (“diabetoporosis”) due to chronic hyperglycemia despite chronic low (DM1) or initially high (DM2) insulin levels, among other not fully understood factors. Furthermore, latent autoimmune diabetes in adults (LADA), a recently recognized model of interest, includes features of both types of diabetes, and has been little explored for fracture risk. Conventional DXA measurements do not reflect bone macro or micro architectural characteristics in diabetes, and is well known, that the microarchitecture features are different between DM1 and DM2. 3d-DXA technology reanalyzes conventional DXA images to obtain measurements from cortical and trabecular bone that could help the predictive value of this tool in diabetic patients

Objective: To analyze BMD and 3D-DXA characteristics in a group of patients with LADA, DM2 and healthy controls seeking for possible structural differences between groups.

Methods: Patients diagnosed with T2D according to ADA criteria and LADA patients (age 30 – 70), positive for at least 1 autoantibody: GAD and/or IA-2A). Diagnosis of added immune disease or a fragility fracture history were exclusion criteria. Anthropometric measurements, serum vitD, and biochemical parameters were taken. Conventional DXA scans for body composition, lumbar and femoral BMD with and iDXA GE Lunar were obtained and 3D-DXA analysis of left femur were made. A group of healthy controls were included for comparison. 3D-DXA software (Galgo Medical, Barcelona, Spain) was used to analyze the cortical and trabecular bone of patients and control group. 3D-DXA registers a 3D appearance model of the femoral shape and density onto the DXA projection to obtain a 3D subject-specific model of the femur of the patient and quantify the volumetric BMD (vBMD), volume (for trabecular and cortical regions) and cortical thickness distribution.

Results: 211 subjects (66% women), mean age 52.7 years (+11.7) were recruited. Of them 87 (41%) were controls, 58 (27.5%) LADA and 66 (31%) DM2 Z-scores for total body less head, lumbar region and left femur had no significant differences among groups. However, 3D-DXA analyses showed the trabecular content in neck and greater trochanter were diminished in T2D patients compared to controls and LADA patients (p=0.005). Total cortical thickness showed no difference between groups, but was lower in the neck region in LADA patients compared to controls and DM2 (p=0.044).

Conclusions: Our results showed significant differences between the trabecular structure in DM2 vs. controls as well as

the cortical thickness in the neck region in LADA patients vs. controls and DM2 using 3D-DXA images. This is as far as we explore in the literature is the first report using this technology in LADA and DM2 patients. Our findings need to be reproduced by other groups.

P896

DIFFERENCES IN FEMORAL NECK STRUCTURE BETWEEN ELDERLY CAUCASIAN AND CHINESE POPULATIONS: A PERTH-BEIJING COHORT STUDY

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Introduction: Ethnic differences in skeletal structure may be related to the different lower population risk of hip fracture in Chinese compared to Caucasian populations. Two dimensional mass and size measurements and structural biomechanics were used to assess these structural differences.

Materials and Methods: Participants consisted of 196 healthy Beijing Chinese women age 76.5±4.8 (mean±SD) years, and 237 healthy Perth Caucasian women age 77.1±5.0 years. Validated two dimensional femoral neck images were constructed using QCT and hip structure analysis (HSA) software. Structural measures included cross-sectional area (CSA), scanned area (A), bone mineral content (BMC), and periosteal width. Derived biomechanical measures included areal bone mineral density aBMD, section modulus (Z) and the buckling ratio (BR) and new assumption free measures sigma (s), a measure of the internal distribution of bone previously identified as a predictor of hip fracture, and delta (d), an indicator of center of mass displacement from geometric center were calculated.

Results: Compared to the Beijing participants the Perth participants were heavier (Beijing 58.7±11.8; Perth: 66.1±11.0 kg), taller (154.9±16.7 vs. 158.9±6.0 cm) and had higher FN bone mass, area, density, and periosteal width. After adjustment for frame size the mass was not significantly different but no size parameters were substantially affected. Regarding calculated biomechanical variables s and BR were larger in the Perth participants, theoretically suggesting greater susceptibility to failure.

Conclusion: These data identified more bone within a smaller femoral neck in Beijing participants resulting in greater theoretical resistance to fracture through improved internal bone

structure and distribution identified by aBMD and s, and a reduced buckling measurement. These differences may underlie the reduced incidence of hip fracture in Chinese. These observations need to be examined in other data sets and related to fracture propensity in both Chinese and Caucasian populations.

P897

PRIMARY HYPERPARATHYROIDISM COEXISTING WITH GRAVES' DISEASE IN A PATIENT WITH VITAMIN D DEFICIENCY

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Primary hyperparathyroidism is known to coexist with thyroid cancer and breast cancer. However, primary hyperparathyroidism coexisting with Graves' disease is extremely rare.

Aim: The aim was to describe the case of a patient with Graves' disease causing severe hyperthyroidism who in the course of the disease developed vitamin D deficiency and primary hyperparathyroidism.

Methods: A patient, female, aged 49 years, presented with severe hyperthyroidism causing tachycardia, palpitations and weight loss. TSH receptor antibodies were positive in the context of Graves' disease. She was treated with methimazole and propranolol and the disease went into remission. A year later treatment with methimazole was discontinued and 4 months later the patient had a relapse of hyperthyroidism. Laboratory tests revealed hyperthyroidism along with vitamin D deficiency and elevated PTH levels.

Results: Vitamin D was administered along with methimazole and propranolol. During follow up, despite normal vitamin D levels, PTH levels remained extremely elevated and blood calcium levels in the upper normal range. Ultrasound of the thyroid and parathyroid glands revealed a parathyroid adenoma adjacent to the left thyroid lobe. The adenoma was visible in a scan with ^{99m}Tc-sestamibi. The patient is being followed up and prepared for surgical treatment of both hyperthyroidism and primary hyperparathyroidism.

Conclusions: The extremely rare case of a patient with concurrent Graves' disease causing severe hyperthyroidism and primary hyperparathyroidism along with vitamin D deficiency is presented. This case further illustrates that primary hyperparathyroidism may be diagnosed in the context of severe vitamin D deficiency, being further aggravated by vitamin D administration and that primary hyperparathyroidism may coexist with thyroid disorders.

P898

MATERNAL VITAMIN D DURING PREGNANCY AND OFFSPRING BODY COMPOSITION: FINDINGS FROM THE VITAMIN D IN PREGNANCY BIRTH COHORT STUDY

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Objective: To determine the association between maternal vitamin D and offspring body composition.

Materials and Methods: Participants were mother-child pairs recruited from an Australian based birth cohort study, the Vitamin D in Pregnancy (VIP) study. Mothers were recruited before 16 weeks gestation and provided a blood sample at both recruitment and at 28-32 weeks gestation. Of the 402 infants at birth, 209 (52.3%) returned at the 11 year follow-up and 183 had complete measures for the current analyses. Vitamin D (25(OH)D) was measured by radioimmunoassay (Tyne and Wear, UK) At 11 years of age lean and fat mass was quantified using dual energy x-ray absorptiometry (GE Lunar Prodigy, Madison, WI, USA).

Results: There was an interaction between maternal smoking and maternal vitamin D status at recruitment, thus data was stratified by smoking status. In smokers, serum 25(OH)D status at recruitment was negatively associated with fat mass percentage and positively associated with lean mass both ($p < 0.05$). This remained independent of child height, sex and maternal parity. There was no association in non-smokers ($p > 0.05$). There was no interaction between Maternal 25(OH)D status at 28-32 weeks gestation and maternal smoking status. 25(OH)D at 28-32 weeks gestation was not associated with offspring body composition measures.

Conclusions: Maternal vitamin D in early pregnancy, but not at a later stage of gestation, is associated with body composition in offspring, in those who smoke during pregnancy. Mothers, who smoke during pregnancy, should be encouraged to quit smoking, and optimise their vitamin D levels from early pregnancy.

P899

VALIDATION OF ASYNCHRONOUS QUANTITATIVE BONE DENSITOMETRY OF THE SPINE: ACCURACY, SHORT-TERM REPRODUCIBILITY, AND A COMPARISON WITH CONVENTIONAL QUANTITATIVE COMPUTED TOMOGRAPHY

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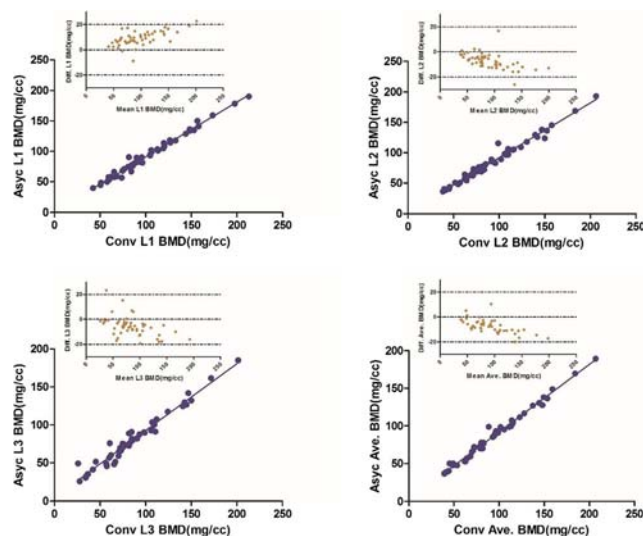
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Introduction: Asynchronous calibration quantitative computed tomography (QCT) is a promising new technology for opportunistic screening for osteoporosis; however, few studies have compared conventional QCT and asynchronous QCT. Moreover, asynchronous QCT has not yet been fully validated for the clinical measurement of BMD.

Materials and Methods: We used the European spine phantom (ESP) with repositioning during scanning and assessed the accuracy and short-term reproducibility of asynchronous QCT. Intra-scanner and intra-observer precision were each calculated as the root mean square of the standard deviation (RMSSD) and the coefficient of variation (CV-RMSSD). We also compared asynchronous and conventional QCT results in 50 clinical subjects.

Results: The accuracy of asynchronous QCT for three ESP vertebrae ranged from 1.4–6.7%, whereas intra-scanner precision for these vertebrae ranged from 0.53–0.91 mg/cc. Asynchronous QCT was most precise for a trabecular BMD of 100 mg/cc (CV-RMSSD=0.2%). For intra-observer variability, overall precision error was smaller than 3%. In clinical subjects there was excellent agreement between the two calibration methods with correlation coefficients ranging from 0.979–0.988. A Bland–Altman analysis demonstrated that methodological differences depended on the magnitude of the BMD variable.

Conclusion: Our findings indicate that the asynchronous QCT has good accuracy and precision for assessing trabecular BMD in the spine.



P900

VISCOSUPPLEMENTATION FOR OSTEOARTHRITIS: IN SEARCH OF THE RIGHT INDICATIONS

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Introduction: With increase in life expectancy and improved quality of life, the elderly population is on the rise. Majority of

them invariably have various grades of degenerative changes in their knee joints. Besides, development of osteoarthritis at young age due to numerous reasons (obesity, trauma) is also on the increasing trends. Approximately 25% of people with pain from knee OA experience difficulty performing major activities of daily living, including walking a quarter mile, climbing stairs, and kneeling. Pain killers (topical and systemic) have a short term limited role owing to safety concerns, whereas orthotic supports and physical therapy are some of the alternative options explored with moderate success. There is a definite void in the current management of such cases and has led to a greater demand for the alternate elixir. Recent clinical studies on intra-articular use of viscosupplementation have demonstrated favorable outcomes and is rapidly gaining worldwide acceptance.

Material and Methods: In our study conducted between Jan 2010 to December 2015, we analysed the use of Viscosupplementation in a tertiary care hospital, with respect to indications, safety and efficacy in 124 patients.

Result: Following viscosupplementation, patient satisfaction, WOMAC and VAS scores were significantly improved in comparison with no injection group (Improvement of Pain:46%, Stiffness:32% and Function:43%). Use of concomitant medication was significantly reduced (48% at 24 weeks and 50% at 52 weeks).

Conclusion: Analysis of cases of osteoarthritis treated with viscosupplementation revealed variable effects. However, when administered to patients with features of early osteoarthritic changes and during the early course of the disease, it appears to be valuable especially in alleviating the pain and improving the overall function. Owing to the prevailing controversies and lack of well-defined guidelines in the current literature, there is need for further randomized controlled studies to be conducted in homogeneous population with further focus on efficacy, formulation, dosage, standardized scheduling, extended indications and drug delivering techniques. Till then, viscosupplementation has arrived and can be considered as an addendum in the orthopaedic surgeons armamentarium in tackling osteoarthritis.

P901

IS THERE AN INDEPENDENT ASSOCIATION OF MUSCLE MASS AND STRENGTH ON BONE MEASURES IN SCHOOL-AGED CHILDREN? THE VITAMIN D IN PREGNANCY STUDY

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Objective: To determine the relative independent contribution of muscle strength and mass on measures of bone mass in a paediatric population.

Materials and Methods: Participants were children recruited as part of the Vitamin D in Pregnancy study. Data for the current analyses pertain to the 11-year follow-up (median age: 10.9 (IQR 10.7-11.4) yrs). 209 of 402 (52.3%) children measured at birth returned for 11-year follow-up, and 193 had complete data for the current analyses. Children had an assessment of BMC, BMD and lean mass by DXA (Lunar). The spine (L2-L4) and total body (less head) (TBLH) sites were used for analyses. Handgrip strength was measured using a dynamometer (JAMAR) and muscle strength in the lower limbs with a manual muscle tester (Lafayette).

Results: There were univariate associations between lean mass (ρ 0.49-0.86, all $p < 0.001$) and BMC and BMD at the spine and TBLH. Similarly, significant correlations were observed between muscle strength at all sites and BMD and BMC at the spine and TBLH (ρ 0.18-0.54, $p \leq 0.001-0.02$). After adjustment for height, sex, pubertal status and fat mass, associations remained significant ($p = 0.001-0.02$). In adjusted models including both strength and mass, both remained significant predictors of BMD. In models using handgrip, a 1kg increase in lean mass was associated with a 0.008 g/cm^2 (95% CI 0.002, 0.013) and a 0.008 g/cm^2 (95% CI 0.002, 0.011) increase in BMD at the spine and TBLH, respectively. A 1kg increase in handgrip strength was associated with a 0.006 g/cm^2 (95% CI 0.002, 0.009) and 0.004 g/cm^2 (95% CI 0.002, 0.006) increase in BMD at the spine and TBLH, respectively. Similar patterns were observed with lower limbs. The same pattern was observed with BMC.

Conclusions: In this cohort, both muscle strength and mass appear to make independent contributions to bone mineral measures. Physical activity interventions in school-aged children could be targeted at not only increasing muscle mass, but also muscle function.

P902

THE DISCRIMINATIVE ABILITY OF BMD, TRABECULAR BONE SCORE AND FRAX[®] FOR NON-VERTEBRAL FRACTURES IN PATIENTS WITH RHEUMATOID ARTHRITIS.

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The aim of our study was to evaluate impact of bone mineral density and trabecular bone score on non-vertebral fracture risk assessment in patients with RA. One hundred forty one

patients age 53.64 ± 11.41 with duration of RA $9, 59 \pm 8, 89$ year were included in our study. High prevalence of non-vertebral fracture during RA was found (annually incidence rate 2.69 per 100 patients/year). We divided patients into two groups – 1 group with non-vertebral fracture ($n=15$) and 2 group without history of any fracture ($n=126$). All demographic and disease related data were similar in two groups. High prevalence of osteoporosis (6 (40.00%) in 1 group vs. 34 (26.68%) in 2 group, $p=0.221$) and osteopenia (4 (26.66%) in 1 group vs. 40 (31.74%) in 2 group, $p=0.470$) was found in both groups without significant differences.

Our data shows that T-criteria hip, FRAX[®] major osteoporotic fracture risk, FRAX hip fracture risk have own discriminative value, whereas T-criteria in lumbar spine, BMD lumbar spine, TBS in our measurements have not get significant level for non-vertebral fractures. We did not find disease-related risk factors for non-vertebral fracture prevalence. Cohort studies have demonstrated that TBS increases the predictive validity for clinical spine, hip and any osteoporotic fractures [Hans D, 2011, Rabier B, 2010].

Our study has several limitations. First, our population does not reflect all RA population due status and location of our Regional Hospital – patients with recent fractures or severity immobility could be missed. Second, a minimal measurements of BMD and T-criteria in hip and femoral neck were chosen, that could interfere on analysis. And, finally we think that for non-vertebral fracture very important to take into account falls frequencies in patients with RA. In several studies, falls were reported to be the most important clinical risk factors for fractures We suggest is required further evaluation of fracture risk in patients with RA.

P903

COMPARATIVE STUDY OF FRAX[®] SCORE IN ECUADORIAN POPULATION

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Introduction: Osteoporosis is a systemic skeletal disease characterized by a decrease in bone mineral density with alterations in bone microarchitecture and an increased risk of fracture. The World Health Organization asserts that it is a major public health problem and increases morbidity and mortality in elderly patients. The FRAX[®] score is a tool that estimates the risk of fracture at 10 years. It was adapted to the Ecuadorian population in 2009.

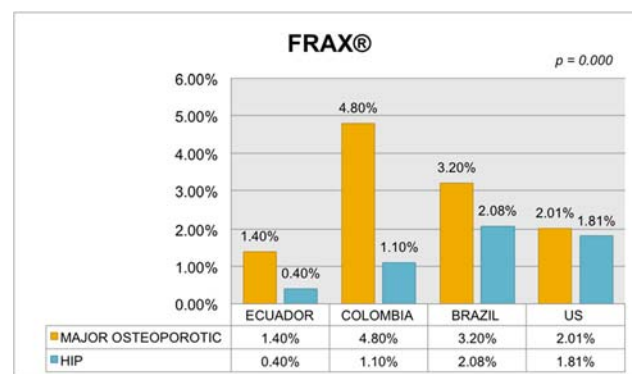
Purpose: To identify the risk of fracture in the Ecuadorian population using the FRAX[®] Ecuador calculator and compare the results with FRAX Colombia, Brazil and the United States (Hispanics).

Methods: This is a retrospective study that included an Ecuadorian population between 40-90 years old, who underwent bone densitometry between 2013-2015, and whose risk of fracture was assessed with FRAX Ecuador, Colombia, Brazil and the United States (Hispanics). The DXA values considered were: Osteopenia: T Score -1.0 -2.5 and Osteoporosis: T Score ≥ 2.5 .

Results: We analyzed 837 patients with a mean age of 61.54 [SD 10.90] (40-90). The predominant gender was female with 87.6% (733) vs. 12.4% (104) male. The mean age of menopause was 45.69 [SD 5.4]. The diagnoses according to bone densitometry were: 20.3% (170) normal, 30.5% (255) osteopenia and 49.2% (412) osteoporosis. The risk of major osteoporotic fracture in the population using FRAX Ecuador was 1.4% (3-13%) and hip 0.4% (0-9.3%). For FRAX Colombia: 4.8% (7-29%) for major osteoporotic fracture and 1.1% (0-17%) for hip fracture. With FRAX Brazil, 3.20% (1.2-25) was obtained for major osteoporotic fracture and 2.08% (0-16%) for hip. Finally, FRAX USA (Hispanic) had a risk of 2.01% (0-17%) for major osteoporotic fracture and 1.81% (2-12%) for hip fracture (Figure 1).

Conclusions: The risk of fracture for the Ecuadorian population according to the FRAX Ecuador calculator was 1.4% for major osteoporotic fracture and 0.4% for hip fracture. Surprisingly, this population presents a low risk of fracture using the calculator of this country, in comparison to the scores obtained using the FRAX of Colombia, Brazil and the United States (Hispanic). This may indicate that the risk of fracture may be underestimated with FRAX Ecuador, although more specific studies are needed.

Figure 1. Risk of fracture by FRAX[®] score in Ecuadorian population.



P904

IDENTIFYING WOMEN AND MEN AT HIGH FRACTURE RISK BY LEVERAGING THE ELECTRONIC MEDICAL RECORD TO ESTIMATE FRAX TREATMENT THRESHOLDS

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Objective: In the busy clinic, identifying individuals at high fracture (fx) risk who warrant intervention can be a challenge. As there are several medical conditions that increase the risk for bone loss and falls, we explored whether we could exploit data available in the electronic medical records (EMR) to estimate FRAX treatment thresholds to help passively identify patients who would benefit from further bone mineral density (BMD) screening and management.

Materials and Methods: We studied 912 women and men, previously recruited for our bone health studies, in whom FRAX scores (with and without BMD) had been determined and comprehensive medical diagnoses were available through the medical linkage system of the Rochester Epidemiology Project. All diagnoses were categorized by the Clinical Classification Software (CCS) system whereby over 14,000 ICD-9-CM diagnoses are reduced to 568 clinically meaningful categories. If a subject had at least two diagnoses in a CCS category that were at least 30 days apart and within 5 years of their FRAX assessment, the subject was treated as having that CCS code. We used Gradient Boosting Machine (GBM) to create models that would predict the treatment thresholds for the FRAX 10-year risk for major osteoporotic (OP) fx (>20%) and hip fx (>3%), based on available diagnoses. Models were fit using age, sex and CCS category from 80% of the data, retaining 20% for validation.

Results: Of the 564 (62%) women and 348 (38%) men, the mean±SD age was 61±16 yrs. There were no significant differences in subject characteristics used for FRAX calculation or FRAX scores between the training and validation sets. The c-statistic for GBM models predicting treatment thresholds for FRAX, calculated with BMD, for major OP fx and hip fx were 0.95 and 0.96, respectively, for the training set, and 0.88 and 0.94 for the validation set. Similar results were observed for FRAX scores without BMD.

Conclusion: FRAX treatment thresholds may be reasonably estimated from data available in the EMR to help passively identify to the clinician those at highest risk for fracture who would warrant further evaluation. Further work to implement and validate these findings in the EMR system would be necessary.

P905

REGULATION OF BONE CELL FUNCTION

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Bone cell function is important for the maintenance of appropriate bone mass levels. Loss of the balance between bone formation and bone resorption leads to osteopenic situation that precedes osteoporosis. As osteoporosis is a serious age-associated disorder that affect an increasing number of

patients in most of the countries worldwide, understanding of the pathological bases for the impairment of bone cell function is a serious matter. However, it is still incompletely understood how the function of bone cells is regulated at cellular and molecular levels. As bone remodeling is a repetitive sequence of bone resorption and bone formation, bone cells need to move to the site of bone resorption cavity to refill the resorbed bone area. This movement of bone cells is based on the migration capability of bone cells and filling of the bone cell cavity is also dependent on how fast the proliferation of bone cells would proceed. Therefore, cell migration and cell proliferation could be linked closely while not much has been known in this aspect of bone cell function. The data on bone cell migration and proliferation on single cell bases will be presented.

P906

OUTCOMES FOLLOWING ELECTIVE TOTAL HIP AND KNEE ARTHROPLASTY IN PATIENTS WITH COAGULATION DEFECTS

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Background: Outcomes following elective total hip and knee arthroplasty in patients with coagulation defects are not well defined. The current literature regarding this patient population is limited by few studies with small sample sizes. This study aims to investigate outcomes following elective total hip and knee arthroplasty in patients with coagulation defects using a national patient population over a twenty year period.

Methods: The National Hospital Discharge Survey was used to identify a cohort of 10,887,942 patients who underwent elective total hip or knee arthroplasty from 1990 to 2010. Patients with coagulation defects (N=23,373) were identified and compared to those patients without coagulation defects (N=10,864,569). Demographic data were collected and the groups were analyzed for differences in complication rates and mortality. Multivariable logistic regression was used to isolate the effect of coagulopathy on complications and mortality.

Results: Patients with coagulation defects were younger (64.8 years compared to 66.6 years, P<0.001) and had lower rates of comorbidities (51.3% compared to 59.1%, P<0.001) than patients without coagulation defects. Patients with coagulation defects had higher rates of complications including postoperative bleeding (4.1% compared to 1.1%, P<0.001), postoperative anemia (31% compared to 18.6%, P<0.001), and pulmonary embolism (0.9% compared to 0.4%) compared to those without coagulation defects and required higher rates of blood transfusion (20.3% compared to 15.9%, P<0.001). Perioperative mortality was higher in patients with

coagulation defects than those without coagulation defects (0.4% compared to 0.2%, $P < 0.001$). Multivariable logistic regression showed that coagulopathy was independently associated with a higher rate of complications (OR 2.05; 95% CI 1.99 to 2.10, $P < 0.001$) and mortality (OR 1.64; 95% CI 1.32 to 2.02, $P < 0.001$).

Conclusions: Patients with coagulation defects undergoing elective total hip and knee arthroplasty are at increased risk for perioperative complications and mortality. These findings emphasize the importance of preoperative risk assessment and medical optimization in this patient population.

P907

INCIDENCE AND PERIOPERATIVE MORTALITY FOLLOWING ELECTIVE TOTAL HIP AND KNEE ARTHROPLASTY IN THE UNITED STATES: A 20-YEAR ANALYSIS

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Background: There has been a substantial increase in elective total hip and knee arthroplasty in the United States over the past several decades. This study aims to investigate changes in incidence and mortality on a national level over a 20 year period for patients undergoing this procedure. This is the largest study to date evaluating trends in incidence and mortality following elective total hip and knee arthroplasty.

Methods: The National Hospital Discharge Survey was used to identify a cohort of 11,236,835 patients who underwent total hip or knee arthroplasty from 1990 and 2010. In order to obtain a purely elective study population, we excluded all patients undergoing surgery for hip or lower extremity fracture, and those with a diagnosis of infection or malignancy. After exclusion criteria were applied a cohort of 10,887,942 was identified. Demographic data including incidence, complication rates and mortality were obtained. Trends in incidence and mortality over the 20 year period were analyzed and logistic regression was used to isolate independent variables associated with mortality.

Results: A total of 10,887,942 patients underwent elective total hip and knee arthroplasty in the United States between 1990 and 2010. Population-adjusted incidence increased from 90 per 100,000 in 1990 to 308 per 100,000 in 2010 ($P < 0.001$). National perioperative mortality for the total cohort was 0.2% over the 20 year period decreasing from 0.9% in 1990 to 0.1% by the final study year in 2010 ($P < 0.001$). A larger decrease in mortality was seen over the first decade, (0.9% in 1990 compared to 0.3% in 1999, $P < 0.001$) than that observed over the second decade (0.1% in 2000 compared to 0.1% in 2010, $P = 0.760$). When controlling for confounders, multivariable logistic regression showed that acute myocardial infarction

(OR 15.8; 95% CI 15.0 to 16.6, $P < 0.001$) and pulmonary embolism (OR 12.5; 95% CI 11.8 to 13.3, $P < 0.001$) had the strongest association with perioperative mortality followed by pulmonary complications including pneumonia (OR 4.6; 95% CI 4.3 to 4.9, $P < 0.001$) and pulmonary insufficiency (OR 4.6; 95% CI 4.2 to 5.0, $P < 0.001$).

Conclusions: This is the largest study to date analyzing the incidence and perioperative mortality following elective total hip and knee arthroplasty in the United States. There has been a substantial increase in incidence of these procedures over the past two decades which is larger than previous reports. Mortality has decreased significantly over the study period. The most pronounced improvement in mortality rate was observed from 1990-1999, likely due to improvements in perioperative management in these patients. This improvement was not observed over the second decade of the study, possibly due to an aging population and an increasing comorbidity burden that may have offset further advances in perioperative medical management.

P908

WHAT PHYSICAL ACTIVITY PROGRAM FEATURES ARE IMPORTANT TO PATIENTS WITH KNEE OSTEOARTHRITIS? A DISCRETE CHOICE EXPERIMENT

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Objective: To assess patient preferences for physical activity programs in the management of knee osteoarthritis (OA).

Material and Methods: Patients met eligibility to participate in our study if they were 45 years or older with complaints of knee pain, aching or stiffness for at least one month over the past 12 months; were able to speak and read in English; and expressed interest in becoming more physically active. Patients were excluded if they had a total joint arthroplasty in their index knee. Patient preferences were assessed using a discrete choice experiment that compared hypothetical physical activity program profiles. Physical activity attributes and attribute levels were developed through use of community-

based focus groups and semi-structured interviews with older adult community members with chronic knee pain. Six attributes were included in the DCE: physical activity time, physical activity effort, monthly cost, convenience, enjoyment, and benefits for my health. Kmeans cluster analysis was used to identify whether participants clustered on preferences for physical activity program attributes. All participants were invited to complete demographic surveys, radiographic knee assessment, and health outcome instruments.

Results: Final sample included 150 participants; mean age 65, 72% female, 47% white, non-Hispanic. Patients ranked benefit for my health (0.26) and enjoyment (0.24) as the two most important attributes to a physical activity program. Physical activity time (0.10), physical activity effort (0.11), and monthly cost (0.13) were equally important. Cluster analysis revealed 3 preference clusters: Cluster 1 (n=34) reported a ranking for enjoyment (0.35) that nearly doubled the ranking for health benefit (0.18); Cluster 2 (n=62) reported a higher ranking for health benefit (0.38) than enjoyment (0.22); Cluster 3 reported similar preferences across all attributes. Cluster 1 had fewer individuals with radiographic knee OA (50% vs. 70% for Clusters 2 and 3).

Conclusion: In the full cohort, patients ranked benefit for health as important as enjoyment. When clustered on preference, clusters 1 and 2 differentially ranked preferences for enjoyment and health benefit, suggesting subgroups of individuals with like preferences to which interventions could be tailored. Further research is required to use DCE-elicited preferences to guide intervention development.

P909

CORRELATION OF BONE MINERAL DENSITY WITH SEVERAL COMMON MUSCLE MASS CRITERIA

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Background: Bone mineral density is known to have a positive correlation with lean body mass but results are inconsistent. There are several indicators of muscle mass used in common operational definitions of low muscle mass, poor concordance between those definitions has been reported.

Objective: To describe the correlation between different muscle mass criteria and bone mineral density corrected by age and body fat as co-variables.

Material and Methods: We evaluated 1174 women aged 50 to 90 years from the western of Mexico. A whole body DXA scan (Hologic QDR 4500) was performed to evaluate the areal bone mineral density of lumbar spine (BMD-L1-L4), Femoral Neck (BMD-FN) and Total Hip (BMD-TH) as well as body composition (fat and muscle mass). The indicators used to evaluate muscle mass were 1) the quotient of Appendicular lean soft tissue corrected by body mass index (ALST/BMI), 2) absolute kilograms of appendicular lean soft tissue (ALSTKG) according to The Foundation for National Institutes of Health Sarcopenia Project (FNHISP), and 3) appendicular lean soft tissue corrected by squared height (ALST/HT²) as propose The European Working Group on Sarcopenia in Older People (EWGSPOP). We performed multiple linear regression analysis for each indicator including age and fat mass (kg) as covariables.

Results: Bone mineral density (all sections) were significantly correlated with all muscle mass indicators. For each muscle mass indicators BMD-L1-L4 showed the weakest correlation and BMD-TH the strongest. Analyzing individually, the weakest and strongest correlations were observed with ALST/HT² + BMD-L1-L4 and ALSTKG + BMD-TH, respectively (Table 1).

Conclusion: Bone mineral density is correlated with the commonly used approaches to evaluate muscle mass. However, this correlation is strongest when it is evaluated with BMD-TH and ALSTKG.

| MODEL* | Coefficient | IC 95% | R Square | Adjusted R Square | t stat |
|----------------------------|-------------|---------------|----------|-------------------|--------|
| ALSTKG | | | | | |
| BMD-L1-L4 | 0.020 | 0.016 - 0.025 | 0.144 | 0.142 | 8.621 |
| BMD-FN | 0.014 | 0.011 - 0.017 | 0.338 | 0.336 | 8.873 |
| BMD-TH | 0.019 | 0.015 - 0.022 | 0.386 | 0.385 | 10.245 |
| ALST/HT² | | | | | |
| BMD-L1-L4 | 0.025 | 0.012 - 0.038 | 0.096 | 0.093 | 3.886 |
| BMD-FN | 0.025 | 0.016 - 0.033 | 0.311 | 0.310 | 5.536 |
| BMD-TH | 0.036 | 0.026 - 0.046 | 0.357 | 0.355 | 6.914 |
| ALST/BMI | | | | | |
| BMD-L1-L4 | 0.380 | 0.260 - 0.500 | 0.118 | 0.116 | 6.200 |
| BMD-FN | 0.188 | 0.107 - 0.268 | 0.306 | 0.304 | 4.578 |
| BMD-TH | 0.256 | 0.163 - 0.350 | 0.346 | 0.344 | 5.388 |

* All models reached statistical significance (p<0.05)

P910

ALTERATIONS OF GUT MICROBIOME IN RHEUMATOID ARTHRITIS

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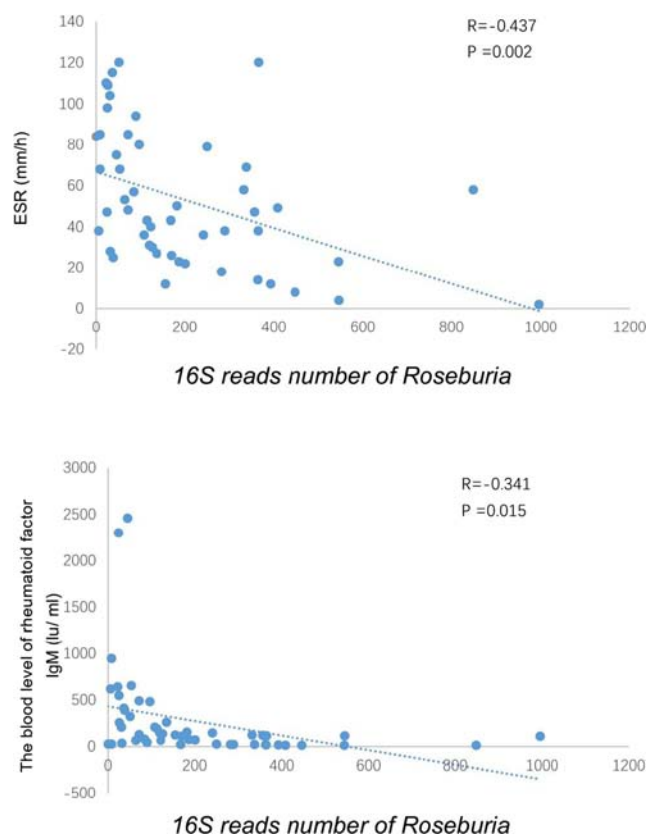
Objectives: Rheumatoid arthritis (RA) is a chronic inflammatory joint disease, which can cause cartilage

and bone damage as well as disability. Recent studies have indicated that the pathogenesis of RA requires the interaction between genetic and environmental factors, such as gut microbiome. However, current evidence for the alterations of gut microbiome in RA is still limited. Thus, our study aimed to analyze the fecal samples from a cohort patient with RA and to identify the associated alterations in gut microbiome when compared to healthy controls.

Material and Methods: Fecal samples were obtained from treatment-naïve RA patients (n=50) and healthy controls (n=50). High-quality 16S rDNA V3-V4 sequences were extracted from fecal samples and further sequenced on a 454 Genome Sequencer platform for bioinformatics analysis, resulting in operational taxonomic units (OTUs) related to gut microbiota and phylogenetic tree. Clinical parameters of RA were correlated with specific microbial taxa by Correlation analysis.

Results: A total of 121227 OTUs was clustered at 97% sequence similarity and assigned taxonomic lineages by comparison with the Ribosomal Database Project database. The OTUs were classified into 35 phylums, 73 classes, 143 orders, 280 families, and 1165 genus. Intriguingly, our data revealed a lower alpha diversity, including richness, evenness and Shannon Index, as well as a lower Firmicutes / Bacteroidetes ratio in the gut microbiome of RA patients when compared with the healthy controls. Moreover, at genus level, our taxonomic analysis identified 288 differentially abundant taxa ($P < 0.05$), among which 6 taxa, including *Bacteroides*, *Parabacteroides*, *Paraprevotella*, *Porphyromonadaceae*, *Phascolarctobacterium* and *Carnobacterium*, were significantly enriched in the gut microbiome of RA patients. Conversely, a series of butyrate-producing taxa such as *Faecalibacterium*, *Roseburia*, *Subdoligranulum*, *Ruminococcus* and *Pseudobutyrvibrio* were depleted in RA patients but enriched in healthy controls. Furthermore, we found a negative correlation ($P < 0.05$) between the abundance of butyrate-producing *Roseburia* and the clinical parameters of disease status and activity such as erythrocyte sedimentation rate and the blood level of rheumatoid factors (IgM) (Figure 1).

Conclusions: In the present study, we demonstrated that the composition of the gut microbiome in RA patients differed from that in healthy individuals. Our results revealed a decreased microbial diversity accompanied by altered microbial abundance in the gut microbiome of RA patients, which could be characterized as ‘dysbiosis’ and associated with the disease status and activity. The identified alterations in the gut microbiome might provide an updated overview for postulating molecular understandings and therapeutic strategy in RA.



P911

ELEVATED MIR-214-3P IN SUBCHONDRAL OSTEOCLASTS PROMOTES SUBCHONDRAL BONE REMODELING AND ENHANCE CARTILAGE DEGRADATION IN EARLY OSTEOARTHRITIS

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Background: Emerging evidence demonstrates that the active osteoclast-mediated subchondral bone (SCB) remodeling precedes the articular cartilage degradation to play a critical role in the initiation and progression of osteoarthritis (OA). Several recent studies have shown that the microRNAs were differentially expressed in SCB between OA individuals and non-OA controls, suggesting a potential role of microRNAs in OA pathogenesis. In our previous studies, we have documented the pro-osteoclastogenic role of miR-214-3p. Moreover, we have demonstrated that osteoclast could release exosomal miR-214-3p into circulation. In this study, we investigated the role of miR-214-3p in osteoclast-mediated SCB remodeling and cartilage degradation in early OA development.

Aim: To investigate the role of miR-214-3p in osteoclast-mediated SCB remodeling and cartilage degradation in early OA development.

Methods: First, the SCB miR-214-3p expression in femoral head samples from OA patients and individuals with femoral neck fracture (non-OA control) were examined by QPCR. Next, a mouse model with surgery-induced OA, *i.e.* anterior cruciate ligament transection (ACLT) model, was established for investigating the miR-214-3p expression in serum and SCB osteoclasts by QPCR, the cartilage degradation by safranin O-staining histology and the circulating bone remodeling marker (CTX-I) and cartilage degradation marker (CTX-II) by ELISA. Thereafter, a series of functional experiments, including luciferase reporter assay and gain-and-loss of function assay, were performed to identify the potential targets of miR-214-3p in regulating OA osteoclast formation and their resorptive activity in cartilage explant *in vitro*. Last, the effect of genetically overexpressing miR-214-3p in osteoclasts on SCB bone remodeling and cartilage degradation in early OA development were evaluated *in vivo*.

Results: We found that the SCB miR-214-3p expression levels were significantly higher in OA patients as compared to non-OA control. In addition, we observed the elevated miR-214-3p levels in SCB osteoclasts at the knee joint together with the increasing serum miR-214-3p levels from day 0 to day 14 after ACLT, which preceded the increase in serum CTX-I and CTX-II. Furthermore, we found that the OA osteoclasts differentiated from bone marrow monocytes/macrophages (BMMs) of ACLT mice showed enhanced resorption activity in cartilage explant *in vitro* as compared to the control osteoclasts differentiated from BMMs of sham-operated mice. Consistently, the OA osteoclasts also expressed remarkably higher level of miR-214-3p than the control osteoclasts. In addition, we found that miR-214-3p could directly target TIMP2 to promote OA osteoclast differentiation and enhance their resorption activity on cartilage explant *in vitro*. Moreover, we also observed highly activated osteoclast-mediated SCB remodeling and accelerated articular cartilage degradation as well as lowly expressed TIMP2 in our established osteoclast-specific miR-214-3p conditional knockin (CKI) mice in the early period after ACLT.

Conclusions: Our study suggests that the elevated osteoclastic miR-214-3p could target TIMP2 to promote the SCB remodeling, thus contribute to the early OA development. The therapeutic potential of targeting osteoclastic miR-214-3p as an alternative anti-resorptive strategy for OA remains to be investigated in future study.

P912

THE EFFICACY OF ABALOPARATIDE-SC IS INDEPENDENT OF BASELINE BMD

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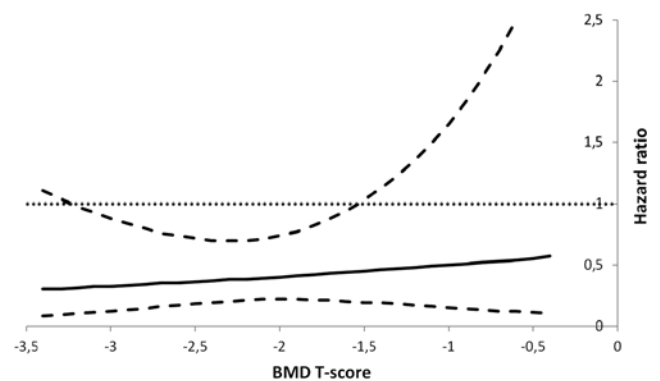
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Daily subcutaneous injection of abaloparatide-SC (80mcg) has been shown to significantly decrease the risk of vertebral and non-vertebral fractures compared with placebo. The aim of this study was to determine the efficacy of abaloparatide-SC as a function of BMD T-score at the femoral neck using BMD as a continuous variable.

Absolute BMD values from the scanners (Lunar Prodigy or Hologic) were used to calculate standardized values to remove the systematic differences between machine manufacturers. A T-score was then calculated using the NHANES reference values for young Caucasian women. The interaction between T-score and treatment efficacy [for any clinical fracture and for major osteoporotic fracture (clinical vertebral, hip, wrist, humerus)] was examined by an extension of Poisson regression. 821 women randomized to the placebo group and 824 women randomized to abaloparatide-SC were followed for up to 2 years. At baseline, femoral neck BMD T-score ranged from -4.3 to 1.3. Treatment with abaloparatide-SC was associated with a 69% decrease in the risk of a major osteoporotic fracture compared to placebo treatment (95%CI: 38, 85%). The risk of any clinical fracture decreased by 43%; (95%CI: 9, 64%). Hazard ratios for the effect of abaloparatide-SC on the fracture outcomes did not change significantly with increasing fracture probability ($p > 0.30$ for any clinical fracture and major osteoporotic fracture (Figure)). Abaloparatide-SC significantly decreases the risk of major osteoporotic fracture and any clinical fracture in women, irrespective of baseline BMD T-score.

Figure. Effect of abaloparatide on major osteoporotic fracture compared to placebo, expressed as hazard ratio and 95% confidence intervals across the range of BMD T-score at baseline



P913

OSTEOCLASTIC MIR-214-3P CONTRIBUTES TO OSTEOLYTIC BONE METASTASIS OF BREAST CANCER

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The metastatic breast cancer cell could cause exaggerated osteoclast formation and excessive bone resorption, leading to osteolytic bone metastasis (OBM). It is becoming evident that the interaction between cancer cells and the bone microenvironment are important for the development of OBM. However, our knowledge on the underlying molecular mechanism responsible for the aberrantly elevated osteoclastic bone resorption during the development of OBM is still limited. Accumulating studies demonstrate that miRNAs also participate in regulating osteoclast differentiation and activity. Nevertheless, the role of osteoclastic miRNAs in regulating the osteoclastic bone resorption under cancer conditions and its contribution to the development of OBM are largely underexplored.

In this study, we examined the expression profiles of osteoclastogenic miRNAs in human bone specimens and identified that miR-214-3p was significantly upregulated in breast cancer patients with OBM. Consistently, we found increased miR-214-3p within osteoclasts, which was associated with the elevated bone resorption, during the development of OBM in human breast cancer xenografted nude mice (BCX). Furthermore, genetic ablation of osteoclastic miR-214-3p in nude mice prevent the development of OBM. Conditioned medium from MDA-MB-231 cells dramatically stimulated miR-214-3p expression to promote osteoclast differentiation. Mechanistically, a series of *in vitro* study showed that miR-214-3p directly targeted *Traf3* to promote osteoclast activity and bone-resorbing activity. In addition, osteoclast-specific miR-214-3p knock-in mice showed remarkably increased bone resorption when compared to the littermate controls, which was attenuated after osteoclast-targeted treatment with *Traf3* 3'UTR-containing plasmid. In BCX nude mice, osteoclast-targeted antagomir-214-3p delivery could recover the TRAF3 protein expression and attenuate the development of OBM, respectively.

Collectively, our findings indicate that inhibition of osteoclastic miR-214-3p may be a potential therapeutic strategy for breast cancer patients with OBM. Meanwhile, the intraosseous TRAF3 could be a promising biomarker for evaluation of the treatment response of antagomir-214-3p.

P914

OSTEOPOROSIS AND LOW MUSCLE MASS COEXIST AND ARE ASSOCIATED IN MEXICAN WOMEN

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Background: Aging related bone and muscle loss are conditions that increase fracture risk and threaten the independence in later life. Numerous studies support the concept of a bone-muscle unit. Many common pathways leading osteoporosis (OP) and low muscle mass (LMM) or sarcopenia have been reported, however, the association of these two conditions is not well characterized.

Objective: To evaluate the coexisting probability and association between OP and LMM in a Mexican women sample.

Material and Methods: We evaluated 1173 Mexican women aged 50 to 90 years. For diagnosing OP and LMM a site and whole body DXA scan (Hologic QDR 4500) was performed. OP was defined according to WHO operational definition as a bone mineral density of -2.5 SD in any of the three sites (lumbar spine, hip, or forearm). For LMM we used three different criteria and cut-off points 1) appendicular lean soft tissue corrected by squared height (ALST/HT²) ≤5.45, as propose The European Working Group on Sarcopenia in Older People (EWGSPOP); 2) appendicular lean soft tissue corrected by body mass index (ALST/BMI) <0.512; and 3) absolute kilograms of appendicular lean soft tissue (ALSTKG) ≤15.02, both according to The Foundation for National Institutes of Health Sarcopenia Project (FNHISP). The sample was divided in decenniums and odds ratios (OR) were calculated for each one. For every LMM criteria, multivariable logistic regression analysis was performed for confounding variables (age and body fat).

Results: LMM and OP are associated independently from the criterion used. However, only ALST/BMI showed statistical significance in all decenniums analysis. ALST/H² was not significant for >80 years group, and ALSTKG was not significant for any decenniums (Table 1). After multivariable logistic regression analysis, we found LMM was significantly related to OP for all indicators (ALST/BMI β -3.75; ALST/H² β -0.46; ALSTKG β -0.27; all *p*<0.001).

Conclusion: LMM and OP showed significant coexisting probability and significant association for all LMM criteria.

| | ALST/BMI | | ALST/H ² | | ALSTKG | |
|-------|----------|----------------|---------------------|----------------|--------|----------------|
| | OR | 95% CI | OR | 95% CI | OR | 95% CI |
| All | 1.57 | (1.21 - 2.04)* | 3.10 | (2.25 - 4.28)* | 3.81 | (2.98 - 4.86)* |
| 50-60 | 3.07 | (1.98 - 4.75)* | 3.77 | (2.18 - 6.54)* | 1.61 | (0.93 - 2.79) |
| 60-70 | 3.06 | (1.99 - 4.73)* | 3.52 | (1.87 - 6.64)* | 1.20 | (0.76 - 1.89) |
| 70-80 | 4.10 | (2.45 - 6.88)* | 2.55 | (1.31 - 4.98)* | 1.28 | (0.77 - 2.14) |
| >80 | 3.41 | (1.29 - 9.00)* | 1.22 | (0.47 - 3.12) | 0.73 | (0.31 - 1.72) |

* *p*<0.05

P915**AWARENESS OF NEUROPATHIC PAIN IN KNEE OSTEOARTHRITIS**M. Yildirim¹, K. Ones¹, A. Cinar¹, G. Goksenoglu¹¹Istanbul Physical Treatment Rehabilitation Education and Research Hospital, İstanbul, Turkey

Objective: Neuropathic pain can be defined as a pain associated with functional abnormality of the nervous system. Neuropathic pain syndromes are heterogeneous conditions. These syndromes do not depend on a single etiopathogenetic mechanism or a clinical entity. Neuropathic pain and osteoarthritic pain are both defined as chronic pain. In this study, we investigated pain and neuropathic pain in knee osteoarthritis.

Methods: One hundred twenty two outpatients who had been diagnosed gonarthrosis according to American College of Rheumatology (ACR) classification criteria were included into the study. Pain scores using Visual Analogue Scales (VAS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and neuropathic pain scores using DN4 scale. Patients divided into two groups according to DN4 score (from 0 to 3) non-neuropathic pain (Group-1) and by the dn4 score (≥ 4) neuropathic pain (Group-2).

Results: Our study identified 61.49% had no neuropathic pain. Neuropathic pain rate in these patients was found to be 38.51%. The average WOMAC pain score in group -1 was 2.79 ± 0.7 while the score for VAS was 6.18 ± 1.7 . Patients with neuropathic pain (group-2) had WOMAC pain score of 4.63 ± 1.1 and VAS of 8.36 ± 0.9 . It was observed that in two groups, neuropathic pain had a statistically significant enhancing effect on the WOMAC pain score and the VAS ($p < 0.001$).

Conclusion: The neuropathic pain scale may facilitate the identification of a neuropathic component to pain in adults with knee OA. It is important to consider the existence of neuropathic pain in the treatment of knee OA pain.

P916**GENDER DIFFERENCES IN KNEE OSTEOARTHRITIS**M. Yildirim¹, K. Ones¹, A. Cinar¹, G. Goksenoglu¹¹Istanbul Physical Treatment Rehabilitation Education and Research Hospital, İstanbul, Turkey

Objective: To examine the associations of sex with knee osteoarthritis (OA) symptomatic severity

Methods: Patients (N=183) with symptomatic knee OA were evaluated. Patients were divided into two groups of men and women. Demographic information was obtained by questionnaire, and radiographic evaluations consisted of weight-bearing semi-flexed knee radiographs. QoL and function were assessed using Western Ontario and McMaster Universities Osteoarthritis (WOMAC) Index and Short Form Health Survey 36-item (SF-36).

Results: The mean age of the 183 study subjects was 61.41 ± 14.21 years and 87% were women. Women showed worse knee OA symptoms in all WOMAC and SF-36 subcategories (all $P \leq 0.001$).

Conclusions: Based on the results of this analysis, it can be concluded that women with knee OA are at a greater risk for worse symptoms.

P917**ARTERIAL HYPERTENSION IN PATIENTS WITH HYPERCALCEMIA**E. V. Brutszkaya-Stempkovskaya¹¹Belorussian State Medical University, Department Of Rheumatology, Minsk, Belarus, Minsk, Belarus

Introduction: According to modern studies, patients with hypercalcemia have an increased cardiovascular risk.

Objective: to study the prevalence of arterial hypertension in patients with hypercalcemia and in patients without hypercalcemia.

Materials and methods: we studied 1,207 people, average age 53.9 ± 17.25 (892 women, 315 men) from 18 to 96 years. Examination: total calcium, total protein, creatinine, cholesterol and triglycerides, HbA1C, ambulatory blood pressure monitoring, ECG, an analysis of morbidity (osteoporosis, kidney stones, cholelithiasis, ulcer disease, type 2 diabetes, hypertension, coronary heart disease, cardiovascular events, cancer, fractures in history).

Results: hypercalcemia has been found in 31 people, mean age was 58.39 ± 11.6 years. Arterial hypertension was detected in 677 (56,1%) cases, in patients with hypercalcemia - in 23 (74,2%) patients and in 654 (55,6%) in patients without hypercalcaemia.

Significant differences was detected in the prevalence of arterial hypertension in patients with hypercalcemia compared all studied patients ($\chi^2=4,03$, $p=0,0447$); in the prevalence of arterial hypertension in patients with hypercalcemia compared patients without hypercalcemia ($\chi^2=4,23$, $p=0,0396$).

Conclusion: The results of the study show an increasing risk of arterial hypertension in patients with hypercalcaemia. The prevalence of arterial hypertension in patients with hypercalcemia was 74,2%. The results suggest the influence of hypercalcemia on the development of arterial hypertension.

P918**ASSOCIATIONS BETWEEN HEALTH LITERACY AND UPTAKE OF OSTEOPOROSIS PREVENTION LIFESTYLE RECOMMENDATIONS IN AUSTRALIAN WOMEN**S. M. Hosking¹, R. Buchbinder², J. A. Pasco³, L. J. Williams³, S. L. Brennan-Olsen⁴

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Objective: To investigate associations between health literacy (the skills an individual requires to manage their health) and uptake of physical activity (PA), smoking, alcohol intake, and calcium intake guidelines.

Methods: Data were collected for women (age range 28.3–89.9 years) participating in the most recent follow-up of the Geelong Osteoporosis Study, a population-based cohort located in south-eastern Australia. Health literacy scores were generated using the Health Literacy Questionnaire (HLQ), a multi-dimensional tool that generates scores across nine domains of health literacy. Dietary calcium and alcohol intake were ascertained by Food Frequency Questionnaire and smoking and PA level were self-reported.

Participants were allocated to one of 4 health literacy groups using hierarchical cluster analysis (Cluster 1=highest health literacy, cluster 4=lowest health literacy). Regression analyses were used to assess the relationship between HLQ cluster and uptake of recommendations for osteoporosis prevention.

Results: Of the 676 women included in analyses, 25.3% self-reported vigorous PA, 89.6% were non-smokers, 75.9% did not exceed the limit of 2 alcoholic beverages per day and 15.0% met Recommended Dietary Intakes for calcium. In age adjusted models, holding cluster 4 as referent, clusters 1 and 3 were significantly more likely to meet PA recommendations (OR 2.62, 95%CI 1.41, 4.88; OR 2.41, 95%CI 1.05, 5.54) but not cluster 2 (OR 1.71, 95%CI 0.91, 3.20). Biphasic associations with socio-economic status were observed. No differences were seen between health literacy clusters and meeting recommendations related to smoking, alcohol and calcium.

Conclusion: Health literacy is likely to play a role in the ability of individuals to meet PA recommendations for osteoporosis prevention. However, further investigation is required to determine which health literacy domains are important in osteoporosis prevention and if similar associations exist in men.

P919

EFFECT OF PLATELET RICH PLASMA ON SERUM AND URINE BIOMARKERS IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objectives: Osteoarthritis (OA) biomarkers reflect joint damage and changes in cartilage metabolism and may be used in diagnosis and evaluation of treatment response (1-4). The aim of this study is to determine the effect of platelet rich plasma (PRP) injections on serum and urine OA biomarkers in patients with knee osteoarthritis.

Material and Methods: The study included 26 patients who were diagnosed as knee OA. All patients had Kellgren-Lawrence grade III radiological changes. One cc of PRP was obtained from 20 cc of venous blood after double centrifugations at 400g for 10 minutes. The patients received 3 injections of PRP at 3-weeks intervals. Blood and urine samples were collected from the patients before treatment and at 3 and 6 months. Serum Procollagen II N-terminal propeptide (PIINP), osteocalcin, cartilage oligomeric matrix protein (COMP) and urine collagen-II telopeptide (U-CTX-II) were studied in all patients. Clinical outcome was evaluated using Western Ontario and McMaster Universities Arthritis Index (WOMAC) questionnaire and quality of life using SF-36 and for pain by a visual analog scale (VAS) in all patients before injection and at 3 and 6 months follow-up visits.

Results: There was no statistically significant difference in cartilage Type II collagen (CII) degradation markers (CTX-II, COMP) and CII biosynthesis marker of PIINP ($p > 0.05$). Significant increase was determined in serum osteocalcin levels ($p < 0.05$) which reflects CII biosynthesis. Statistically significant improvement in all WOMAC parameters (pain, stiffness, physical function ($p < 0.05$) and physical function, physical role, pain, social function, emotional role, mental health, general health and vitality subscores of SF-36 ($p < 0.05$) was noted.

Conclusions: We found statistically significant clinical improvements in knee OA patients treated with PRP injections. Our results suggest that PRP injection does not affect cartilage breakdown but effects Type II collagen biosynthesis which is reflected by increased osteocalcin levels.

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P920

PREVALENCE OF HYPERCALCEMIA IN ADULT IN MINSK-CITY

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Introduction: The incidence of hypercalcemia varies in different populations from 0.042% to 3,9%.

Objective: To investigate the prevalence of hypercalcemia in the adult population of Minsk-city.

Materials and Methods: were studied 1,207 people, average age $53,91 \pm 17,25$ (892 women, 315 men) from 18 to 96 years. Examination: total calcium, total protein, creatinine, cholesterol and triglycerides; the analysis of morbidity were made (osteoporosis, kidney stones, cholelithiasis, ulcer disease, diabetes mellitus, hypertension, coronary heart disease, cardiovascular events, cancer, fractures in history).

Results: hypercalcemia has been found in 31 people (2,6 per 100 adults), women-23, men-8. In the age group up to 30 years - 145 people, hypercalcemia was founded in 1 case (0,7%); in the age group of 30-44 years - 244 people, hypercalcemia was detected in 4 (1,6%) cases; in the age group 45-59 years - 270 people, hypercalcemia was detected in 9 cases (3,3%); in the age group 60-74 years - 404 people hypercalcemia - 16 cases (4,0%); in the age group 75 years over - 144 people hypercalcemia was detected in 1 case (0,7%). The highest incidence of hypercalcemia has been detected in the age group 45-59 and 60 - 74 years ($p < 0,05$).

Conclusion: The prevalence of hypercalcemia in the adult population of Minsk-city was 2,6 per 100 adults (26: 1000). The highest incidence of hypercalcemia has been detected in the age group 45-59 and 60 - 74 years.

P921

OSTEOPOROSIS MANAGEMENT IN PRIMARY CARE IN RUSSIA

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Aim: To evaluate the participation of doctors of different specialty in the detection and treatment of patients with osteoporosis

Material: A survey of 1,200 physicians (200 in each specialty: general practitioner, gynecologist, neurologist, rheumatologist, traumatologist and endocrinologist) from 40 public health clinics of different regions in Russia was made by using standardised interviews. Questions addressed responsibility for bone healthcare, and whether diagnostic procedures, initiation of bone-specific treatment and follow-up were performed in accordance with national recommendations on osteoporosis.

Result: Among all respondents only 26% physicians considered osteoporosis detection as a part of their routine practice. Rheumatologists (71%) and endocrinologists (46%) observed patients with osteoporosis significantly more often compared to traumatologists (12%), general practitioners (11%), neurologists (9%) and gynecologists (4.5%)($p < 0.001$ and $p < 0.05$, respectively). 93% physicians recommended to perform bone densitometry (DXA) as a main diagnostic procedure, 51%

ordered additional laboratory testing. Only 18% respondents used the World Health Organisation (WHO) fracture risk assessment tool FRAX®, which predicts a patient's 10-year probability of osteoporosis-related fracture on the basis of age, gender and various risk factors. 78% physicians initiated an osteoporotic treatment for one year or more, but only 46% doctors carried out the control of treatment in a year after start of therapy, among them 93% persons used DXA, 34% applied bone markers and 29% used laboratory chemistry parameters for monitoring osteoporosis therapy. 60% doctors prescribed bisphosphonates (5%- original alendronate, 21% - different generics of alendronate, 12%- oral ibandronate, 6%- i.v. ibandronate, 12%- original zoledronic acid, 4% - generics of zoledronic acid), 11% - strontium ranelate, 8% - alfacalcidol, 3% - denosumab, 16% - supplements of calcium and vitamin D only.

Conclusion: A survey of physicians of 6 specialties showed, that patients with osteoporosis are most frequently identified and treated by rheumatologists and endocrinologists, which account for about 1.5% of all doctors in Russia. To improve the detection of patients with osteoporosis it is required to widespread adoption of national recommendations on osteoporosis and FRAX® tool as the most affordable and cheap method to identify individuals at high risk of osteoporotic fractures.

P922

CORRELATION OF TNF ALPHA LEVEL IN PLASMA TO BONE MINERAL DENSITY IN TYPE 2 DIABETES OBESE PATIENTS

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Background: Osteoporosis, a global age-related health problem in both male and female elderly, insidiously deteriorates the microstructure of bone culminating in fragility fractures, pain and disability. Although osteoporosis is normally associated with senescence and estrogen deficiency, obese type 2 diabetes mellitus also contributes to and/or aggravates bone loss in osteoporotic patients. In obese type 2 diabetes was found more adipose tissue who produce more pro-inflammatory cytokine such as IL-1 and TNF alfa that increase osteoclast differentiation and bone resorption.

Objective: To find out correlation of TNF alpha level in plasma to bone mineral density in type 2 diabetes obese patients.

Method: Study was held in Mohammad Hoesin Hospital Palembang in 2015. This was cross sectional and observational analytic study. We collected 42 obese type 2 diabetes subjects by non probability consecutive sampling. Bone mineral

density was checked by densitometry device Stratos brand at spine and femur. We divided the result bone mineral density of subjects into normal, low bone density and osteoporosis according to WHO criteria. TNF alpha was checked by Elisa method used quantitative enzyme immunoassay. The data was analyzed to significance test used Chi Square or Fisher test and spearman test.

Result: There were 42 subjects collected in this study, consist of 16 female and 26 male and age between 33 until 66 year old. We found 3 (7,1%) subjects have osteoporosis, 19 (45,3%) subjects have low bone density and 20 (47,6%) subjects were normal. The mean level of TNF alpha were found 2,76 u/l in normal bone mineral density, 2,53 u/l in low bone density and 1,99 u/l in osteoporosis subjects. We tested correlation of level TNF alpha to bone mineral density by spearman test was found $r=-0,263$ on p value 0,093.

Conclusion: There was no correlation of the TNF alpha level to bone mineral density in obese type 2 diabetes.

P923

CLINICAL AND FUNCTIONAL EFFICIENCY OF LARGE JOINT ARTHROPLASTY IN PATIENTS WITH HIGHLY ACTIVE RHEUMATOID ARTHRITIS

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The synovium in rheumatoid arthritis (RA) produces a variety of cytokines, causing the destruction of articular cartilage, secondary osteoarthritis, determining in some cases the need for joint replacement. At the same time inflammation within the joint substrate is the source of the high activity of the underlying disease. It is believed that reconstructive surgery on joints are possible only in the period of minimal activity of rheumatoid diseases, since the high activity of rheumatoid diseases leads to difficult rehabilitation period, higher risk of infection. Currently, the possibility of joint replacement in patients with high activity is debatable and requires serious study.

Aim: To evaluate the results of knee and hip joints replacement in patients with highly active RA, depending of the initial therapy and its impact on patient quality of life during the first year after surgery.

Materials and methods: Arthroplasty was performed in 24 patients (mean age - 56,5±9,6 years) with high RA activity (average DAS28 5,51±0,63 points). Duration of the disease - 11,91±4,80 years, seropositive rheumatoid factor in 18 (75%) patients. At the time of surgery 16 (66.7%) patients received methotrexate, 3 (12.5%) - leflunomide, corticosteroids (prednisone at a mean dose of 4,2±4.3 mg per day) - 10 (41.6%) patients, of which in combination with DMARDs - 5 (20.8%). Basic therapy did not change after surgery. 7 (29.2%) patients received biologics (infliximab, adalimumab, rituximab,

etanercept). Joint pain (VAS), disease activity - DAS28, functional ability - index HAQ. were assessed before the operation, after 1, 6 and 12 months.

Results: The VAS decrease was observed in the first month after the surgery (47,3±18,6 mm), initially it was 70,6±14,3 mm, at 6 months decreased by 1.5 times up to 48,0±10 9 mm ($p < 0.05$), after 12 months - up to 30,1±10,0 mm ($p < 0.05$). 6 months after the surgery disease activity DAS28 significantly ($p < 0.05$) reduced from 5,51±1,63 to 3,83±0,55; in 12 months DAS28 - 3,26±0,62,2. The positive dynamics of the HAQ index: before surgery - 1,72±0,22, a month after - 1,58±0,26, after 6 months - 1,22±0,28 ($p < 0.05$), at 1 year - 1,03±0,18 points ($p < 0.05$).

Conclusion: Arthroplasty in patients with highly active RA may be considered quite reasonable and effective in improving functional ability and pain relief. Removal of abnormal joint tissues also reduces RA activity, increases the overall response to basic therapy after surgery.

P924

THE EFFECT OF VERTEBRAL OSTEOARTHRITIS (VO) AND VERTEBRAL FRACTURES (VF) ON TRABECULAR BONE SCORE (TBS): PRELIMINARY RESULTS

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Objectives: TBS is a textural score that provides an indirect index of trabecular microarchitecture from lumbar spine (LS) dual energy x-ray absorptiometry (DXA). We evaluated the effect of VO and VF on bone mineral density (BMD) and TBS.

Methods and Materials: We retrospectively identified all patients that performed a LS DXA in January-March 2015 together with a LS x-ray/MRI (maximum interval with DXA=6 months). Among them, we included patients with VO or VF diagnosed on LS x-ray/MRI with a maximum of two vertebrae involved. We calculated the BMD/TBS difference between vertebrae affected by VO/VF and the adjacent vertebrae with the greater values of BMD/TBS; and between vertebrae affected by VO/VF and the average L1-L4 BMD/TBS (average value included the vertebrae with VO/VF).

Results: Out of 258, we included 20 patients (19 females, age=72±10y) with VO (n=13) or VF (n=7). Mean BMD (g/cm^2): vertebrae with VO/VF=1.004±0.167; adjacent-vertebrae=0.935±0.154; L1-L4=0.946±0.127. Mean TBS: vertebrae with VO/VF=1.300±0.122; adjacent-vertebrae=1.252±0.122; L1-L4=1.261±0.091. Considering VO+VF together,

all differences were significant ($p < 0.05$), except for BMD difference between vertebrae with VO/VF and adjacent-vertebrae ($p = 0.082$). Considering only VO vertebrae, all differences between vertebrae were significant ($p < 0.05$). Considering only VF vertebrae, no differences were found with adjacent-vertebrae/L1-L4 for BMD and TBS ($p > 0.119$). Correlations between BMD and TBS for vertebrae with VO/VF were all significant ($p < 0.05$): $R = 0.5247$ (VO+VF), $R = 0.6194$ (only VO), $R = 0.9224$ (only VF).

Conclusion: Compared to adjacent-vertebrae and L1-L4, VO significantly impacts both on BMD and TBS, while no differences were found for VF. BMD and TBS are positively correlated, especially for VF.

P925

IMPROVEMENT IN VITAMIN D LEVEL TESTING AFTER USING THE ELECTRONIC MEDIA AND CLASSICAL COMMUNICATION TOOLS: STUDY FROM LATVIA

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Objectives: Vitamin D is crucial for bone mineral density and osteoporosis. It is necessary to test every person regarding their age and gender for vitamin D (25[OH]D) level. To reveal vitamin D-deficient patients (pts.), it is important to improve medical specialists' and pts. knowledge about the importance of vitamin D by the use of electronic media (e.g. websites, radio, and television) and classical communication tools (lectures, seminars, and publications). The aim of the study was to analyze the improvement in 25(OH)D testing after having raised awareness about the importance of vitamin D.

Material and methods: Electronic data base of one of the biggest laboratories (Ltd. Central Laboratory) in Latvia was analyzed. 25(OH)D test results were divided into two groups (before/after raising awareness). Pts. from group 1 were tested from 16.11.11 till 18.10.12, group 2 – from 01.06.2015 till 31.05.2016. Overall 47 752 tests were done.

Results: In group 1 overall 7368 tests were done (women $n = 6236$; 85%), in group 2 – 40 384 tests were done (women 31 636; 78%). The number of tests done had increased 5 times among females, 7 times – among males ($p < 0,001$). Median (Me) age in both groups was similar (57 [68–41] vs. 53 [65–33]). Proportionally the most significant increase was in the young adult group (19–34 yrs; group 1 – $n = 668$, 10% vs. group 2 $n = 6203$, 18%; $p < 0,001$). Me 25(OH)D level in group

1 was 22,9 [IQR 30–17] ng/ml vs. group 2 – 22,1 [IQR 29–16] ng/ml. Group 1 and group 2 were compared according to their 25(OH)D levels (deficiency < 19 ng/ml (37% vs. 41%, $p < 0,001$), insufficiency 20–30 ng/ml (39% vs. 37%, $p = 0,023$), normal > 30 ng/ml (25% vs. 22%, $p < 0,001$) and additionally > 45 ng/ml as optimal level (4% vs. 3%, $p < 0,001$).

Conclusion: After raising awareness of vitamin D importance for bone health, much more laboratory testing of 25(OH)D level was done, but there is no improvement in vitamin D level (possibly tests were done, but the treatment was not started or was not adequate).

P926

SKIN AND SUBCUTANEOUS FAT ATROPHY AFTER CORTICOSTEROID INJECTION FOR LATERAL EPICONDYLITIS: A CASE REPORT

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Lateral epicondylitis are the most common elbow problems in adults. Corticosteroid injection for the treatment of lateral epicondylitis is a frequently used method of conservative management. A 43 year-old woman was referred to our clinic with a 6 month history of pain along the lateral side of her right and left elbow. She had been treated for lateral epicondylitis with 20 mg Triamsinolon heksasetonit to the right and left elbow for lateral epicondylitis due to the resistance of pain. Pain decreased in 3 weeks. Examination revealed atrophy of the skin and subcutaneous fat over the lateral epicondyle and she had no pain in her two elbow. Patient had unlimited range of elbow motion. Cortical injection of lateral epicondylitis is useful for pain but injection into the lateral site of the elbow may cause skin and fat atrophy in long term if appropriate injection technique is disregarded.

P927

SPACEFLIGHT MIMICKS RAPID BONE AGING

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Objective: By providing a weightlessness environment, spaceflight induces site-specific bone loss in both human and mice but cellular mechanisms remains unclear. On the

other hand, during aging, osteocyte apoptosis associated with lacunae mineral occlusions occurs and bone marrow fat increases. Here, we wanted to analyze the effects of spaceflight on osteocytes lacunae, osteocytes survival and marrow adiposity. Then, we aimed to investigate the events occurring after a short term of earth recovery.

Material and Methods: Mature C57/Bl6 male mice flew on the 30-day space Russian BION-M1 high-orbit satellite mission. The Flight group was killed after landing, and the recovery group 8 days later. The ground control group was kept under spacecraft housing conditions. Osteocytes Lacunae of femur cortical sections were imaged using Synchrotron Radiation μ CT (resolution 0.7 μ m) and 3D shape descriptors were calculated and analysed. Medial, anterior, posterior and lateral zones were analyzed, each containing more than 1200 lacunae. Osteocytes death and bone marrow fat were investigated in femur by histology.

Results: The lacunar volume fraction was significantly decreased in the Flight vs. Habitat Control group in medial zone (-33% and -38%, respectively; $p < 0.025$). In the posterior zone, the length/width ratio was significantly decreased in the Flight vs. Habitat Control group, indicating a more spherical lacuna shape in the Flight group. Moreover, particularly in the posterior zone, the lacuna mean volume was significantly decreased and the fraction of smaller lacunae (less than 200 μm^3) was greater in Flight and Flight+Rec groups vs. Habitat Control. Furthermore, the ratio of empty overall lacunae was dramatically increased in Flight vs. Habitat Control group (11.44% vs. 3.64%, $p < 0.005$) and remained elevated in the Flight+Rec group (9.71%, NS vs. Flight). Finally, femur bone marrow analyses revealed a marrow adipocytes invasion in Flight and Flight+Rec groups.

Conclusion: We provide first evidences that one-month spaceflight induces osteocyte death along with decreased osteocyte lacunar volume and increases bone marrow fat, both being hallmarks of aging. No recovery was seen 8-day after landing. Given the critical role of osteocytes to orchestrate bone remodeling, their compromised survival might jeopardize bone reversibility, mainly in the most aged.

P929

EVOLUTION OF TURNOVER BONE MARKERS AFTER DENOSUMAB DISCONTINUATION: A PRELIMINARY STUDY

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Introduction: The subcutaneous administration of denosumab (Dmab) twice yearly reduces bone turnover and increases bone mineral density. Dmab discontinuation is associated with bone turnover rebound and increased risk of

vertebral fracture. However this risk of fracture may depend of patient profile and other osteoporotic substances given. The aim of our study was to evaluate the evolution of this turnover rebound if a BP was prescribed before and/or at the end of the biological effect of Dmab.

Method: We randomly selected a subset of women from our daily practice who had received subcutaneous Dmab treatment (60 mg subcutaneously every 6 months) for osteoporosis for at least one year (2 injections) between 2010 and 2016. We separated them in four groups. A: No BP neither before nor after Dmab, B: No BP before but BP 6 months after the last Dmab, C: BP before but no BP after Dmab, D: BP before and 6 months after the last Dmab injection. We retrospectively analyzed the evolution of bone turnover markers with C-telopeptide (CTX, ng/l) up to 12 months after the last Dmab injection (6 months after the last BP prescription). Appropriate statistics were applied.

Results: The first 38 women were included (mean age 65 \pm 10 yo before the first injection of Dmab). 8 in group A, 13 in group B, 10 in group C and 7 in group D. At the end of Dmab treatment, CTX values were significantly lower than baseline for all groups ($p < 0.05$) and were respectively A: 84 (\pm 54), B: 336 (\pm 266), C: 80 (\pm 60) and D: 95 (\pm 63). 12 months after the last Dmab injection (~6 months after the last BP prescription), the CTX were respectively A: 1075 (\pm 321), B: 241 (\pm 236), C: 677 (\pm 359) and D: 370 (\pm 286), with significantly lower CTX in group B compared to group A ($p = 0.03$) and in group C compared to group A ($p = 0.05$).

Conclusion: In this preliminary study, the exposition to BP before or after Dmab treatment attenuates significantly the turnover rebound. However, the prescription of BP 6 months after Dmab tends to be better than pre-treatment with BP but without reaching significance. We failed to demonstrate the superiority of pre- and post-treatment use of BP (group D) which could be related to the sample size of our preliminary study. Larger study is ongoing to further warrant our results.

P930

LONGITUDINAL CHANGES OF TRABECULAR BONE SCORE IN PATIENTS WITH CUSHING'S SYNDROME: EFFECT OF TREATMENT

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Endogenous hypercortisolism causes secondary osteoporosis and low-traumatic fractures. However, the impact of Cushing's syndrome (CS) remission on BMD and TBS and the reversibility of bone complication remains uncertain.

Objective: To evaluate the changes in TBS and BMD in patients with CS in 12 and 24 months after treatment

Methods: 68 patients with confirmed active CS were enrolled. We assessed lumbar spine (L1-L4) BMD before radical treatment and in 12 and 24 months after it with retrospective TBS evaluation. All measurements were performed using a DXA Prodigy device (GEHC Lunar, Madison, Wisconsin, USA). The TBS was derived retrospectively from existing BMD scans, blinded to clinical outcome, using TBS iNsign software v2.1 (Medimaps, Merignac, France).

Results: we enrolled 55 females and 13 males (F/M 80.9%/19.1%), mean age was 36.1 years (95% CI 33.5–38.8), mean BMI 30.2 kg/m² (95% CI 28.7–31.7). All subjects had active CS at the initial evaluation; 12 months after the treatment 46 subjects were evaluated, 16 remained in an active stage of disease, whereas 30 were in remission. After 24 months 40 patients remained in the study, 18 patients were in an active stage of disease (two relapsed), however all of them had mild, controlled stage of hypercortisolism.

The difference in TBS and BMD values was as following: TBS (0) – 1.2062 (0.147), TBS (12 months) – 1.298 (0.145), TBS (24 months) – 1.291 (0.139) $p < 0.01$. L1-L4 BMD (0) – 1.044 (0.02) g/cm²; Z-score -1.43 (0.14), BMD (12 months) – 1.026 (0.141) g/cm² Z-score -1.38 (0.17), BMD (24 months) – 1.076 (0.140) g/cm² Z-score -0.95 (0.17) $p < 0.01$.

There was a significant differences in TBS values after 12 months depending on the disease activity (ANCOVA adjusted for initial value) ($p = 0.044$), but not in 24 months ($p = 0.374$). At the same time, we could not find any difference in BMD values after 12 months or 24 months in dependence on the disease activity ($p = 0.084$).

Conclusion: Both BMD and TBS values improves after treatment of Cushing's syndrome. However, TBS seems to be more sensitive than BMD measurements to reflect the achievement of a complete remission after 12 months of treatment.

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P931

BOTH TBS AND VOLUMETRIC BMD ARE ASSOCIATED WITH PEDICLE SCREW PULL-OUT STRENGTH: AN EX-VIVO FEASIBILITY STUDY

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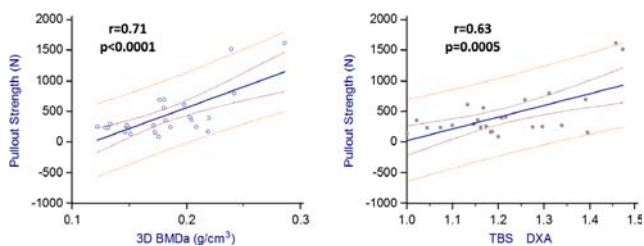
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Aim: To evaluate the ex-vivo relationship between TBS, computed from DXA acquisitions, and the pull-out strength of pedicle screws in human fresh vertebra.

Method: 26 human fresh vertebrae (T12, L4 and L5) were selected from 10 donors (mean age 81.8 yrs) by residents in the Institut de Biomécanique Humaine (Paris, France). Image acquisitions were performed the day of the surgery using a standardized protocol on a DXA device (QDR 4500A, Hologic, Bedford, U.S.A.). During the DXA scan acquisition, the vertebrae were inserted into water in order to simulate the soft tissues around the bone. Cylindrical pedicle screws with a trap-ezoidal thread shape were implanted by a single surgeon. Biomechanical testing was performed on the vertebra in order to measure the pull-out strength of the pedicle screw. Bone texture was evaluated using TBS (TBS iNsign, Medimaps, Merignac, France). TBS was computed into the same ROI used to assess BMD from DXA acquisition. To take into account vertebral morphology variability a pseudo 3D BMD (3D BMDa) was computed based on a cylindrical approach. Relationships between TBS and the pull-out strength were evaluated using a Pearson correlation test. A bootstrap approach on the vertebrae (20 random sampling) was done in order to evaluate the variability of the possible associations. A multivariate analysis, that includes DXA TBS and 3D BMDa, has also been performed.

Results: Mean TBS, 3D BMDa and pull-out strength were 1.213±0.126, 0.181±0.04 g/cm³ and 473±419 N respectively. A moderate but significant correlation has been observed between TBS and the pull-out strength ($r = 0.63$; $p = 0.0005$) while a strong correlation (see Figure 1) was observed for 3D BMDa ($r = 0.71$; $p < 0.0001$). Bootstrap approach demonstrated the stability of the TBS association $r^2 = 0.39$ [0.33-0.46]. In multivariate analysis, both TBS and 3D BMDa remained significantly associated with the pull-out-strength ($p = 0.034$, $r = 0.43$ and $p = 0.003$, $r = 0.57$, respectively). The combined model explained 56.2% (r^2 -adjusted) of the pull-out-strength.

Conclusion: The present study demonstrated an association between TBS and the pull-out strength of the pedicle screws. After adjustment for 3D BMDa, TBS explained 18.5% of the pull-out-strength while 3D BMDa explained 32.5%. These results are consistent with those in the literature. Further ex-vivo studies are needed to confirm these findings in a larger sample size.



P932

PLGA NANOPARTICLES POTENTIATE THE PROTECTIVE EFFECT OF CURCUMIN AGAINST BONE LOSS IN OVARECTOMIZED RATS

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Osteoporosis increases fragility fractures and is a major health issue in the elderly. Curcumin, an active constituent of *Curcuma longa*, was reported to exert a beneficial effect on osteoporotic bone loss. However, poor aqueous solubility has limited its pharmacological efficacy. Although application of poly(lactic-co-glycolic acid) (PLGA) nanoparticles as carriers for curcumin was demonstrated to improve the bioavailability of curcumin, the effect of curcumin-loaded PLGA (C-P) nanoparticles on bone health has not been investigated. To examine the therapeutic potential of C-P, we prepared C-P nanoparticles and confirmed curcumin was successfully encapsulated within the PLGA polymer. Ovariectomy (OVX)-induced bone loss was found to be ameliorated in rats fed with curcumin or C-P. The in vitro release study showed a typical biphasic pattern with an initial burst and following sustained release. Measurement of bone mineral density and observation of trabecular microarchitecture showed that C-P was more effective than free curcumin against osteoporosis. A qRT-PCR analysis demonstrated that C-P significantly improved bone remodeling. These results suggest that encapsulation with PLGA enhances the protective effect of curcumin against OVX-induced bone loss. This approach could be a promising strategy to improve the therapeutic index of phytochemicals against osteoporosis.

P933

ANALYSIS OF THE EFFECTS OF INTRAARTICULAR IMPLEMENTATION OF 1% NAHYALURONATE IN PATIENTS WITH THE KNEE OSTEOARTHRITIS

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Introduction: Intra-articular injection of hyaluronate is a significant method in treating mild to medium forms of the knee osteoarthritis(OA).

Aim: To test the effects of administration of 1% Nahaaluronate on reduction of pain and functional status of the patients with OA in the knees.

Material and Methods: This study involved 20 patients (14 women and 6 men), average age of 74 with OA of both knees. The diagnosis was set based on ACR criteria. The degree of radiological changes was determined based on Kellgren-Lawrence classification by rheumatologists and orthopedic surgeons. 70% of the patients had changes of the third degree, 30% of the second degree) The treatment consisted of administering the hyaluronate to the more painful knee, each 7 days during the course of 5 weeks. In 13 patients the treatment was applied in the right knee. Level of pain was tested according to the analogous pain scale by VAS, the range of knee motion was measured by an angle ruler (shown in degrees), while the functional status was evaluated in accordance with Oxford Knee and T. Lysholm Knee Scoring scale. The evaluation of the patients was performed before the treatment, 5 weeks later and 12 weeks after the last treatment. During the treatment, amount of consumed analgesics per patient per day was monitored.

Results: Average pain before the treatment was 8/10 VAS, after the treatment 4/10, while 12 weeks after the treatment it was 5/10. Motion range of the knee increased in 75% of the patients. Medium value of the functional status according to the Oxford Knee Score was 22 before the treatment, 38 after the treatment and 39, 12 weeks after the treatment. Medium value of the functional status according to the T/ Lysholm Scale was 43 before the treatment, 76 after the treatment, and 75 at the end of the observation. In 18 patients the dose of analgesics was reduced.

Conclusion: intraarticular application 1% Na hyaluronate significantly reduces pain even 12 weeks after the treatment, increases mobility of the knee, improves functional status of the knee joints and patient satisfaction, while the need for analgesics is reduced, and the therapy did not have unwanted side effects.

P934

CHARACTERIZATION OF A NOVEL CDC73 GENE MUTATION IN A PATIENT WITH HYPERPARATHYROIDISM-JAW TUMOR SYNDROME AFFECTED BY PARATHYROID CARCINOMA

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Introduction: Hyperparathyroidism-jaw tumor syndrome (HPT-JT) is an autosomal dominant disorder (1,2). The cell division cycle protein 73 homolog (*CDC73*) gene, was shown to be responsible for the development of HPT-JT syndrome (3). This gene encodes an ubiquitously expressed 531 amino acid protein named parafibromin (4). It has been shown to act as tumor suppressor. In fact, loss of heterozygosity (LOH) of the *CDC73* locus in many HPT-JT associated parathyroid tumors from patients with germline mutations is in accordance with Knudson's "two-hit" model for hereditary cancer (2).

Patients and methods: A 41-year-old man with mandible ossifying fibroma, surgically removed, subsequently showed severe hypercalcemia due at parathyroid carcinoma (PC). Genetic analysis to evaluate germinal and somatic *CDC73* gene mutation were performed. RT-qPCR, immunohistochemistry and western blotting assay were performed to quantify *CDC73* mRNA and parafibromin expression, respectively.

Results: A novel heterozygous nonsense mutation (c.192delT) in *CDC73* gene has been discovered. No LOH has been revealed in PC tissue. No significant difference between CP and parathyroid adenoma tissues control has been detected in *CDC73* gene expression. On the contrary, both HIC and WB assay have showed the ~90% reduction of parafibromin expression in CP.

Conclusions: This study describes a novel both germinal and somatic heterozygous nonsense mutation (c.192delT) in *CDC73* gene. Moreover, despite the normal *CDC73* gene expression, we found a great decrease of the parafibromin expression. This is coherent with the CP presence, but is inconsistent with the genetic result. How is it possible? We suggest that a mechanism of gene silencing induced by microRNA could have a role determining the post-transcriptional inactivation of the wild type *CDC73* allele.

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P935

TBS ASSOCIATION WITH BIOMECHANICAL PROPERTIES OF HUMAN VERTEBRAE EX-VIVO

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Objective: The clinical utility of Trabecular Bone Score (TBS) to evaluate the risk for osteoporotic fracture has been widely recognized by the scientific community. To date only one study presented data on the relation between real TBS and

bone mechanical properties, with a relatively small sample size. The aim of this study was to evaluate the relationship between TBS, BMD and mechanical properties of on a larger sample of human vertebra ex vivo.

Method: 52 vertebrae (L1 to L4) were harvested from 13 post-mortem human subjects (mean age 74.9±8.2 yrs). The isolated vertebrae (including posterior arches) were scanned with a DXA device (Prodigy, GE-Lunar) using water to simulate the soft tissues around the bone. Bone texture was evaluated using TBS (TBS iNsight software, Medimaps). BMD and TBS were evaluated over the same ROI, the largest rectangle included within the vertebral body. Biomechanical testing was performed on each whole vertebra to measure the failure load and the stiffness. The quasi-static compression tests were realized with a traction-compression device (INSTRON 55000, INSTRON). Relationships between TBS and mechanical properties were evaluated using a Pearson correlation test. A multivariate analysis, that includes both TBS and BMD, has also been performed.

Results: Over the 13 subjects, 2 were excluded due to their abnormal L1-L4 BMD when looking at the global distribution (0.409 and 1.401 g/cm²). No outliers were detected for L1-L4 TBS. Among the 44 remaining vertebrae, 9 were excluded due to presence of severe arthrosis (presence of osteophytes) or established vertebral fracture. Mean BMD, TBS, failure load and stiffness were 0.854±0.161 g/cm², 1.561±0.098, 2351±1064 N, 4170±1260 N.mm⁻¹ respectively. Moderate but significant correlations (figure 1) were observed with failure load for BMD (r=0.65; p<0.0001) and for TBS (r=0.63; p<0.0001). Stronger significant correlations (figure 1) were observed with stiffness for BMD (r=0.65; p<0.0001) and for TBS (r=0.73; p<0.0001). In the multivariate analysis, both BMD and TBS remained significantly associated with the failure load (r=0.50, p=0.002 and r=0.47, p=0.005 respectively). The combined model explained 52.3% (r²-adjusted) of the failure load. The association with the stiffness also remained significant for BMD and TBS (r=0.49, p=0.004 and r=0.62, p=0.0001 respectively). The combined model explained 64.6% (r²-adjusted) of the stiffness.

Conclusion: The present study confirms on a larger sample the correlations between TBS and biomechanical properties of the lumbar spine and those results are independent of spine BMD. Both BMD and TBS characterize a significant part of the vertebral bone strength which may explain the ability of TBS in conjunction with BMD to improve the risk of fracture in clinical practice.

P936

INCREASED RISK FOR INCIDENT HIP FRACTURE IN MEN WITH TYPE 2 DIABETES

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Objectives: To investigate if men with type 2 diabetes have increased 10 year risk for hip fracture and other osteoporotic fractures.

Population and methods: The Swedish Mr OS study is a multicenter population study of osteoporotic fractures in 3014 men (69-81 years). Incident fractures were searched for in computerized X-ray archives. Bone density was measured with Lunar Prodigy and Hologic QDR 4500. The probability of incident fracture was determined by Cox proportional hazards models.

Results: 297 men had diabetes type 2 at baseline. 197 incident hip fractures were recorded and the number of all fractures was 673. The age adjusted hazard ratio, HR, for hip fracture in diabetic men was 1.52 (95% CI 0.99-2.33) $p=0.056$. Men with diabetes had an elevated ten year risk for hip fracture, HR 2.0 (CI 1.30-3.10) after adjusting for age, center, femur neck BMD and BMI. With the same model HR for all fractures was 1.32 (CI 1.02-1.701) and for vertebral fractures 1.1 (ns) in diabetic men. Diabetic men had higher BMI and fat mass but slower walking speed, lower hand grip strength and more falls. However, the appendicular lean mass was similar in men with diabetes and controls. BMD was 4-5% higher in diabetic men at hip, lumbar spine and total body and was still significant after adjustment for BMI.

Diabetic men had higher serum leptin and lower vitamin D. In a fully multivariable model the HR for hip fracture among diabetic men was 1.63 (CI 1.01-2.62) adjusting for age, BMD, BMI, falls, walking speed, hand grip strength, kidney function, leptin and vitamin D. A trend ($p=0.06$) to interaction between diabetes and BMD for hip fractures was found, indicating that men with diabetes sustain hip fracture at higher BMD. Men with type 2 diabetes had a higher risk for medial compared to trochanteric hip fractures OR 2.8 (1.04-7.57).

Conclusion: We demonstrate a trend to increased 10 year age adjusted risk for hip fracture in men with diabetes. A multivariable model adjusting for several covariates as BMD, BMI, falls, hand grip strength, kidney

function showed an increased risk for hip fracture in diabetic men HR 1.63(CI 1.01-2.62).

P937

THE EFFECT OF WHOLE BODY VIBRATION EXERCISE ON FRACTURE RISK IN ADULTS OVER 50 YEARS OF AGE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction: Previous studies have shown promising but inconsistent results on the effect of whole-body vibration exercise (WBV) on bone mineral density, muscle strength, and balance. The aim of this study was to investigate the effect of WBV on fracture risk in adults ≥ 50 years of age.

Methods: A systematic search was performed of published papers in the databases PubMed, EMBASE, and the Cochrane Central Register the 4th April 2016. Included studies were randomized controlled trials examining the associations between WBV and fracture risk in adults ≥ 50 years of age. The primary outcomes were fragility fractures, fall rates, and the proportion of patients who fell. Secondary outcomes were bone mineral density (BMD), bone microarchitecture, calcaneal broadband attenuation (BUA), and bone turnover (markers). Relative risk ratios, fall rate ratio/person years, and absolute weighted mean difference were pooled using random effects models and heterogeneity (I^2) was estimated. Cochrane Collaboration's risk of bias tool and the GRADE approach were used to evaluate quality of evidence and summarize conclusions.

Results: 15 papers (14 trials) met the inclusion criteria. Moderate quality evidence from four studies ($n=746$) showed that WBV reduced the rate of falls with a rate ratio/ person years of 0.67 (95% CI=0.50-0.89, $p=0.0006$; $I^2=19\%$). Furthermore, data from three studies ($n=805$) found a trend towards falls reduction (RR=0.76, CI=0.48-1.20, $p=0.24$; $I^2=24\%$). Only one study had data on fragility fractures reporting a non-significant

trend in fracture reduction (RR=0.47, CI=0.14-1.57, p=0.22). Finally, low to very low quality evidence showed no effect on BMD (spine or total hip) and only sparse data were available in microarchitecture parameters and bone turnover markers.

Conclusion: WBV seems efficient in reducing falls and might reduce the risk of fractures, but seems to have no overall effect on BMD or microarchitecture. Further larger trials focusing on fragility fractures are warranted before implementing WBV into current guidelines of falls- and fracture risk interventions.

P938

PRESCREENING FOR LOW HIP BMD BY USING PULSE-ECHO ULTRASOUND

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Objectives: Fracture Liaison Services (FLSs) encourage DXA scanning in fracture patients older than 50 yrs, in line with the IOF "Capture the Fracture® Program". Regrettably, only half of invitees show up. In this study, pulse-echo ultrasound measurement was applied and evaluated for detection of hip osteoporosis, which may be beneficial to avoid DXA examinations.

Material and Methods: A handheld pulse-echo ultrasonometer (Bindex®, Bone Index Finland, Kuopio, Finland) that measures cortical thickness at 1/3 length of tibia was used, resulting in a Density Index (DI), which represents an estimate for DXA hip bone mineral density. Previously, 90% sensitivity and specificity thresholds for hip osteoporosis with axial DXA have been determined for DI, classifying patients to healthy (above upper threshold), intermediate (between the thresholds - DXA investigation needed) or osteoporotic (below lower threshold) DI value. The ultrasound method was evaluated in predicting BMD at the (total or neck) hip (Hologic Discovery QDR).

Results: We studied 157 consecutive female fracture patients, age: mean 65,1; range: 50-89 yrs, attending the FLS. Seven patients were excluded because of pretibial edema. Based on DI, 47 patients (31,3%) belonged to the healthy category (defined by the manufacturer being $>0,844 \text{ g/cm}^2$), 48 in intermediate (32%) and 55 in osteoporotic category (36,7%). DXA T-scores at the femoral neck were $> -1.0 \text{ SD}$ (n=14 (9%)); from -1.0 SD to -2.4 SD (n=96 (64%)) and $\leq -2.5 \text{ SD}$ (n=40 (27%)). The DI predicted the DXA T-score $\leq -2.5 \text{ SD}$ at the hip of 98% sensitivity, 70% specificity, 99% NPV and 54% PPV. One out of 47 patients classified as healthy by DI, had a T-score of $\leq -2.5 \text{ SD}$. Finally, there were 3 patients with morphometric vertebral fractures. All these patients had a 'osteoporotic DI' and a hip T-score $\leq -2.5 \text{ SD}$.

Conclusions: The DI excluded osteoporosis at the hip in near 100%. A DI value above upper threshold excluded almost completely the presence of osteoporosis at the hip, while in case of a DI value $<0,844 \text{ g/cm}^2$ it was a 50:50 chance. DXA scans could be questioned and further threshold studies are needed.

Acknowledgments: We thank Dr. Reikkinen and Dr. Karjalainen for providing a Bindex® ultrasonometer and their support in the interpretation of data.

P939

RISK OF OSTEOPOROSIS DEVELOPMENT IN PATIENTS WITH RHEUMATIC DISEASES

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Objective: Evaluation of changes in bone mineral density (BMD) in patients with rheumatic diseases.

Material and Methods: A retrospective analysis of protocols of X-ray densitometry was performed in patients who were at the dispensary observation in the Rheumatologic Centre of Kazan City in the period from January 2016 to December 2016. The changes of BMD in two points were taken into account: the lumbar spine and proximal femur. T-score was evaluated in postmenopausal women and men older than 50 years. Z-test was evaluated in women before menopause and men younger than 50 years. 253 patients were included in analysis. 100 of them had rheumatoid arthritis (RA), 52 – ankylosing spondylitis (AS) and 101 had osteoarthritis (OA).

Results: 85 (33.6%) of 253 patients (74 women and 11 men) had osteoporosis and 102 (40.3%) patients (84 women and 18 men) had osteopenia according to the criteria of WHO. Distribution by rheumatic diseases was as follows. 35 (35%) of 100 patients with RA had osteoporosis and 44 (44%) – osteopenia. 13 (25%) of 52 patients with the AS had osteoporosis and 9 (17,3%) – osteopenia. Osteoporosis and osteopenia were revealed in 17 (16.8%) and 24 (23.8%) of 101 patients with OA, respectively.

Conclusion(s): Osteoporosis is often met in rheumatic diseases, especially in RA and AS. However, the prevalence of osteopenia is even higher and this situation requires the actions for prevention of osteoporosis and fractures. In addition, osteoporosis and osteopenia in OA were observed much more often than it was thought previously.

P940

ASSOCIATION BETWEEN METABOLIC SYNDROME AND BONE MINERAL DENSITY IN COMMUNITY-DWELLING OLDER WOMEN: THE SÃO PAULO AGEING AND HEALTH STUDY (SPAHS)

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Objective: To evaluate the prevalence of MS in community-dwelling older women with high frequency of overweight/obesity and its association with bone parameters.

Material and Methods: 343 women aged over 65 years were evaluated by specific questionnaire (including history of clinical fractures and cardiovascular risk factors). Lumbar spine, femoral neck and total hip BMD were evaluated by DXA. Laboratory tests, including calcium, phosphorus, creatinine, lipid profile and glucose were also performed. Thoracolumbar spine X-rays were assessed to identify vertebral fractures. National Cholesterol Education Program-Adult Treatment Panel III (NCEP-ATPIII) criteria were used to define MS. Logistic regression models were used to analyze the relationship between MS and bone parameters.

Results: The prevalence of MS was high (62.1%). Women with MS had higher BMI (30.7 ± 4.9 vs. $27.2 \pm 4.9 \text{ kg/m}^2$, $P < 0.001$), body fat percentage (37.7 ± 5.0 vs. $34.9 \pm 6.5\%$, $P < 0.001$), lumbar spine BMD (0.881 ± 0.171 vs. $0.837 \pm 0.178 \text{ g/cm}^2$, $P = 0.025$), femoral neck BMD (0.684 ± 0.120 vs. $0.629 \pm 0.121 \text{ g/cm}^2$, $P < 0.001$) and total hip BMD (0.814 ± 0.131 vs. $0.743 \pm 0.140 \text{ g/cm}^2$, $P < 0.001$) compared to women without MS. After adjustments for BMI, logistic regression analyses demonstrated that hip BMD remained as an independent factor associated with MS (OR:10.73 95% CI:1.33-86.55, $P = 0.026$). No significant difference concerning the prevalence of vertebral or nonvertebral fractures was observed between the groups.

Conclusion: A positive association between total hip BMD and MS was found, even after adjustment for BMI. Nevertheless, the frequency of vertebral and nonvertebral fractures was similar in women with and without MS. Taken together, these results suggest that higher BMI per se does not explain the positive association between higher BMD and MS and it does not protect against osteoporotic fractures. Further studies are necessary to elucidate the effect of MS on bone mass and fracture risk, possibly related to bone quality.

P941

FEASIBILITY STUDY OF A QUALITY CONTROL METHODOLOGY FOR TBS

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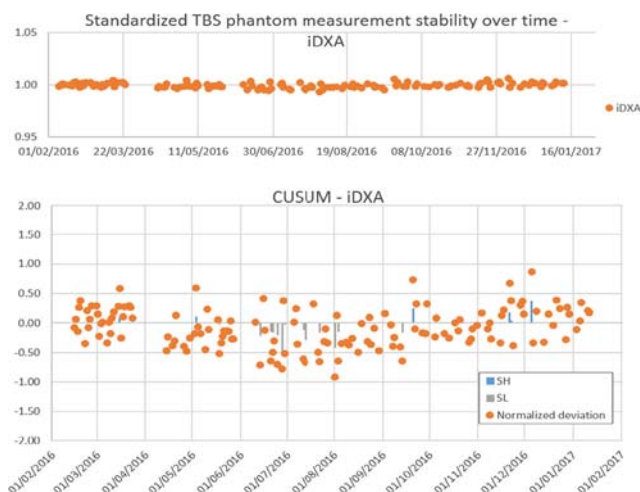
Objective: To develop a Quality Control (QC) methodology for TBS using the TBS phantom.

Material and Method: A TBS phantom has been acquired almost daily over 339 days (146 measurement days) on a Prodigy device (GE-Lunar) and an iDXA (GE-Lunar). The phantom is composed of a soft tissue region (14 cm tissue equivalent, 100% fat content) and a TBS component which generates 4 different TBS values. Each day, 5 acquisitions of

the phantom were performed for the first 45 days, subsequently, only one phantom acquisition was measured. We arbitrary selected the 10 first days to create TBS reference values for this QC exercise. Phantom precision was computed for both devices. To develop a TBS QC, we have followed the methodology proposed by Lu et al. (JBMR,1996); i.e. using Shewart 2 and Tabular CuSum methods. TBS standard deviation for the QC was not derived from the phantom precision but from a performance target similar to the one on BMD method: $TBSsd = \text{in-vivo L1-L4 TBSsd} / 2.5$. $TBSsd = 0.008$

Results: Phantom precision is lower than the target TBSsd for both devices (0.005 and 0.002 vs. 0.008 for Prodigy and iDXA respectively). Shewart and CUSUM graphs for iDXA are presented in Fig. 1. No confirmed alarms were risen for either DXA device.

Conclusion: This study demonstrates the potential to develop a QC plan for TBS. These two devices exhibited stable comportment during the follow-up. Phantom scanning is sufficient to evaluate software performance using a daily QC program. The number of days needed to create a stable reference value has to be determined. Further studies are needed to assess the sensitivity of the method to detect a change in device performance regarding TBS.



P942

ASSOCIATION BETWEEN ULTRAVIOLET INDEX AND 25-HYDROXYVITAMIN D LEVELS IN OLDER ADULTS IN PORTUGAL

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Objective: To explore the association between Ultraviolet Index (UVI) and serum 25-hydroxyvitamin D3 [25(OH)D] levels considering the effect of other potential influential factors in Portuguese older adults.

Methods: A cross-sectional study was conducted in 1497 Portuguese older adults, (≥ 65 years) within Nutrition UP65 project¹. For each individual blood 25(OH)D was determined (December 2015–June 2016), and the mean UVI (mUVI) in the respective residence district was calculated for the previous 30 days. A stepwise linear regression analysis was conducted in order to formulate the equation to predict 25(OH)D with the independent variables of interest (Table 1).

Results:

Table 1. Factors associated with serum 25(OH)D by multivariable linear regression analysis ($r^2=0.28$, $p<0.001$).

| Independent variables | β (95%CI) | <i>p</i> |
|---|-------------------------|----------|
| mUVI | 0.244 (0.198; 0.291) | <0.001 |
| Age, years (<80-0; ≥ 80 -1) ^c | -0.135 (-0.184; -0.086) | <0.001 |
| Residence (Home-0; Institution-1) ^c | -0.064 (-0.110; -0.019) | 0.006 |
| Education, years ^a | | |
| 0 | -0.060 (-0.106; -0.014) | 0.010 |
| 5-12 | 0.052 (0.007; 0.096) | 0.022 |
| Marital status (Not married-0; Married-1) ^c | 0.089 (0.042; 0.137) | <0.001 |
| Household income, € ^a | | |
| 500-999 | 0.056 (0.011; 0.101) | 0.015 |
| ≥ 1000 | 0.099 (0.052; 0.145) | <0.001 |
| Physical activity level (IPAQ) (Normal-0; Low-1) ^a | -0.078 (-0.124; -0.033) | 0.001 |
| Alcoholic beverages consumption, n/day ^f | | |
| women=1, men=1 or 2 | 0.054 (0.011; 0.098) | 0.015 |
| Self-perceived health, "Bad" ^a | -0.051 (-0.096; -0.006) | 0.025 |
| Supplement intake (No-0; yes-1) ^a | 0.202 (0.158; 0.245) | <0.001 |
| Nutritional Status (MNA-SF score) | 0.070 (0.025; 0.115) | 0.002 |
| BMI | -0.123 (-0.168; -0.079) | <0.001 |

CI: confidence interval.

c For the dichotomous variables, baseline categories were coded as 0.

d Baseline: "1-4 years".

e Baseline: "Does not know or does not declare".

f Baseline: "None".

g Baseline: "Moderate".

Some computed variables and categories were excluded from the final model.

Conclusion: The studied factors explained 28% of 25(OH)D's variance and mUVI showed the highest effect after controlling for socio-demographical, health, diet and nutritional variables.

Reference: 1. Amaral TF et al. JMIR Res Protoc 2016;5:e184.

P943

OBESITY AND SARCOPENIC OBESITY IN COMMUNITY-DWELLING OLDER ADULTS

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Objectives: Aging is associated with increase in body fat and decline in muscle-mass and strength. Sarcopenia may lead to decreased physical activity and further increase obesity. We aimed to investigate the prevalence of obesity and Sarcopenic obesity(SO) in community dwelling older adults.

Methods: We enrolled subjects between the ages of 60–99 years old. We measured muscle-mass using bioimpedance analysis. Definition of low-muscle-mass was by Baumgartner (skeletal-mass kg/height squared). Sarcopenia was defined according to EWGSOP recommendations as sarcopenic muscle mass and function (usual gait speed or muscle strength). Obesity was defined by two different methods, a fat percentile above 60th percentile (Zoico method) or a BMI of ≥ 30 kg/m² (WHO definition).

Results: We enrolled 992 subjects (308 men and 684 women). The rates of obesity according to WHO-definition were 29.2% and 53.7% for men and women. The prevalence of sarcopenia was 3.1% in men and 0.4% in women. The rate of SO was 0.3% and 0.1% in men and women when obesity was assessed with Zoico-method and 0 in both sexes when obesity was assessed using WHO definition.

Conclusion: Prevalence of obesity in both sexes was higher in our population compared with other populations according to both Zoico and WHO definitions. The rate of sarcopenic muscle-mass was similar for men and lower for women compared with other populations. The findings of this study indicate that the prevalence of SO in the community-dwelling older adults in our country is low and comparable to other populations.

P944

LONG-TERM EFFECTIVENESS OF TREATMENT WITH ZOLEDRONIC ACID IN PAGET DISEASE OF BONE

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Introduction: In the last decade, zoledronic acid (ZA) has become the treatment of choice in Paget's disease of bone (PDB) due to its efficacy, adherence, duration of response and cost. ZA has been shown to achieve prolonged control of metabolic activity of PDB in clinical trials, but there are no long-term follow-up studies in clinical practice.

Objectives: To study the duration of the biochemical response in patients with PDB treated with a single infusion of ZA and followed in a hospital consultation. To analyze variables associated with this response.

Material and methods: All patients with PDB and elevated serum alkaline phosphatase (AF > 128 IU/L), who were treated with ZA in the last 12 years (from 2003 to 2015) were included. All patients were treated with a single intravenous infusion of 5 mg of ZA. Patients treated with other

bisphosphonates in the previous year and those with less than one year of follow-up after ZA were excluded. Serum AF was collected in all patients at 0, 6, 12, 18 months, and thereafter, annually. Patients were considered to maintain the response during the time the AF was within the normal range in our laboratory (40-128 IU/L). Sociodemographic, clinical and other analytical variables were collected. A Kaplan-Meier survival study and a Cox regression-univariate analysis was performed.

Results: Seventy patients treated were included, 62.9% were males, and the mean age was 73.4±8.6 years. The baseline AF was 328.9±140.1 IU / L and the median follow-up time was 57 months (range 25-156). Six months after infusion 68/70 patients had normal AF (rate of therapeutic response 97%) and at 12 months the response was 100%. During follow-up 11 patients had AF relapse, 5 patients died and 11 were lost to follow-up. In Kaplan-Meier analysis, 77.6% of patients maintained normal AF at 6 years, 73.5% at 8 years, and 63% at 9 years, after infusion of ZA. There was no significant association between loss of response and any of the epidemiological and clinical variables.

Conclusions: In our study of usual clinical practice, ZA has an effectiveness close to 100% to achieve normalization of AF at 6 months, similar to the results of other series and clinical trials. In the long term, our results show a longer duration of the response described so far, reaching a survival rate of 63% at 9 years. These data confirm that ZA achieves the goal of prolonged remission in the majority of patients in clinical practice to avoid long-term complications.

P945

IMMUNOLOGICAL PROFILE AND BONE LOSS IN PATIENTS WITH EARLY RHEUMATOID ARTHRITIS

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Objective: To assess the possible relationship between immunological profile and bone loss in patients with early rheumatoid arthritis (RA).

Material and Methods: We enrolled 35 patients diagnosed with early RA, according to ACR-EULAR 2010 classification criteria. BMD measurement of the femoral neck, spine and non-dominant wrist was performed using DXA.

Results: Most of the patients were women (31; 88.57%), with a mean age of 41.72±9.38 years, with a duration of the symptoms under 12 months. A low BMD was found mostly for seropositive cases, statistically significant different, compared to seronegative ones, $p=0.02$; for anti-CCP positive patients, we determined a mean lumbar T-score of $-1.5+1.05$, significant different of the value calculated for anti-CCP negative

patients, $p=0.002$. Regarding the value measured for total hip, the difference was also significant (0.2 vs. -1.25 , $p=0.004$). Positive anti-CCP antibodies predicted a low BMD, with a RR of 3.1, $p=0.013$. For RF, our results also revealed different values depending on seropositivity (T-score lumbar spine $-1.15+1.33$ vs. $-0.21+1.14$; $p=0.01$; T score total hip $-1.32+1.32$ vs. $-0.43+0.92$, $p=0.09$).

Conclusions: Immunological profile has an important impact on bone resorption in patients with RA, even from early stages, with a significant input on future structural damage, implying a careful monitoring and proper prevention and therapeutic management of osteoporosis.

P946

PERSONALITY DISORDERS AND BONE: DATA FROM THE GEELONG OSTEOPOROSIS STUDY (GOS)

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Objectives: Data are slowly emerging to suggest an association between personality disorder (PD), a group of psychiatric disorders characterised by maladaptive patterns of behaviour, and increased risk of chronic diseases such as cardiovascular disease, diabetes, gastrointestinal disease and arthritis. Associations with bone are yet to be explored, thus we aimed to investigate in a population-based sample of women ($n=705$; 28-94 years).

Material and Methods: Lifetime mood and PD (Cluster A, B and C) was assessed using semi-structured clinical interviews (SCID-I/NP and SCID-II). BMD (g/cm^2) was measured at the PA-spine and hip using DXA (Lunar). BMD T-scores <1 were defined as low bone mass. Anthropometric measurements were performed and medication use and lifestyle factors were self-reported. Linear and logistic regression models were used to test the associations, after adjusting for age and weight.

Results: One hundred and thirty-two (18.7%) met criteria for PD [Cluster A, 19 (2.7%); Cluster B, 5 (0.7%); Cluster C, 108 (15.3%)]. BMD among those meeting criteria for Cluster A PD was 6.2% lower at the hip [mean 0.855 (95%CI 0.784-0.926) vs. 0.911 (95%CI 0.861-0.691) g/cm^2 , $p=0.031$] compared to those without. No associations were observed at the spine or between Cluster B or C PDs and BMD at either site (all $p>0.05$). Four hundred and nineteen (63.2%) had low bone mass at the spine and/or hip. Similarly, Cluster A PDs but not Cluster B or C PDs, were associated with an increased likelihood of low bone mass (adjusted OR 3.3, 95%CI 1.0-

10.7, $p=0.05$); the relationship was attenuated following adjustment for mood disorders (OR 2.8, 95%CI 0.9-9.4, $p=0.09$). All patterns persisted after further adjustment for physical activity, smoking, mood disorders (linear regression only) and medications known to affect bone.

Conclusion: Cluster A PDs, characterised by odd, eccentric and non-help seeking behaviours, were associated with reductions in bone mass. Given the dearth of literature, replication and research into underlying mechanisms is warranted.

P947

DOSE DEPENDENT EFFECTS OF ANTIPSYCHOTICS ON BONE MASS IN PHENCYCLIDINE ANIMAL MODEL OF SCHIZOPHRENIA

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Objectives: Schizophrenia (SCH) is a severe neuropsychiatric illness affecting nearly 1% of the world's population. Long-term treatment with typical or atypical antipsychotics is often required for disease control. Decreased bone mineral density (BMD) and increased fracture risk are noticed in SCH patients. It is not clear whether the disease *per se* or a life style together with antipsychotics is the cause of observed changes. Phencyclidine (PCP) is non-competitive antagonist of N-methyl-D-aspartate (NMDA) receptors. Perinatal PCP administration to rodents represents animal model of SCH. Reduced bone mass in PCP rat model has been reported recently. The aim of the study was to examine the dose dependent effects of typical antipsychotic haloperidol and atypical antipsychotic clozapine treatment on bone mass in male rats perinatally treated with phencyclidine.

Material and methods: Ten groups of animals were subcutaneously treated on 2nd, 6th, 9th and 12th postnatal day (PN), with either PCP (10mg/kg) or vehicle (0.9% saline). From PN35, two NaCl and two PCP groups have started to receive haloperidol (NaCl-H1, NaCl-H2, PCP-H1, PCP-H2) in appropriate doses (1 mg/kg/day or 3 mg/kg/day) and two PCP and two NaCl groups have started to receive clozapine (NaCl-C1, NaCl-C2, PCP-C1, PCP-C2) in appropriate doses (20mg/kg/day or 30mg/kg/day), dissolved in drinking water. The remaining NaCl (control) and PCP group have received drinking water. BMD and BMC were measured *in vivo* by dual X-ray absorptiometry (DXA) on PN98.

Results: Reduction of BMD and BMC was noticed in PCP perinatally treated rats. Lower doses of haloperidol have caused decrease of both parameters in NaCl perinatally treated group (NaCl-H1) and further decrease in PCP-H1 groups that

was statistically significant both to NaCl and PCP groups. Lower doses of clozapine did not cause changes of these parameters in animals in NaCl-C1 and PCP-C1 groups. Higher dose of haloperidol have caused more pronounced decrease of BMD and BMC in NaCl-H2 and PCP-H2 groups. However higher doses of clozapine did not have influence of these parameters in NaCl-C2 group while in PCP-C2 group clozapine has even corrected the changes caused by PCP treatment. **Conclusions:** Decrease of bone mineral density, seen in SCH patients, could be the consequence of the disease process, but treatment with typical antipsychotic haloperidol leads to further deterioration of the bones. Atypical antipsychotics express dose dependent protective effects on bones.

P948

BROWN TUMORS AS FIRST SIGN OF HYPERPARATHYROIDISM IN A YOUNG ADULT

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Objectives: Primary hyperparathyroidism (hPTH) in adulthood is often asymptomatic. Conversely, in young people, hPTH is rare and generally complicated by symptomatic hypercalcemia, kidney stones and/or skeletal fragility. Brown tumors, which are osteoclastic focal lesions, are a rare manifestation in Europe.

Materials and Methods: A twenty-four-year-old female patient was referred to our Endocrine Unit with hypercalcemia. Physical examination revealed short stature and scoliosis. She was limping for a recent left hip atraumatic fracture. As an infant, she suffered from vesico-ureteral reflux. Recently, she had been diagnosed with complete congenital atrio-ventricular block and interatrial shunt. Blood tests revealed elevated levels of PTH 324 pg/ml (n.v. 6-30), calcium 12.5 mg/dl, alkaline phosphatase 826 U/l (30-120), and 25-OH vitamin D <5 ng/ml. Ultrasound displayed a 24 mm lesion, inferior to the right thyroid lobe, consistent with parathyroid adenoma, confirmed by parathyroid scintigraphy. Radiological exams disclosed metabolic bone disease. In fact, X-rays showed subcutaneous radial calcifications, while MRI multiple cyst-like spaces and a larger T2-hyperintense lesion, histologically consistent with giant cell proliferation. Scintigraphic skull hyperostosis and severe osteoporosis (BMD 0.6 g/cm², T-score -4.6,

Z-score -3.8) confirmed the severity of the disease. Nephrolithiasis emerged. Oral supplementation with calcitriol and cholecalciferol and rehydration were started. After the improvement of vitamin D storage, surgical excision was scheduled; histological report: intrathyroid parathyroid adenoma. Post-surgery hypocalcemia was corrected with calcium and calcitriol supplementation. After one year of follow-up, there was a marked improvement of bone mineral density. Molecular genetic tests (CGH-Array test, karyotype, molecular testing for Noonan syndrome) and hormonal exams (panel for multiple endocrine neoplasia and pituitary diseases) could not justify the complexity of the case.

Conclusion: younger patients present with increased disease severity; delay in evaluation can lead to significant end-organ damage. We encourage phosphocalcemic screening in young people with fragility fractures. Given the complexity of our case, a strict metabolic and instrumental follow-up was set.

References:

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2. Luo I et al. *Am J Surg* 2017;21:146

P949

FEASIBILITY AND EFFECTIVENESS OF THE FIRST FRACTURE LIAISON SERVICES SET UP IN A SWISS OUTPATIENT CLINIC INVOLVING COLLABORATION WITH PRIMARY CARE PHYSICIANS

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Context: Fracture liaison services (FLS) set up in hospitals have been shown to efficiently reduce the fracture care gap. Objective: To test the feasibility of implementing an outpatient FLS through collaboration between general practitioners (GPs) and the local emergency unit (EI) with the aim to show an enhancement of bone assessment and treatment rates.

Methods: Patients who attended the EI with low trauma fracture were recommended to have their bone health assessed (DXA and biology) by either their GP or a specialist in osteoporosis upon decision of their GPs who were notified immediately. A specific osteoporosis treatment was then given within around 4 months and patients were followed up for a maximum of 21 months either by their GPs or the bone specialist. The treatment for all patients who had a non-major osteoporotic fracture (20%) was defined based on their FRAX outcome. Bone assessment rates, treatment initiation/refusal rates as well as recurrent fractures were assessed.

Results: the cohort of 83 patients (mean age of 70.8±12.4 years) consisted of 88% females. All (31) but one physician agreed to participate in this study. Fractures of vertebrae,

wrist, humerus, pelvis, ankle, ribs, hip, tibia were seen in 54%, 14%, 8%, 2%, 5%, 2%, 4% and 4% of patients, respectively. Among these 83 patients, 80 (96%) had a bone mineral density assessment. Amongst them, treatment was initiated in 70 (87.5%) and refused by 5 (6%) patients. Two patients are under completion. Three patients were lost to follow-up which was mainly performed by GPs or the bone specialist (51% and 46%, respectively). Re-fracture was seen in 2 treated patients (one vertebrae and one wrist at 18 and 8 months, respectively).

Conclusion: a coordinated multi-disciplinary secondary fracture prevention program can easily be implemented in primary care if there is close collaboration between GPs, emergency physicians and a bone specialist at the time of the low trauma fracture. Since this outpatient FLS was also associated with a marked improvement in osteoporosis assessment and treatment rates, its widespread implementation in the primary care setting is required.

Disclosure: Lilly Laboratories: consultant activities

P950

EQUAL BONE MASS ACQUISITION IN ADOLESCENCE WITH AND WITHOUT A HISTORY OF CHILDHOOD FRACTURES: A POPULATION BASED STUDY, THE TROMSØ STUDY, FIT FUTURES

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Introduction: Studies suggest that childhood fractures may be an early marker of skeletal fragility and low peak bone mass accrual. Population-based studies are few and evidence scarce, and the aim of this study was to examine the association between fracture occurrence in childhood and bone mass parameters during adolescence.

Methods: In 2010-2011 all first-year upper-secondary school students (n=1117) in two North-Norwegian municipalities were invited to a somatic health survey, the Fit Future study. The attendance rate was almost 93%. This study included 961 girls and boys aged 15-18 years. We measured bone mineral content (BMC) and bone area (BA) using dual energy X-ray absorptiometry (DXA) at femoral neck (FN), total hip (TH) and total body (TB) and calculated bone mineral apparent density (BMAD, g/cm³) at total hip as BMC-TH/projected bone area^{3/2}. All fractures from birth to DXA screening were retrospectively recorded from the local hospital. We analysed differences in bone mass parameters among girls and boys with and without fractures using independent samples t-test. Multiple linear regression was used to assess the association between childhood fractures and BMC/BMAD.

Results: The registration recorded 316 fractures in 253 individuals. Fractures were more common in boys (35%) than

girls (31%). Girls and boys with and without a history of fracture had similar BMC and BMAD at all sites. In girls, regression analyses controlling for age, height and lean mass showed no statistical significant associations (beta coefficients, 95% CI) with -0.03 g (-0.15, 0.09), -0.25 g (-1.03, 0.53) and -5.50 g (-68.4, 57.4) in BMC-FN, BMC-TH and BMC-TB respectively. Corresponding figures for boys were -0.01 g (-0.16, 0.13), -0.04 g (-0.97, 0.88) and -12.6 g (-71.5, 46.3) for BMC-FN, BMC-TH and BMC-TB. Similar models showed no association between childhood fractures and BMAD.

Conclusion: This study shows that a history of previous fracture does not influence bone mass at adolescence. Therefore, childhood fractures should not be regarded as a marker of adolescence bone fragility.

P951

MULTIDISCIPLINARY OUT-PATIENT CLINIC (RHEUMATOLOGY-ENDOCRINOLOGY) FOR PATIENTS WITH COMPLEX METABOLIC BONE DISEASE: 2 YEARS EXPERIENCE

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Introduction: Osteoporosis (OP) is a highly prevalent metabolic bone disease and may be secondary to endocrine diseases. In these cases the assessment of a rheumatologist and an endocrinologist may be complementary and beneficial for both the patient and the hospital.

Objectives: To describe the experience of two years of a multidisciplinary out-patient consultation Rheumatology-Endocrinology in the care of patients with metabolic bone diseases.

Methods: A multidisciplinary outpatient clinic Rheumatology-Endocrinology was set in December 2013 to assess patients coming from one or another specialty with some metabolic bone disease that could benefit from both a rheumatologist and an endocrinologist. The consultation takes place between 12-14h, on a monthly basis. Demographic characteristics, department of origin, diagnosis, complementary tests, and implemented changes in both the diagnosis and treatment were recorded. Data collected during the years 2014 and 2015 are presented.

Results: In these 2 years there have been 20 consultation sessions (10 per year), with a total of 103 visits. 54 patients (43 women and 11 men) were treated as first visit. Age 57±15 years (range 29-88). There have been 27 successive visits (ratio first/successive 2/1) and in 22 cases the patients did not attend the appointment. 63% of patients (34) came from Endocrinology and 31% (17) from Rheumatology. Three

patients came from other services (Internal Medicine, Primary Care and Physical Therapy). Pathologies in order of frequency derived from Endocrinology were OP in the context of primary hyperparathyroidism (29%), hypogonadism (26%), bariatric surgery (15%) and glucocorticoid induced OP (6%). In 6 patients the inquiry was not related to bone metabolism and the diagnoses were: gout, psoriatic arthritis, osteoarthritis, fibromyalgia, among others. The pathologies most frequently derived from Rheumatology were primary hyperparathyroidism (41%), hypogonadism (18%) and adrenal insufficiency in patients with chronic corticosteroid therapy (12%). In 62% of patients referred from Endocrinology and in 65% of patients from Rheumatology underwent some change, either diagnosis or treatment.

Conclusion: A multidisciplinary consultation Rheumatology-Endocrinology improves communication between the two specialties and facilitates the standardization of diagnostic and therapeutic criteria. It also represents a convenience for the patient and savings for the hospital, as the number of visits and complementary tests are reduced.

P952

PREVALENCE OF HYPOCALCEMIA IN ADULTS IN MINSK-CITY, BELARUS

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The prevalence of hypocalcemia among patients non-operated the thyroid and parathyroid glands has increased significantly with the introduction the screening of calcemia. The main reasons for hypocalcemia are hypoproteinemia and hypoparathyroidism.

Objective: To study the prevalence of hypocalcemia in the adult in Minsk.

Materials and Methods: We studied 1 207 people, average age 53,9±17,25 (892 women,315 men) from 18 to 96 years. Examination: total calcium, total protein; the analysis of morbidity were made. Hypocalcaemia was detected in total calcium level under 2,2 mmol / L.

Results: hypocalcaemia was recorded in 40 people (3.3 per 100 adults), the mean age was 42,9±17,63 years (32 women, men-8). In the age group up to 30 years of hypocalcemia was revealed in 12 cases (8,3%); in the age group of 30-44 years - 5 cases (1,3%), 45-59 years - 3 cases (1,1%); 60-74 years - 10 cases (2,5%); >75 years - 1 case (0,7%).

The prevalence of hypocalcemia in the age group up to 45 years was 6,6 per 100 adults. The prevalence of hypocalcemia in the age group 45 years over was 1,7 per 100 adults. The

results of the study indicate a significant occurrence of hypocalcemia in the age group up to 45 years ($\chi^2=20,34$, $p=0,00001$).

Conclusion: The prevalence of hypocalcemia in the adult population of Minsk-city was 3,3 per 100 adults (33: 1000). The prevalence of hypocalcemia in the age group up to 45 years was 6,6 per 100 adults. The prevalence of hypocalcemia in the age group 45 years over was 1,7 per 100 adults. The results of the study indicate a significant occurrence of hypocalcemia in the age group up to 45 years.

P953

ASSOCIATION BETWEEN GENETIC FACTORS OF OSTEOPOROSIS AND FRAX[®] CALCULATED TEN-YEAR FRACTURE PROBABILITY

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Osteoporosis (OP) is a common disorder with reduced BMD and increased susceptibility to fracture. As much as 80% of BMD variation is determined by genetics. Screening of genetics factors of predisposition to OP may enable early identification of risk groups to perform preventive measures. Another approach for OP fractures risk calculation is to use fracture risk assessment tool.

Aim: To reveal possible association between allelic variants of OP susceptibility genes and OP probability, calculated from FRAX[®].

Materials: A group of 42 Belarusian women with OP, average age 60.5 (56.3; 64.8) years, BMI 26.6 (24.4; 28.0) were genotyped for *COL1A1 Sp1* (rs1800012), *COL1A2 A/G* (rs42517), *VDR Apal* (rs7975232) and *VDR TaqI* (rs731236) polymorphisms using RT-PCR analysis. Association between genotyping data and FRAX ten-year probability of major fracture (MF) or FRAX ten-year probability of hip fracture (HF) was assessed using χ^2 test for single polymorphism analysis and linear regression analysis for haplotype testing. The differences were considered significant at $P<0.05$.

Results: The data shows that for the bearers of homozygous *C/C*-genotype *VDR Apal* the median of MF and HF is 2.5 times and 3.5 times higher, respectively, compared to bearers of *A/A*-genotype ($P=0.01$ in both cases). We found also statistically significant association of global haplotype distribution with HF ($\chi^2=16.5$, $df=7$, Global $P=0.01$), corresponding that this FRAX parameter strongly correlates with analyzed gene variants. Analysis of possible allelic combinations of rs42517, rs7975232 and rs731236 revealed that the most frequent

haplotype was wild-type *A-A-C* (total frequency 42.4%, MF median - 4.1 points). For the carriers of *G-C-C* haplotype (8.3%), MF median was 5.1 points higher compared to reference haplotype (95% CI: 0.7–9.5, $P=0.02$). Meanwhile, for the carriers of *G-C-T*-allelic combination, constructed from risk alleles (9.1%), there was a tendency for MF median increase by 4.2 points compared to reference haplotype (95% CI: -0.1–8.5, $P=0.058$). We also revealed that HF median was 3.4 points higher for the carriers of *G-C-C* haplotype compared to reference haplotype (95% CI: 0.8 – 6.1, $P=0.02$).

Conclusion: Our findings suggest that analyzed genetic markers may be associated with FRAX-calculated probability of fractures.

P954

ECHOSOUND TECHNIQUE FOR SHORT-TERM FOLLOW-UP OF THE DENOSUMAB AND AROMATASE INHIBITORS EFFECTS ON BONE MINERAL DENSITY IN BREAST CANCER PATIENTS

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Objective: To monitor the short-term Denosumab therapeutic effects on bone status in breast cancer patients in treatment with Aromatase Inhibitors (AIs), through an innovative echographic technique known as EchoSound approach [1].

Materials and Methods: 106 breast cancer patients, selected for AIs therapy administration and programmed for annual spinal/femoral dual X-ray absorptiometry (DXA) were recruited. All the patients underwent DXA examination before AIs therapy administration starting (time T0). Then, patients were split into 2 groups: 73 patients received only AIs treatment (Group A) and the remaining 33 patients received an additional Denosumab treatment, in order to contrast the bone loss due to AIs effect (Group B). Follow-up measurements were conducted at 12 (T1) and 18 (T2) months from AIs administration starting. At T1 both DXA exams and echographic scans (by EchoSound Technology) were realized, whereas only the echographic scans were carried out at T2, since DXA is not suitable for short-term follow-up.

Results: At T1, Group B reported an increase in lumbar spine bone mineral density (BMD) of $3.89\pm 1.41\%$ ($p<0.05$) and $4.15\pm 0.56\%$ ($p<0.05$) as measured by DXA and EchoS scans, respectively; on the other hand, Group A reported a BMD decrement of $1.92\pm 1.55\%$ ($p<0.001$, DXA) and

2.24%±0.82% ($p<0.001$, EchoS). A supplementary BMD increment in Group B was revealed at T2, resulting in a total BMD increase of 4.86%±0.95% ($p<0.05$) during the whole 18-months period; whereas Group A showed a total BMD decrement of 3.80%±1.01% ($p<0.001$) in the same period. A similar trend was shown for femoral neck BMD. In Group B: at T1 BMD increment of 2.90%±1.21% ($p<0.05$, DXA) and 3.19%±0.27% ($p<0.05$, EchoS); at T2, total BMD increment of 3.49%±0.30% ($p<0.05$). In Group A: total BMD decrease of 2.22%±0.92% ($p<0.001$).

Conclusion: The EchoSound approach allowed a reliable short-time follow-up of Denosumab effects on BMD variations in patients being treated with AIs.

Reference: [1] Casciaro et al, Clin Cases Min Bone Metab 2015;12:142.

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P955

EVALUATION OF LUMBAR ERECTOR SPINAE MUSCLE TONE, STIFFNESS AND ELASTICITY IN PATIENTS WITH CHRONIC LOW BACK PAIN

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Objectives: To determine the tone, stiffness and elasticity of the erector spinae muscles in patients with chronic low back pain and to evaluate its associations with clinical variables.

Material and Methods: Between January and June 2016, a total of 138 patients with chronic low back pain were evaluated. Seventy patients with chronic lumbar strain (CLS group), 68 patients diagnosed with spondyloarthropathy (SPA group) and 42 controls without low back pain were evaluated. Muscle tone, stiffness and elasticity measurements were performed with a myotonometer device (MyotonPro) from the lumbar and thoracic erector spinae muscles. Spinal metric evaluations and questionnaires evaluating pain, disability and general health status were performed in the patient groups.

Results: Demographic characteristics of the groups were similar. There was a significant difference among groups in terms of lumbar stiffness and elasticity. Elasticity was lower and stiffness was higher in the patient groups compared to the

control group. However, no significant differences were detected between CLS and SPA groups. Regarding the thoracic measurements, there was also no significant difference in myotonometric values. When we evaluate the results of the lumbar measurements according to gender, muscle tone and stiffness (right) were significantly higher in males, and the elasticity (left) was significantly lower in females in the control group. No significant difference in stiffness was detected in the CLS group, whereas elasticity and tone were higher in males. In the SPA group, tonus, stiffness, and elasticity (right) were higher in males than females.

Conclusions: Lumbar erector spinae stiffness was high and elasticity was found to be low in both patient groups. Regardless of the nature of pain (inflammatory or mechanical origin), similar treatment strategies-along with the primary treatment- can be tailored to treat increased stiffness. Myotonometric measurements can be used to evaluate the efficacy of these treatment approaches objectively.

P956

PROFILE OF A PATIENT WITH OSTEOPOROSIS AND SARCOPENIA

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We report a 55 year old woman, who was admitted to the Medical Rehabilitation Clinical Hospital Baile Felix, Romania due to back pain, decreased muscle strength and physical performance. Personal medical history revealed left radius fracture, osteoporosis diagnosed in 2012 for which followed treatment with bisphosphonates. Other comorbidities: recurrent depressive disorder with antidepressant treatment, chronic hepatitis B inactive form, duodenal ulcer, bilateral cataract surgery, bilateral knee osteoarthritis, bilateral hip osteoarthritis, bilateral Dupuytren's contracture. Upon admission, her physical examination revealed: height 1,62 m, weight 52 kg, static and dynamic vertebral syndrome with limited mobility of lumbar spine and of bilateral hip joints, crackles with knees mobilization, arthritic changes of both hands, varicose hydrostatic legs, Dupuytren retraction, generalized sarcopenia. Laboratory investigations revealed low blood glucose levels, low hematocrit values, low hemoglobin concentration. Lumbar spine radiographs showed vertebral compression in middle portion of the vertebral body with kyphoscoliosis. Pelvic X-ray revealed signs of bilateral hip osteoarthritis. Knee X-ray also revealed bilateral osteoarthritis, stage I/II. DXA conducted in December 2015 showed

lumbar spine T score -4.2 and left hip T score -2.9 and $Z=-2.4$. In January 2017 DXA lumbar spine T score was -4.7, left hip T-score was -3.1 and right hip T-score was -2.5 confirming the diagnosis. As there was a suspicion of sarcopenia, total body Lean Body Mass was performed: 7.776 g/cm². By using the BTS G-walk test we established that physical performance was low, 28.6 when performing Timed up and Go test. Evaluation of handgrip strength with Jamar dynamometer revealed low values: 11 for the right hand and 14 for the left hand. Medical rehabilitation was performed together with personalized diet and pharmacologic therapy, targeting painkilling, combating contracture, increasing stability of the lower limb joints, maintaining joint mobility within normal limits, correcting spine posture. Rehabilitation therapy included hydrothermotherapy with thermal water at 36°C, painkiller electrotherapy (TENS), kinetherapy, occupational therapy.

P957

BONE ALKALINE PHOSPHATASE, OSTEOCALCIN AND INSULIN-LIKE GROWTH FACTOR-1 AND THEIR RELATIONSHIP IN ELDERLY WOMEN WITH ADVANCED BREAST CANCER AND BONE METASTASES

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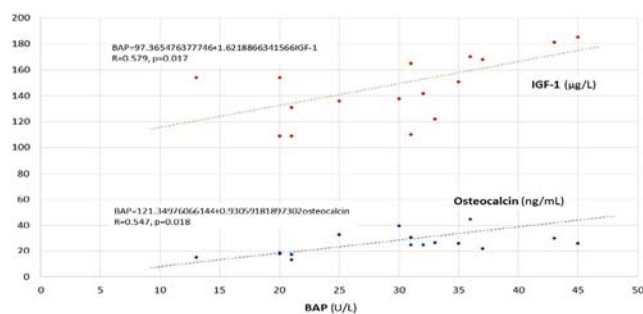
Objectives: Although breast cancer (BC) metastasizes primarily to the regional lymph nodes, distant metastases, including lung, liver, brain, and bone metastases (BMs) may also develop. Metastatic bone disease seriously affects the overall survival. The diagnostic value of serum bone tumor markers (TMs) in patients with BMs is still unclear. Unfortunately, it seems that there are not reliable TMs to be recommended in during follow-up of patients with BC. The aim of this study was to evaluate the relationship between bone alkaline phosphatase (BAP), osteocalcin, and insulin-like growth factor (IGF)-1 in a small group of patients with BC and BMs.

Material and Methods: The medical records of 15 elderly (older than 65 years) women (median age 69 years, range 66-74 years) with advanced BC and BMs (confirmed with 18F-FDG-PET) were retrospectively reviewed. All patients have undergone regular measurement of several serum TMs, including BAP, osteocalcin, and IGF-1. The assay methods were automated spectrophotometric immunoassay, sandwich chemiluminescence immunoassay (CLIA), and sandwich

(quantitative) colorimetric enzyme-linked immunosorbent assay (ELISA), respectively.

Results: There was no correlation or a weak correlation between the age of the patients and BAP ($r=0.429$, $p=0.097$), IGF-1 ($r=0.369$, $p=0.158$), and osteocalcin ($r=0.520$, $p=0.038$). The regression line equation between BAP and IGF-1 and osteocalcin were $BAP=97.365476377746+1.6218866341566IGF-1$ ($r=0.579$, $p=0.017$), and $BAP=121.34976066144+0.93059181897302osteocalcin$ ($r=0.547$, $p=0.018$), respectively.

Conclusions: In women with advanced BC and BMs, all the three considered TMs were partially independent of one another. However, BAP was significantly ($p<0.05$) related to both IGF-1 and osteocalcin, suggesting that this TM is not useful in the early diagnosis of BMs. However, our results should be confirmed by further studies with more patients.



P958

SAFETY PROFILE OF ALLOB[®], AN ALLOGENEIC OSTEOBLASTIC CELL THERAPY PRODUCT

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Bone Therapeutics is an advanced biotechnology company which develops innovative osteoblastic cell therapy products for the treatment of orthopaedic conditions. The company is currently evaluating its human allogeneic osteoblastic cell therapy product, ALLOB[®], in three Phase II proof-of-concept trials. Safety profile of ALLOB[®] was evaluated based on preclinical and clinical safety studies.

Methods: A 6-month single dose GLP toxicity study was performed by intravenous injection of 2.5×10^6 ALLOB[®] cells ($n=15/\text{sex}$) or vehicle ($n=5/\text{sex}$) in NMRI-Nude mice. Toxicity evaluation included mortality, clinical signs, body weight and food consumption monitoring, urine, blood and bone marrow analysis and histopathology of organs. In parallel, a biodistribution study after a single administration of ALLOB[®] at femoral fracture site was evaluated in NMRI-Nude mice using either SPECT-CT imaging between D1 to D7 (¹¹¹In-oxinate radiolabeling) or highly sensitive real time PCR targeting human repetitive α -satellite DNA sequences performed on excised organs/tissues at D1, D4, D7 and D14 ($n=6/\text{group}$).

Clinical safety profile was evaluated in a Phase I/IIA open-label clinical trial in the treatment of delayed-union fractures of long bones or interbody fusion. Safety evaluation was based on occurrence of AE/SAE, physical examination and vital signs, laboratory measurements and patient open questionnaires. Immunogenicity was also examined.

Results: Single dose toxicity study demonstrated that over the 6-month observation no safety concern related to ALLOB[®]. Biodistribution study demonstrated that from D1 to D4, ALLOB[®] cells localized mainly at the fracture site; at D7, *ex vivo* counting showed that 51±23% of radioactivity signal was present at fracture site in ALLOB[®] treated animals while less than 20% (17.3±2.3%) was observed in vehicle control mice. Remaining radioactivity signal was localized in kidneys and liver. Detection of human DNA by real time PCR show that at D1 to D14, human cells stay localized at fractured site. Only rare cells were detected in lungs and in heart at D1. There was no drug related adverse event reported in patients followed up so far in the clinical program. No hypersensitivity reactions were reported to the allogenic cells.

Conclusions: Preclinical and clinical studies document an excellent safety profile of ALLOB[®] and provide further support for continued development in humans as osteoblastic cell-based therapy.

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RELATIONSHIP BETWEEN SARCOPENIA AND METABOLIC SYNDROME

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Objectives: Sarcopenia is a prevalent problem in the older population that is commonly considered for its well known adverse functional associations. Cardiovascular diseases and metabolic syndrome are also significant problems whose prevalence dramatically increase with age and remain the main cause of mortality in older adults. These two entities have recently been suggested to be inter-related and significant evidence has accumulated. Previous studies showed conflicting results which may depend on the differences in methodology assessing sarcopenia. In this study, we aimed to investigate the association between sarcopenia and metabolic syndrome components in terms of different sarcopenia methodologies.

Methods: Community dwelling older outpatients were prospectively recruited from the geriatrics outpatient clinics of a university hospital for assessing hand grip strength and gait speed. Body composition was assessed by bioimpedance analysis. Muscle strength was assessed measuring hand grip strength with a Jamar hand dynamometer. We used Turkish population cut-off points according to Baumgartner, Janssen and FNIHa-b

definitions while assessing sarcopenia. The cut-off thresholds for muscle mass were defined as the mean-2SD of the values of the young reference study population. Low muscle mass was defined as followings according to Baumgartner, Janssen and FNIHa-b, respectively: appendicular muscle mass/height² (kg/m²), skeletal muscle mass/total body weight*100 (%), muscle mass/body mass index (kg/m²). Hypertension (HT), diabetes mellitus (DM) and increased waist circumference (IWC) (Male–Female ≥102 cm vs. 88 cm, respectively) were used as the components of metabolic syndrome.

Results: Total of 970 community-dwelling outpatients between 60 and 99 years of age. 303 (31.2%) were male and 667 (68.8%) were female. Mean age was 75±7.2 years. N=19 (%2), n=449 (%46,2), n=601 (%61,9), n=178 (%18,3) of total had lower-muscle-mass according to Baumgartner, Janssen and FNIHa-b, respectively. N=309 (%31.8) had lower gait speed, 363 (%37.4) had lower muscle strength, 479 (%49.3) had decreased muscle functionality. Sarcopenia prevalences were 11 (%1,2), 220 (%22,6), 315 (%32,4), 106 (%10,9) according to Baumgartner, Janssen and FNIHa-b, respectively. Prevalences of HT, DM, increased WC were 25.3%, 75%, 65.6% respectively. In chi-square analyses, lower-muscle-mass was associated with increased HT and WC according to Janssen and FNIHa methodology (p <0.05), while associated with only increased WC according to FNIHb methodology (p <0.001). According to Baumgartner methodology there was reverse-association between lower-muscle-mass and increased HT (p=0.055) and WC (p <0.001). In functional parameters only decreased gait speed was associated with increased WC in MS components (p=0.03). According to Janssen methodology increased HT and WC were associated with sarcopenia (p=0.04 and p <0.001, respectively) while FNIHa-b methodology was associated with only increased WC (p <0.001). Baumgartner methodology showed that sarcopenia is reverse associated with increased WC (p=0.001). There was no association between DM and lower-muscle-mass, gait speed, muscle strength and sarcopenia.

Conclusion: We observed that relationship between sarcopenia and MS depends on the kind of definition in sarcopenia. It seems that Janssen methodology has the highest prediction value in terms of MS in older population.

P960

TBS, VFA AND HANDGRIP IN A GROUP OF POSTMENOPAUSAL WOMEN WITH VERTEBRAL FRACTURE

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Objective: To evaluate the results of VFA, TBS and handgrip test measurement in postmenopausal women.

Material and Methods: The study was conducted in a group of 36 women aged 49-95 years. All patients had been tested with the use of VFA, TBS (Hologic Horizon) and for handgrip strength (Baseline SN 04201183). Vertebral fractures assessed by VFA were classified according to the Genant scale. Statistical analysis of the results was performed by Statistica 12.

Results: VFA results showed presence of fractures in 17 women (40% of the group). Most fractures were located in vertebra T7, Th12, T6 and Th8 (15; 13; 12; 10). Analysis of TBS in the research group showed significant abnormalities of bone microarchitecture. The average TBS result was 1,197, with only 2 patients having the proper TBS score (>1350). The results showed no statistically significant correlation between the TBS, BMD, VFA and the number of fractures in patients. Analysis of the muscle strength test showed that average score of the handgrip was 23.9 kg. Results showed a correlation between handgrip and the value of TBS, however it was not statistically significant ($R=0.44$). The study demonstrated a statistical significant dependence between the number of vertebral fractures (identified by VFA) and the result handgrip test ($p<0.05$). Another statistically significant correlation ($R=0.79$, $p<0.001$) between the number of fractures, and decrease of growth recorded in patients.

Conclusions: There is a correlation between the number of fractures (noticed by VFA) the handgrip results and the decrease in growth. TBS results in the group of patients with vertebral fractures are generally low.

P961

INTER-RATER RELIABILITY OF DARTFISH MOVEMENT ANALYSIS SOFTWARE FOR MEASURING MAXIMUM FLEXION AND EXTENSION AT THE HIP AND KNEE IN OLDER ADULTS WITH OSTEOPOROSIS AND OSTEOPENIA

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Objective: Various methods are used to measure hip and knee joint motion angles, however their use is often limited by high cost, or inability to measure dynamic movements. The assessment of movement patterns is clinically useful in individuals with osteoporosis (OP) and osteopenia (OPe) through its potential to optimize fracture risk assessment. This study aims to evaluate the inter-rater reliability of using Dartfish™ 2-D Motion Analysis Software to measure maximum flexion and

extension angles at the hip and knee in individuals with OP or OPe while performing five daily activity tasks from the Safe Functional Motion test (SFM).

Methods: participants were recruited from an osteoporosis specialty clinic and videotaped performing the pour, footwear, newspaper, sweep, and sit-to-floor tasks of the SFM. Five raters used Dartfish™ software to measure maximum flexion and extension angles at the hip and knee using the video of each task. The inter-rater reliability of all the measurements was assessed by intraclass correlation coefficient (ICC) and standard error of the mean (SEM).

Results: Twelve participants (eleven females) with mean (SD) age 64.7 (12.8) and femoral neck bone mineral density 0.61 (0.07) were included. In all five tasks, knee measurements ICC and SEM values ranged from 0.23 to 0.95, and 1.75 to 11.54 degrees, respectively and hip measurements ICC and SEM values ranged from 0.25 to 0.94, and 2.1 to 11.22 degrees, respectively.

Conclusion: Dartfish™ measurements of maximum knee flexion angles in uni-planar tasks demonstrate a moderate to excellent degree of inter-rater reliability in patients with OP and OPe, while measurements at the hip joint should be used with caution. The inter-rater reliability was higher when measuring maximum knee angles for pour, newspaper, and sweep tasks. In people with OP and OPe, Dartfish™ in general is clinically feasible software for movement analysis and providing immediate visual feedback for patient about their movement strategies.

P962

HI-SALT DIET INDUCES BONE LOSS

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Objective: Recent studies suggest that high salt intake have the potential to modulate immune system by inducing generation of Th17 cells, leading to various immune disorders including osteoporosis. Based on these findings we hypothesized to study the effect of high dietary salt intake on bone health.

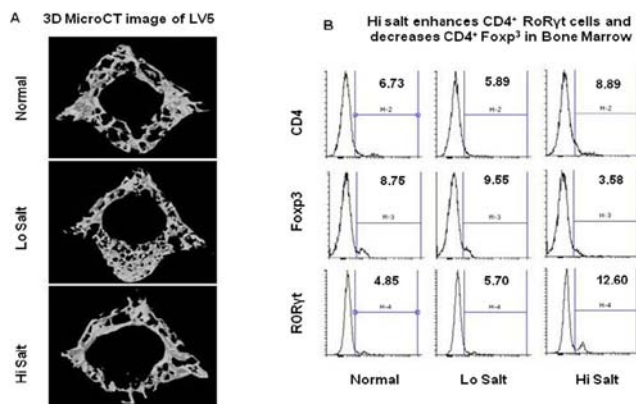
Material and Methods: 8-10 weeks old thirty male mice (under standard SPF conditions) in three groups were fed diets with Normal (0.8% NaCl), Lo salt (0.4% NaCl) and Hi salt (4% NaCl). After 45 days mice were sacrificed and analyzed for various parameters to access the role of high dietary salt intake on bone health by using various cutting edge technologies such as SEM, AFM, μ CT, FACS, ELISA etc.

Results: Interestingly we found that high salt intake induces enhanced bone loss when analysed by SEM, AFM and μ CT. Both the cortical and trabecular bone histomorphometric parameters of high salt fed group were significantly reduced in

comparison to normal and low salt groups. Since Th17 cells are the main culprits for enhanced osteoclastogenesis we looked at these cell populations in both primary and secondary lymphoid organs. We observed that high salt intake significantly induces the differentiation of RoR γ ⁺ Th17 cells and inhibit the differentiation of Foxp3⁺ Treg cells in both primary (thymus and bone marrow) and secondary (spleen and lymph node) lymphoid compartments. Also high salt intake leads to enhanced production of osteoclastogenic cytokines (IL-6, IL-17 and TNF- α) and inhibits the induction of anti-osteoclastogenic cytokines (IL-10 and IFN- γ) in blood serum. More importantly we found that the same was reversed in case of low salt intake group.

Conclusion: Our results for the first time report the effect of high dietary salt intake on bone loss via modulating the balance of Treg and Th17 cells. These results once again highlight the importance of environment in the form of high salt intake on immune system ultimately leading to increased risk of various inflammatory diseases such as osteoporosis.

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COMPARISON OF EFFICACY OF WEEKLY VS. DAILY TERIPARATIDE IN THE MANAGEMENT OF POSTMENOPAUSAL OSTEOPOROSIS

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Background: Teriparatide (daily subcutaneous 20 μ g) has been approved for the treatment of postmenopausal osteoporosis (PMO). But the cost is prohibitively high and in countries like India with limited personal resources may not be a feasible option. We tried to compare weekly vs. daily teriparatide therapy in an effort to bring down the cost of treatment if found efficacious.

Objective: To compare weekly vs. daily teriparatide therapy in postmenopausal osteoporosis. **Methods:** Study: Open label non-inferiority In this prospective study 21 patients with PMO were recruited and given the option for daily or weekly teriparatide injections. Patients in group A were given 20 μ g of teriparatide daily and in group B were given 60 μ g weekly for 1 year. BMD was measured at baseline and 12 months. The bone formation marker, type 1 collagen C-terminal propeptide (PINP) and the bone resorption marker, C-terminal telopeptide of type 1 collagen (CTX) were measured at baseline, 6 weeks, 6 months, and 12 months.

Results: In the daily treatment group, BMD at lumbar spine and hip increased by 4.1% and 0.2% respectively. Serum PINP levels increased significantly at 6th week, peaked at 6 months and remained above the baseline at the end of 1 year. In the weekly treatment group, there was an increase in lumbar spine BMD of 3.1% after 1 year, PINP increased at 6 weeks (39.96%), peaked at 6 months (69.24%) and remained elevated at 1 year (34.64%). CTx levels started decreasing in weekly therapy, by 6.9% at 6 weeks, 62.08% at 6 months and remained suppressed at 1 year (46.9%). There was no statistical difference between two groups.

Conclusion: Though, data was too small to be of any significance intergroup comparison, but weekly Teriparatide therapy was found to have achieved sustained anabolic bone window and thus may be effective in treatment of PMO and bring down the cost of treatment making it a feasible option in poor countries.

P964

UNDERSTANDING BETWEEN PHYSICIAN AND PATIENT WITH OSTEOARTHRITIS AS A KEY FACTOR IN INCREASING THE EFFECTIVENESS OF THERAPY

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Relevance: Effective long-term treatment of osteoarthritis (OA) is possible with the active participation of the patient in this process. At the same time, the patient and the doctor's opinion on this issue are different, which determines the difficulty of effective communication and collaboration with regard to treatment.

Purpose: To identify the most significant problems for the patient with osteoarthritis (OA) in order to create a system of effective interaction between physician and patient in future **Materials and Methods:** 50 patients with confirmed OA diagnosis (the average duration of the disease 12,45 \pm 5,53 years, the average age of patients 49,5 \pm 15,82 years) responded to 10 questions concerning their relationship to the disease and the impact on the daily life with the need to evaluate the

importance of each question on a scale from 1 to 10. Rheumatologists (n=10) and other physicians (n=40) answered the same questions from their point of view, what is important for patients. Responses were ranked and compared.

Results: Physicians and patients opinions coincided in answering the most important question - the forecast for the future in relation to the possibility of movement and overall health. The second most important for patients was the cost of treatment, the third - understanding the causes of the disease and its consequences. Thereafter, patients worried about constant pain and the need to take drugs constantly and possible side effects. In contrast, doctors believed that patients are worried about limitations in everyday life and disability, persistent pain. To a lesser extent they are concerned about the causes of disease and the cost of therapy.

Conclusions: Understanding the patients opinion to their disease will allow to restructure the communication with the patient, educational programs for them. Physician must pay more attention to the explanation of the causes of disease, the effectiveness and safety of therapy that will improve the quality of life of patients.

P965

STATUS OF BONE METABOLISM IN MEN WITH CORONARY HEART DISEASE

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Purpose: Rate indices of bone metabolism in men with coronary heart disease (CHD).

Materials and methods: The study involved 102 men aged 51-75 years (60.8±6.9 years) with CHD, verified by coronary angiography. Assessed the concentration of osteocalcin (OC), bone alkaline phosphatase (BAP) and cathepsin K in serum by enzyme immunoassay. Calcium index was determined by Agatston method, based on the value of calcium score assessed degree of coronary arteries calcification: 0 units. - no calcification, 1-10 units. - minimal, 11-100 units. - moderate, 101-400 units. - increased calcification, more than 400 units. - pronounced calcification. The control group consisted of 20 healthy men (mean age 55.9±1.1 years) without clinical and angiographic evidence of CHD.

Results: In patients with CHD the absolute value of BAP was 23.0±12.7 U/L, cathepsin K - 18.3±23.2 pmol/L, which was

significantly higher than in men without CHD, 5.7±2.2 U/L and 2.9±4.6 pmol/L respectively (p<0.005). OC concentrations were higher in patients with CHD compared with the control group, without statistical significance (p=0.118). With increasing severity of calcification averages BAP and OC values were increased, however, significant differences in the studied parameters found only in patients with severe calcification, and in its absence. Thus, in patients with severe coronary artery calcification BAP concentration was significantly higher than in patients without calcification, 24.2±13.0 U/L and 15.2±9.4 U/L respectively (p=0.05). Similar results were obtained when assessing the concentration of OC: in men with severe calcification - 23.0±14.6 ng/ml, in the absence thereof - 14.7±7.6 ng/ml (p=0.05). In assessing the concentration of cathepsin K significant differences were obtained in all the study groups (p>0.05).

Conclusions: Increased rates of bone turnover markers is characterized by high rates of bone loss in men with CHD, that is probably confirms the common pathophysiological mechanisms of bone resorption, atherosclerosis and vascular calcification.

P966

EARLY ANTI-OSTEOPOROSIS TREATMENT AND RISK OF MORTALITY AFTER HIP FRACTURE: A POPULATION BASED STUDY

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Objective: To evaluate the effect of early anti-osteoporosis medications on the risk of mortality after hip fracture.

Material and Methods: Data were obtained from the electronic database in the Hong Kong Hospital Authority. Patients aged ≥50 admitted with incident hip fracture (ICD-9 820.XX) in 2005-2013 were followed for 30-, 180-, and 365-day all-cause mortality. Patients who had cancer at baseline or during follow-up period, and had exposure of anti-osteoporosis medications two years prior to hip fracture were excluded. The risk of mortality in patients treated with anti-osteoporosis medications in the first 30-days of discharge was compared with patients without the treatment during the follow-up period using Poisson regression model, adjusted for age, sex, and comorbidity index.

Results: 37,459 patients (mean age 81 years; 68.5% women) were included in the analysis. 2,117 (5.7%) patients were treated with anti-osteoporosis medications in the first 30-days of discharge. During the 1-year follow-up period, 5,266 (14.9%) and 137 (6.5%) patients died in the non-treatment and treatment groups, respectively. Compared to the non-treatment group, the risks of 30-, 180-, and 365-day all-cause

mortality in the treatment group were reduced with an adjusted relative risk (RR) of 0.29 (95% confidence interval, CI 0.17-0.50), 0.44 (95% CI 0.35-0.55), 0.50 (95% CI 0.42-0.59), respectively. Among the anti-osteoporosis medications, bisphosphonate showed significant decreased risks of mortality (adjusted RR 0.29, 95% CI 0.16-0.5; 0.39, 95% CI 0.30-0.50; 0.43, 95% CI 0.36-0.53 for 30-, 180-, 365-day all-cause mortality respectively), whereas no significant decreased risk was observed in patients using non-bisphosphonate. The risks of mortality related to cardiovascular diseases (CVD) were further investigated and results were similar.

Conclusion: An increasing risk of death after hip fractures has been well documented. Our study showed that early anti-osteoporosis medications associated with reduced risk of mortality, including CVD mortality, after hip fracture. A larger sample size is required to study the role of each individual anti-osteoporosis medications in mortality after hip fracture.

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FATIH GERIATRICS TRIAL: HOW OFTEN IS SARCOPENIA, LOW MUSCLE MASS AND

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Objective: In this abstract, it is aimed to determine the prevalence of sarcopenia and its components in the elderly people who are evaluated by Fatih/Istanbul Province geriatric survey research.

Methods: In the study, the sample changes from 63 to 101 years old people. Muscle mass is measured by bio impedance analyze (TANITABC532) and is evaluated by Baumgartner Index (skeletal muscle kg/ length²). According to our national data, low muscle mass (the average of adult-2SD) and muscle power threshold are determined for men and women: <9.2 kg/m², 7.4 kg/m² and <32 kg, <22 kg respectively. Also, Class 1 low muscle mass level is determined as 10,1 and 8,2 kg/m². The definition of sarcopenia is defined as low muscle mass (SMMI) and reduction of muscle function (OYH or strength of muscle) by definition of EWGSOP. Additionally, calf girth is noted. According to our national references, the low calf girth is determined as being the diameter of calf girth lower than 33 cm.

Results: 204 cases (94 men, 110 women) were included in the research. Median age was 74,5±7,3 years. The characteristics and their distributions by gender are summarized in the Table 1. The prevalence of sarcopenia and its components are by order: sarcopenia 5.3%, low muscle mass 9.8%, dynapenia 51.5%, low walking speed 25.6%. Low calf girth-

an indirect indicator of low muscle mass-was observed in the 15.8% of the cases.

Conclusion: Our results of study show that the sarcopenia prevalence of elderly people in our society is low which is similar in other population; however, dynapenia and the low level of walking speed are very common problems.

| | Men (n=94) | Women (n=110) | Total (n=204) | p |
|--------------------------------|---------------|------------------|------------------|--|
| Age | 74,7 ± 6,6 | 76 ± 7,8 | 75,4 ± 7,3 | 0,19 |
| Height | 167,1 ± 7,4 | 153,2 ± 7,5 | 159,5 ± 10,2 | <0,001 |
| Weight | 75,9 ± 14,1 | 73,1 ± 16,5 | 74,3 ± 15,7 | 0,2 |
| BMI | 27,1 ± 4,5 | 31,3 ± 6,9 | 29,4 ± 6,3 | <0,001 |
| Falling (last 1 year) | 25,5% | 30,3% | 28,1% | 0,47 |
| Fear of falling | 18,1% | 45% | 32,5% | <0,001 |
| Inability to walk without help | 19,1% | 23,6% | 21,6% | 0,25 |
| Strength of hand grip | 32,1 ± 8,8 | 19,8 ± 5,5 | 25,6 ± 9,5 | <0,001 |
| Dynapenia | 43,6% | 58,5% | 51,5% | 0,036 (men <32 kg, women <22 kg) |
| Calf Girth | 36,1 ± 4,8 | 37,8 ± 6,1 | 37 ± 5,6 | 0,03 |
| Low calf girth | 19,1% | 12,8% | 15,8% | 0,24 |
| OYH | 1,09 ± 0,40 | 0,98 ± 0,34 | 1,03 ± 0,38 | 0,051 |
| Low OYH | 21,3% | 29,8% | 25,6% | 0,21 |
| Muscle mass (kg) | 52 ± 7,8 | 41,6 ± 8,7 | 46,4 ± 9,8 | <0,001 |
| SMM | 29,4 ± 4,4 | 23,5 ± 4,9 | 26,3 ± 5,5 | <0,001 |
| Low SSMI (Baumgartner) | 17,9% | 3% | 9,8% | 0,001 |
| Sarcopenia Baumgartner | 8,2% | 2,9% | 5,3% | 0,11 |

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PATIENT AND CLINICAL FACTORS ASSOCIATED WITH HOSPITAL LENGTH OF STAY AND DISCHARGE DESTINATION AMONG OLDER ADULTS WITH UPPER LIMB FRACTURES: A DATA LINKAGE STUDY EXAMINING HOSPITAL PATHWAYS

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Objectives: This study examined several aspects of inpatient care models for older adults hospitalized with upper limb fractures, including patient and clinical factors associated with hospital length of stay (LOS) and discharge destination.

Materials and Methods: ICD-10 diagnosis codes from linked hospital records for adults aged >65 years admitted to public or private hospitals in Queensland (Australia) were used to identify patients hospitalized for treatment of proximal humerus, forearm and wrist fractures. Clinical pathways and demographic characteristics were described, and multi-level models (two-level random intercept, patients clustered within hospitals) was used to examine patient and clinical factors associated with LOS and discharge destination.

Results: 5,141 unique patients (74% female, mean (SD) age 77 (8) years) with proximal humerus (n=2,096), forearm (n=2,401) or wrist (n=644) fractures from 150 hospitals were identified. The most common mechanism of injury was falls

(n=3998, 77%) and the most frequent admission pathway was via the emergency department (n=3,897, 75%). The median (IQR) acute hospital LOS was 2 (1-6) days, n=2519 (49%) received care on a specialty orthopedic ward. Most were discharged directly home (n=3929, 76%), rather than transferred to a hospital rehabilitation unit (n=527, 10%) or another acute hospital (n=525, 10%). Factors associated with longer LOS (expressed as coefficient; 95% CIs) included older age (per decade 0.10; 0.08, 0.13), cerebrovascular disease (0.21; 0.10, 0.32), dementia (0.14; 0.09, 0.19), COPD (0.22; 0.15, 0.29), rheumatoid arthritis (0.63; 0.47, 0.78), all $p < 0.001$. Younger patients (per decade -0.58; -0.68, -0.49), males (0.33, 0.15, 0.51), shorter LOS (-0.05; -0.06, -0.03), forearm (0.62; 0.45, 0.78) or wrist (0.77; 0.49, 1.05) vs. humerus fracture and those without congestive heart failure (-0.52; -1.09, -0.04) or dementia (-0.34; -0.61, -0.06) were more likely to be discharged directly home.

Conclusion: Most older adults hospitalized with upper limb fractures had a relatively short LOS and were discharged directly home. Several factors that may be used for identification of patients at elevated risk of long stays, undesirable discharge outcomes and who may benefit from targeted clinical care interventions have been identified.

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EDUCATIONAL PROGRAMS FOR PATIENTS WITH OSTEOPOROSIS IN CLINICAL PRACTICE

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An effective and long-term treatment for osteoporosis is not possible without active patient's right to participate in this process, which is required to carry out educational programs.

Objective: To evaluate effectiveness of educational interventions for patients with osteoporosis (OP).

Materials and methods: 48 patients with OP (main group) have been trained in the school (5 lessons for a year), 40 patients in the control group, who only came to the rheumatologist consultation 4-5 times per year. The groups were matched by sex, age, structure (primary and secondary) and the severity of OP, the presence of fractures, the resulting therapy. At baseline and after 6 months the intensity of back pain (VAS), adherence to treatment were determined. At baseline and after 12 months densitometry was performed.

Results: After 6 months from the start of training intensity of back pain significantly ($p < 0.01$) decreased by 2.5 times in the study group and 1.5 times in control, constantly wore a corset 52% of people from the main group, and 37.5% - in the control. Calcium and vitamin D after 6 months continuously received 95.8% of the patients who have passed the school and 90% of patients in the control group, after 12 months 93.7%

and 85% respectively. Pathogenetic therapy has been assigned to all patients, initially 97.9% pts of the study group and 92.5% in the control group began to take, after 6 months of continuous administration of drugs continued - 89.5% of the main group patients and 67.5% in control, after 12 months commitment to therapy was 87.5% and 42.5% in the study and control groups. Densitometry results over time in 12 months showed that the BMD gain was significantly ($p < 0.05$) higher in the group that took a school for the patients and was 5.6±6.2% at the spine, 4.2±4.5% at the femoral neck in the basic group, 3.1±4.8% and 1.9±3.2% respectively and in control group.

Conclusion: The educational program improves functional status and quality of life, maintains a high compliance to receiving drugs, increases adherence to treatment.

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THE SYSTEM STATUS OSTEOCLASTOGENESIS IN MEN WITH ANKYLOSING SPONDYLITIS IN DEPENDING ON RADIOLOGICAL STAGE

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Objective: To assess the state of the system osteoclastogenesis in men with as, depending on the radiographic stage.

Materials and methods: The study included 60 males: 40 patients with diagnosis of as (according to modified new York criteria 1984) and 20 men without AC. The average age of patients was 42.3±1.9 years, disease duration of 11.2±5.3 years. To explore relationships between the indicators of regulators osteoclastogenesis and radiological stage of the patients were divided into 3 groups: the first group included 3 patients with radiological stage II, the second 16 patients with radiographic stage III, in the third - 21 patients with radiographic stage IV. Determination of OPG and RANKL were carried out by enzyme immunoassay using Elisa kit Biomedica Gruppe (Austria).

Results: The concentration of OPG in patients with as with different variants of the x-ray stage was significantly higher than the control group. The lowest percentages are found in patients with II-nd stage of the radiological as - 3.65±0.14 U/l, and the highest values determined in men with IV radiographic stage of as, where the concentration of OPG amounted to 4.64±0.28 U/l ($p=0,059$). Levels of RANKL in patients with as with different x-ray stage was not significantly different between themselves and with the control group. So, men with II radiographic stage of as the level of RANKL amounted to 0.26±0.06 pmol/l and patients with IV radiographic stage of as - 0.21±0.03 ($p=0,798$), respectively. The ratio of OPG/RANKL was significantly higher in patients with AC IV

radiographic stage than in patients with II-nd and III-th x-ray stage.

Conclusion: The content of OPG and the ratio of OPG/RANKL in patients with as was significantly higher than in men without AC. High level of OPG and the relationship of OPG/RANKL correspond to a late radiographic stage of as. The increase in OPG level and the relationship of OPG/RANKL in the patients examined may be due to the fact that the vast majority of patients (74%) had late (3 and 4) the stage of the spondylitis.

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KNEE ARTHROPLASTY RESULTS IN RHEUMATOID ARTHRITIS PATIENTS WITH SECONDARY GONARTHROSIS

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Endoprosthesis is an effective method of pain relief and can improve knee function in patients with rheumatoid arthritis (RA). There remains the question of RA drug therapy in the perioperative period

Purpose: To review the results of knee arthroplasty depending on the initial activity of the disease.

Materials and methods: Knee replacement was done 54 RA patients (48 women, 6 men), mean age 49, 8±16,14 years. At the time of the operation duration of the disease was 12,79±6,18 years, high activity (DAS28) - in 26%, moderate - in 55.5%, low - 18.5% of patients. 44 (81.5%) pts continued to take basic anti-rheumatic drugs (DMARDs), 22 (40.8%) pts received steroids, including in combination with DMARDs - 10 (18.6%). Before the operation, and after the 6 months estimated joint pain (VAS), disease activity - DAS28, functional capacity index HAQ were evaluated. In 28 patients the same parameters were assessed after 12 months.

Results: Decrease in pain intensity on the VAS was observed in the first month after knee arthroplasty, after 6 months the pain (VAS) decreased almost to 31.9 mm ($p < 0.05$).

Disease activity decreased with HAQ index 1,68±0,94 to 1,15±0,73 ($p < 0, 05$). After 12 months, VAS was 25,4±11,8 mm, HAQ - 1,06±0,63. 6 months after surgery evaluation showed that VAS in patients treated with corticosteroids (n=22) was - 44,2±16,2 mm, receiving DMARDs without corticosteroids (n=32) -35,4±12,1 mm ($p < 0.05$), after 12 months VAS was 30,8±10,6 mm and 21,3±9,6 mm ($p < 0.05$), respectively, in groups. Significantly ($p < 0.05$) was observed than the positive dynamics in relation to the functional capacity of patients in the group receiving DMARDs with corticosteroids (HAQ 6 months -0,98±0,64, 12 months- 0,89±0,56) compared with patients receiving basic therapy without corticosteroids (HAQ 6 months -1,23±0,69, 12 months- 1,14±0,61)

Conclusion: Knee joint arthroplasty is an effective method to improve functional capacity, pain relief in gonarthrosis and reduces inflammatory activity. Joint function after surgery and in the remote period is better for patients receiving DMARDs compared to patients receiving corticosteroids.

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THE ASSOCIATIONS BETWEEN BONE MINERAL DENSITY AND MORTALITY IN ELDERLY MEN AND WOMEN FROM THE KOREAN LONGITUDINAL STUDY ON HEALTH AND AGING (KLOSHA)

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Good musculoskeletal condition is crucial component for elderly health status. Osteoporotic fractures, especially hip fractures, are closely related to increased risks of mortality. We aimed to examine the relationship between bone mineral density and mortality in elderly men and women. We conducted a longitudinal, population based elderly cohort study. Biochemical parameters and clinical histories were comprehensively accessed as baseline evaluation from 2005-2006. Bone mineral density was measured at lumbar spine, femur neck and total hip using dual energy X-ray absorptiometry, and the study subjects were further stratified according to their region-specific T-score, normal BMD, osteopenia and osteoporosis. Mortality was recorded during 9-year follow up. A total of 319 men and 330 women aged 65 year or older were included. Mean age and BMI were 73.8±7.8 and 23.9±3.2 in men, and 73.2±7.3 years and 24.4±3.4 kg/m² in women. Seventy-four men (23.2%) and 50 women (15.2%) died during 9-year follow-up. Compared to survived group, subjects who deceased were older, had lower BMI and lower serum albumin level in both men and women. These individuals had lower BMD at the LS, FN and total hip. In a multivariate cox proportional hazard model, osteopenia and osteoporosis at femur neck were significantly related increased risk of mortality compared to subjects with normal BMD in men (Osteopenia: HR 2.090; 95% CI 1.01-4.32; $p=0.046$ and Osteoporosis: HR 4.15; 95% CI 1.23-13.9; $p=0.022$). In women, subjects with osteopenia or osteoporosis also showed higher risk of mortality, but without statistical significance. In conclusion, lower BMD was associated with increased risk of mortality in elderly, but this association appeared to be stronger in men.

P973**THREE-DIMENSIONAL CT RECONSTRUCTION IN THE IMAGING OF ACETABULAR AND PELVIC FRACTURES**A. Venter¹, F. Cioara¹, O. Straciuc¹, A. Pirte¹¹University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania**Purpose:** To assay the relevance of 3D CT reconstruction in radiological assessment of problem pelvic and acetabular fractures.**Material and method:** For the period 2012-2016 3D reconstruction was performed in 92 patients with fractures of acetabulum and pelvic ring. Plain radiographs and standard CT scan were obtained as well. There were 64 isolated acetabular fractures, 15 pelvic ring disruptions and 13 simultaneous acetabular-pelvic. The pelvis was examined with Optima GE 16 CT machine with 5 mm collimation and 0,5 pitch.**Results:** In 20 acetabular(26%),4 pelvic(15,3%) and 7 combined(55%) injuries additional lesions were detected after 3D reconstruction. In respect to acetabulum most of such features (N=14,23%) were discovered in complex fracture patterns, in particular in anterior column/posterior hemitransversal and both column types. In 8 cases the preoperative planning was changed due to 3D findings. In pelvic ring fractures additional lesions revealed by 3D investigation did not affect the preliminary conclusions on fracture type and stability. In 5 of 7 combined injuries information obtained by 3D reconstruction concerned acetabular component. In all but one operatively treated fractures 3D information was proved during surgery.**Conclusions:** 3D reconstruction is found to be of essential value in imaging of complex acetabular fractures and should be used routinely in evaluation of these injuries. Though in pelvic ring and simple acetabular fractures 3D imaging shows no considerable diagnostic advantages comparing to plain films and standard CT, it is helpful to clarify the stereometry of the injury and some fracture details and may be performed in selected cases.**P974****QUESTIONS OF RHEUMATOID ARTHRITIS DRUG THERAPY IN THE PERIOPERATIVE PERIOD OF LARGE JOINTS ARTHROPLASTY, ITS IMPACT ON THE LONG-TERM RESULTS OF SURGERY**S. Lapshina¹, I. Akhtyamov¹, L. Miasoutova¹¹Kazan State Medical University, Kazan, Russian Federation**Aim:** To analyze the results of large joints arthroplasty depending on the received rheumatoid arthritis (RA) drug therapy.**Materials and methods:** Knee and hip joints arthroplasty was performed for 54 RA patients (48 women, 6 men), mean age 51,4 ±12,8 years. At the time of the operation disease duration was 11,8 ±3,8 years, high activity (DAS28) - in 26%, moderate - in 55.5%, the low - at 18.5% patients. At the time of surgery 39 (72.2%) pts

continued to take basic anti-rheumatic drugs (DMARDs) (methotrexate at a dose of 10-20 mg per week - 32, leflunomide (20 mg daily) -5). Corticosteroids (prednisone at a dose of 5-15 mg, an average of 7.1 mg per day) - 25 (46.2%) patients, of which in combination with DMARDs - 10 (18.6%). Before the operation, and after the 6 months joint pain (VAS), disease activity - DAS28, functional ability HAQ index were evaluated. In 32 patients, these same indexes were estimated after 12 months.

Results. The reduction of pain intensity VAS was observed in the first month after a joint arthroplasty, after 6 months VAS fell almost to 31.8 mm (p <0.05). Activity of the disease decreased (high - 11.2%, moderate - 44.4%, low - 44.4%), HAQ - from 1,61±0,41 to 1,09±0,26 (p <, 05). After 12 months HAQ - 1,01 ±0,28. The analysis showed that in patients not receiving corticosteroids (n=29) arthroplasty was conducted in 13,6±3,2 years after RA onset, and receiving long-term steroids (n=25) significantly earlier (p <,05) - through 9,9±3,5 years. The functional capacity of patients in the group receiving DMARDs without corticosteroids (n=29) (the HAQ 6 months - 0,9±0,24, 12 months - 0 81±0,16) was significantly (p <0.05) higher compared with patients receiving corticosteroids (n=25) without the basic treatment (HAQ 6 months -1.13±0.21, over 12 months- 1,24±0,19).**Conclusion:** Large joints arthroplasty is an effective method to improve the functional capacity of patients with RA. For patients receiving corticosteroids need of arthroplasty arises a few years earlier. The function of the joints after surgery and in the remote period is better when patients continuously receive DMARDs compared to steroid therapy, the dose should be reduced to a reasonable minimum for the time of surgical treatment.**P975****ASPECTS OF PREVENTION LIMITING PHYSICAL PERFORMANCE IN ELDERLY PATIENTS WITH OSTEOPOROSIS**L. Vicas¹, F. Cioara¹, C. Nistor Cseppento¹, M. L. Cevei¹¹University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Getting older often is accompanied by a progressive decline resulted from complex interactions among different age and pathological aspects on multiple systems, resulting in a constellation of signs and symptoms that are classified as geriatric syndromes. At the elderly persons, there are decreased strength, muscle mass and volume, decrease attributed to the disappearance of muscle fibers and qualitative changes of contractile properties. These are troubling costly health and social assistance.

Objective: To highlight aspects of dependency prevention and recovery of elderly patients, how it participates in an exercise program that will help improve their quality of life. The study evaluated the effectiveness of physical

therapy program tailored to the clinical aspects mentioned and it tried to define the difficulties in implementing programs for physical therapy.

Material: The study was conducted over a period of one year on a sample of 40 patients with a mean age of 76.2 years, patients who followed courses of recovery resort and at home. Geriatric syndromes were frequent, like: lower limb osteoarthritis, osteoporosis, sarcopenia, balance disorders, neurologic, psychiatric disorders and incontinence. Psychiatric disorders include a wide range from mild to psychotic mental changes involution.

Methods: Patients were treated based on specific hydrokinetotherapeutic means at Felix spa resort alongside drug therapy for associated diseases. During the program, in different periods, the treatments were discontinued or modified at various functional levels because of events such as fractures or intercurrent infections. Therapeutic options aimed at reducing the risk of falls and fractures, through action on health-related and environmental factors that can be influenced. Another aim was to create harmonious relations with family or entourage. We conducted tests to identify patients at risk for falling. This functional test emphasizes reduced lower limb functionality, a factor favoring falls (Standing Tandem, Up and Go, Chair Rising Test). We evaluated the stability, balance and coordination (test Berg) and rating scales autonomy (IADL ADL). We evaluated the quality of life and applied a Satisfaction questionnaire to family. For quantitative comparison of the mean values of the variables we used Student t-test and calculating correlations between the rows of values of quantitative variables we used Pearson correlation coefficient.

Results: Physical condition has improved in patients involved in self-care actions and actions to decrease functional dependence. Balance disorders, falls, fractures, very protective family circle have had a negative impact in some parts of the study which highlights the improvements are minimal fitness. Even if we noticed improvements in overall muscle functionality, non decreasing number of falls depend largely on the greater mobility of these patients, especially the ambient challenges of their social status. The risk of falling is great for the patient who lives alone. Patients with peripheral vestibular syndromes or sensory ataxias had fewer failures although they have a higher functional dependency. A noteworthy factor in this group was backing permanent family for these patients. Severe impact that changes family status creates psychotraumatizing situations (leaving children, restricting housing conditions, leaving home, the death of one partner etc.).

Conclusion: Balance problems have a negative impact on patient recovery and elderly. Statistically significant improvements global highlighting short temporal functionality break during the study. The variety of social factors influence the functional status and quality of life. The risk of falling is greater in alone patients, neglected and functionally dependent.

P976

OSTEOPOROSIS AND FRACTURES AMONG RESIDENTS WITH DEMENTIA IN NURSING HOMES: WHICH RESIDENTS HAVE THE GREATEST RISK FOR FRACTURES?

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Objective: 50-80% of nursing home (NH) residents have osteoporosis (OP) and $\pm 40\%$ have had a fracture, while only $\pm 6\%$ receives OP medication. The objective was to survey the situation on OP among NH residents with dementia only and whether patient characteristics upon admission can predict fracture risk.

Material and methods: A retrospective medical record study collecting patient characteristics, OP medication and fractures upon admission and during stay in 9 NH in The Netherlands. Student T-test or Pearson Chi-Square test were used to access differences between groups for numerical and categorical data, respectively. $P < 0.05$ was considered significant.

Results: 226 residents were included; mean age 84 years. Mean duration of stay in NH was 2.5 years, 77% was female, and 70% was able to walk. 15% had the diagnosis OP in their medical record, while 39% had had an OP fracture. 91% of them received vitamin D supplements, 14% calcium supplements and 5% bisphosphonates.

The year incidence for an OP fracture was 6.6% (none-vertebral fractures 5.9% and hip fractures 4.1%). Vertebral fractures were hardly reported (0.7%). Women had more often a none-vertebral or hip fracture ($p=0.045$ and $p=0.027$, respectively) and residents with secondary OP more often had a hip fracture ($p=0.040$). Residents who had had an OP fracture during their stay tended to have a higher FRAX score upon admission for none-vertebral ($p=0.086$) and hip fractures ($p=0.107$), respectively. Garvan score upon admission, however, predicted the actual observed OP fractures better than FRAX score (observed OP fractures in 2.5yr=16.4%; FRAX 10yr=13.4%=> 2.5yr=3.4%; Garvan 5yr=27.7%=> 2.5yr=13.9%)

Conclusion: OP fractures are common and clinical vertebral fractures are hardly recognized at psychogeriatric wards in Dutch NH. For residents with secondary risk factors and a high fracture risk it is, therefore, important to consider additional fracture prevention besides standard vitamin D supplements.

P977

GERIATRIC STUDY IN THE DISTRICT OF FATI H: SARCOPENIC OBESITY IN THE ELDERLY POPULATION – HOW FREQUENT?

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Aim: To determine the prevalence of sarcopenic obesity in the elderly population of the Fatih District that take part in this geriatric screening survey.

Materials and methods: Bioelectrical-impedance- analysis (BIA) (TANITA-BC532) was used to measure the muscle weight. The muscle mass was evaluated with Baumgartner index (skeleton muscle weight/height²). Low muscle weight (average of young adults-2SD) and the threshold for muscle strength are evaluated as the following according to our national data -men and women respectively, low muscle weight: <9.2 kg/m² vs. 7.4 kg/m²; <32 kg vs. <22 kg. In addition, value of class-1 low muscle weight was determined as 10.1 and 8.2 kg/m². The definition of sarcopenia was determined through EWGSOP algorithm and reduction of low muscle weight (SMMI) and muscle functions (OYH or muscle strength). The definition of obesity was evaluated through two alternative procedures, which are recommended by the literature as Zoico methodology: the percentile of fat belonging to elderly population is ≥ 60 or WHO definition: BMI ≥ 30 kg/m².

Results: 204 of elderly population was recruited in the study (110 women-94 men). The average age is 75.4 \pm 7.3. The features of the study population including gender differences are summarized in Table 1. The determination for sarcopenic obesity was absent in both genders according to WHO definition, whereas the determination for sarcopenic obesity was present as %4.6 for males and %2.1 for the entire population according to Zoico methodology.

Conclusion: The fact that our study determined the SO as 0 according to the WHO criteria suggests that with this methodology, sarcopenia is absent in obese cases. Therefore we suggest that Zoico methodology could be more convenient in evaluating SO.

P978

DNASE SERUM ACTIVITY DURING THE TREATMENT OF RHEUMATOID ARTHRITIS BY RITUXIMAB

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Background: Now is important to study new potential markers of response to treatment in rheumatoid arthritis (RA). DNase activity of the blood serum may be useful in this context. Changes of serum DNase activity in the RA treatment by biological agents previously have been not investigated.

Objectives: To study the dynamics of DNase serum activity and other clinical and laboratory parameters during the RA treatment by rituximab (RTX).

Methods: 12 RA patients were involved in the study. All patients fulfilled the EULAR / ACR 2010 RA criteria. 11/12 patients received 4 infusions of RTX at a dose of 1000 mg according to standard protocol: at 0th and 2th week, and after 24 weeks at 0th and 2th weeks. 1/12 patient received 2 infusions of RTX 500 mg at 0th and 2th week. All patients received synthetic DMARDs therapy by methotrexate (10-15 mg weekly), some of them received glucocorticoids (methylprednisolone 4-8 mg daily) and non-steroidal anti-inflammatory drugs. Prior to treatment by RTX patients did not receive any biological agents. To determine the DNase activity of serum the method of rivanol clot was used. DNase activity was measured in serum samples before 1st RTX administration, at 8-12 weeks after the 1st RTX administration, at 24 and 36 weeks of treatment.

Results: At week 24, ACR70 improvement reached 41.67% (5/12) of the patients, ACR50 16, 66% (2/12) of the patients, ACR20 - 41,67% (5/12) of patients. At 24 weeks of treatment by RTX 75% (9/12) of patients achieved remission (SDAI 3,3), 25% (3/12) - a low disease activity (3,3 < SDAI \leq 11). At week 48 3/12 patient, who did not achieve remission at week 24, did it, but 2/12 (16.67%) patients, who were in remission at 24 week return to low disease activity (3,3 < SDAI \leq 11) at week 48. Thus, to the 48 week observation 10/12 (83.33%) patients achieved remission. Levels of serum DNase activity did not differ before and during the RTX treatment. (p 0,05). At the same time, the RF level sequentially decreased to 36 weeks of treatment (p 0,05). At the correlation analysis of clinical and laboratory parameters prior to treatment were found positive relationship (p 0,05) between the level of serum DNase activity and the number of painful joints(68) (r=0.72), number of swollen joints (66) (r=0.82), DAS 28(r=0,76), IgG levels (r=0,82), IgA levels (r=0,71). Changes in levels of serum DNase activity at week 0 and 24 correlated with SDAI and CDAI changes in these same time points (r=0,66, p 0,05).

Conclusions: The study confirmed the efficacy of RA treatment by RTX for primary biological-naive patients. There are the relationship between levels of serum DNase activity and clinical and laboratory parameters during RA treatment with RTX. Also positive correlation between RA activity and serum levels of DNase activity during the RA treatment with RTX was found. DNase serum activity may be used as additional biomarker of RA activity. For the assessment DNase activity as marker of response to therapy is needed further investigations with more number of patients.

P979**EFFECT OF BISPHOSPHONATES ON THE DYNAMICS OF BONE MINERAL DENSITY IN PATIENTS WITH PSORIATIC ARTHRITIS TREATED WITH METHOTREXATE**

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Objective: To evaluate the influence of antiresorptive therapy on the dynamics of bone mineral density (BMD) in patients with psoriatic arthritis (PsA) treated with methotrexate (MTX).

Materials and methods: 62 patients (31 men and 31 women, mean age 47.2 (8.4) years) with diagnosed PsA according to CASPAR criteria, treated with MTX at doses 15-22, 5 mg / week, were enrolled in the study. Determination of BMD in lumbar spine (LS, L₁-L₄) and proximal femurs (PF) was performed by dual-energy X-ray absorptiometry ("LUNAR Prodigy", GE, USA) at study entry and after 12 months. Evaluation of serum calcium, levels of markers of bone resorption β -Cross laps (conducted by the method of electrochemiluminescence (Cobas e411, Roche Diagnostic)) was performed before treatment and after 6 and 12 months.

Results: Low BMD was found in 58% (n=18) of men with PsA, among them osteoporosis (OP) was diagnosed in 32% (n=10) and low bone mass (osteopenia) in 24% (n=8). In 52% (n=16) of women with PsA decreased BMD was observed: OP in 26% (n=8), osteopenia in 26% (n=8). The level of β -Cross laps at baseline was 0.370 [0.209; 0.534] ng/ml, total calcium 2.51 (0.18) mmol/L, which corresponded to the reference values. There were no any statistical significant differences between levels of β -Cross laps and serum Ca at baseline and after 6 and 12 months of antiresorptive therapy. For the correction of osteopenia PsA patients were prescribed Ca supplements at a dose of 500 mg/day and cholecalciferol 1000 IU per day. In patients with OP bisphosphonates were administered (alendronic acid 70 mg / week or 150 mg of ibandronic acid / month) for 12 months. The positive dynamics of BMD was determined in all patients at all measured skeletal sites: L₁-L₄ before treatment 1,002 (0,118) g/cm², after treatment 1,036 (0,104) g/cm² ($p < 0,05$); total femur before treatment 0,899 (0,104) g/cm², after treatment 0,913 (0,125) g/cm² ($p < 0,05$).

Conclusion: In patients with PsA treated with MTX and having osteopenia use of calcium and cholecalciferol at doses of 500 mg and 1,000 IU, respectively, lead to improvement in BMD after one year follow-up examination. Intake of bisphosphonates, calcium supplements, cholecalciferol in

patients with PsA and OP had positive impact on the dynamics of the BMD.

P980**VALIDATION OF AN MALE MODIFIED OSTEOPOROSIS SIMPLE TOOL FOR TAIWAN (MOSTAI) TO IDENTIFY PRIMARY OSTEOPOROSIS IN TAIWAN MEN**

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Objective: Validate the effectiveness of the Male Modified Osteoporosis Simple Tool for Taiwan (MOSTAi) in identifying primary osteoporosis in Taiwan men.

Material and Methods: A bus, equipped with Dual-energy X-ray absorptiometry (DXA), serving for country-wide BMD test was available between 2008 and 2011. Participants must complete a questionnaire regarding risk factors of osteoporotic fracture in FRAX® tool before BMD test. The participants are men (≥ 50 yo). The participants with a disorder strongly associated with secondary osteoporosis must be excluded. These include type I DM, osteogenesis imperfecta, hyperthyroidism, rheumatoid arthritis, liver cirrhosis and steroid use over 5mg daily more than 3 months. Osteoporosis was defined as lowest T-score ≤ -2.5 at any sites, including lumbar spine (L₁ ~ L₄), total hip, femoral neck. We performed MOSTAi (MOSTAi index = $0.3 \times \text{Weight (kg)} - 0.1 \times \text{Age (year)}$, cutoff value: 11) to determine the sensitivity, specificity, and area under the receiver operating characteristic curve (AUC) for correctly selecting men with primary osteoporosis.

Results: A total of 1997 men (mean age: 69.85 \pm 9.53 years) were enrolled in this study. Of the study subjects, 324 met the definition of osteoporosis (16.2%). According to the previous Taiwan study, we select 11 as the cut-off value in MOSTAi. The AUC of the MOSTAi to identify osteoporosis in the femoral neck, total hip, and lumbar spine were 0.742 (95% confidence interval (CI₉₅): 0.705-0.779), 0.824 (CI₉₅: 0.775-0.873), and 0.676 (CI₉₅: 0.634-0.719) respectively. The AUC, sensitivity and specificity of the MOSTAi index (cutoff value=11) to identify primary osteoporosis in healthy men were 0.708 (CI₉₅: 0.676-0.740), 63.6% and 71.0%, respectively.

Conclusion: The MOSTAi may be a simple and effective pre-screening tool for identifying the risk of primary osteoporosis in Taiwan healthy men.

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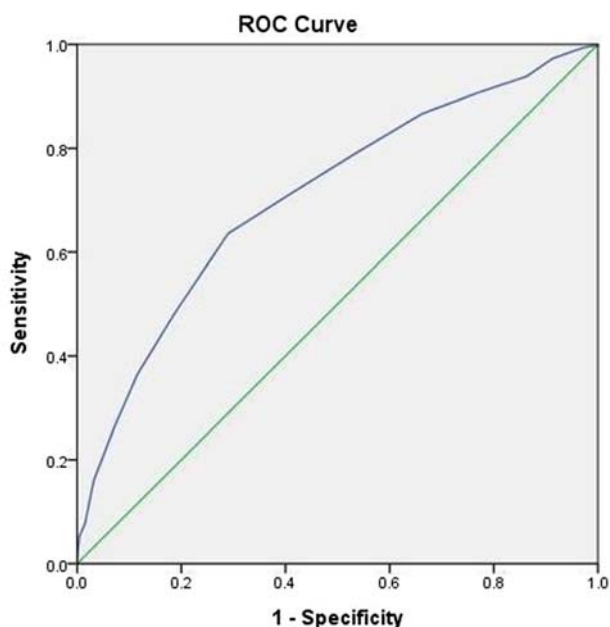


Fig. AUC of the MOSTAi, MOSTAi index = $0.3 \times \text{Weight(Kg)} - 0.1 \times \text{Age (Year)}$

P981

EFFICACY OF PLATELET RICH PLASMA (PRP) IN SEVERE KNEE OSTEOARTHRITIS: CAN PRP INJECTIONS DELAY ARTHROPLASTY?

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Objectives: PRP is known to be effective in patients with early knee osteoarthritis (OA) (1-2). The efficacy of PRP injections in severe knee OA patients is under question (3-5). The aim of this study is to determine efficacy of PRP in patients diagnosed with severe OA and whether injection of PRP delays arthroplasty.

Material and Methods: The study included 60 patients who were diagnosed as severe knee osteoarthritis. All patients had Kellgren-Lawrence grade IV radiological changes. The patients were randomised into PRP and control groups. One cc of PRP was obtained from 20 cc of venous blood after double centrifugations at 400g for 10 minutes. The patients in PRP group received 3 injections of PRP at 3-week intervals. Both PRP and control groups were given home exercise program. Clinical improvement was evaluated using Western Ontario and McMaster Universities Arthritis Index (WOMAC) questionnaire, SF-36 and visual analog scale (VAS) in all patients at 0, 3 and 6 months follow-up visits. In one year follow up all patients were called and asked for history of arthroplasty.

Results: Statistically significant improvement in all WOMAC parameters (pain, stiffness, physical function) ($p < 0.05$) and physical function, physical role, pain, social function, emotional role, mental health, general health and

vitality subscores of SF-36 ($p < 0.05$) was noted in the group treated with PRP. One patient included in PRP group had arthroplasty after first injection and lost follow up. None of the patients in the control group had arthroplasty. Clinical improvement in WOMAC (Pain, stiffness and function) and SF-36 subscores were statistically significantly better in PRP group.

Conclusions: Studies with larger sample size and longer follow-up period are needed to evaluate whether PRP injection delays arthroplasty, but our findings suggest that PRP treated patients have better clinical status and quality of life in severe knee OA patients.

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P982

FATİH PROVINCE – GERIATRIC STUDY: FRAGILITY AND CONTRIBUTING FACTORS IN OLD POPULATION LIVING THE COMMUNITY

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Aim: To investigate fragility prevalence and contributing factors among the old population living in Fatih/Istanbul province.

Material and methods: Age range of 60–101 were taken into the study. The fragility screened with FRAIL-questionnaire, functional capacity measurement with KATZ-Activities-of-Daily-Living-Scale(ADL) and LAWTON-BRODY-Instrumental Activities-of-Daily Living Scale (IADL), quality of life measurement with EQ5D-questionnaire, cognitive status with Mini-Cog-test, depression with GDS-SF, malnutrition with MNA-SF, balance and gait with Romberg-test and postural-instability test, were evaluated accordingly. We measured muscle mass with bioimpedance analysis (TANITA-BC532). We evaluated muscle mass using Baumgartner index (skeletal muscle $\text{kg}/\text{length}^2$). According to our, low muscle mass(young adult average-2SD) and muscle threshold values national data, low muscle mass values are=60 percentile among old case population values (Zoico methodology) or $\text{BMI} \geq 30 \text{ kg}/\text{m}^2$ (WHO definition).

Results: We included 204 old cases (94 male–110 female). Average age: 75.4±7.3 years. 30.4% of the cases were normal, 42.6% were prefrail and 27% were frail. There significant differences in these groups in terms of age/number of diseases/drugs/hand grip strength/daily life activities/EGYA/cognitive state/SCT (p=0.001) /MNA/ GDS/Eq-5D score and health state subjective scoring (p <0.001); BMI (p=0.032), OYH (p=0.03), BIA-fat (p=0.021) and muscle mass (p=0.019). On the other hand, there were no significant differences in calf diameter (p=0.25, visceral fat level (p=0.71). While there were significant differences between the fragility groups, in terms of presence of malnutrition/fear of falling/UI/chronic pain/Romberg's sign/postural instability/ambulation level/presence of depression (p <0.001)/ dementia (p=0.001)/falling in past year (p=0.011) and sex (p=0.004), there were no significant differences in presence of diabetes (p=0.90), hypertension (p=0.065, fecal incontinence (p=0.10). In regression analysis, independent factors to fragility were (dependent variable fragility (robust vs. prefrail + frail), independent variables: age, sex, disease and drug number, muscle strength, egypta and EQ-5D scores; cognitive dysfunction-depression, MN, falls, presence of chronic pain) drug number (OR=1.24, p=0.036), cognitive dysfunction (OR=0.3, p=0.016), EQ-5D (OR=1.53, p=0.017).

Conclusion: Our study is a strong study in multiple factors are taken into account regarding fragility. Our results indicate that multiple drug usage, cognitive-dysfunction and low-life-quality perception are related major factors regarding fragility.

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VITAMIN D SUPPLEMENTATION USING AN EASY ADMINISTRATION SCHEME IN LONG-TERM SURVIVORS AFTER GASTRIC CANCER RESECTION

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Objective: Bone disease in long-term survivors after gastric cancer resection has received little research attention. This study aimed to investigate bone health after curative resection of gastric cancer.

Patients and methods: We selected from our prospectively maintained database all patients with gastric cancer who

underwent curative total or subtotal gastric resection between 2004 and 2013, and had survived at least 2 years without disease recurrence. Bone mineral density and presence of fractures were assessed by X-ray. 25 (OH) Vitamin D and serum markers of bone metabolism were assessed also. All patients were asked about osteoporosis risk factors and previous non-fragility fractures, height decrease, and back pain. Dietary calcium intake was estimated using a weekly food-intake frequency questionnaire. Patients with 25-(OH)-vitamin D ≤ 30 ng/mL at baseline received 16 000 IU of vitamin D3 every 10 days during the one-year follow-up.

Results: Forty patients were included in the study. Mean time from surgery was 48.9 (24-109) months. Vitamin D insufficiency and secondary hyperparathyroidism were observed in 38 (95%) and 20 (51%) patients, respectively. Densitometry showed osteoporosis in 14 women and 7 men and prevalent fractures in 12 women and 6 men at baseline. After 3 months of vitamin D supplementation, 35 (87.5%) patients reached values of 25-(OH)-vitamin D over 30 ng/mL. After 12 months, 38 (95%) patients were in the normal range of 25-(OH)-vitamin D. iPTH levels decreased after vitamin D intervention. Mean levels were 58.6±33.0, and only 11 (27.5%) patients maintained concentrations >70 pg/mL at 3 months

Conclusion: Oral administration of high doses of vitamin D is easily implemented and restored 25-(OH)-vitamin D and iPTH values, which are frequently disturbed after gastric cancer resection.

P984

THE IMPORTANCE OF A SUPPORT GROUP IN IMPROVING QUALITY OF LIFE AND WELL BEING IN PATIENTS WITH OSTEOPOROSIS

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Aim: To assess quality of life and some psychological factors in patients with osteoporosis.

Material and methods: Our study consisted in patients women with osteoporosis from Oradea, Romania. The patients were divided in three groups. The first group was the support group ASPOR. It belongs to Association for Prevention of Osteoporosis in Romania, consisted in 25 women with osteoporosis. The second group, was the placebo group, consisted in 25 patients with osteoporosis, not included in a support group. The third group, the control group, consisted in 25

patients with osteoporosis, sedentary, also not included in a support group. The inclusion criteria were: fulfilling the WHO criteria for osteoporosis, complying with the principles of medical ethics. The exclusion criteria were: severe diseases, noncompliance. The mean age in the ASPOR group was of 63.24 ± 4.96 , in the placebo group of 64.96 ± 4.74 , and in the control group of 64.04 ± 4.97 . In all three groups educational level were almost similar. All the subjects from the three groups were measured for osteoporosis by DXA method. We assessed all the patients for quality of life with Qualeffo 41 Questionnaire, with Hamilton Anxiety Rating Scale for anxiety, and with Levenstein Stress Perceived Questionnaire for stress and for self-esteem with Rosenberg Self-Esteem Scale at baseline and 12 weeks later.

Results: showed that the values of all the parameters investigated were almost similar at baseline. The values measured at the end of the study showed that patients from the support group ASPOR had the best results, than the placebo group and the worst were in the control group.

Conclusion: this controlled study has the intention to be a catalyst for future long term approach on patients with osteoporosis in a holistic manner, with an accent on adherence to a support group. It is also important not to neglect the psychological implication on quality of life in patients with osteoporosis.

P985

DXA ERROR REDUCTION THROUGH QUALITY CONTROL AND IMPACT ON ECHOSOUND FEMORAL NECK DENSITOMETRY

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Objective: To assess the influence of dual x-ray absorptiometry (DXA) report inaccuracies on the performance of the Osteoporosis Score (OS), a recently introduced ultrasound (US) parameter for osteoporosis diagnosis on the femoral neck.

Materials and Methods: 191 patients aged in 50-75 years were enrolled in this study. They underwent a conventional femoral DXA and an echographic scan of the same anatomical site by the new EchoSound technology [1]. At first, all the DXA reports of the enrolled patients were considered as the reference to evaluate the performance of the OS parameter, calculating the diagnostic accuracy in patient classification (osteoporotic, osteopenic, or healthy) and the correlation coefficient between DXA-measured bone mineral density

(BMD) and corresponding OS-derived BMD values. At a later stage, all those cases presenting a typical DXA error as identified by recent literature (e.g., incorrect patient positioning, presence of artifacts, improper image segmentation, etc.) [2] were excluded from the analysis and the actual diagnostic accuracy of the EchoSound approach was re-assessed by considering only those patients having a reliable DXA report.

Results: Considering all the DXA reports, an overall accuracy of 80.6% in patient classification was obtained, and a good correlation between DXA-measured BMD and corresponding OS-derived BMD values was measured ($r=0.75$, $p<0.001$). After the detailed examination of DXA reports, 63 patients (33%) were excluded from the analysis for the presence of various errors. An actual diagnostic accuracy of 92.2% ($r=0.87$, $p<0.001$) was obtained by considering only the remaining 128 patients having a reliable DXA report. Furthermore, the intra- and inter- operator repeatability of OS-derived BMD measurements were evaluated through the root mean square coefficient of variation (RMS-CV) which resulted to be respectively 0.28% and 0.35%.

Conclusion: The common inaccuracies of the routine DXA reports lead to an underestimation of OS accuracy in osteoporosis diagnosis. The actual performance of different ultrasonic methods that assumed routine DXA reports as the gold standard reference could be re-assessed employing the same approach.

References:

[1] Conversano et al, UMB 2015;41:281.

[2] Messina et al, Eur Radiol 2015;25:1504.

Acknowledgements: Work partially funded by FESR PO Apulia Region 2007-13 – Action 1.2.4 (grant n. 3Q5AX31: ECHOLIGHT Project).

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P986

TRABECULAR BONE SCORE MEASUREMENTS IN 123 ROMANIAN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM

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Objective: There is evidence for increased overall fracture risk in primary hyperparathyroidism (PHPT). As areal BMD by DXA is not effective in capturing all the determinants of bone fragility, “Trabecular Bone Score” (TBS) has been

recently proposed as an indirect measure of trabecular microarchitecture. The aim of this study was to assess TBS from spine DXA images in patients with PHPT.

Methods: This was a cross-sectional study conducted in an osteoporosis referral center. One hundred and twenty three patients with PHPT were selected from our database (2010 to 2016) if they had a valid LS DXA scan. The patients were both females (20% premenopausal) and males (10%), mean age 59.4yr (range 16 to 83), with both asymptomatic and symptomatic PHPT (35% kidney stones and 25% fractures); mean PTH 194 pg/ml, mean serum calcium 11.2 mg/dl. TBS indices were derived from LS-DXA images and cutoff points used in term of fracture risk were those previously reported.

Results: Mean TBS values of the group was 1.25 ± 0.11 : 33% of patients with PHPT had degraded microarchitecture (TBS ≤ 1.20), an additional 53% had partially degraded microarchitecture (TBS > 1.20 and < 1.35) and only 14% had normal TBS. The prevalence of patients with osteoporosis, osteopenia or normal BMD by DXA were 49%, 40% and 11%, respectively. Patients with vertebral fractures had mean values of TBS numerically lower (1.19) than those without fractures (1.25). TBS was significantly correlated with aBMD ($p < 0.003$), but not with age, BMI, years since menopause. Only 4% of patients showing degraded or partially degraded microarchitecture by TBS had normal LS T-score.

Conclusion: Our data suggest that TBS measurement adds little information beyond aBMD in the assessment of PHPT bone involvement in a group of combined asymptomatic and symptomatic patients, including a large proportion (30%) of premenopausal and male subjects.

P987

SARCOPENIA PREVALENCE IN GERMANY: EFFECTS OF VARYING TEST PROTOCOLS

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Due to current demographic trends Sarcopenia is becoming increasingly important for our fast aging societies. However, with respect to varying definitions, components and cut-off points it is difficult to determine the prevalence of this “geriatric syndromes” in a given population. The aim of the study was thus to determine the prevalence of sarcopenia in community-dwelling Caucasian German men 70+ and to determine the inherent variation of the European Working Group on Sarcopenia in Older People (EWGSOP) definition using varying approaches, cut-off points and test protocols.

Nine-hundred-sixty-five (965) community-dwelling Caucasian men 70+ living in the area of Northern Bavaria, Germany were included into the project. Prevalence of

sarcopenia was diagnosed using the definition of the EWGSOP and applying the T-Score based method. Obesity was determined using body-fat-based approaches with a cut-off point of 28% as applied for the present calculation. Different EWGSOP based suggestions for the diagnosis of low muscle mass were calculated and compared. In parallel, different methods to evaluate functional Sarcopenia parameters were applied to estimate the variation within the EWGSOP definition from applying different approaches.

Using the most popular EWGSOP valuation, amongst the present cohort 5.1% were classified as sarcopenic. However, using different methods to calculate the EWGSOP approach, prevalence for sarcopenia varied between 0.9% and 6.0%. The most important characteristics of our cohort were comparable to German mean values.

The prevalence of sarcopenia in this German cohort of community-dwelling Caucasian men 70 years and older was slightly higher compared with European neighborhood countries that also applied the EWGSOP definition. Potentially this could be due to our rather cautious approach within the testing strategy. Indeed, the variation when applying different methods, cut-off points and testing strategy either prescribed or even not addressed by the EWGSOP was higher compared with the application of different Sarcopenia definitions than determined by comparable methods and testing strategies. Our finding clearly underscores the need for a standardized diagnose protocol that not only addresses Sarcopenia components, cut-off points and algorithms but also prescribes a consistent testing strategy. Since sarcopenia is now included in the ICD-10 (M62.84), which will further increase the relevance of this “geriatric syndrome”, this process should be tackled in the near future.

P988

THE IMPORTANCE OF DIAGNOSING BAKER CYST IN RHEUMATOID ARTHRITIS

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Baker cyst arises through a one way valve mechanism, which causes the joint fluid transition from the knee to the cyst in the bursae between the medial gastrocnemius and semimembranosus. In rheumatoid arthritis patients, Baker cyst is usually underdiagnosed and can be present in the absence of clinical symptoms. Large cysts can rupture in the distal area causing synovial fluid migration between the gastrocnemius muscle, fascia profunda and soleus muscle during an acute increase of internal

pressure. We present the case of a 47 year old female patient diagnosed with rheumatoid arthritis 6 years ago, who presented with pain and swelling in the left ankle. Ultrasound examination has revealed a fluid collection with linear appearance, dissecans in the calf muscular mass. Musculoskeletal ultrasound examination is very important both for positive and differential diagnosis in patients with rheumatoid arthritis.

P989

THE STUDY OF FRAX TOOLS IN EVALUATING THE RISK OF OSTEOPOROTIC FRACTURE IN HOHHOT

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Objective: To evaluate the applicability of FRAX in the population in Hohhot, Inner Mongolia.

Methods: A total of 435 subjects (56 Mongolian and 379 Han) with osteoporotic fractures, who were examined in our hospital from Jan 2016 to June 2016 were selected. The clinical data of all the patients were retrospectively analyzed. All the risk factors contained in FRAX prediction tool were collected. The data including BMD of the femoral neck were input into the FRAX prediction tool. Then, the fracture probability of main parts (hip, spine, humerus, and wrist) and the hip in the next 10 years was calculated. With the consideration of different nationalities were compared.

Results: In the total of 354 female subjects, considering different nationalities, with the Mongolian nationality, the fracture probability of main parts and the hip in the next 10 years was 1.1%~20.5% and 0%~13%, as for Han, the probability of main parts and the hip was 1.1%~28.8%, and 0%~27%, respectively, and in the total of 81 male subjects, considering different nationalities, with the Mongolian nationality, the fracture probability of main parts and the hip in the next 10 years was 1.2%~7.3% and 0%~4%, as for Han, the probability of main parts and the hip was 1.1%~17.7%, and 0%~6.8%, respectively, the difference of the fracture probability of main parts and the hip between Mongolian and Han was not significant ($P>0.05$). However, femoral neck and lumbar spine bone mineral density of Mongolian subjects were significantly higher than the Han ethnic group ($P<0.05$).

Conclusion: There are no significant differences between the fracture probability of main parts and the hip in part of subject from Hohhot Mongolian and Han population.

P990

COMPARISON OF PAIN INTENSITY, FATIGUE AND LIFE QUALITY WITH PATIENTS SUFFERING FROM RHEUMATOID ARTHRITIS AND KNEE OSTEOARTHRITIS

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Introduction: It is well known that chronic rheumatoid diseases have negative impact on life quality. Pain and joint swelling, limited motion, stiffness and deformity from one side, as well as fatigue, poor sleep quality and depression, on the other hand, significantly reduce life quality.

Aim: Comparison of life quality, pain intensity and fatigue intensity of patients with rheumatoid arthritis (RA) and knee osteoarthritis (knee OA).

Material and method of work: 105 patients have been examined: 53 patients with RA and 52 patients with knee OA. Groups were homogenous regarding gender and age. Life quality has been estimated by means of questionnaire-Short Form Medical Outcomes Instruments (SF 36) SF 36F-physical sphere and SF 36M-mental sphere. Pain and fatigue intensity was estimated by scale VAS.

Results: Average value of SF 36F with patients suffering from RA was 38.65 ± 23.65 in regard to patients suffering from knee OA 60.68 ± 19.67 , $p<0.001$. Average value of SF 36M with patients suffering from RA was 46.75 ± 25.19 compared to patients with knee OA having 70.12 ± 20.55 , $p<0.001$. Pain intensity with patients with RA was 48.79 ± 25.66 compared to patients with knee OA ranging 47.08 ± 19.82 , $p=0.612$. Fatigue intensity with patients suffering from RA was 49.28 ± 26.44 compared to patients with knee OA having 30.53 ± 16.58 , $p<0.001$.

Discussion and Conclusion: Patients with RA have significantly less quality of life and greater fatigue intensity compared to patients with knee OA. Pain intensity was not statistically significantly different. Although patients with RA have poorer values of quality of life, taking into account a big number of patients with knee OA, a significant implication of this disease is recognized. Pain is significant predictor of poor quality of life.

P991

CLINICAL EXPERIENCE OF GENERIC INTRAVENOUS ZOLEDRONIC ACID IN THE TREATMENT OF OSTEOPOROSIS: BELARUSIAN DATA

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Aim: This retrospective, single-center, non-interventional study was to evaluate the effectiveness and safety of once-yearly intravenous infusion of 5 mg/100 mL of generic zoledronic acid (ZA) (Belarus, Belmedpreparaty) in patients with osteoporosis.

Materials and methods: We have analyzed data of patient records, which were treated with IV ZA on the basis of 1 Clinical Hospital of Minsk for the period from January 2013 to December 2015. Inclusion criteria: age 18 – 85 years; established diagnosis of osteoporosis with or without the history of low energy fractures; availability of the results of a dual energy X-ray absorptiometry (DXA) of lumbar spine (LS) and proximal femurs (PF), performed not earlier than 3 months prior to administration of the drug (BMD₁) and after 11 - 14 months after administration (BMD₂). All subjects also received calcium (from 1000 to 1200 mg/day) and vitamin D3 (from 400 to 1000 IU per day) supplementation. Patients with severe morbid obesity, renal impairment with creatinine clearance less than 35 mL/min, patients taking drugs affecting bone metabolism, except calcium and vitamin D, were excluded. The primary efficacy endpoint was the change of BMD from baseline and after 12 months of ZA treatment.

Results: The study cohort comprised 64 patients (61 women and 3 men) with mean age of 64.1 years, mean body weight of 60.9 kg, and mean body mass index of 24.3 kg/m², mean period of repeated DXA scans – 13.4 months. Repeated BMD measurements performed after treatment revealed statistically significant positive trend of BMD at LS (BMD₁ 0,818 g/cm², BMD₂ 0,842 g/cm², t=5,03 p<0,001), right PF (BMD₁ 0,764 g/cm², BMD₂ 0,775 g/cm², t=3,91 p<0,001) and left PF (BMD₁ 0,768 g/cm², BMD₂ 0,782 g/cm², t=2,16 p=0,038). The percentage increase in BMD at LS was 5.74%, 2,3% at left PF and 6.5% at right PF.

Conclusion: Generic ZA is an effective drug which significantly increase BMD in the LS and PF in patients with OP.

P992

VITAMIN D SUPPLEMENTATION IN LONG TERM CARE: WHERE DO WE STAND?

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Objectives: Vitamin D status plays an important role in skeletal health and low levels are associated with bone loss, muscle weakness and falls, particularly in the elderly. It is

estimated that elderly people produce 75% less cutaneous D3 than young adults and this becomes even more significant in the institutionalised elderly. ¹ This study seeks to assess the status of vitamin D supplementation in a long-term care facility in Malta, as well as the history of fractures in such institutionalised individuals.

Material and Methods: The treatment charts of all 1073 residents at St Vincent de Paul Long Term Care Facility (SVP) were assessed to note vitamin D and calcium supplementation. Data on vitamin D levels and history of fractures over an 8-year period (2008 – 2016) was gathered using governmental digital software containing patient medical history.

Results: Out of a population of 1073 subjects, 69.9% were female (n=750) whilst 30.1% were male (n=323) with the mean age of the population being 81.3 years. The average length of stay at the facility was 615 days. The percentage population receiving vitamin D supplementation was 26.8% (n=288), the majority of which (61.8%, n=178) were receiving a suboptimal dose of 400IU daily. 14.5% of the total population (n=156) was receiving calcium supplementation. 12.7% (n=136) of residents had their vitamin D levels checked over the previous 8 years with 62.5% (n=85) of these being deficient (i.e. levels <20 ng/mL). A history of a fracture was noted in 16.9% (n=171) of the total population, with 40% (n=69) being hip fractures. 81.3% (n=139) of those who sustained a fracture were not on vitamin D supplementation.

Conclusion: The study highlights the need for clear guidelines on Vitamin D supplementation, particularly in the context of the institutionalised elderly. A need emerges for an assessment tool which helps identify individuals who are at risk of deficiency and in whom measurement of Vitamin D levels should be prompted and any deficiency treated.

Reference: 1. Lips P. Endoc Rev. 2001;22:477.

P993

THE EFFECTIVENESS OF EDUCATIONAL PROGRAMS IN IMPROVING THE QUALITY OF LIFE AND REDUCING THE INTENSITY OF PAIN IN OUTPATIENTS WITH KNEE AND HIP JOINTS OSTEOARTHRITIS

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Relevance: The effectiveness of educational programs for patients with regard to facilitating the clinical manifestations of osteoarthritis (OA) in ambulatory patients is not studied enough.

Objective: To evaluate the effect of participation in educational programs on the level of pain and quality of life in patients with OA of the knee and / or hip joints.

Methods: 52 patients with OA of the knee and / or hip joints (x-Ray stage 2-4) took part in the educational program for

ambulatory patients with OA (study group). 2 hours classes were held by doctors once a month. Initially and after 3 months the following parameters were evaluated: joint pain VAS, the WOMAC index (Likert scale), overall patients receiving treatment satisfaction (by VAS, 0-100 mm), the need of pain therapy. The control group (comparable in age, sex, baseline levels of pain according to VAS, the WOMAC index) included 50 patients with OA of the knee and / or hip joints.

Result: After 3 months in the study group: reduction of pain intensity on the VAS (49.3±7.3 - at baseline, 24.2±5.6- after 3 months, the control group - 50.1±6.9 - at baseline, 38.2±6.4 - 3 months, $p<0, 05$), the overall assessment of WOMAC index (39.7±14.5 - baseline, 24.6±3.9 - 3 months, the control group - 36.6±10.1 - baseline, 32.9±8.0 - 3 months, $p<0.05$). Overall satisfaction with receiving treatment (by VAS) was higher in the training group (79,3±10,2 and 55,8±14,0, respectively, $p<0.05$). During this period, the proportion of patients who regularly performed physical exercises in the study group was 48.1% of patients, in the control - 20%. In the study group did not need a regular intake of NSAIDs 48.1% of patients, taking these drugs 1-2 times a week - 26.9%, almost every day - 25% of patients. In the control group, these figures were 22%, 48% and 30%, respectively.

Conclusion: Participation of patients with OA in educational programs increases the commitment to the overall treatment and as a result, may lead to a decrease in the severity of pain in the analgesic therapy needs, improves quality of life.

P994

PREDICTION OF POSTMENOPAUSAL OSTEOPOROSIS

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Osteoporosis is considered a "hidden epidemic" of modern civilization, due to its high prevalence and certain difficulties in the timely diagnosis. The onset of menopause is a significant factor in the formation of osteoporotic changes.

Aim: To develop a system that predicts postmenopausal osteoporosis.

Material and methods: In a study of 96 women in the early postmenopausal period it was included. method of binary logistic regression was used. It was estimated the probability of the average annual decrease in bone mineral density.

Results: The predictive model included the following factors: the level of calcium intake, serum levels of 25 (OH) of vitamin D, indicators of the total intensity of menopausal disorders and the importance of MDA concentration in plasma. The developed model is used to predict the primary (postmenopausal) osteoporosis. The following results were obtained when assessing the validity of the model: The percentage of correct reclassification (the

accuracy of the model) was 74.7%; Somers'D coefficient was 0.726 ($p=0.001$); Hosmer-Lemeshow criterion testified about the general consistency of forecast models with real data ($\chi^2=0,61$, $p=0.644$). The figures shown demonstrate the high validity of the model. The sensitivity of the model was 76.3%, specificity – 87.5%. The area under the (AUC) ROC-curve was equal to 0.863. Classification thresholds for predictors included in the model were as follows: for menopausal scale indicators – 8.5 points for the level of consumption of calcium – 1075 mg/day, figures for 25(OH) vitamin D – 21,3 ng/mL for MDA – 7.0 mmol/l.

Computer program "Prediction of postmenopausal osteoporosis" was created.

Conclusion:

The created model along with the FRAX tool, SCORE, ORAI and OST will allow for a comprehensive assessment of the risk of osteoporotic postmenopausal changes.

P995

GERIATRIC STUDY IN MUNICIPALITY OF FATIİH: SARCOPENIA AND SARCOPENIC OBESITY IN ELDERLY PATIENTS ACCORDING TO DIFFERENT INDEXE

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Introduction: In our study we evaluate patients with different definitions of sarcopenia and sarcopenic obesity and compare prevalence of cases.

Methods: We enrolled patients ages between 60 and 101. Skeletal muscle mass were measured with bioimpedance analyse (TANITABC532). Muscle mass assessed with Baumgartner-index. In addition; muscle mass values calculated according to Janssen, FNIHa and FNIHb definitions and low muscle mass evaluated according to national data base. Low body mass was defined as a=60TH percentile or BMI 30 kg/m2 suggested in literature. This was a study of 204 elderly patients.(mean-age:75,4±7.3).

Results: Sarcopenia and its components' prevalence are as follows: Sarcopenia (S) according to Baumgartner index: 5.3%, low muscle mass:%9.8, dynapenia:%51.5, slower walking tempo:%25.6. On the other hand; S-prevalence according to Janssen, FNIHa and FNIHb were: 29.3%,37.9% and 18%, respectively. Lower calf circumference as an indirect indicator of lower body-mass was%15,8. SO-prevalence measured with Baumgartner-BMI is 0%, with FNIHa-BMI is 24.9%, with FNIHb-BMI is 13.2%. Besides; SO-prevalence measured with Baumgartner-Zoico ile 2.1%, with Janssen-

Zoico is 18.2%, with FNIHa-Zoico is 23.4%, with FNIHb-Zoico is 14.7%. S-prevalence is higher among women with Janssen and FNIHa ($p < 0.001$). Similarly, SO-prevalence is higher among women with Janssen-BMI, FNIHa-BMI, FNIHb-BMI, Janssen Zoico and FNIHa-Zoico ($p < 0.001$, $p < 0.001$, $p = 0.02$, $p < 0.001$, $p = 0.003$). According to Baumgartner-Zoico definition women do not have SO thereby it is more common in men, meaningfully ($p = 0.012$).

Conclusions: SO-prevalence have been the lowest according to Baumgartner index. The highest S-prevalence has been detected with FNIHa description and the lowest has been detected with FNIHb. SandSO correlation with gender vary among different methods. Our results have shown that SandSO is most likely higher in women.

P996

PREVALENCE OF UNHEALTHY LIFESTYLES AND RISK FACTORS FOR FALLS IN A REPRESENTATIVE SAMPLE OF ITALIAN OLDER SUBJECTS WITH OSTEOPOROSIS.

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Objective: Life style changes as well as the interventions to reduce the risk of falling should be promoted in older adults who suffering from osteoporosis. Our study aims to identify the prevalence of unhealthy lifestyles and risk factors for falling in osteoporotic community-dwelling older adults.

Materials and Methods: Data come from the Multipurpose Survey "Health conditions and use of health services". A stratified multi-stage probability design using municipal lists of households was used to select a representative sample of Italian population. For our purpose, 27003 subjects aged 65 years or older were considered. Smoking status, body mass index, physical activity and diet were considered. We also seeked personal and environmental risk factors for falls.

Results: 8633 subjects reported to suffer from osteoporosis. 73% were women. The mean age was 77 years compared to 74 years of the subjects without osteoporosis ($p < 0.001$). 30% followed a diet, in 25% of cases without a medical prescription. 5.9% were current smokers; 3.5% of subjects were underweight and 3.7% were extremely obese. About 50% of subjects did not perform regular physical activity, while 5.2% did excessive exercises weekly. The regression analysis was carried out on the entire sample and stratified by gender. Factors associated with an increased risk for osteoporosis were of older age (OR 1.054, CI 1.049-1.058); followed a diet (OR 1.556, CI

1.454-1.665), smokers (OR 1.032; CI 1.097-1.282) and lack in or excess of physical activity (OR 1.299, CI 1.153-1525; OR 1.299; CI 1.214-1.389, respectively). For women, severe obesity was significant (1.317, CI 1.095-1.1.584). Among subjects with osteoporosis, 39.9% had to walk up stairs in their home. Of those, 42.7% reported difficulties to go up and down the stairs. Almost 30% of patients with osteoporosis had at least one motor or sensory deficiency that could be corrected: 24% of subjects referred a visual impairment but they did not use glasses; 80% of who had an hearing impairment did not use hearing aids and 32.7% of those had an impairment in walking did not use any walking aid.

Conclusions: our study confirms the high prevalence of potentially modifiable risk factors for osteoporosis and falls in community dwelling older adults, which should be targeted as a non- pharmacological interventions.

P997

USING THE "BEST PRACTICE FRAMEWORK" QUESTIONNAIRE FOR SELF-AUDIT OF SECONDARY FRACTURE PREVENTION SERVICE ORGANIZATION

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Background: The secondary fracture prevention service is created today in many countries. The basic principles of its organization are proposed by IOF. Such services may vary due to dissimilarity of health care systems in different countries, so there is need to have a tool for evaluation of the effectiveness of their work.

Aim: To evaluate the possibility of using the IOF questionnaire "Best Practice Framework" for self-audit to optimize the organization of secondary fracture prevention service in Regional Emergency Hospital, Yaroslavl (RF).

Materials and methods: In the first phase of its establishing a traumatologist sent a patient with a fracture to the secondary fracture prevention service. Then we changed the organization of the service, and added a nurse-coordinator into its staff. We used the questionnaire "Best Practice Framework" to identify shortcomings of organization at both stages.

Results: In the first phase of the work, we noted poor performance in several sections of the questionnaire: the identification of patients, the timing of assessment after a fracture, the falls prevention, and the frequency of drug therapy initiation. To improve these indicators we added a nurse-coordinator, we limited cohort of patients by only in-hospital cases, we provided the minimum laboratory exams in the emergency room, we created the information booklet for training patient about the fall prevention. After the second phase of working we have

identified the next changes: the completeness of identification of patients increased from 26% to 94%, the timing of evaluations was reduced from very poor to level 3, the frequency of initiation of drug therapy increased from 63% to 78%, the patients with the increased risk of falls were trained.

Conclusion: The questionnaire "Best Practice Framework" proved to be an effective tool in performing the current audit, allowing to identify problems in the organization of secondary fracture prevention service.

P998

STATUS OF VITAMIN D IN MEN WITH HIP FRACTURE

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Background: Hip fractures are the most severe complication of osteoporosis. Lower level of vitamin D relates to risk factors for fractures and falls.

Aim: To assess the level of 25(OH)D in men with hip fracture.

Materials and methods: We included in the research men 40 years of age and older, residents of the city of Yaroslavl, Russian Federation, who suffered from hip fracture during the period from 01 SEP 2010 to 31 AUG 2011. To measure the level of 25(OH)D electrochemiluminescent immunoassay (ECLIA) was performed on the analyzer "Elecsys 2010", Roche. According to Russian national recommendations, the normal level of 25(OH)D is >30 ng/ml, insufficiency – 20-30 ng/ml, deficiency <20 ng/ml, severe deficiency <10 ng/ml. The assessment was carried out in the age groups of 40-69 years old (n=120) and ≥70 years old (n=92).

Results: The average level of 25(OH)D in 40-69 years old men was 17.34±9.74 ng/ml, ≥70 years old – 16.31±11.81 ng/ml, p>0.05. Among men aged 40-69 years 17 (14,17%) patients had the normal value of 25(OH)D, 21 (17,50%) had the insufficiency, 61 (50,83%) had the deficiency, and 21 (17,50%) had severe deficiency. Among the ≥70 years old patients the normal value was observed in 12 (13,04%) men, insufficiency – in 13 (14,13%), the deficiency – 41 (44,57%), a severe deficiency – in 26 (28,26%).

Conclusion: Thus, the normal value of 25(OH)D was observed only in 13.68% men who suffered from hip fracture. Deficiency of this vitamin was detected in 70.28% of the patients.

P999

GIANT MANUBRIUM STERNI BY PATIENT WITH SAPHO SYNDROME: CASE REPORT

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Introduction: SAPHO (Synovitis-Acne-Pustulosa-Hyperostosis-Osteitis) syndrome, an inflammatory musculoskeletal disorder dominated by osteitis and hyperostosis, synovitis of the joints and more frequently associated with neutrophilic dermatosis such as palmoplantar pustulosis and acne conglobate, was described in 1987. Osteitis most often affects the anterior chest wall (sternum, medial ends of the clavicle and ribs) and vertebrae, less often the long bones, mandible or ilium. Synovitis usually affects the joint adjacent to the affected bone for which reason the most common are synovitis of the sternoclavicular, sternocostal and manubriosternal joints, which may be erosive. The X-ray image is initially normal. The more sensitive methods are computed tomography (CT) and magnetic resonance imaging (MRI); the "bull's head" image during bone scintigraphy is specific for the SAPHO syndrome. In the X-ray image, the osteolytic areas are initially dominant, and gradually osteosclerosis and hyperostosis become more dominant, with the consequence of bone hypertrophy.

Case: A 53 year old patient was recommended for internal examination for fatigue, elevation of inflammation markers (C-reactive protein 32mg/L) and microcytic anaemia. When viewing the patient's chest, there was a conspicuous massive bulge of the manubrium of the sternum and clavicle with warm-up and mild palpation pain. The patient has observed intermittent mild pain for 11 years already. About 8 years before start of his problems, he had transitory skin lesions, which could have been palmoplantar pustulosis. X-ray, CT and MRI described the typical changes in the manubrium, medial part of the ribs and clavicle and relevant joints for the SAPHO syndrome. The hypertrophic sternum thickness was 48mm, which is about 4-fold the dimensions in the case of a healthy person. Positron emission tomography described the inflammatory changes only in the area of the manubrium sternum; no other inflammatory focus or neoplasm was detected.

Conclusion: The reason for delay or failure in the identification of SAPHO syndrome, apart from the rare occurrence, may also be the minimal subjective difficulties of the patient and missing skin lesions.

P1000

ADHERENCE TO IRANIAN TRADITIONAL DIETARY PATTERN MAY INCREASE THE RISK OF KNEE OSTEOARTHRITIS GRADE IN POSTMENOPAUSAL WOMEN

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Objective: Several environmental factors have been associated with Osteoarthritis (OA), including obesity, nutrition and sex. We aimed to explore the association between dietary patterns and different degrees of knee OA based on Kellgren and Lawrence (KandL) score in a group of Tehranian women.

Methods: 250 women with knee pain (age: 52.42±7.64 yo) participated in our cross-sectional study. All participants underwent weight-bearing bilateral anteroposterior radiography of knees. Weight, height, waist, hip circumference and bioelectrical impedance analysis were also measured in the patients. All participants were asked to fill the physical activity questionnaire. Finally, food intakes were assessed using a 147 item semi-quantitative food frequency questionnaire (SFFQ), from which twenty two food groups and three major dietary patterns were derived.

Results: Among three major dietary patterns, women in the higher tertile of traditional dietary pattern (which loaded heavily on red meat, Organ meats, legumes, onion and potato, olive, fruit, eggs and nuts) were more likely to suffer from severe knee OA (OR: 2.178, 95% CI 1.084-4.374). They also had higher total energy intake which remained significant after adjustments. In addition, age and physical activity (Mets) were lower and hip circumference was greater in women in the highest tertile of western dietary pattern compared to those who were in the lower tertile. Also, participants in the highest tertile of the Healthy dietary pattern showed significant results for BMR, fat free mass, and total body water variables (P<0.05).

Conclusion: Higher adherence to Iranian traditional dietary pattern may increase the risk of knee OA for more than two-fold in postmenopausal women. Since the highest prevalence of knee OA among Asian people has been seen in Iranian rural dwellers, it is recommended that future studies focus on investigating the effects of different Iranian traditional food groups on the development and/or progress of knee osteoarthritis.

P1001

THE RISK OF OSTEOPOROSIS IN PATIENTS WITH PARAPARESIS

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Objectives: Patients with paraparesis lose through inactivity 2% of muscle mass per day with progressive bone demineralisation. We intend to highlight the risk of osteoporosis in patients with paraparesis for more than one year.

Material and method: There were evaluated 42 patients with paraparesis of different causes: 31 with posttraumatic paraparesis, 4 of neuropathic issue, 7 due to vascular brain injury. Patients between the age of 28 and 56 years old, 32 of them being males and 10 females. They were divided in two groups: Group A of 18 patients with paraparesis no longer than 18 months and Group B, 24 patients with paraparesis for more than 18 months. Were included in the study only patients who scored muscle strength values between 3 and 5 during the muscular testing. All the patients were radiologically assessed throughout the lumbar and dorsal spine and evaluated by osteodensitometry at lumbar level.

Results: Group A presented osteopenia values on osteodensitometry evaluation with a T score range from -0.5 to -1.4, in Group B there were 8 patients with osteopenia while the rest presented higher than -2.5 values of osteoporosis. The radiologic examination marked out osteoporosis with demineralization and vertebral compression fracture in 8 patients of Group B, diagnosed with paraparesis for more than 3 years. Fragility induced fracture of the distal radial extremity occurred at two of the patients from Group B. In our survey, patients with paraparesis that exceeds 18 months since debut, the prediction for developing osteoporosis is 38.09%.

Conclusions: The study presented shows that the neurological deficit such as paraparesis is a cause of secondary osteoporosis through prolonged immobilization, respectively by low physical activity. The risk of secondary osteoporosis is higher at patients with long lasting neurological deficit and lack of proper physical activity for longer period of time.

P1003

DYNAMICS OF BMD IN WOMEN WITH OSTEOPOROSIS AFTER LONG-TERM USE OF BIPHOSPHONATES: ROLE OF ADHERENCE TO TREATMENT

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Aim: to evaluate the dynamics of bone mineral density (BMD) in the spine and proximal femurs in subject with osteoporosis (OP) receiving bisphosphonates (BP) for 5-8 years according to their adherence to treatment.

Materials and methods: hospital records of 60 women aged 60 to 80 years diagnosed with OP, with duration of BP intake 5-8 years. The degree of adherence was calculated using Medication Possession Ratio (MPR). Patients were divided into groups according to treatment duration: 10 women with duration of 5 years; 17 women with duration of 6 years; 12 women with duration of 7 years; 21 women with duration of 8 years. The primary efficacy endpoint was the change in BMD of lumbar spine (LS) and proximal femurs (PF) from baseline and after treatment

Results. As a result of five-year BP treatment in group with high adherence BMD of LS increased from 0.782 [0.714; 0.808] g / cm² to 0.900 [0.840; 0.980] g / cm² (p 0.041); BMD of PF from 0,858 [0,802;0,975] g / cm² to 0,902 [0,880;0,994] g / cm² (p 0,041). In group with low adherence gain of BMD of LS was +0,029 g / cm² (p 0,133), in right PF - +0,019 g / cm², (p 0,617), in left PF - +0,023 g / cm², (p 0,617). In group of patients who took BP for six years and had MPR > 80% dynamics of BMD was as follows: from 0,775 [0,736;0,795] g/cm² to 0,891 [0,859;0,974] g/cm² at LS (p 0,023); 0,781 [0,666;0,856] g/cm² before and 0,808 [0,712;0,882] g/cm² after treatment in right PF; 0,735 [0,607;0,798] g/cm² before treatment and 0,800 [0,787;0,841] g/cm² after treatment in left PF, p 0,041. Those patients from this group with MPR < 80% also had statistically significant gain of BMD: +0,058 g/cm² (p 0,004) at L1-L4, +0,011 g/cm² (p 0,034) at right PF. In patients with high adherence within 7 years of treatment BMD gain L₁-L₄ was +0,127 g/cm², p 0,023, right PF +0,063 g/cm², p 0,023; for left PF no significant changes were observed (p 0,130). In group with low adherence significant differences were not obtained (p 0,371). As a result of 8 years of treatment, there was growth of BMD at all measured sites in group of patients with high adherence (L₁-L₄ - +0,094 g/cm², p 0,0001; right PF +0,076 g/cm², p 0,005; left PF +0,031 g/cm², p 0,009. In group with low adherence BMD increase was not statistically significant.

Conclusion: Patients with long period of BP treatment and high adherence had significant increase of BMD in lumbar spine and proximal femurs.

P1004

FOODS FOR BONE HEALTH: DIETARY HABITS IN THE EURO-MEDITERRANEAN POPULATION OF THE CREDITS FOR HEALTH PROJECT

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Objectives: To evaluate the change of dietary habits for some selected food groups, important for bone health¹, in the Euro-Mediterranean population of the Credits for Health (C4H) project. C4H has been funded by the EC (#602386) and is intended to fight the increasing prevalence of lifestyle-related diseases through an innovative multi-stakeholder approach based on people empowerment.

Material and Methods: A randomized controlled trial has been developed recruiting 2064 subjects of three Mediterranean countries (Italy, Spain, Greece), in order to test an Information and Communication Technology (ICT) platform, that was characterized by interactive nutritional and physical activity sections and a rewarding system (Dynamic platform) or by static information only (Static platform). Recruited subjects were automatically randomized to the intervention (Dynamic platform) or control (Static platform) groups. Food Frequency Questionnaires were administered to both study groups through the ICT platform. The consumption frequency of dairy products, fruits, vegetables and meat was evaluated.

Results: The interaction with Dynamic platform produced an improvement in food consumption habits. Considering the achievement of the recommended portions for each food group, the percentages of Dynamic platform users who met dietary aims at the end of the study period are as follow:

- Fruit: 57.8% (32.1% at baseline);
- Vegetables: 22.2% (15.3% at baseline);
- Red Meat: 68.3% (46.1% at baseline);
- White Meat 60.7% (55.5% at baseline);
- Dairy products 42.2% (29.7% at baseline), with a 72.6% (68.3% at baseline) of subjects who declared to prefer low fat ones.

Conclusions: Dynamic users demonstrated to be involved with the dietary recommendations of the C4H platform. This is proved by the improvement of the adherence to the Mediterranean lifestyle. Similarly, this approach could be utilized to support people in eating well for bone health.

Reference: 1. IOF "Serve up bone strength throughout life" (2015).

P1005

CASE FINDING IN OSTEOPOROSIS: IS THERE STILL A ROLE FOR OSTEORISK?

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Increasing both life expectancy and osteoporotic fractures in Mexico, as most of the world, face a limited access to DXA scans in many regions, generating the need for alternatives to identify candidates to receive antiresorptive therapy. The role of FRAX is well defined, but its uptake is limited. Could OsteoRisk (the Latin American version of OST including only age and weight) identify who should be studied with FRAX, DXA or be treated?

Objective: To assess if OsteoRisk can identify postmenopausal women who are candidates for antiresorptive therapy.

Methods: We performed a cross sectional study on women who attended Hospital Aranda de la Parra to get a DXA scan from 2007 to 2013. The subjects included in this analysis met the following selection criteria: age ≥ 50 years; completed the risk factor questionnaire; had both weight and height measured, and had both femoral neck and spine bone mineral density reported. Subjects were classified according the OsteoRisk in two categories: high risk and moderate to low risk and per FRAX score for 10-year absolute risk of hip fracture in: $<3\%$ and $\geq 3\%$. We classified subjects who were candidates for antiresorptive therapy based on: a) a hip or spine T-score <-2.5 or b) hip or spine osteopenia plus a FRAX score for hip fracture $\geq 3\%$ and/or major osteoporotic fracture $\geq 10\%$. We performed descriptive statistics on data obtained.

Results: We included 2000 females aged 50 to 92 (mean 62 ± 8.8) years, with mean height $155 (\pm 0.07)$ cm and mean weight $66.1 (\pm 11.6)$ kg. OsteoRisk at high risk category showed a statistically significant association with the need for treatment classification ($X^2=262.47$, $p < 0.000$), with a sensitivity of 76.7% , and specificity of 73.5% (compared to FRAX sensitivity 88.6% and specificity 78.6%). Through logistic regression analysis, the odds ratio for need for treatment was 9.140 , $p < 0.000$, 95% CI $6.747-12.382$.

Conclusions: OsteoRisk performs well in identifying women who are candidates for treatment. Its graphic version could be adapted easily for daily practice and improve the selection of candidates for further study or even treatment.

P1006

PREVALENCE OF VERTEBRAL FRACTURES SECONDARY TO CORTICOSTEROIDS IN EGYPTIAN SYSTEMIC LUPUS ERYTHEMATOSUS PATIENTS

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Objective: To estimate the prevalence of vertebral fractures secondary to chronic corticosteroids use in Egyptian patients afflicted with SLE.

Methodology: The current study will include 100 Egyptian patients with SLE diagnosed according to ACR revised classification criteria of SLE. (Hochberg, 1997)

As well as, 50 normal individuals of matched age and sex as a control group.

Inclusion criteria for this study will involve:

1. Disease duration ≥ 5 years.
2. Premenopausal patients.
3. Using long term oral corticosteroids (prednisolone) $\geq 7.5/d$ for more than 2 years.

Exclusion criteria:

Other diseases that can affect the bone, such as thyroid diseases, kidney diseases, and metabolic bone disease.

All patients will be subjected to:

- Full history taking
- Complete clinical examination
- Detailed articular examination
- Routine laboratory examination
- Plain radiography of dorsolumbar spine (lateral view)
- SLICC/ACR international collaborating clinics group-damage index for SLE) (Urowitz and Gladman, 1998)

Results: Results were statically analyzed, tabulated and graphically represented.

One hundred systemic lupus (SLE) patients were included in this study. The SLE patients were 94 females and 6 males. Their age ranged between 19 -48 years with a mean of 29.26 ± 8.844 years. SLE duration ranged between 60 - 228 months with a mean of 75.06 ± 32.781 months. Their weight ranged between 42-116 (kg) with a mean of 72.71 ± 17.745 kg. All the female patients were premenopausal. The mean number of parity of female patients was 2.17 ± 1.253 . Only 4 of the patients were smoker while the rest 96 patients were non-smoker. The total GCs dose equivalent to prednisone $3.6-64.8 \pm 11.6296$.

Demographic and disease related variables. The general characteristics of the study population are shown in Table 1. The participants' ages ranged from 19 to 48 years. Age of onset of disease ranged from 8 to 43 years. Their weight ranged between 42-116 (kg). All the female patients were premenopausal. The mean number of parity of female patients was 2.17. Only 4 of the patients were smoker while the rest 96 patients were nonsmoker. The total GCs dose ranged from 3.6-64.8 g.

Conclusion: In our study, vertebral deformities scored according to Kleerekoper method (Kleerekoper et al, 1984), were found in 24 (24%) patients these results nearly match those of Almedeh et al (2010) who studied 150 SLE patients. there was a higher prevalence of vertebral deformities Twenty-nine% of the patients in Almedeh et al, 2010 study had at least one prevalent, radiological, vertebral compression. Eighty-eight% of these fractures were asymptomatic. Bultink et al (2005) study can be compared with our study with a slightly younger Dutch SLE population, mean age 41 years, where 20% of the patients had at least one prevalent vertebral

fracture whereas the prevalence was 21% in a premenopausal cohort of SLE women in Brazil.

P1007

THE ROLE OF MECHANICAL SHOCKWAVES IN TREATMENT OF SUPRASPINATUS CALCIFYING TENDONITIS

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Objectives: The mechanical shockwaves applied at tendon level produce a stimulation of mechanical receptors, proprioceptors and at nervous terminations. Through the mechanically process it is accomplished a local circulation stimulation. Additional shockwaves acting on calcified structures by splitting them into fragile points. And also through the stimulated vascular process and the action of macrophages occurs a reduction in the size of calcified formations. We intend to highlight the effect of analgesia and remodelling of calcified structure by mechanical shock waves in the supraspinatus tendon proven by musculoskeletal ultrasound.

Material and method: The study included 52 patients with different size calcifications at the supraspinatus tendon insertion level proven by musculoskeletal ultrasound. Patients were divided into two groups, Group A that followed a treatment with mechanical shock waves and nonsteroidal drugs, painkillers and topical analgesics. Group B followed received the same medical therapy without mechanical shock waves applied at the tendon. Group A received treatment with mechanical shock waves for 10 days repeated every 2 months for 6 months. There was a clinical evaluation-joint testing, visual analgesic scale (VAS) and musculoskeletal ultrasound initially and after 6 months.

Results: Evaluation at 6 months we noticed that the patients from Group B maintained the same ultrasound findings and the pain diminished only with 23,4% on VAS in comparison with the patients from Group A in which the recorded values showed a decrease in VAS by 63,2%. The ultrasound evaluation of Group A revealed a reduction in the size of the calcified formations by an average of 1,2 mm, two of the cases no longer revealing any calcified formation.

Conclusions: Mechanical Shock waves are useful at patients with calcified tendonitis through significant pain reduction, improving joint mobility and participates at calcifications reduction through local stimulation of

circulation and activation of macrophage phagocytosis of calcified detritus. This therapeutic model can be useful in shoulder rehabilitation after proven calcified tendonitis.

P1008

TENOFOVIR-RELATED FANCONI SYNDROME AND CHRONIC RENAL FAILURE IN DIABETIC PATIENT: CASE REPORT

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Tenofovir disoproxil fumarate (TDF) is a nucleotide reverse transcriptase inhibitor used to treat hepatitis B infection. Herein, we report a case of tenofovir induced Fanconi syndrome who was misdiagnosed as Paget's disease. Case: A 56-year old male who was under TDF treatment for HBV infection had a fragility femur fracture in 2014 and had been treated with IV zoledronate 5 mg. A few months after that, he admitted to another clinic with diffuse bone pain, weakness especially at lower extremities, difficulty in ambulation. Because of hypophosphatemia, elevated alkaline phosphatase (ALP) and increased osteoblastic activity on bone scintigram, Paget's disease was the diagnosis and He was referred to our Endocrinology clinic for evaluation of hypophosphatemia and osteoporosis. He had a history of diabetes until 2006. Serum phosphorus:1.1 mg/dL (N:2.7-4.5 mg/dL), bone ALP: 71 μ L (4-22 μ L), calcium:9 mg/dL (N: 8,5-10.5 mg/dL), creatinine 1,6 mg/dL(N: 0.7-1.4 mg/dL), uric acid 1.5 mg/dl (N:2,5-7,5 mg/dl), TMP/GFR was calculated as 0,008 mmol/L. Metabolic acidosis with normal anion gap, aminoaciduria, hypophosphatemia with increased fractional excretion of phosphate, glycosuria, hypouricemia and all of which were compatible with Fanconi syndrome. L1-L4 T score on DXA was -3.4 and bone scan showed increased uptake in the multiple fracture lines. Renal biopsy which was performed to identify the etiology of chronic renal failure showed granular degeneration of tubulus and was not associated with diabetes mellitus. Diagnosis of tenofovir induced osteomalacia due to Fanconi syndrome and phosphate wasting was made. TDF was switched to entecavir 5 mg/d. Oral phosphate supplementation (sodium phosphate 1500 mg/d) and calcitriol (0.25 mg thrice a day) were initiated. Phosphate level increased to 2.7 mg/dl in 3 weeks and his symptoms improved, he can walk with walker, but creatinine level did not change. Conclusion: Despite being a rare adverse event, Fanconi syndrome secondary to TDF can occur and glomerular and tubular function should be monitored closely. This case also highlights the importance of monitoring for bone disease and clinical aspects of hypophosphatemia in these patients.

P1010**RISK OF FALL FACTORS AND FRAX SCORE IN ELDERLY PATIENTS FROM THE REPUBLIC OF MOLDOVA**

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Aim: To evaluate the risk of fall factors and FRAX score in elderly patients from the Republic of Moldova.

Materials and methods: The study included 40 patients aged over 65 years old, mean age 73,77±1,13 y.o. with fragility fractures after a fall from the proper height (the first fall ever in life) admitted to the department of emergency medicine (group I) and 125 patients aged over 65 years old with mean age 71,5±1,1y.o. without falls in background admitted to the department of gerontology (group II) during October - December 2016. Patients with risk factors for secondary osteoporosis were excluded from the study. Both groups were identical by age and sex. We evaluated FRAX score and factors for the risk of fall in both groups.

Results: In both groups female sex was predominant 82,50% vs. males 17,50%. Mean age of females constituted 78,72 ±1,32 y.o. and of males 75,85±3,78 y.o. Traumatic consequences of the falls were fracture of proximal humerus in 12,5%, fracture of proximal femur in 65%, fracture of distal radius 7,5% and distal tibia in 15%, as well as vertebral fracture in 2,5% and polytopic fractures 5% of the patients from group I. Analyzing the risk of falls in both groups (status before the fracture) we could notice significantly higher number of patients positive for “the risk of fall” factors 80% (group I) vs. 35,2% (group II), p<0,01. For calculation of FRAX score we made an abstraction and calculated it using the data as for the day before the fall and the day after the fall in the first group. For group II FRAX score was calculated just once. As for the day before the FRAX score in both groups was comparable and constituted 12,46±0,83 vs. 11,86±0,54 (p>0,05). After the fracture FRAX score in group I increased dramatically 18,37±0,65 vs. 11,86±0,54 (p<0,05).

Conclusion: In elderly patients due to the presence of conditions that can lead to the increased risk of falls FRAX score can be combined with the appreciation of the “risk of the fall” factors in order to timely introduce preventive measures and decrease fracture risks and consequences.

P1011**IS VITAMIN D ASSOCIATED WITH MUSCLE AND BONE MINERAL DENSITY IN ELDERLY WOMEN AND MEN WITH LOW-ENERGY HIP FRACTURES?**

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Introduction: The aim of this cross-sectional study was to examine the relationship between 25(OH)VD3 and quantitative computed tomography (QCT)-derived areal and volume bone density in the hip and thigh muscle area.

Methods: Two-hundred and twenty-four elderly patients with low-energy hip fractures were recruited in the study, 157 women (mean±SD age, 78.1±7.6 years) and 67 men (78.5 ±7.3 years). Areal and volume bone mineral density (BMD) in the femoral neck(FN) and total hip (TH) were assessed using CTXA of QCT. The cross-sectional area of the skeletal muscle and fat inside the fascia was calculated at the proximal thigh by Using CT images. Association between 25(OH)VD3 and QCT variables were explored using linear regression.

Results: Serum 25(OH)VD3 deficiency (<50 nmol/L) was present in all hip fracture patients. No associations were found between 25(OH)VD3 and the proximal thigh muscle or fat measurements in both genders. Correlations between 25(OH)VD3 and FN and TH aBMD were weak but significantly positive in men. However, for women, there was no correlations between 25(OH)VD3 and all bone density variables.

Conclusion: Thigh muscle variables were not associated with serum 25(OH)VD3 in elderly women and men with hip fractures. Serum 25(OH)VD3 were weakly correlated with FN and TH aBMD but not vBMD in men. All bone density indices were not associated with 25(OH)VD3.

P1012**FOOD CONSUMPTION OF A EURO-MEDITERRANEAN POPULATION IN THE CREDITS FOR HEALTH PROJECT: ROLE OF FRUIT AND VEGETABLE FOR BONE HEALTH**

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Objectives: To evaluate the change of dietary habits for vegetables and fruits, also important for bone health and typical of the Mediterranean Diet in the population of the Credits for Health (C4H) project. C4H has been funded by the EC

(#602386) and was intended to fight the increasing prevalence of lifestyle-related diseases through an innovative multi-stakeholder approach based on people empowerment, higher adherence to Mediterranean Diet and an higher level of physical activity.

Material and Methods: A randomized controlled trial has been developed recruiting 2064 subjects in Italy, Spain and Greece, in order to test an Information and communication Technology (ICT) platform, that was characterized by interactive nutritional and physical activity sections and a rewarding system (Dynamic platform) or by static information only (Static platform). Recruited subjects were automatically randomized to the intervention (Dynamic platform) or control (Static platform) groups. Food Frequency Questionnaires were administered to both study groups through the ICT platform. The consumption frequency of all food groups, included fruits and vegetables, was evaluated.

Results: There were some differences in food consumption habits between the overall sample of individuals assigned to the static and dynamic platform at the end of the study, but the interaction with dynamic platform produced a significant increase in the consumption of fruits and vegetables. At the baseline, the mean values of consumption (in terms of serv/day) for Dynamic and Static subjects were:

- Fruit: Dynamic 2.40 (S.D. 1.69), Static 2.33 (S.D. 1.55);
- Vegetables: Dynamic users 2.29 (S.D. 1.59), Static users 2.27 (S.D. 1.55).

Instead, the results at the end of the follow-up period were:

- Fruit: Dynamic 3.03 (S.D. 1.55), Static 3.01 (S.D. 1.60);
- Vegetables: Dynamic 2.78 (S.D. 1.49), Static 2.57 (S.D. 1.57).

Conclusions: Both platforms produced an increase in the consumption in fruits and vegetables, with a significant increase for users interacting with the Dynamic platform ($p < 0.001$). An higher adherence to Mediterranean Diet corresponds to an higher consumption of vegetable foods essential for bone health.

Reference: Cosman F et al. *Osteoporos Int* 2014;25:2359.

P1013

CONGENITAL INSENSITIVITY TO PAIN SYNDROME (CIPA): TRY TO PREVENT SEVERE COMPLICATIONS OR JUST TREAT THEM?

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Objective: To show the problems related to making therapeutic decisions in patients with CIPA.

Material And Methods: Congenital insensitivity to pain with anhidrosis (CIPA) or hereditary sensory and

autonomic neuropathy type IV (HSAN-IV) o type V without anhidrosis, are very rare autosomal recessive genetic disorders with difficult diagnosis and treatment. A few hundred cases have been reported. It associates insensitivity to pain, developmental delays, anhidrosis and thermo-regulation disorders. The complications of CIPA are essentially orthopaedic, but the vital prognosis can often be challenged and the life expectancy rarely reaches adulthood. We report 2 cases from Basurto University Hospital. The first one is a girl who was diagnosed with CIPA at the age of 8 months. It was the first description of a CIPA-associated NTRK1 mutation (Sarason et al. *BMC Medical Genetics* 2011). She is currently 13 years old and she suffers corneal injuries, distal phalangeal amputation, several bone fractures, calcaneo/astragalus osteomyelitis surgically treated that is becoming more aggravated (severe infection/complications). She had vertebral fractures also, axial curvature is seriously damaged, she could have spinal cord injury and the ankle infection has become chronic. The second case is a 5 years-old girl with calcaneo fracture with osteomyelitis. We realized she cannot feel pain, she exhibited corneal and tongue injuries, several fractures, and aseptic osteomyelitis. The genetic study showed homozygosity for SCN9A gen (c.2908G>T (p.Glu970)). There are some other cases with this gene affected, but no one shows this mutation.

Results: The genetic studies are different but both are involved in pain regulation. However, the manifestations and complications of them are similar and do not differ from other cases described in the literature.

Conclusion: CIPA is a dangerous genetic disorder. Fractures have complications, usually aseptic osteomyelitis, even sometimes they are infectious. Our 2 cases present those problems. Should we decide for surgical treatment with the dangerous complications we are sure that they will present or should we stay and only treat the complications of the disease? More studies are needed to answer this question.

P1014

RUNNING A NATIONAL AUDIT FOR FRACTURE LIAISON SERVICES DATABASE (FLS-DB): EXPERIENCES IN EFFICIENT DATA ENTRY

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Objective: Limited resources mean it can be challenging for services to enter the data required for the FLS-DB, however

adopting effective data entry processes could improve efficiency and ensure FLSs can enter data and simultaneously deliver care.

Material and methods: Data for the FLS-DB data is collected within the FLS service and entered using a secure web-based data portal. Data entry can be completed by directly entering records for each patient, or alternatively services can arrange mass upload data from local databases on to the web tool. The dataset specifications, web user guide and a FAQ document were made available as well as a support email and telephone line.

Results: Some FLSs (15) submitted data via mass upload, though the vast majority (32) entered data directly into the web tool. Although there are far more sites entering data directly, the total number of records uploaded by the 15 FLSs doing mass load (16,403), is greater than the total number for sites entering data directly (15,649). Comparing mean number of records for FLSs uploading in mass vs. direct entry: Mass upload sites have a mean of 1093.53 while direct entry sites have a mean of only 489.09 in comparison. Therefore FLSs manually uploading have a mean record upload rate which is less than 50% of mass upload sites. This is an indication that the mass upload facility may improve efficiency in data entry. Though the introduction of a local system for maintaining FLSDB records involves a time commitment, it is prudent for FLSs to allocate this time as in the long term it will effectively eradicate the duplication involved in entering data into the FLSDB directly.

Conclusion: The difference in numbers of records uploaded across FLSs indicates that there is significant variation across sites in terms of their ability to enter data. A number of factors may contribute, however one factor is likely to be the use of good data processing systems. Mass upload of data appears to be an effective tool for improving efficiency in data entry and further work is needed to make these tools more widely available.

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P1015

FALLING OF ELDERLY LIVING IN THE COMMUNITY

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Objectives: The research was aimed to investigate falling prevalence and associated factors among elders who was evaluated in Fatih district geriatric study.

Material and methods: Age range of 60–101 were taken into the study. Falling has been evaluated as an existence of falling within a year. The fragility screened with FRAIL-questionnaire, functional capacity measurement with KATZ-Activities-of-Daily-Living-Scale (ADL) and LAWTON-BRODY-Instrumental Activities-of-Daily Living Scale (IADL), quality of life measurement with EQ5D-questionnaire, cognitive status with Mini-Cog-test, depression with GDS-SF, malnutrition with MNA-SF, balance and gait with Romberg-test and postural instability-test, were evaluated accordingly.

Results: 204 cases (94 male–110 female) were recruited in this research. Average age is 75.4±7.3. Case of falling rate is%28.1 in all cases(M:%25.5, F:%30.3). There was a significant difference among falling and number of disease ($p < 0.001$)-number-of-drug ($p=0.003$)- fragility-score ($p=0.001$), IADL ($p=0.019$), EQ-5D score ($p=0.010$), depression score ($p=0.023$) but there wasn't any significant finding among falling and age ($p=0.97$), BMI (0.56), afraid of falling ($p=0.16$), VAS score ($p=0.98$), power of muscle ($p=0.053$), diameter of foreleg ($p=0.60$), TUG test ($p=0.96$), UGS ($p=0.91$), ADL score ($p=0.065$), BIA parameters (body fat, visceral tallowing, bone), CDT score ($p=0.08$), MNA score ($p=0.065$, point of subjective health condition ($p=0.16$)). Among the group of falling, dementia ($p=0.003$), chronic pain ($p=0.028$), dynapenia ($p=0.028$), level of ambulation ($p=0.036$), fragility ($p=0.013$) had a significant difference, however; gender ($p=0.47$), obesity-DSO($p=0.69$), level of education ($p=0.50$), HL ($p=0.63$), existence of MN ($p=0.09$), existence of DM ($p=0.07$), existence of HT ($p=0.54$), UI ($p=0.48$), finding of Romberg ($p=0.51$), postural instability ($p=0.38$), low UGS ($p=0.84$), cognitive defect ($p=0.47$, existence of depression ($p=0.35$)) did not have a significant difference. Falling non-related factors in regression analysis in last 1 year scores were; (depending variability: falling/non-dependending variability: disease/number of drug/fragility/IADL/GDS-SF/eq-5d score/dementia/chronic pain/ existence of dynapenia): Existence of dementia (OR=0.29, $p=0.012$) and fragility score (OR=1.43, $p=0.031$).

Conclusion: Many falling related factors were taken into account. As a result, we think that cognitive defect and fragility are major factors which are the related factor of falling.

P1016**SHORT AND MEDIUM TERM MORTALITY IN ELDERLY PATIENTS WITH HIP FRACTURE: A PROSPECTIVE STUDY**

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Objective: Elderly patients with hip fracture develop a high number of adverse events that affect the clinical outcome and overall survival. The aim of this prospective study was to identify markers of short and medium term mortality in patients with hip fracture followed in the Orthogeriatric Unit of Pisa University Hospital (AOUP).

Material and Methods: Patients were consecutively enrolled from April 2013 to August 2014. All the patients underwent a thorough medical history and geriatric multidimensional assessment, including ADL (Activities of Daily Living), CAM (Confusion Assessment Method), SPMSQ (Short Portable Mental Status Questionnaire), CIRS (Cumulative Illness Rating Scale). Routine biochemical parameters were also collected. After discharge the prevalence of functional recovery and the received rehabilitation treatment were assessed by telephone interview.

Results: We enrolled 270 patients (mean age [\pm SD] 84.2 \pm 6.9 years, 75.8% women) with frail hip fracture (93.3% due to accidental fall). The mean hospital stay was 5.6 days (C.I 95% 5.3-5.9), the incidence of delirium was 7.9% (95% C.I 6.8-8.5) and 4 died (1 man). At follow-up (median 21 months [95% C.I. 20-23]; 45 patients dropped out), 68 patients died (19 men, 27.9%). Analysis of survival showed a significant worse outcome in males ($p < 0.05$) and in patients undergoing prosthesis/endoprosthesis compared to those receiving osteosynthesis ($p < 0.01$). MDRD >40 , measured either at hospital admission or discharge, correlated with better outcome ($p < 0.01$ and $p < 0.05$, respectively). Pre-hospital preserved autonomy (ADL ≥ 4) and cognitive function (SPMSQ ≤ 3) were also associated to better outcome ($p < 0.01$, for both). No correlation was observed with both comorbidity degree (CIRS) and perioperative delirium. At multivariate logistic regression method, female gender, a shorter hospital length of stay and the absence of cognitive impairment (SPMSQ >3) emerged as the most predictive factors for better overall survival. The survivors received any kind of rehabilitation in the 94.7%.

Conclusion: Several factors significantly affected short and medium term survival. Despite most of them were unmodifiable, a worse outcome could be at least partially prevented by optimizing the duration of hospital stay, avoiding renal function decline and favouring early mobilization and functional rehabilitation.

P1017**PLATELET RICH PLASMA EFFECTIVENESS ON LEVELS OF PAIN AS A TREATMENT OPTION FOR KNEE OSTEOARTHRITIS**

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Objective: Pain and the pain related disability are the major complaints of patients with knee osteoarthritis (OA). In the last years and in an effort to control these, new methods have been developed like the intra-articular injections of autologous Platelet Rich Plasma (PRP) as a part of the orthobiologic treatment of OA. The PRP has an anti-inflammatory action and also releases several growth factors in the joint which have a favorable effect on the articular cartilage. We wanted to evaluate the effectiveness of an autologous PRP specific preparation on the levels of pain experienced by patients with knee OA.

Method: Initially and from January 2014 until December 2016, we included in this study 53 Caucasians (9 males) from North-Western Greece with a known history of knee osteoarthritis who complaint of persistent knee pain. We excluded from the study a total of 14 patients based on the criteria of a recent knee trauma, a known history of coagulopathy, an abnormal Platelet count or being under anticoagulant treatment. The remaining 39 patients had undergone a standard bilateral standing antero-posterior and profile knee X-ray. These X-rays were assessed by the same team of doctors for knee OA according to the Kellgren-Lawrence (K-L) radiologic criteria: OA stage 0-4. These 39 patients who were diagnosed with at least stage 1 unilateral knee Osteoarthritis (stage 1-4 K-L classification) had done further intravenous tests of a full blood count and a coagulation check. These patients had a mean age of 64.07 y.o. and consented for the PRP treatment. They were asked to fill the Numeric Pain Rating Score (NPRS) regarding the level of knee pain they experienced at the time of the assessment. The NPRS is a visual numeric descriptive score assessing the intensity of the pain with 11 possible answers which range from 0-10. The value 0 represents no pain, the value 5 the moderate pain and the value 10 represents the worst pain experienced. After the first assessment, we applied the same PRP protocol for all the 39 participated patients. According to this every patient had an intra-articular knee injection of 5 ml PRP once weekly for the next 3 weeks. These 5 ml of the autologous PRP preparation were obtained after a peripheral venous blood collection of 20 ml and a single centrifugation on swing rotor for 8 minutes at 2400 rotations per minute. The patients were assessed at 1, 3 and 6 months after the last intra-articular injection. For the statistical analysis we used the non-parametric Mann-Whitney U-test and the parametric t-test and the statistical importance was set at $p < 0.05$.

Results: All patients attended the 1 month assessment but 2 patients did not attend the 3 month and 4 the 6 month

assessment. Their answers were not taken into account. The data obtained from the patients' given answers was statistically important with a $p < 0.5$. The mean value of the pain score before the PRP application was at 6.38. At 1 month after the application the mean value of the pain score was at 1.66 in comparison with the mean value at 3 months after the last injection which was at 1.25. The last evaluation at 6 months showed a mean value regarding the pain intensity of 1.23.

Conclusion: The intra-articular application of the PRP had a continuous progressive notable positive effect on the levels of pain experienced by the participated patients diagnosed with at least K-L stage 1 knee OA. In order to strengthen the accountability of this study's results, more and better all-around organized studies are needed with bigger samples and eventually with homogenous patient's characteristics regarding the knee osteoarthritis severity status.

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P1018

VALIDATION OF OSTEOPOROSIS SIMPLE TOOL TO IDENTIFY PRIMARY OSTEOPOROSIS IN TAIWAN MEN

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Objective: Validate the effectiveness of the Osteoporosis Simple Tool (OST) in identifying primary osteoporosis in Taiwan men.

Material and Methods: A bus, equipped with Dual-energy X-ray absorptiometry (DXA), serving for country-wide BMD test was available between 2008 and 2011. Participants must complete a questionnaire regarding risk factors of osteoporotic fracture in FRAX® tool before BMD test. The participants are men (≥ 50 y/o). The participants with a disorder strongly associated with secondary osteoporosis must be excluded. These include type I DM, osteogenesis imperfecta, hyperthyroidism, rheumatoid arthritis, liver cirrhosis and steroid use over 5mg daily more than 3 months. Osteoporosis was defined as lowest T-score ≤ -2.5 at any sites, including lumbar spine (L1 ~ L4), total hip, femoral neck. We performed OST (OST index = $0.2 [\text{Weight}(\text{kg}) - \text{Age}(\text{Year})]$, cutoff value: -1) to determine the sensitivity, specificity, and area under the receiver operating characteristic curve (AUC) for correctly selecting men with primary osteoporosis.

Results: A total of 1997 men (mean age: 69.85 ± 9.53 years) were enrolled in this study. Of the study subjects, 324 met

the definition of osteoporosis (16.2%). According to the previous study, we select -1 as the cut-off value in OST. The AUC of the OST to identify osteoporosis in the femoral neck, total hip, and lumbar spine were 0.748 (95% confidence interval (CI95): 0.714-0.782), 0.811 (CI95:0.765-0.857), and 0.656 (CI95:0.614-0.698) respectively. The AUC, sensitivity and specificity of the OST index (cutoff=-1) to identify primary osteoporosis in healthy men were 0.705 (CI95:0.675-0.736), 76.2% and 51.9%, respectively.

Conclusion: The OST may be a simple and effective pre-screening tool for identifying the risk of primary osteoporosis in Taiwan healthy men.

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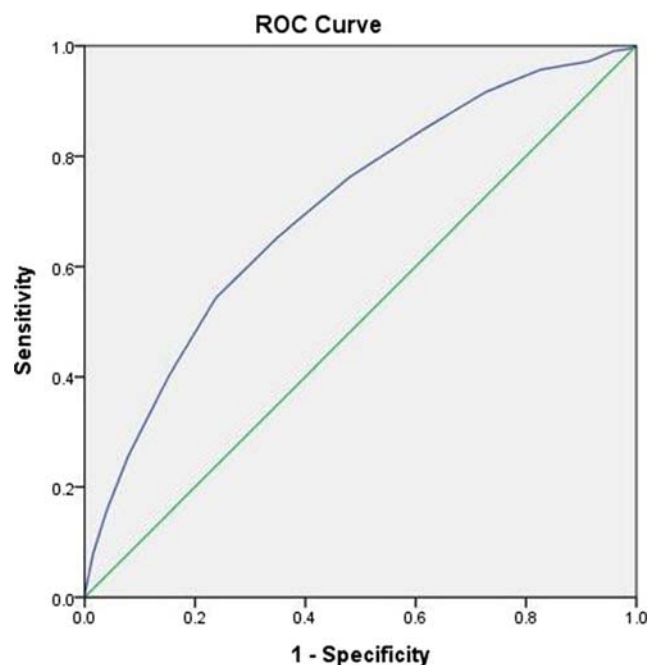


Fig. AUC of the OST, OST index = $0.2 \times [\text{Weight}(\text{kg}) - \text{Age}(\text{Year})]$

P1019

BONE MINERAL DENSITY AND TRABECULAR BONE SCORE IN UKRAINIAN MEN WITH OBESITY

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Aim: To determine the connection between the bone mineral density (BMD) and trabecular bone score (TBS) parameters in Ukrainian men suffering from obesity.

Materials and methods: We examined 396 men aged 40-89 years, depending on the body mass index (BMI) all the subjects were divided into 2 groups: Group A – 129 men with obesity

whose BMI was ≥ 30 kg/m² (mean age – 59.9±10.4 years; height – 174.4±6.8 cm; weight – 100.0±9.8 kg, BMI – 32.9 ±2.6 kg/m²) and Group B – 267 men without obesity and BMI of <30 kg/m² (mean age – 60.9±12.5 years; height – 174.3±6.7 cm; weight – 77.1±9.8 kg, BMI – 25.3±2.6 kg/m²). The BMD of total body, lumbar spine at the site L₁-L₄, femoral neck and ultra-distal forearm were measured by DXA (Prodigy, GEHC Lunar, Madison, WI, USA). The TBS of L₁-L₄ was assessed by means of TBS iNsight® software installed on our DXA machine (product of Med-Imaps, Pessac, France).

Results: In total group we found that obese men have significantly higher BMD in comparison with men without obesity of lumbar spine (A – 1.289±0.212 g/cm², B – 1.172±0.237 g/cm²; F=22.59; p<0.001), femoral neck (A – 0.964±0.148 g/cm², B – 0.914±0.150 g/cm²; F=25.18; p<0.001), total body (A – 1.277±0.098 g/cm², B – 1.185±0.118 g/cm²; F=57.38; p<0.001) and ultra-distal forearm (A – 0.555±0.086 g/cm², B – 0.494±0.095 g/cm²; F=37.57; p<0.001). TBS (L₁-L₄) was significantly lower in obese men compared to non-obese men (A – 1.053±0.161, B – 1.197±0.167; F=66.48; p<0.001). Fat mass and BMD status showed a significant positive correlation at various sites. The correlation between the fat mass and TBS of L₁-L₄ was also significant, although negative.

Conclusion: In Ukrainian men obesity negatively affected on TBS L₁-L₄, despite significantly higher BMD at all measured sites compared with men without obesity. The study results reveal a significant positive correlation between fat mass and BMD. Correlation between fat mass and TBS L₁-L₄ was significant and negative.

P1020

EPIDEMIOLOGY OF HIP FRACTURES IN UKRAINE: RESULTS OF STOP-STUDY

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Background: Hip fracture is one of the most serious complications of osteoporosis, which has important medical, social and economic complications. It is well known that incidence of hip fractures gradually increases with age and depends on the sex, but similar epidemiological studies in Ukraine are limited.

Objectives: To estimate age- and sex-specific hip fracture rates in Ukrainian population.

Study Design and Methods: The STOP study (Study of The prevalence of Osteoporotic fractures in Ukrainian Population) was conducted in 2011-2012. It was organized by Ukrainian Association of osteoporosis with the support of the Ukrainian Association of orthopaedist and traumatologists and was gathering the information about incidence of hip fractures in different parts of Ukraine.

Results: It was established that incidences per 100 000 persons in both sexes progressively increased with age. At younger ages, up to 67 years, incidence rates were higher in men than in women; but thereafter they were much higher in women, almost double at the age of 80–85 years. Overall incidence of hip fracture was comparable with data from neighboring countries (Poland and Romania).

Conclusions: As hip fractures are a serious health problem in Ukraine and around the world, the regional epidemiological data about hip fractures incidence is an important basis for the development of a national system of prevention and treatment of osteoporosis and its complications.

P1021

INSULIN-LIKE GROWTH FACTOR-1 AND FREE TESTOSTERONE AS EARLY SERUM MARKERS OF OSTEOPOROSIS IN ELDERLY MEN

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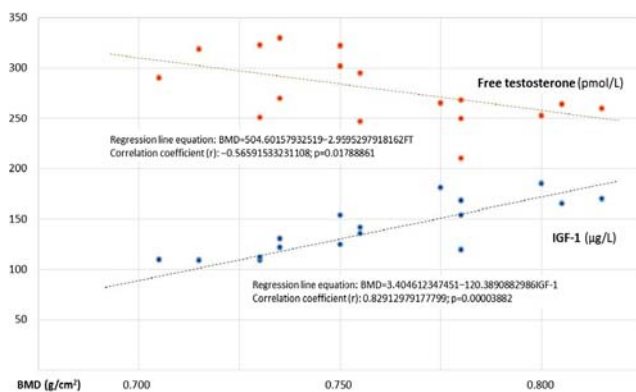
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Objectives: Osteoporosis is rare in males, affecting almost exclusively the elderly, while up to 30% of postmenopausal women may have low bone mineral density (BMD). In both sexes, dual-energy X-ray absorptiometry (DXA) is usually considered a reliable tool to evaluate bone loss by measuring BMD. However, several potential serum markers of bone remodeling, including insulin-like growth factor I (IGF-1) and free testosterone (FT) have been investigated, not only in order to identify bone changes early, but also to predict subsequent losses in BMD and prevent the risk of some adverse skeletal related events. The aim of this study was to evaluate the relationship between BMD, serum IGF-1, and FT in a group of osteoporotic men older than 65 years with DXA-confirmed osteoporosis.

Materials and Methods: We retrospectively reviewed the medical records of 17 elderly men (median age 69 years, range 66–76) who underwent DXA (Hologic QDR 4500 C, Waltham, MA, USA) and lumbar spine (L2–L4) BMD measurement. Serum IGF-I was measured by an immunochemiluminescent (ICMA) method (Maglumi 2000, SNIBE, China), while serum FT was assayed by a radioimmunoassay (RIA) method (Immunotech, Prague, Czech Republic).

Results: The results were the following: LS-BMD=0.760 ±0.064 g/cm²; IGF-1=140.7±26.3 µg/L; FT=277.6±33.5 pmol/L. No correlation was found between BMD and the age of the patients (R=-0.28, p=0.27), BMI (R=0.01, p=0.96), PTH (R=0.02, p=0.93), and 25-hydroxyvitamin D (R=0.13, p=0.61). The regression line equations between BMD, IGF-1, and FT were BMD=3.404–120.389IGF-1 (R=0.82, p<0.001), and BMD=504.601–2.959FT (R: -0.56, p=0.017). No significant relationship between IGF-1 and FT (R=0.33, p=0.19) was found.

Conclusion: High IGF-1 and low FT serum levels are independently related to low BMD, suggesting that the two markers together could be used in the early diagnosis of bone loss in elderly men. Further studies will eventually confirm our results.



P1022

BILATERAL TIBIAL INCURVATION IN A PATIENT WITH HYPOPHOSPHATEMIC RICKETS: A CASE REPORT

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Objective: We present a complex case of bilateral tibial deformity in a patient with a strange musculoskeletal disease: hypophosphatemic rickets.

Material and Methods: The case is about a 23-year-old woman with hypophosphatemic rickets who was treated with

bilateral tibial lengthening in childhood. She now presents severe triaxial deformity of both legs and a progressive pain that requires her to use a wheelchair to move around. She was operated performing bilateral tibial osteotomies and endomedular nailing. Preoperative planning and a strict metabolic control were crucial to achieve good results.

Results: A good alignment was achieved and the patient is currently able to walk without pain.

Conclusions: Hypophosphatemic rickets is a type of hereditary rickets characterized by persistent hypophosphatemia and hyperphosphaturia. The most predominant type is inherited in an X-linked fashion and caused by mutation in the gene encoding the phosphate-regulating endopeptidase homolog, X-linked. It causes deficient calcification of mineralized structures such as bones, resulting in severe bone deformities.

P1023

NON-VERTEBRAL FRACTURES IN UKRAINIAN WOMEN WITH OBESITY AND METABOLIC SYNDROME IN POSTMENOPAUSAL PERIOD

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Introduction: The number of obesity in the world has been significantly increasing in population. Abdominal obesity leads to the metabolic syndrome (MS) development. It was researched that components of MS have influence on bone mineral density (BMD), but data are contradictory

Aim: To determine peculiarities of non-vertebral fractures in women with obesity and MS.

Methods: 590 women aged 50–79 years (mean age – 64,0±8,0 yrs; mean weight –75,8±13.6 kg, body mass index (BMI) – 29.4±5.3 kg/m², mean duration of menopause – 14,6±8,4 yrs) were examined. The women were compared into the three groups: **A** included 298 women without obesity (BMI ≤ 29,9 kg/m²), **B** involved 177 patients with obesity (BMI ≥ 30,0 kg/m²). MS was diagnosed in women of the C group (115 people). Women were considered to have the MS according to IDF criteria (2005 yr). BMD was measured by the DXA method (Prodigy, GEHC Lunar, Madison, WI, USA). Results are present as means (±SD) and categorical variables were expressed as frequencies. Significance was set at p<0.05. We performed an one-way ANOVA test, multiple regression and correlation analysis. Data were analyzed using “Statistika 6.0” © StatSoft, Inc.

Results: Non-vertebral fractures were found in 37,92% of the A group patients, 29,94% of B group women and 35,56% of the C one. We estimated that patients without obesity have significantly lower BMD of lumbar spine (A – 0,931 ±0,168g/cm², B –1,091±0,191g/cm², C –1,082±0,190g/

cm²), femoral neck (A – 0,772±0,113 g/cm², B – 0,858 ±0,132 g/cm², C –0,861±0,135g/cm²) and ultradistal forearm (A – 0,347±0,073g/cm², B – 0,428±0,083g/cm², C –0,418 ±0,088g/cm²) in comparison with women of the groups B and C. We did not found significant differences among BMD of the B and C group patients (p>0,05).

The results of the study showed significant better BMD of the C group patients without fractures compared to those with fractures. Differences of BMD in patients with and without non-vertebral fractures in other groups of the women were not found. **Conclusion:** BMD is better in women with obesity and MS. Non-vertebral fractures are more common in patients without obesity.

P1024

USE OF GENERIC DRUGS IN ANTI-RESORPTIVE THERAPIES: THE RESULTS FROM THE ANALYSIS OF A REGIONAL DATABASE

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Objective: To assess the effects of the switches between drugs and their bio-equivalents on persistence.

Material and Methods: The study is based on the analysis of the administrative database of Tuscany Region, within the T.A.R.Ge.T. project (Appropriate Treatment of Geriatric re-fracture in Tuscany). The study (retrospective, observational) was conducted over a period of 10 years from 2006 until 2015. For each patient, gender and age were extracted. For each considered drug (alendronic, risedronic and ibandronic acid), data about number of dispensed boxes, and date of administration were extracted.

Results: The descriptive analyses showed a widespread use of generic drugs. In 2015, for alendronic acid, the generic drugs represent 61.8% of total boxes dispensed and 69.3% of total patients treated. With regard to ibandronic acid, the percentage of generic drugs was 33.8% for boxes and 38.8% for patients. With regard to risedronic acid, the percentage was 60.7% and 54.1% for the number of packages and for the treated patients, respectively.

There were several significant correlations between the number and type of switches (in the first year of therapy) and the total duration of therapy. Such correlations depended on different configurations between generic and branded who were taken during therapy. Three types of therapy have been identified: exclusive generics treatment, exclusive branded treatment or mixed therapy. There was a positive relationship

between the number of switches and the persistence. Patients with exclusive branded treatment or with exclusive generics treatment had similar correlations. However, in the mixed therapy group, the number of switches between generics and between generics and branded during the first year of therapy was negatively correlated with the total duration of therapy.

Conclusions: The presence and type of switch between drugs in therapies with bisphosphonates are elements that can affect the persistence in therapy. Nonetheless, they must be evaluated with particular attention in the patient's overall management.

P1025

FRACTURE LIAISON SERVICE DATABASE: DEVELOPING A NATIONAL CLINICAL AUDIT TO MEASURE SECONDARY PREVENTION PROVISION

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Objective: Secondary fracture prevention delivered by a fracture liaison service (FLS) requires effective identification, investigation, treatment initiation and monitoring of patients. The Fracture Liaison Service Database (FLS-DB) was commissioned to measure the delivery of secondary fracture prevention and adherence to guidelines with a view to informing quality improvement.

Material and methods: The audit criteria were based on NICE technology assessments and guidance on osteoporosis, and the National Osteoporosis Society clinical standards for FLSs. Selection of the audit criteria was also informed by the consensus of a multi-disciplinary group of experts. Data is collected in FLSs and entered using a secure web-based data portal. Individual sites can view their submitted data using live run charts with national averaged data.

Results: Data collection began in January 2016. To date 35,221 records have been entered by 57 FLSs. The first report is due to be published in April 2017. This will include data from 18,356 patients seen by 38 FLS between January and June 2016. The report will address the following questions, what proportion of patients:

- presenting with a fragility fracture are identified by the FLS?
- are assessed with a DXA?
- are assessed for falls risk factors?
- are followed up within 4 months of index fracture?

- are on a bone protection treatment within 4 months of index fracture?
- are initiated on a falls intervention within 4 months of index fracture?

Conclusion: The FLS-DB aims to provide a feedback mechanism for fragility fractures. This audit is the first step in understanding current secondary fracture prevention care, improving its efficacy and ultimately preventing those who suffer a fragility fracture from experiencing further fractures. Further work is needed to review the dataset and data completeness for some fields could be improved; however the first year of data collection has shown it is possible to answer questions on the assessment, treatment and management of patients who sustain a fragility fracture.

Disclosures: KJ has received honoraria, travel and/or subsistence expenses from: Amgen, Eli Lilly, Medtronic, Novartis, Proctor and Gamble, Servier, Shire, Internis, Consilient Health, Stirling Anglia Pharmaceuticals, Mereo Biopharma, Optasia, Zebra Medical Vision

P1026

SECONDARY OSTEOPOROSIS CAUSED BY CORTICOSTEROID TREATMENT IN PATIENT WITH IN SEVERE ASTHMA

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Introduction: Osteoporosis represents a systemic disorder with low bone mass and impaired microarchitecture of bone tissue due to many factors. One of the risk factors is the long-term treatment with systemic corticosteroids in patients with severe uncontrolled asthma.

Purpose: To show developing of osteoporosis in female patient with uncontrolled asthma treated with increased dose of systemic corticosterone due allergy to aminophylline.

Case report: A 76 years old woman with severe asthma, non-smoker, with DM type 2 (cortico-induced), low BMI (BMI 18 kg/m²), 35 years suffering from asthma, with VC=75% FEV1=35%. Due to aminophylline allergy, the patient at each exacerbation was treated with higher doses of systemic corticosteroids, combined with inhaled corticosteroids, long-acting beta-2 agonist and tiotropium bromide. Because of back pain, dual-energy X-ray absorptiometry (DXA) was performed 4 years ago, with finding of significant spine and hip

osteoporosis. L1-L4 T-score -3.4 SD, left femur neck T-score -2,9 SD and right femur neck T-score -3.1 SD. Laboratory findings: normal PTH (59 pg/ml), normal values of bone turn over markers, normal ionized calcium (1,13mmol/l) and vitamin D on the low normal limit (25 nmol/l). The patient was treated with alendronic acid 70 mg + cholecalciferol 5,600 IU weekly, and Calcium 1000mg daily. Control DXA was performed 2 years after the start of the treatment, with L1-L4 spine T-score - 2.9 SD, left femur neck -2,5 SD and right femur neck -2,6 SD. The patient continued to take the same therapy for treatment of osteoporosis and regularly took inhaled therapy. Even the number of exacerbations of asthma remained the same, the treatment with bisphosphonates, vitamin D and calcium was effective.

Conclusion: The patient who had secondary osteoporosis caused by the treatment of severe asthma with high doses of systemic corticosteroids due the unusual aminophylline allergy, with routine screening for osteoporosis will prevent osteoporotic fracture, the timely treatment will improve the T-score, and will reduce the bone symptomatology.

P1028

AGE-RELATED CHANGES IN SPINE BMD BASED ON DXA EXAMINATION

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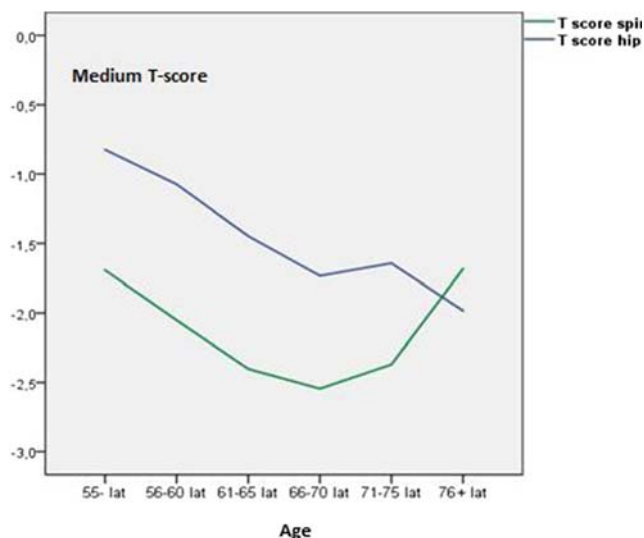
Introduction: Despite the fact that the bone mineral density of adults decreases with age leading to osteoporosis, the measurement of this feature by densitometry is subject to error. Especially in the field of spine the actual BMD value may be different from the measured one.

Aim: To evaluate the age-related changes in BMD as measured by spine DXA.

Material and methods: 1,284 women aged over 50 were randomly selected into the study. Between 1997 and 2003 these subjects were screened for osteoporosis in the process of which they underwent the densitometry and fracture risk assessment. The subjects underwent the spine and/or hip densitometry, in accordance to the methodology of the International Society for Clinical Densitometry.

Results: Despite the increasing age a growth in spine BMD was observed in the study group. This tendency

shows an increase in T-scores as the age values grow. (Figure 1).



Conclusion: Spine BMD may be impaired by the technological imperfection. X-rays measure the density of all the places - in front and behind a vertebra. Therefore, if the area of measurement includes degenerative changes, their density will be added to the density of the body, and thus the value of BMD will increase. For this reason, some patients may display a normal or osteopenic result, when in fact the vertebral body BMD is low. This leads to an incorrect diagnosis and a delay in therapy implementation. Therefore, it is advised that the patients above the age of 70 have both spine and hip BMD measured.

P1029

CLINICAL PREDICTORS OF RESPONSE TO CETYLATED FATTY ACIDS TOPICAL TREATMENT IN KNEE OSTEOARTHRITIS

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Objective: Knee osteoarthritis (OA) is one of the prevalent degenerative affection of the lower extremities. Analgesics, oral a topical Non Steroid Anti-inflammatory Drugs are the most common self-treatments. Nevertheless, even if they are quite effective,

they are associated to adverse events leading to withdrawal. Topical cetylated fatty acids (tCFA) has proven to be helpful in knee OA self-administered treatment and they are not burdened with adverse events. Identifying the subgroup of knee OA patients which could benefit from tCFA could be extremely useful in clinical practice. The aim of this study was to verify if there are clinical, radiological or anamnestic predictors of response to tCFA treatment.

Materials and methods: One-hundred thirteen patients with knee OA according to ACR classification criteria were enrolled. For each of them were registered anamnestic data (sex, age), knee OA radiological stage (according to Kellgren-Lawrence scale) and WOMAC (Western Ontario and McMaster Universities) overall and sub-scales' scores before treatment. A favourable outcome was defined as an improvement >10% of the maximum score of WOMAC overall score after one week (twice per day) of tCFA treatment. Nonparametric tests were applied; p-value <0.05 was considered statistically significant.

Results: A favourable outcome was observed in 52% of patients (59/113). From univariate analysis only WOMAC overall and sub-scales' scores were associated to response (p<0.0001). Multivariate logistic regression analyses established that the WOMAC overall score was the only predictor of a favourable outcome (p<0.0001; Odds Ratio 1.08). Taking into account the WOMAC sub-scales instead of the overall score, both stiffness and physical functional predict the response to tCFA treatment (respectively: p=0.0328 and p=0.0095; OR 1.09 and 0.96).

Conclusions: This study support the hypothesis that tCFA treatment in patients with knee OA may represent a therapeutic option. We observed that only WOMAC score was a mild predictor of response. These findings suggest that, in order to realise a knee OA tailored therapy, tCFA should be prescribed more on the basis of symptoms (especially stiffness and disability) than on radiological impairment, sex or age.

P1030

ARE THERE PROGNOSTIC FACTORS OF NEW FRACTURE OCCURRENCE DURING BISPHOSPHONATES DRUG HOLIDAY?

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Objective: to describe changes in BMD and fracture (FX) occurrence during bisphosphonates (BPs) drug holiday after ≥ 5 years of treatment, in postmenopausal women with osteoporosis (OP)

Methods: A retrospective analysis of 234 postmenopausal women with OP that discontinued BPs after 5 years of treatment, were admitted between March 2014 and April 2016. Patients with other metabolic bone diseases, secondary OP, those under another anti-OP treatment, less than 70% of annual drug compliance or follow-up <12 months after BPs cessation were excluded. Clinical data including BPs treatment history, BMD by DXA at lumbar spine (LS), femoral neck (FN) and total hip (TH) and clinical and/or radiological FX, were analyzed before and after cessation of BPs during 72 months.

Results: A total of 133 patients aged 71.07 ± 7.33 years old (yo) were included, 51.1% of them were ≥ 70 yo. Patients received BPs for 99.7 ± 38.7 months. Forty four patients had FX: 22 before, 13 during and 9, both, pre and during treatment. Follow-up at drug holiday was 44.2 ± 21.1 months (12-72), each patient had 2.47 ± 1.34 (1-6) clinical and BMD controls. BMD at TH declined 2.04% ($p=0.011$), without changes in LS or FN. Patients with OP features increased during drug holiday (54.2% vs. 63.6%; $p<0.0001$). In patients ≥ 70 yo, BMD at LS increased 5.3% ($p=0.047$), probably due to spondyloarthritis, while BMD at TH declined 4.1% ($p=0.007$) after 36 months of follow-up. Twenty seven FX were reported in 25/133 (18.8%) patients, 48.5% of them occurred in the first three years of drug holiday. Vertebral FX was the most common FX (37%) and they were almost twice than intra-treatment (10 vs. 6, $p=0.037$). History of intra-treatment FX and the persistence of OP features at BPs cessation were associated with new FX occurrence ($p=0.007$), without differences by age and type or duration of BPs therapy. BMD at TH was lower in those patients who presented new FX ($p=0.022$). The FX rate was higher than the observed during treatment (0.27 vs. 0.56 FX/month, $p=0.016$)

Conclusion: Besides the retention of BPs in bone, there would be a significant decline in BMD at TH as well a higher FX rate, during drug holiday. The main determinants of FX occurrence seem to be the decline of BMD at TH and the history of FX during BPs treatment. We suggest an active follow-up in this group of patients

P1031

SKELTAL MUSCLE AND HORMONAL STATUS IN OLDER WOMEN

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Introduction: In recent years there has been a number of

studies examining the association between skeletal muscle and growth hormone, as well as androgens (*Di Monaco M, 2011; Cruz-Jentoft A. J, 2010; Buehring B, Binkley N, 2013*).

Aim: To study the correlation between skeletal muscles and growth hormone, total and free testosterone level in older women.

Materials and methods: The study involved 42 healthy women aged 60 to 86 years (mean age – 70.62 ± 6.97 yrs). According to age, the examined women were divided into groups: 60-74 years ($n=25$) and 75-89 years ($n=17$). Lean mass of the total body, upper and lower extremities was evaluated using Dual X-ray absorptiometry (Prodigy, GEHC Lunar, Madison, WI, USA). Strength of skeletal muscle was evaluated using springy carpal dynamometer. To determine the functional capacity of skeletal muscle, we used a «4-meter» test. To measure the level of growth hormone, total and free testosterone, Immulite 2000 analyzer-based electrochemiluminescent method was used (Siemens DPC, USA).

Results: For the purpose of quartile analysis, women were divided into 4 groups depending on their growth hormone values: Q1 – growth hormone <1.12 ng/ml ($n=11$), Q2 – growth hormone being 1.13-1.98 ng/ml ($n=10$), Q3 – growth hormone being 1.99-2.60 ng/ml ($n=11$), Q4 – growth hormone >2.61-3.19 ng/ml ($n=10$). Women with the lowest growth hormone values are also marked with the lowest lean mass of upper ($p=0.01$) and lower ($p<0.05$) extremities, as well as appendicular lean mass ($p=0.03$). We found a significant correlation between appendicular lean mass and level of growth hormone (women aged 60-74 yrs: $r=0.36$; women aged 60-89 yrs: $r=0.31$), between strength of skeletal muscle and level of total testosterone (women aged 75-89 yrs: $r=0.55$; women aged 60-89 yrs: $r=0.32$), free testosterone (women aged 75-89 yrs: $r=0.31$), growth hormone (women aged 75-89 yrs: $r=0.35$; women aged 60-89 yrs: $r=0.32$); between function of skeletal muscle and level of total testosterone (women aged 75-89 yrs: $r=0.46$), free testosterone (women aged 75-89 yrs: $r=0.48$).

Conclusion: Significant correlation between parameters of lean mass, skeletal muscle strength, functionality and level of growth hormone and androgens was determined in older women.

P1032

PREVALENCE OF OSTEOPOROSIS AND FRACTURE RISK IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Introduction: A number of epidemiological studies have shown that osteoporosis is closely associated with chronic obstructive pulmonary disease (COPD). The patients with COPD have various clinical risk factors for osteoporosis including smoking, older age, low body weight, physical inactivity. Decreased pulmonary function, inflammation, glucocorticoid use and vitamin D deficiency are also risk factors related to the development of osteoporosis in COPD.

Objective: To evaluate the prevalence of osteoporosis and fracture risk among the patient with COPD, out patients examined in pulmonary unit in Clinical Hospital Stip.

Methods: The analysis included 2865 patients with COPD. In all patients spirometry was performed by determining the FVC and FEV1. Bone mineral density of the hips and lumbar spine was measured with dual-energy X-ray absorptiometry (DXA). FRAX tool was used to estimate the 10 years fracture risk.

Results: The patients with COPD were divided into groups according to gender and age. From 2865 patients with COPD, 1712 (59.5%) were men and 1153 (40.5%) women. With normal DXA (T-score -1 and higher) were 1121 (39%) patients, with osteopenia (T-score -1 - $2,5$ SD) were 1264 (44%) and with osteoporosis (T-score below $-2,5$ SD) were 480 (17%) patients. Osteoporosis and osteopenia was found in 61% of patient and the prevalence was higher in woman and in older patients. The risk of fractures in the next 10 years was estimated by FRAX, and was higher in the patients with higher daily doses of corticosteroid therapy, in older patients, in women and in those with low body mass index.

Conclusion: Severity of COPD, using corticosteroid therapy and decrease of BMI are risk factors for high prevalence of osteoporosis in COPD patients. The high prevalence of osteoporosis and osteopenia is a reason for screening all patients with COPD for osteoporosis, to recognize the patients with high risk of fracture and to initiate the treatment in the early stage of the disease to prevent osteoporotic fracture and to improve the quality of life.

P1033

ASSESSMENT OF THE FRACTURE RISK BY THE FRAX IN POSTMENOPAUSAL WOMEN WITH TYPE 2 DIABETES MELLITUS

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Introduction: The fracture risk assessment tool (FRAX), devised by the World Health Organization (WHO), uses several variables, including age, sex,

lifestyle, body mass index and bone mineral density to predict the risk of hip fractures and other major fractures due to osteoporosis. Diagnosis of vertebral fracture (VF) is important for identifying patients who need pharmacologic therapy for osteoporosis. This study shows the importance of radiographic vertebral assessment for identifying patients who need treatment for osteoporosis in diabetic women.

Objective: We investigated the FRAX-estimated fracture risk in patients with type 2 diabetes mellitus (DM) compared with nondiabetic control group.

Materials and methods: We examined 100 type 2 diabetic women (mean age: $59,4 \pm 6,2$ yrs, mean BMI: $32,4 \pm 6,11$ kg/m², duration of DM – 7 [IQR $5;12$] yrs, duration of menopause $8,5$ [IQR $4;15$] yrs.). The control group consisted of 77 nondiabetic without major diseases age- and BMI-matched persons. Bone mineral density (BMD) was measured with DXA (GE Lunar) with lateral vertebral assessment (LVA). The individual 10 year fracture risk was assessed by FRAX tool (<http://www.shef.ac.uk/FRAX>) for Europe-Belarus.

Results: In comparison of diabetic women with the control group regardless of vertebral deformities 10-year probabilities of fractures were similar between the groups for major osteoporotic fractures (MOF) (diabetic $2,6$ [IQR $2,0;3,6$] vs. nondiabetic $2,4$ [IQR $2,1;3,1$], $p=0,2874$) and hip fractures (diabetic $0,4$ [IQR $0,1;0,7$] vs. nondiabetic $0,4$ [IQR $0,1;0,7$], $p=0,7269$). The prevalence of vertebral deformities in diabetic women in our study was higher than in the control group ($16,4\%$ vs. $4,5\%$ respectively, $p=0,00462$). Considering the revealed vertebral deformities it is found that the 10-year probability of MOF in diabetic women was higher than in the control group $3,1$ [IQR $2,2;3,95$] vs. $2,4$ [IQR $2,1;3,3$] $p=0,018$, whereas there was not statistical confidence for the hip fractures.

Conclusions: Considering the increased risk of vertebral deformities in postmenopausal Belarusian women with type 2 diabetes mellitus radiographic vertebral assessment would be useful for the clinical identification of osteoporosis and fractures.

P1034

ABNORMAL BMD RESULT OF THE FEMORAL NECK DXA RESULTING FROM LOW BODY WEIGHT: CASE STUDY

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Objective: To show the erroneous measurement of hip BMD in patients with low body weight as well as to show a solution of this issue.

Material and methods: A case of a 47-year-old patient was analysed. In a period of 5 years he underwent 4 densitometric examination of femoral neck.

Results: Based on the first study osteopenia was diagnosed with T-score of -1.5 in the neck. Prophylactic therapy and a follow-up examination after 12 months were recommended as a result of the differential diagnosis. The follow-up DXA showed bone loss in the area of the greater trochanter (Figure 1.). The succeeding DXA examinations were performed after and 5 years (showing more bone loss in the greater trochanter with a decline in BMD).

Figure 1.



Conclusion: The observed bone loss in greater trochanter was caused by the decrease in body weight leading to improper imaging of the femur. Lunar DXA recognized trochanter area as a background to the healthy femur due to its too low density/mass. The actual structure of the femur has not been changed and the reduced bone mineral density (neck T-score -2.0) was not correctly assessed. The proposed solution is to increase the density of the study area by placing underneath the femur a bag of rice or a content of a similar density.

P1035

PATTERNS OF MUSCULOSKELETAL SYSTEM INVOLVEMENT IN PATIENTS WITH TYPE I AND TYPE II DIABETES MELLITUS

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Objectives: To study the different patterns of musculoskeletal (MSK) system affection in both types of diabetes mellitus (DM).

Methods: We performed a retrospective single-center study on sixty five patients during the period from May 2014 to February 2015, to evaluate MSK manifestations in diabetic patients at Sayyed Galal University Hospital, Cairo, Egypt. Patients were identified as diabetics based on Diagnosis and Classification of Diabetes Mellitus diagnostic criteria (1997). Clinical data, laboratory investigations, X-ray, musculoskeletal ultrasonography (MSUS) and Bone mineral density was measured using Dual energy X-ray absorptiometry (DXA) scan were all collected from all patients.

Results: We included 65 diabetic patients; of these 21 patients (32.31%) had type I diabetes while 44 patients (67.69%) had type II diabetes. Age in type I was 24.5±10.5 years while in type II was 50.1±8.44 years (P=0.001). DM type II showed higher BMI(P=0.001), fatigue(P=0.005), shoulder peri-arthritis (frozen shoulder)(P=0.034), knee osteoarthritis(P=0.002), cheiroarthropathy(P=0.016), anserine bursitis(P=0.001) and plantar fasciitis(P=0.003) than type I. Osteoporosis was found in both types but type II showed more prevalence 13/44 patients (29.5%) while type I showed only 3/21(14.2%). No statistically significant difference between both groups as regard t-score in the three sites. MSUS showed increased prevalence of quadriceps tendon enthesophytes in type I(P=0.033), while Infrapatellar(P=0.023) and retrocalcaneal bursitis(P=0.001) were more prevalent in type II DM.

Conclusion: Early evaluation of any diabetic patient regarding BMD by DXA scan and soft tissue by MSUS seems to be beneficial for early detection of any abnormality and therefore early management and prevention of complications.

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P1036

CONTINUOUS POSITIVE AIRWAY PRESSURE TREATMENT IMPROVES BONE MINERAL DENSITY IN MEN AFFECTED BY SEVERE OBSTRUCTIVE SLEEP APNEA

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Objective: We have recently demonstrated that severe OSA (Apnea-Hypopnea Index>30/h) significantly reduced bone mineral density (BMD) in male patients at all ages. The aim of this study was to evaluate the improvement of BMD in lumbar spine and femur in male severe OSA patients treated by continuous positive airway pressure (CPAP).

Methods: Sixty male severe OSA patients underwent dual-energy x-ray absorptiometry for BMD assessment before and after 1 year of CPAP therapy. We distributed OSA patients in two subgroups on the basis of the compliance at the CPAP therapy. Compliance was measured by analyzing the software ventilator report; patients should use their device for at least 4 hours per night and for 5 days a week. Sixty-two patients compliant to the CPAP therapy constituted the OSA+CPAP group, while twenty-four patients not showing the adequate

compliance at the CPAP therapy were included in the OSA-CPAP group.

Results: OSA+CPAP showed the significant increase of BMD in the lumbar spine after the 1 year treatment of CPAP, whereas the BMD of femur did not change. Considering the comparison of the parameters obtained at the 1 year follow-up we observed the significant increase of BMD in L1 in OSA+CPAP than OSA-CPAP.

Conclusion: This study shows that CPAP restores BMD in male patients affected by severe OSA. The improvement of BMD was particularly evident in the lumbar spine and mainly in L1. We are aware that L1 is considered a transitional vertebra at higher fracture risk. Therefore, since OSA could be a detrimental factor on BMD leading to osteoporosis and thus giving susceptibility to bone fractures, we showed that CPAP therapy improves BMD in OSA patients. In particular, we supposed that the correction of both hypoxia and sleep quality may be the main candidate in the improvement of BMD in OSA+CPAP patients. Therefore, we encourage clinicians in assessing BMD in male OSA patients inviting them to treat their sleep disorder by CPAP, also for reducing the fracture risk.

P1037

REHABILITATION AFTER BILATERAL TOTAL HIP AND SIMULTANEOUS BILATERAL KNEE ARTHROPLASTY IN A PATIENT WITH RHEUMATOID ARTHRITIS –A CASE REPORT

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Introduction: Rheumatoid arthritis (RA) is a chronic, inflammatory autoimmune disorder resulting joint destruction. In the treatment of end-stage damage of the joints many patients with RA require hip and knee arthroplasty. RA is the common indication for these surgery due to the fact that around 90% these patients have one, often both of the hip / knee affected. Appropriate rehabilitation in addition to the quality of endoprosthesis is crucial to restore the function and quality of life.

Aim: To show the importance of the implementation of rehabilitation after surgical procedures to achieve functional recovery and quality of life.

Method: We describe a case patient Z. Lj. aged 48 g. who had surgery endoprosthesis implantation right hip 2013, left 2014. Simultaneous operation of implantation endoprosthesis both knees in 2016. Before first and after these operations she had physical therapy (FT) in our hospital several time. During rehabilitations we applied the following FT: electro (IFS, laser, magnet, vasculator), hydro, kinesi and work therapy.

Results: Before and after rehabilitation we observed: local status (scar, local temperature, edema), pain, range of motion, muscle strength and gait, X-ray findings. During the last

rehabilitation on the reception postoperative scars were healed, skin temperature easily elevated, periarticular edema knee minimal. Pain was a 7 by VAS. Range of motion in the hips: flexion bending the lower thigh / Flexion with stretched lower thigh / Abduction (Fb/Fs/ A was 75/60/30 degrees left, and 80/60/30 right. Range of motion in the knees: Flexion / Extension (F/E) was 100/0 degrees left, and 90/0 right. Muscle strength estimate as 3 per manual muscle test (MMT-).The patient walked with pair underarm crutches. On the discharged scar sanitized. Local temperature normal, knee without edema, in mild valgus. Pain was 4 by VAS. In left hip Fb/Fs/ A was 85/70/35, and 90/70/35 degrees right. F/E knee: 110/0 left. 90/0 right. Muscle strength estimate as 4- per MMT. She was allowed to walk with one underarm crutch. X-ray findings of both knee and hips in correct position.

Conclusion: Timely rehabilitation after total hip and knee arthroplasty are satisfactory solution in RA patients with advanced joint destruction.

P1038

QUALITY OF LIFE AND WELL BEING IN PATIENTS WITH HIP OSTEOARTHRITIS

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Aim: To assess quality of life and wellbeing in a group of patients with hip osteoarthritis.

Material and method: Our study consisted in a group of 84 patients with hip osteoarthritis. We split up the patients in two groups. First group consisted in 42 patients who underwent a physical rehabilitation program three times per week for 12 months and the second group of 42 sedentary patients. All the patients were assessed with Lequesne Index, Short Form 36 for quality of life, Hamilton Anxiety Rating Scale for anxiety, and Levenstein Index for stress at baseline, at six months and at twelve months. Patients were recruited from ambulatory system Bihor county, Romania. The mean age in the first group was 61.36±4.31, and in the control group of 62.71 ±3.45. We found body mass index and educational level almost similar in both groups.

Results: The values of the Lequesne questionnaire proved a small improvement at 6 months and at 12 months in the treatment group, but in the control group we did not find any improvement. Also in the group who underwent rehabilitation program the values of both Physical Component Summary (PCS) and Mental Component Summary (MCS) showed an improvement after 6 and 12 months, than in the control group which showed no improvement in quality of life. Anxiety values diminished in the therapy group after 6 and 12 months, at the same time, in the control group there

was a mild increase in values at 6 and 12 months. We noticed also that stress values diminished in the therapy group at 6, 12 months, and at the same time the mean values of stress in the control group were a little higher at the end of the study. According to our results, we found also correlations between quality of life, anxiety and stress.

Conclusion: Like other studies, our study pointed out the beneficial effect of rehabilitation therapy and active lifestyle in improving quality of life and also psychological well-being in patients with hip osteoarthritis. We noticed also correlations between quality of life and some psychological factors in patients with hip osteoarthritis.

P1039

ALTERED PHYSICAL PERFORMANCE TESTS ARE A RISK FACTOR FOR FALLS BUT NOT FOR FRACTURES IN OLDER AMBULATORY WOMEN FROM BUENOS AIRES

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Objective: To investigate associations between appendicular lean mass, obesity and serum 25-hydroxy vitamin D (25OHD) levels with incidence of falls and osteoporotic fractures in ambulatory postmenopausal women ≥ 60 years

Methods: A cohort of 144 ambulatory postmenopausal women ≥ 60 years admitted at University Hospital from Buenos Aires for bone evaluation was included. Anthropometric measurements, 25OHD, appendicular lean mass adjusted to height² (ALM/ht²) by DXA, muscle strength (Hand-grip test) and physical performance tests: 4-meter Walking speed, 3-meter Timed Get-Up-and-Go Test and Chair sit-to-stand test, were performed. Abnormal ALM/ht² was considered < 5.67 kg/m² and obesity as body mass index (BMI) > 30 kg/m². Participants responded a questionnaire about history of osteoporotic fractures, spontaneous loss ≥ 4.5 kg weight and incidence of falls in the last year, and currently physical activity.

Results: A total of 144 women aged 69.44 ± 6.9 years with BMI of 28.4 ± 5.6 kg/m² and ALM/ht² 6.33 ± 0.87 kg/m² were included. Women with falls had lower Hand grip ($p=0.003$) and Walking speed tests ($p=0.015$), a spontaneous weight loss ($p=0.04$) and a tendency toward lower ALM/ht² ($p=0.09$), but no difference in fracture incidence. History of fracture had no association with any functional or strength tests. Women with 25OHD deficiency had

similar ALM/ht², functional and strength tests, fractures and number of falls than those with 25OHD sufficiency. Physical activity was associated with a tendency toward better physical performance tests: walking speed ($p=0.071$) and chair sit-to-stand tests ($p=0.057$). In contrast, women with BMI > 30 kg/m² had lower 25OHD ($p=0.023$) and abnormal physical performance tests: worst Timed Get-Up-and-Go TUG ($p=0.039$), and a tendency toward abnormal walking speed ($p=0.051$) and chair sit-to-stand tests ($p=0.067$), but without no difference in falls, FX incidence or ALM/ht².

Conclusions: Worst physical performance tests were associated with obesity, sedentary lifestyle and particularly with falls, but not with osteoporotic fracture antecedents.

P1040

THE ELEVATED LEVELS OF BONE TURNOVER MARKERS IN YOUNG MEN ARE ASSOCIATED WITH BONE LOSS: A LONGITUDINAL STUDY IN HEALTHY YOUNG ADULTS

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Introduction: In adult men after completion of growth, biochemical markers of bone turnover are remarkably high as compared to middle-aged men or young adult women. Little is known about the biological significance hereof. Moreover, longitudinal data investigating changes in bone mineral density (BMD) are lacking in this age group.

Objective: We investigated DXA-derived bone changes in a cohort of healthy men after completion of growth and explored the associations between baseline bone turnover markers and changes in BMD and bone mineral content (BMC).

Methods: 428 healthy men aged 25-45 (mean 34.9 ± 5.3) years participated in a longitudinal population-based sibling-pair study, with a mean follow-up of 12.4 ± 0.4 (range 11.2 – 13.6) years. Areal BMD (aBMD) and BMC were measured at the total body (minus head), proximal femur (total hip and femoral neck region), and lumbar spine using DXA. Procollagen type 1 amino-terminal propeptide (PINP), osteocalcin (OC), and C-terminal telopeptide of type 1 collagen (CTX) were measured from fasting serum samples using an electrochemiluminescence technique. Associations between baseline bone turnover markers and annual changes in aBMD and BMC were investigated using linear mixed-effects modeling, with adjustment for baseline age, weight and weight changes.

Results: During the 12-year follow-up period, aBMD at the total body, lumbar spine, total hip and femoral neck decreased

by $2.3 \pm 3.0\%$, $1.7 \pm 5.3\%$, $3.1 \pm 4.6\%$ and $6.0 \pm 5.8\%$, respectively (all $p < 0.001$). BMC at the total body, lumbar spine and femoral neck decreased by $1.4 \pm 3.9\%$, $0.9 \pm 6.6\%$ and $5.8 \pm 6.6\%$ ($p \leq 0.002$), whereas no change in BMC was observed at the total hip. Higher P1NP, OC and CTX levels at baseline were associated with a larger decline in aBMD at the total body ($\beta = -0.19$ to -0.34 , $p < 0.001$), lumbar spine ($\beta = -0.17$ to -0.26 , $p \leq 0.002$), total hip ($\beta = -0.13$ to -0.25 , $p \leq 0.008$) and femoral neck ($\beta = -0.13$ to -0.18 , $p \leq 0.012$). Similar associations were observed with changes in BMC.

Conclusion: The relatively high levels of bone turnover markers in young adult men after completion of growth appear not to be reflective of ongoing bone mass accrual. In contrast, higher concentrations of these markers are associated with a more rapid decline in BMD and BMC, possibly reflecting a less favorable skeletal metabolism in these otherwise healthy men.

P1041

INFLUENCE OF VITAMIN D STATUS ON BONE TURNOVER MARKERS IN POSTMENOPAUSAL WOMEN

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Aim: To determine the peculiarities of bone turnover markers depend on the vitamin D status in postmenopausal women.

Methods: 160 subjects aged 50-88 yrs. old were included to the study: 121 patients (mean age - 63.77 ± 8.61 yr. old) were suffered with systemic postmenopausal osteoporosis and 39 healthy subjects (mean age - 64.40 ± 8.33 yr. old, $p > 0.05$). Serum markers of bone formation (procollagen type I N-terminal propeptide (P1NP)), bone resorption (collagen type I cross-linked C-telopeptide (β -CTX)) and 25(OH) D_{total} were determined by the electrochemiluminescence method "ECL technology" by Elecsys[®] assay. The optimal vitamin D status was defined when serum 25(OH)D level was 30-50 ng/ml, vitamin D insufficiency and deficiency were noted for 25(OH)D levels between 20 and 30 ng/ml and for 25(OH)D levels lower than 20 ng/ml, respectively. Severe vitamin D deficiency was diagnosed when 25(OH)D level was below 10 ng/ml.

Results: Due to the results 62.5% examined had vitamin D deficiency and 21.9% - vitamin D insufficiency. It was found that patients with systemic postmenopausal osteoporosis and severe vitamin D deficiency had significantly higher bone turnover markers compared with subjects who had optimal vitamin D status (P1NP - 52.84 [39.49 ; 80.39] vs. 34.58 [25.54 , 58.67] ng/ml, $P = 0.053$; β -CTX - 0.609 [0.381 ;

0.831] vs. 0.385 [0.289 ; 0.514] ng/ml, $P = 0.01$). It was found significant negative correlation between 25(OH)D and β -CTX ($r = -0.25$, $p = 0.006$) in patients with systemic postmenopausal osteoporosis. Healthy women did not show any significant changes in bone turnover markers depend on vitamin D status.

Conclusion: The results of the study showed that severe vitamin D deficiency is increasing the bone turnover markers in postmenopausal women with systemic osteoporosis. Doctors must pay attention on vitamin D status in complex therapy of systemic osteoporosis.

P1042

DIFFERENCES IN FEMORAL BONE MICROSTRUCTURE OF MICE AFTER AN ACUTE EXPOSURE TO ACRYLAMIDE

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Objective: This study aimed to examine, for the first time, femoral bone microstructure of mice after an acute exposure to acrylamide (AA), one of the most common toxins in foods.

Material and Methods: Twelve clinically healthy 12-week-old Swiss mice (males) were used. The mice were randomly divided into three experimental groups: E1 group - males were treated per orally with 2 doses of AA (1 mg/kg b.w.) in a 24 hour period; E2 group - mice received 3 doses of AA (1 mg/kg b.w.) during a 48 hour period, and a control group. Histological, histomorphometrical methods and micro-computer tomography were used to determine femoral bone microstructure. The study was approved by the First Local Ethic Committee on Experiments on Animals in Cracow (No. 175/2012).

Results: In the compact bone, more resorption lacunae (from 100% to 122%) occurred in mice exposed to AA. The sizes of the primary osteon's vascular canals were significantly decreased in groups E1 and E2 ($P < 0.05$). Secondary osteons were significantly smaller in mice from the E2 group ($P < 0.05$). Cortical bone thickness was not affected by AA exposure. In the trabecular bone, bone volume and trabecular number were significantly increased in mice administered AA ($P < 0.05$). On the contrary, trabecular separation was significantly decreased in these individuals ($P < 0.05$). Significantly higher value of bone surface was observed in mice from the E1 group whereas trabecular thickness was increased in animals from the E2 group ($P < 0.05$).

Conclusion: The effect of AA on microstructure of compact and trabecular bone tissues is different. The compact bone is more resorbed, trabecular bone is more robust and mineralized. Therefore, further studies are needed to study mechanisms by which AA acts on bone in detail.

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P1043

EFFECT OF VITAMIN D DEFICIENCY ON THE ULTRASOUND DENSITOMETRY DATA

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Aim: To determine the influence of vitamin D deficiency on the ultrasound densitometry data.

Materials and methods: The study involved 227 healthy subjects aged 20-85 years. The average age of men was (52.79±14.44) years, and women (51.12±13.72) years of age ($p>0.05$). Serum 25(OH)D_{total} level was determined by electrochemiluminescence (ECL) method in Elecsys analyzer with cobas test systems. The structural and functional state of the bone tissue was measured on the heel by Quantitative ultrasound densitometer "Sahara" (Hologic). The optimal vitamin D status was defined when serum 25(OH)D level was 30-50 ng/ml, vitamin D insufficiency and deficiency were noted for 25(OH)D levels between 20 and 30 ng/ml and for 25(OH)D levels lower than 20 ng/ml, respectively.

Results: Studies have found vitamin D deficiency in 50.7% subjects, insufficiency - in 33.0%, and normal serum 25(OH)D level in 16.3% of residents. It was evaluated that speed of sound parameter was significantly higher in subjects with optimal 25(OH)D level (1552.87±37.66 m/s) compared to subjects with vitamin D deficiency (1538.27±28.71 m/s, ($p<0,01$)) and insufficiency (1547,99±9,51 m/s, ($p<0,05$)). Also, it was determined that in subjects 45-60 years with vitamin D deficiency had ultrasound densitometry data significantly lower compared to those who had vitamin D insufficiency (particularly, stiffness index: 88.57±14.78 vs. 97.82±17.69, % ($p=0.02$), speed of sound: 1538.68±25.13 vs. 1552.87±27.98 m/s ($p=0.03$), broadband ultrasound attenuation: 69.29±13.32 vs. 78.41±16.05, dB/MHz ($p=0,006$)) and optimal serum 25(OH)D level (stiffness index: 88.57±14.78 vs. 100.55±22.17, % ($p=0.02$), speed of sound: 1538.68±25.13 vs. 1561.05±40.04, m/s ($p=0.009$)). It was found that serum 25(OH)D level had a significant positive influence on the parameters of structural and functional state of bone tissue ($r=0.15-0.18$, $p<0.05$).

Conclusions: The observations revealed that vitamin D deficiency and insufficiency have a negative effect on

the structural and functional state of bone tissue, especially in the age group 45-60 years.

P1044

INVESTIGATION ON THE PREVALENCE OF SARCOPENIA AND RELATED FACTORS IN ELDERLY LIVING IN ACHAIA, GREECE

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Background: Sarcopenia is a syndrome characterized by progressive loss of skeletal muscle mass, muscle strength and/or physical performance. It is one of the most common problems amongst the elderly worldwide. According to the European Working Group on Sarcopenia in Older People, there is no data yet, evaluating sarcopenia in Greek people.

Objectives: To evaluate the prevalence of Sarcopenia in older people living in Achaia-Greece.

Methods: The study's cohort consisted of individuals aged over 60 years, living in the region of Achaia, in central-west Greece. Patients' assessment included the Mini-Mental State Examination, as well as the measurement of body mass index, muscle mass, calf circumference, gait speed and handgrip strength. Muscle mass was assessed via bioelectrical impedance analysis grip strength was measured with a specific dynamometer, and the Timed up and Go (TUG) test was used to measure physical performance.

Results: The present study evaluated 154 community-dwelling elderly subjects (38 men and 116 women; mean age, 70.05, SD=8.04) who volunteered to participate in the study. Fifty participants (29,2%) were found sarcopenic. Logistic regression analysis identified Body Mass Index (OR 2.37; 95% CI 1.26-4.47) and calf circumference (OR=0.045; 95% CI 0.01-0.11) to be significantly associated with sarcopenia.

Conclusions: Almost one-third of the sample, were diagnosed with sarcopenia according to the criteria developed by the European Working Group on Sarcopenia in Older People. Calf circumference and body mass index were associated with increased risk of sarcopenia among Greeks. There is a need for large multicentered studies evaluating sarcopenia in Greece.

P1045

THE ROLE OF EXTRACORPOREAL SHOCKWAVE THERAPY IN PLANTAR FASCIITIS

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Demonstration the effect of extracorporeal shock waves in the treatment of plantar fasciitis.

Plantar fasciitis is commonly found in medical practice as suffering from painful plantar aponeurosis affecting the heel due to mechanical pressure at this level. The etiology is unknown is supposed existence of calcaneal spurs in approximately 60% of patients presenting with pain and limitation of movement of dorsal flexion of the foot. 15 patients had been treated with extracorporeal shock wave therapy and 10 patients had been treated conservatively with NSAIDs, cold local applications, strengthening exercises of the calf muscles and plant. A pain was assessed by VAS (visual analogue scale), the patients with extracorporeal shock wave therapy experienced VAS decreased in 70% while patients with conservative treatment just 40%. Extracorporeal shock wave therapy is an alternative therapy in fasciitis planting.

P1046

BONE MINERAL DENSITY AND QUALITY, BODY COMPOSITION OF WOMEN IN POSTMENOPAUSAL PERIOD

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Aim: To examine the bone mineral density and quality, body composition of women depending on the duration of the postmenopausal period (PP); correlation of total fat mass (TFM) with bone mineral density (BMD) and trabecular bone score (TBS).

Materials and methods: 179 women (mean age – 58.5±0.4 yrs; duration of the PP – 11.6±0.6 yrs) were examined. The examined were divided into the following groups: A – women in the premenopausal period (n=18); B – women in PP with a duration of less than 5 yrs (n=32); C – women in PP with a duration of 5-9 yrs (n=39); D – women in PP with a duration of 10-14 yrs (n=56); E – women in PP with a duration of 15-20 yrs (n=34).

BMD of lumbar spine, femur and body composition (total fat and lean (TLM) masses) were measured by DXA method (Prodigy, GEHC Lunar, Madison, WI, USA) and TBS (L1-L4) were assessed by TBS iNsight[®] software package installed on our DXA machine (Med-Imaps, Pessac, France).

Results: BMD at the femoral neck was likely decreasing with age (p<0.001). The changes in TFM (p=0.01) and TLM (p=0.05) in patients with various postmenopausal duration were improbable. Relationship among TBS, BMD and TFM of women in premenopausal period (A-group) was found unjustified (p=0.2 and p=0.2 respectively). In B-group this relationship was equally improbable (p=0.9 and p=0.5

respectively). In C-group regression relationship between the bone indicators and TFM was insignificant (p=0.4). With increasing TFM, BMD at the spine (p=0.008) and femoral neck (p=0.00004) was significantly increasing. In D-group similar results were observed. The regression relationship between TBS and TFM was improbable (p=0.3), and with the growth of TFM accompanied the increase of BMD at the spine (p=0.000004) and femoral neck (p=0.0001).

Conclusion: BMD and TBS probably deteriorate with advancing of PP. TFM and TLM ratio is not likely to change with age. In middle and late PP, the BMD of spine and femoral neck increases along with TFM.

P1047

EPIDEMIOLOGY AND RISK FACTORS OF LOWER LIMB FRACTURES IN PATIENT OF DIFFERENT AGE

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Introduction: Lower limb fractures (LLF) account for approximately one third of all fractures and may result in substantial mortality and morbidity. Age, osteoporosis, road collision, obesity and different diseases (osteoarthritis, Parkinsonism, cataract, dementia etc.) are the risk factors of LLF. Fractures are a considerable public health burden but information about its risk factors in Ukraine is limited.

Objective: To study the risk factors of the LLF of patients depending on the age, sex, type of fracture, parameters of bone mineral density, the geometric parameters of the femur and the level of vitamin D in serum.

Material and Methods: We identified 1265 subjects in age 10 years old and more, who had at first incident (diagnosis) of LLF. Methods: questionnaires (determination of sex, age, time and reason of fracture), dual-energy X-ray absorptiometry (DXA, Lunar, Prodigy), assessment of geometry parameters of the hip (traditional X-ray), biochemical analyses of serum (the evaluation of level of 25(OH)D_{total} by electrochemiluminescence method, Elecsys, Roche).

Results: Our study confirmed the significant association between LLF and age and sex. Lower limb fractures were more common among males than among females in the younger age groups (up to 50 years old). 44.4% from the total fractures were established in patient aged 50 years and older. In this group the incidence of LLF was higher in women than in men, and the difference has grown up with increasing age. The most common anatomic site of LLF was the tibia and/or fibula (48.9% of all incident LLF), followed by the hip (29.5%), and the tarsal/metatarsal bones (21.6%). Incidence of fracture in patients 50 years and older was 519.8 per 100

000 patients for all LLF, 226.9 per 100 000 patients for hip fracture and 212.3 per 100 000 patients for tibia and/or fibula fractures. Frequency of tibia and/or fibula fractures rose with aging from 20-29 to 60-69 years and feet fractures increase from 20-29 to 50-59 years. The incidence of hip fractures was highest in the age group over 85 years. Most patients with hip fractures had vitamin D deficiency or insufficiency, only 5% of patients has normal value of vitamin D in serum. Also this study has shown that some geometric parameters of hip have significant influence on hip fracture risk on older patients, especially hip axis length, neck-shaft angle and cortical bone thickness. BMD indices were lower in patients with hip fractures in men and women but not differ in patients with feet or tibia and/or fibula fractures compare with healthy population.

Conclusion: Age, sex, parameters of bone mineral density, the geometric parameters of the femur and the level of vitamin D in serum are significant risk factors for lower limb fractures. The presence of these risk factors should be considered when planning therapeutic interventions in patients with fractures.

P1048

PARATHORMONE FOR OSTEOPOROSIS TREATMENT IN REAL CLINICAL LIFE

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Background: Since persistence and adherence to osteoporosis treatment influence on fracture outcome, and patients requiring osteoporosis treatment with parathormone (PTH) are at high fracture risk, it is important to follow this kind of patients during and after PTH therapy. Therefore, the object of study was to evaluate adherence, presence of side effects during PTH therapy and follow-up after PTH therapy.

Patients and methods: We analysed all the patients who received PTH treatment for osteoporosis from 2004 to 2016, and we registered the following parameters: reason of PTH therapy; side effects; interruption of therapy and its reasons; follow-up after PTH therapy.

Results: 87subjects (82 females, 5 males), 67.2±11.3 years-old, received PTH for osteoporosis treatment due to multiply fractures (58.3%), low response to bisphosphonate therapy (35.7%), fractures during glucocorticoid therapy (6%). 48.3% of subjects completed PTH therapy (18 or 24 months); 20.7%dropped-out from follow-up after 6-12 months after prescription due to unknown reasons; 18.4% of subjects interrupted PTH therapy after 9.3±5.0 months; and 12.6% of subjects have not finished PTH therapy yet. 73.7% of subjects

had high adherence to PTH therapy (medical possession ratio, $MPR \geq 0.8$), 12.3% and 14% of subjects had medium and low adherence to therapy ($MPR=0.5-0.8$ and <0.5 , respectively). Interruption of PTH therapy, transient for a couple of months or permanent, happened in 26.8% of cases, the main reason of which was the presence of side effects (63.2% of subjects). 36.8% of subjects interrupted PTH therapy for unknown reasons. All the patients who completed or interrupted PTH therapy received the prescription of sequential therapy with antiresorptive drugs but only 72.4% of them followed it for 4.8±3.0 years. During follow-up after PTH therapy, 4 patients (6.9%) presented fragility fractures, and these subjects were among those with low adherence both to PTH and sequential therapy with antiresorptive drugs after PTH.

Conclusion: Although one half of patients completed PTH therapy, almost 39% of patients interrupted PTH therapy due to side effects which could lead to fragility fractures after interruption. Therefore, tight follow-up both during and after PTH therapy is needed in order to reduce fracture risk in this kind of patients.

P1049

EVALUATION OF THE PAIN, NEUROPATHIC PAIN AND SYMPATHETIC SKIN RESPONSE TO TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION TREATMENT IN CHRONIC MECHANICAL LOW BACK PAIN PATIENTS

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Objectives: To investigate the effectiveness of transcutaneous electrical nerve stimulation (TENS) in mechanical chronic low back pain, and compare the effects of different clinical application methods of TENS on pain, neuropathic pain, functional status, and sympathetic skin response (SSR).

Materials and Methods: 73 patients, aged between 18 and 65, with mechanical suffering from low back pain more than three months were included the study. After the baseline measurements, patients were randomized to three physical treatment groups. Burst mode TENS was applied at the first group, conventional TENS was applied at the second group while the third group received sham TENS application during 15 sessions. Patients were evaluated by visual analog scale (VAS), LANNS (The Leeds Assessment of Neuropathic Symptoms and Signs), DN4 (Douleur Neuropathique 4 Questions), Modified Oswestry Scoring (MOS), Beck Depression Inventory (BDI) and SSR.

Results: After TENS application, average VAS scores showed statistically significant decrease in whole groups ($p < 0,001$), after treatment showed statistically significant

difference between the comparisons of groups. This difference was due to BTENS ($p < 0,05$). After the treatment, LANNS, DN4, MOS, BDI and SSR showed no statistically significant differences between groups ($p > 0,05$).

Conclusions: Burst TENS treatment to lumbar region can be used for short term pain control in chronic mechanical low back pain is an efficient and reliable method.

P1050

THE EFFECTIVENESS OF THERAPEUTIC ULTRASOUND IN NON SPECIFIC MECHANICAL CERVICAL PAIN AND COMPARISON OF DIFFERENT APPLICATION METHODS FOR CLINICAL PRACTICE

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Objectives: The aim of this study was to investigate the effectiveness of therapeutic ultrasound (US) in non-specific mechanical neck pain, and to compare the effects of intermittent and continuous US applications on pain severity and functional disability.

Materials and Methods: 71 patients, aged between 18 and 65, with non-specific mechanical neck pain suffering from less than three months were included the study. After the baseline measurements, patients were randomized to three physical treatment groups. US was applied intermittently in the first group and continuously in the second group while the third group received sham US application during 10 sessions. Three groups were also treated with TENS. Patients were evaluated by visual analog scale, algometer, neck disability and goniometer. Control measurements were three months later after therapy.

Results: Pain severity was improved statistically significant in three groups three months later after therapy ($p < 0,001$). Pain pressure threshold (PPT) was increased statistically significant in the first and second group after the treatment ($p < 0,05$), while PPT was decreased in control group. Three months later after therapy PPT was increased statistically significant in all of three groups ($p < 0,05$). Continuous US was observed more effective than intermittent application in cervical rotation range when the groups were compared after the physical therapy sessions. Continuous application was observed more effective when the group were compared in terms of functional recovery.

Conclusions: Therapeutic US applications are effective in reducing the severity of pain furthermore it affects the functional status positively by increasing cervical range of motion

P1051

METABOLIC PARAMETERS AND BONE DENSITOMETRY IN ADULT PATIENTS WITH AND WITHOUT TYPE 2 DIABETES

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Diabetes is a major health problem both by the increasing incidence, and by the associated complications, including secondary osteoporosis through damage of bone micro-architecture, according to contemporary data.

Objective: To evaluate metabolic parameters and bone densitometry in adult female patients with type 2 diabetes mellitus (2DM), compared with non-diabetic women.

Method: This is a cross-sectional study obtained in a Romanian Tertiary Endocrine Center. We analyzed: glycaemic profile (fasting blood glucose, HbA1c), lipid profile (cholesterol, LDL-cholesterol, HDL-cholesterol, triglycerides), uric acid, phospho-calcium metabolism, the levels of 25 hydroxyvitamin D (25(OH)D), bone markers (Beta-CrossLaps - bone resorption marker, osteocalcin - bone formation marker), assessment of bone mineral density in the lumbar spine and femoral neck (GE Lunar), together with anthropometric data, such as body mass index (BMI). We used for statistical analysis Student's t-test and Spearman correlation. Statistical significance was considered when $p < 0.05$.

Results: Were enrolled 36 female patients with 2DM and 47 control female patients without 2DM. In the 2 DM group: the 25(OH)D, osteocalcin and magnesium levels was lower ($p = 0.017$, $p = 0.034$, $p < 0.001$) and the BMI, levels of fasting glucose and triglycerides was higher ($p < 0.01$, $p < 0.0001$, $p < 0.0008$). There have been linear correlation between BMI and 25 (HO) D level ($r = -0.22$, $p = 0.05$) and between BMI and bone mineral density in the lumbar spine ($r = 0.46$, $p = 0.001$) in both groups.

Conclusion: Based on our observations, 25(OH)D, osteocalcin and magnesium levels are lower in the 2DM group, (borderline significance); BMI correlates positive with

bone mineral density in the lumbar spine, and negatively with 25(OH)D, independent of 2DM (borderline significance).

P1052

REHABILITATION FOR MOBILITY IMPROVEMENT IN PARAPLEGIA FLACCID IN COMPLEX PLURIMALFORMATIV SYNDROME WITH STRUCTURAL CHROMOSOME ABNORMALITIES INV(9)(P12Q13): CASE REPORT

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Introduction: Chromosomal abnormalities can affect the number or structure of chromosomes. Most genetic abnormalities appear spontaneously. They represent an important part of human genetic pathology not only by frequency but also by causing phenotypical and structural consequences with congenital malformation and functional deficiency that affect motor function and daily living of individual.

Methods: We present the case of a female toddler 10 years old, that we followed up from three to ten years old. The surveillance was during her admission in hospital for rehabilitation treatment. We estimate her neuropsychic and motor development. We evaluate the patient using various scales GMFM, ROM, ADL.

Results: The presence of complex cardiac, genital, digestive, renourinary, bone malformation was life threatening as new born, and almost not compatible with life. Early vital functions support and surgical correction - left colostoma, adapted orthopaedic step by step treatment program was applied in order to achieve motor development for social abilities. The case improvement was slowly, but satisfactory. The patient was physical prepared before and after each surgical orthopaedic correction, focusing on functional outstanding, in relation with orthopaedic team. For each stage of case evolution we adapt prescribing orthoses and other medical devices. At age of ten the patient was able to walk on short distances with supportive devices.

Conclusion: The presence of congenital abnormalities creates limits in rehabilitation by severity and multiple functional deficits. This case is evidence that despite the severity of case, if there is an early intervention and a dedicated team during the patient's life long there can be made important improvements. There is also need for the consequent family support.

P1054

SKELETAL MUSCLE AND VITAMIN D LEVEL IN WOMEN OF VARIOUS AGES

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Introduction: In recent years there has been a number of studies examining the correlation between vitamin D status and skeletal muscles. However, there are many different approaches to the role of vitamin D metabolism and function of skeletal muscles.

Aim: The research was conducted at the SI «D.F. Chebotarev Institute of Gerontology NAMS of Ukraine» to study the correlation between skeletal muscles and vitamin D level in women of different ages.

Materials and methods: The study involved 122 healthy women aged 20 to 83 years. According to the gerontological classification, the examined women were divided into groups: younger – up to 44 years (n=35), middle – 45-59 years old (n=26), older – 60-74 years (n=44), senile age – 75-89 years (n=17). Lean mass of the total body, upper and lower extremities was evaluated using Dual X-ray absorptiometry (Prodigy, GEHC Lunar, Madison, WI, USA). Strength of skeletal muscle was evaluated using springy carpal dynamometer. To determine the functional capacity of skeletal muscle we used a «four-meter» test. To determine the level of 25(OH)D electrochemiluminescent method was used with Elecsys 2010 analyzer (Roche Diagnostics, Germany).

Results: We determined a significant correlation between parameters of lean mass ($r=0.45$; $t=2.08$; $p=0.05$) and the level of vitamin D in women of middle (45-59 years) age; skeletal muscle functionality ($r=-0.51$; $t=-2.29$; $p=0.04$) and the level of vitamin D in women of older (60-74 years) age. We did not find the significant correlation between parameters of muscle strength and level of vitamin D.

Conclusion: Significant correlation between parameters of lean mass, skeletal muscle functionality and the level of vitamin D was determined in women of middle and older age.

P1055

BONE MINERAL DENSITY AND TRABECULAR BONE SCORE IN UKRAINIAN POSTMENOPAUSAL WOMEN WITH METABOLIC SYNDROME

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Aim: To estimate the bone mineral density (BMD) and trabecular bone score (TBS) in Ukrainian postmenopausal women with metabolic syndrome (MS).

Methods: The study involved 1013 50-79 yrs old women in postmenopausal period (mean age – 64.44 ± 8.11 yrs; mean duration of menopause – 14.51 ± 8.21 yrs). Patients were

compared into two groups: **A** – included 691 women without obesity ($BMI \leq 29.9 \text{ kg/m}^2$), **B** – contained 322 female with MS (IDF, 2005). Additionally groups were divided on subgroups according to age of patients (50-59 yrs; 60-69 yrs; 70-79 yrs). The BMD of lumbar spine (L_1 - L_4) was measured by the DXA method (Prodigy, 2005). The quality of bone tissue (TBS L_1 - L_4) was assessed by the TBS iNsight® software package installed on DXA machine (Med-Imaps, Pessac, France).

Results: We estimated that women without obesity in total group have significantly lower BMD of lumbar spine ($A - 0.950 \pm 0.178 \text{ g/cm}^2$, $B - 1.113 \pm 0.199 \text{ g/cm}^2$; $p < 0.001$) compared to patients with MS. Analyze of BMD depending on age showed the same results (50-59 yrs – 1.009 ± 0.169 vs. $1.139 \pm 0.200 \text{ g/cm}^2$ ($p < 0.001$), 60-69 yrs – 0.932 ± 0.180 vs. $1.089 \pm 0.201 \text{ g/cm}^2$ ($p < 0.001$), 70-79 yrs – 0.912 ± 0.169 vs. $1.117 \pm 0.195 \text{ g/cm}^2$, $p < 0.001$). In total group of women we found that TBS L_1 - L_4 was significantly higher in non-obese patients in compare to another ones ($A - 1.195 \pm 0.146$, $B - 1.153 \pm 0.175 \text{ g/cm}^2$; $p < 0.001$), especially, due to 50-59 yrs old group ($A - 1.263 \pm 0.125$; $B - 1.193 \pm 0.172$, $p < 0.001$). There was not significant differences of this index between A and B group women in other age groups. It was found significant positive correlation between BMI and BMD of lumbar spine in all groups and subgroups of patients ($p < 0.05$). Correlation between BMI and TBS L_1 - L_4 was significantly negative in total group of women ($p < 0.05$).

Conclusion: Ukrainian postmenopausal women with MS have significantly better BMD indexes of lumbar spine, but quality of bone tissue is significantly worse in compare to females without obesity.

P1056

THE INCIDENCE OF OSTEOPOROSIS AMONG PATIENTS WITH FIBROMYALGIA

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This study proposed measuring the amount of bone mineral density in patients with fibromyalgia. Fibromyalgia is manifested by pain associated with tenderness of the joints, muscles and tendons along with other subjective symptoms. The exact causes of fibromyalgia are unknown, but hormonal imbalance of cortisol and growth hormone could be the cause. In period may 2016 - September 2016 were finding 30 female persons who have been diagnosed with fibromyalgia. DXA test performed showed a T score between - 3,2 and -4,2 at patients with risk factors. Making DXA in patients with fibromyalgia is welcome to tracing and other disease associated.

P1057

A NOVEL NETWORK ANALYSIS-BASED METHOD FOR ANALYZING DRUG SWITCHING MATRICES

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Objective: Validating a novel network analysis-based method that is able to provide several statistical indices for describing drug switching patterns.

Material and Methods: To validate the network analysis-based method, data about drug switching patterns were extracted from the administrative database of Tuscany Region, within the T.A.R.Ge.T. project (Appropriate Treatment of Geriatric re-fracture in Tuscany). Moreover, data were also generated via simulation in order to have several switching configurations with similar matrices but different features.

Results: Analyses of drug switching patterns are often limited to a description of a matrix reporting the different drugs on rows and columns and the frequency of switches in each cell. Network analysis (together with graph theory) [1] can provide several tools and indices to go beyond a simple description of the switching matrix. Within this approach, each drug is considered as a node in a graph and the (possible) switch as an edge. The use of indices such as degree centrality (i.e., the number of links incident upon a node), closeness centrality (i.e., the average length of the shortest path between a node and all other nodes), betweenness centrality (i.e., the number of times a node acts as a bridge along the shortest path between two other nodes) as well as clustering algorithms such as InfoMAP [2] can be used to compare more precisely different switching matrices from a quantitative point of view. By using T.A.R.Ge.T. data and data obtained via simulation, it is possible to show the usefulness of this novel method.

Conclusions: Network analysis and graph theory represent a novel and useful method for analyzing drug switching matrices going beyond the limitations of a simple description of drug switching matrices.

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P1058

DISABLING FOOT PAIN IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objectives: Many of the patients suffering from rheumatoid arthritis are accusing also foot pain. This condition is very frequent and it is also very disabling, affecting people all ages.

The aim of this study is to follow up this group of patients and measure their function and the quality of life in everyday living.

Material and Methods: We analyzed all cases of rheumatoid arthritis from the 3rd Clinic of National Institute of Physical Medicine and Rehabilitation during 2015-2016. In this period we selected the patients suffering also from foot pain, and we included them in this clinical study. We performed physical and paraclinic examination and questionnaires concerning function and the quality of life (HAQ and AAOS-FAM).

Results: 49 patients suffering from chronic pain (32 females and 17 males), aged between 39 – 69 years old were included in the study. They all were submitted at first at the same steps regarding the evaluation, and then after the treatment the follow up was first at 2 weeks, at 3 months, then after 12 months. During this survey only 21 patients answered at the final stage of the follow-up. The treatment consisted in personalized rehabilitation program and pharmaceutical treatment. The majority of them reported that pain still affects the quality of life, but with significant improvement during this period. The improvement of function was reported as good. Statistically, 8 out of 21 patients still suffer from pain walking more than 500 m, 12/21 patients suffer from pain during the ADL, 6/21 the pain affects the quality of life and 19 out of the 21 have problems falling asleep.

Conclusion: The data resulted from this study, showed a substantial reduction in physical and professional functioning in these group of patients. Physical therapy is a common therapeutic solution used also in rheumatoid arthritis, and that has demonstrated it is efficacy. Associated with medical treatment the global results of the study were reduced pain levels with 79% and with 51% improvements in range of motion

P1059

BONE AND MINERAL DISORDERS IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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Introduction: Chronic kidney disease (CKD) causes disturbances in calcium and phosphorous homeostasis, abnormalities in acid-base and vitamin D-parathyroid hormone balances, that leads to the impairment of the structure and function of many systems such as the skeletal system, known as CKD- MBD. Disorders of mineral and bone metabolism are commonly observed in CKD are associated with increased

risk for cardiovascular calcification, morbidity and mortality, although these associations are not firmly established. Much of what is known about CKD-MBD is based on knowledge obtained in the dialysis population. Much less is known about CKD-MBD in patients with CKD not yet on dialysis. CKD changes both the quality and quantity of the bone through its multifactorial influence on bone metabolism, leading to loosing of bone mass and increased risk of fracture.

THE AIM of this study was to study the prevalence of disorders of bone and mineral metabolism, parathyroid glands function, vitamin D concentration in patients with various stages of CKD, to evaluate the frequency of disturbances of BMD and to work up the risk factors of osteoporosis in CKD patients

Methods: We analyzed data on 220 adults with CKD aged 20-61 years. 78 (35.5%) patients with CKD II-IV stages and 142 (64.5%) patients on hemodialysis (CKD VD) aged 20-61 years (mean 48,6±3,8 years). The laboratory investigations included evaluation of PTH, serum total and ionized calcium, serum phosphate, serum level of alkaline phosphatase and 25(OH)D₃ concentrations. Regression models were used to determine relationship between lumbar BMD and renal function, age, weight, height.

Results: Results CKD subjects had significantly higher concentrations of P, Ca × P product and PTH compared to the control group. The concentrations of Ca × P product and PTH were significantly higher in hemodialysis patients compared to CKD stages II-IV ones (Ca × P product 4,78±0,11 vs. 3,68 ±0,18, p<0,01, iPTH 601,28±68,45 vs. 289,10±60,48 p<0,01) There was no difference in level of 25(OH)D₃ between CKD II-IV and CKD VD patients (18,71±1,72 vs. 19,55±2,18 ng/ml, p>0,05). Analyzing the compliance with KDIGO 2009 recommended target levels it was found that all four parameters met target levels of only 11 (14,1%) patients with CKD II-IV stages and 4 (3%) CKD VD stage. Vitamin D insufficiency was found in 44.9% of CKD II-IV patients and 51,4% those with CKD VD. BMD was decreased in 55.4% CKD II-IV stages patients and in 19.1% it was lower than -2,5 T SD. In CKD VD BMD was decreased in 51,1% and in 34,0% it was lower than -2.5 T score units. It was established negative association between decreased renal function and decreased BMD (GFR correlated s with spine-BMD (r=-0,452, p<0,05, the level of serum creatinine correlated s with spine-BMD (r=-0,33, p<0,05). Duration of CKD correlated significantly with spine-BMD, (r=-0.45, p<0.05). The degree of bone demineralization was more pronounced in individuals with low body weight (in patients with CKD stages II-V: r=0,31, p=0,009; in CKD VD r=0 36, p=0,027). Values of BMD were not related to the duration and cause of CKD.

Conclusions: It has been established that dominant disorders of mineral metabolism are hypocalcemia, hyperphosphatemia, secondary hyperparathyroidism and 25 (OH) D₃ insufficiency.

Such disturbances occur in the early stages of CKD and progress with the decline of renal function, especially in hemodialysis and result in bone loss. Persons with CKD are at higher risk of low BMD relative to the age-matched general population. The risk factors of bone loss in patients with CKD are duration of CKD, female gender, older age, lower body weight. Negative association between decreased renal function and decreased BMD was established.

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P1060

PROGRESSING OF HAND OSTEOARTHRITIS DEPENDS ON SYNOVITIS

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Objectives: Significant role of inflammation at hand osteoarthritis (HOA) requires the assessment of these changes and searching of the factors influencing on the progressing of disease.

Methods: The study included 45 women 45-75 years old with the diagnosis of HOA on the criteria of ACR. 22 joints were examined at each patient: 2-5 distal and proximal interphalangeal joints, joints of the first finger and 1st carpo-metacarpal joint. The study included multilane gray-scale ultrasound investigation. The presence and severity of synovial hypertrophy and effusion followed by evaluation of the degree of synovitis was determined in the B-mode; the quantity and the sizes of osteophytes and bone erosions were evaluated in a similar way. The vascularization of synovial hypertrophy was estimated in the power Doppler ultrasound. The study was repeated after 3 years.

Results: All patients were divided into three clinical subtypes of HOA: erosive (16 women), isolated (14 women) and generalized (15 women). The average number of joints with synovitis prevailed in a group with generalized subtype was 12.6(3.7), vs. isolated subtype – 6.8(2.6), $p < 0.05$. The average number of joints with osteophytes per one patient was maximal in erosive subtype – 14.1(5.4), in comparison with the isolated subtype – 8.6 (5.2), $p < 0.05$ and generalized subtype – 11.1(4.9). After three years 10 patients with generalized subtype and 3 patients with isolated subtype turned into

erosive HOA. 5 women with isolated subtype turned into generalized HOA. The final number of women with isolated HOA was only 6 patients; generalized - 10, erosive - 29. The average number of joints with synovitis amounted 12.5(4.0) for erosive subtype vs. 6.8(3.5) for isolated subtype ($p < 0.05$) and 11.6(4.2) for generalized subtype.

Conclusions: The detection of synovitis is a prognostic adverse factor of transformation of the isolated and generalized subtypes into the erosive HOA.

P1061

THE ROLE OF PRIMARY PREVENTION OF OSTEOPOROSIS

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Measures that lead to primary prevention was risk factors - poor women, heredity, diabetes mellitus type I, rheumatoid arthritis, inflammatory bowel disease and hormonal disorders which would be responsible for decreased bone mass. Also, the risk factors that can be controlled like: smoking, physical inactivity, alcohol and corticoids. Patients who have risk factors that recommendations: calcium-rich foods, physical activity and moderate exposure to the sun.

P1062

NO EFFECT OF LONG-TERM COLA INTAKE ON QUANTITATIVE CHARACTERISTICS OF FEMORAL BONE IN MICE

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Introduction: Both, association studies in humans as well as short interventional animal experiments have shown that cola intake has negative effects on bone mineral density measured using X-ray absorptiometry. The effects of long-term cola intake on the microstructure of bones has not been experimentally evaluated yet.

Objective: To investigate the effects of long-term cola intake on quantitative characteristics of the femoral bone in mice.

Material and Methods: Adult CD-1 mice of both sexes (n=42) were randomized into control groups with ad libitum access to tap water and experimental groups with ad libitum

access to cola (decarbonated Coca cola) for 6 months. Quantitative characteristics of the compact and trabecular bone tissues were assessed at the diaphyseal midshaft and the distal epiphysis of right femurs using micro-computed tomography.

Results: Being heavier, male mice had significantly higher compact bone volume, trabecular number and bone surface ($p < 0.01$). On the contrary, bone mineral density, cortical bone thickness, trabecular thickness and their separation were significantly higher in females in comparison to male mice ($p < 0.01$). No significant differences were found between the control and cola groups of either sex in any of the measured quantitative parameters of the compact and trabecular bone tissues.

Conclusion: Morphometrical characteristics of the femoral bone were not affected by cola intake for 6 months. Our results do not support the hypothesis that long-term consumption of soft drinks induces osteopenia or osteoporosis. Besides interspecies differences a source of interpretational bias could be the use of decarbonated caffeine-containing cola despite low pH (3.3). Whether similar negative effects would be observed for the intake of other acid-containing soft drinks remains to be elucidated.

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BONE AND MINERAL DISORDERS IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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Introduction: Chronic kidney disease (CKD) causes disturbances in calcium and phosphorous homeostasis, abnormalities in acid-base and vitamin D-parathyroid hormone balances, that leads to the impairment of the structure and function of many systems such as the skeletal system, known as CKD-MBD. Disorders of mineral and bone metabolism are commonly observed in CKD are associated with increased risk for cardiovascular calcification, morbidity and mortality, although these associations are not firmly established. Much of what is known about CKD-MBD is based on knowledge obtained in the dialysis population. Much less is known about CKD-MBD in patients with CKD not yet on dialysis. CKD changes both the quality and quantity of the bone through its multifactorial influence on bone metabolism, leading to loosening of bone mass and increased risk of fracture.

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Methods: We analyzed data on 220 adults with CKD aged 20-61 years. 78 (35.5%) patients with CKD II-IV stages and 142 (64.5%) patients on hemodialysis (CKD VD) aged 20-61 years (mean 48.6 ± 3.8 years). The laboratory investigations included evaluation of PTH, serum total and ionized calcium, serum phosphate, serum level of alkaline phosphatase and $25(\text{OH})\text{D}_3$ concentrations. Regression models were used to determine relationship between lumbar BMD and renal function, age, weight, height.

Results: Results CKD subjects had significantly higher concentrations of P, $\text{Ca} \times \text{P}$ product and PTH compared to the control group. The concentrations of $\text{Ca} \times \text{P}$ product and PTH were significantly higher in hemodialysis patients compared to CKD stages II-IV ones ($\text{Ca} \times \text{P}$ product 4.78 ± 0.11 vs. 3.68 ± 0.18 , $p < 0.01$, iPTH 601.28 ± 68.45 vs. 289.10 ± 60.48 $p < 0.01$) There was no difference in level of $25(\text{OH})\text{D}_3$ between CKD II-IV and CKD VD patients (18.71 ± 1.72 vs. 19.55 ± 2.18 ng/ml, $p > 0.05$). Analyzing the compliance with KDIGO 2009 recommended target levels it was found that all four parameters met target levels of only 11 (14.1%) patients with CKD II-IV stages and 4 (3%) CKD VD stage. Vitamin D insufficiency was found in 44.9% of CKD II-IV patients and 51.4% those with CKD VD. BMD was decreased in 55.4% CKD II-IV stages patients and in 19.1% it was lower than -2.5 T SD. In CKD VD BMD was decreased in 51.1% and in 34.0% it was lower than -2.5 T score units. It was established negative association between decreased renal function and decreased BMD (GFR correlated s with spine-BMD ($r = -0.452$, $p < 0.05$, the level of serum creatinine correlated s with spine-BMD ($r = -0.33$, $p < 0.05$). Duration of CKD correlated significantly with spine-BMD, ($r = -0.45$, $p < 0.05$). The degree of bone demineralization was more pronounced in individuals with low body weight (in patients with CKD stages II-V: $r = 0.31$, $p = 0.009$; in CKD VD $r = 0.36$, $p = 0.027$). Values of BMD were not related to the duration and cause of CKD.

Conclusions: It has been established that dominant disorders of mineral metabolism are hypocalcemia, hyperphosphatemia, secondary hyperparathyroidism and $25(\text{OH})\text{D}_3$ insufficiency. Such disturbances occur in the early stages of CKD and progress with the decline of renal function, especially in hemodialysis and result in bone loss. Persons with CKD are at higher risk of low BMD relative to the age-matched general population. The risk factors of bone loss in patients with CKD are duration of CKD, female gender, older age, lower body weight. Negative association between decreased renal function and decreased BMD was established.

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P1064**EFFECTIVE MEDICAL REHABILITATION ON PATIENTS WITH OSTEOPOROSIS KYPHOSIS**S. D. Birsan¹¹Faculty of Medicine Oradea, Oradea, Romania

Kyphosis is referred to as a deviation of the spine in the sagittal plane by emphasizing the physiological curvature in the thoracic region. We conducted randomized study on the therapeutic effectiveness of the treatment recovery on a group of 15 patients with dorsal kyphosis in the osteoporosis that we have monitored 1 year. That have used methods for assessing complex based on measurements with goniometer - the test consisted as follows: an arm is applied to the spinous process T2 -T3 in dorsal kyphosis and the other arm on the spinous process T12 - L1, the patient was put to flex maximum trunk and then expand it. The evaluation was performed at 6 months. The final conclusion is that medical rehabilitation is the rule for creating the correct position through continuous self-toning paravertebral muscle group and toning abdominal and chest muscles by bringing the shoulders blades.

P1065**CAN TOPICAL TREATMENT PROVE USEFUL FOR TENOSYNOVITIC DISEASES? BETAMETHASONE VALERATE PLASTERS AND DE QUERVAIN'S TENOSYNOVITIS: A PILOT STUDY FOR A PROMISING TREATMENT**M. Evangelista¹, V. Cilli², R. De Vitis³, F. Marinangeli⁴

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Objective: De Quervain's disease refers to tenosynovitis of the first wrist's extensors (EPB and APL). Its prevalence in the general population is estimated to be 1% circa, with the peak among women aged 40 years old or more. Common treatments are NSAIDs, acetaminophen, local corticosteroid infiltration, surgery, immobilization in splints. However, in the last years, transdermal drug delivery systems have been developed, offering a number of advantages over the oral route. Betamethasone valerate 2250 mg plasters, due to the

strong inflammation combined with the anatomical superficiality of the involved structures typical of de Quervain's were expected by the authors to prove an effective and safe treatment.

Material and Methods: 10 patients visited at our service suffering from de Quervain's disease were recruited. Diagnosis was clinical and ultrasound aided. Treatment: topical application of betamethasone plaster: 1/day for 8 days, then 1/alternate days for other 8 days.

T0: clinical examination; PRWHE (Italian validated version), NRS (for spontaneous pain) scores. At T1, one month after, PGIC evaluation was added. P value assessment was also performed. Exclusion criteria: children and adolescents under 18 years old, allergies to betamethasone valerate or bulking agents, no informed consent, bacterial, fungal, viral skin infections, skin ulcers, widespread plaque psoriasis.

Results: An improvement in PRWHE and NRS score was observed in 9 of 10 patients: average PRWHE was 74 (\pm 4.0) at T0, 14,6 (\pm 21.4) at T1, $p=0.005$; average NRS passed from 7,8 (\pm 1.0) to 2,3 (\pm 2.5), $p=0.005$. Swelling of the wrist decreased in all cases at clinical examination. Only one patient did not show significant improvements in PRWHE (from 77,5 to 75,5) and NRS (from 9 to 9) scores. Average PGIC was 2.3 (great improvement).

Conclusions: Moving from this, betamethasone valerate plasters seem to be an useful alternative to more consolidated and invasive treatments for de Quervain's tenosynovitis.

P1066**ULTRASONOGRAPHIC EVALUATION OF ANTERIOR KNEE PAIN**A. A. Negm¹, M. Khairy¹, A. Hasseb¹, K. M. Abbas¹

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Objectives: The Primary outcome of the present work is to detect type and frequency of Ultrasonographic changes in patients with anterior knee pain. Secondary outcome is to determine the role of MSUS in early detection of causes of anterior knee pain (AKP).

Patients and Methods: Sixty patients with AKP and 20 sex and age matched healthy control were included in this study obtained from the outpatient of Physical Medicine and Rheumatology Department of El Hussein and Bab El - Sharia university hospitals. Inclusion criteria: age between 20-40. Exclusion criteria: Trauma, Crystal induced arthritis, connective tissue diseases (RA, SLE, SpA), chronic liver or kidney disease and previous surgery. Full medical history and clinical examination as well as WOMAC, knee Conventional Radiography and Musculoskeletal Ultrasonography (MSUS) were done to all patients. Bilateral MSUS examination of the following common sites:

Insertion of quadriceps tendon, Ligamentum patellae and Anterior aspect of the knee from medial to lateral. According to EULAR guide lines for musculoskeletal ultrasonography. (Backhaus *et al*, 2001).

Results: The mean duration of knee pain in patients group was 11.42 ± 9.134 months. ESR, CRP and WOMAC were higher in patients group ($p < 0.01$). MSUS showed significantly more frequent Supra-patellar and Infra-patellar bursitis in patients than control group ($p = 0.000$). patients had higher frequency of cartilage clarity loss ($p = 0.039$) as well as lower cartilage thickness than control, 2.28 ± 0.258 vs. 2.73 ± 0.261 mm respectively ($P = 0.000$, 95% CI: 0.31 to 0.58).

Conclusion: The degree of Knee pain, measured by WOMAC, is positively correlated with inflammatory biomarkers (ESR and CRP) in patients with Anterior knee pain. MSUS revealed a positive correlation between Femoral Articular Cartilage thickness and the periarticular tendon-thickness, namely Patellar origin, patellar insertion and Quadriceps insertion. Interestingly, our data present an evidence of the negative impact of the duration of knee pain over Femoral Articular Cartilage thickness as well as Patellar origin thickness. (FAC thickness get worse with longer duration of pain).

Reference: Backhaus, M *et al*. *Ann Rheum Dis* 2001;60:641.

P1067

NEUROPSYCHIATRIC LUPUS AND MUSCULOSKELETAL MANIFESTATIONS

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Introduction: Nervous system involvement in systemic lupus erythematosus (SLE) is a grave manifestation of the disease affecting health, quality of life and disease outcome. It is one of the most complex manifestations of SLE and may affect the central, peripheral and autonomous nervous system. Complex interrelated pathogenetic mechanisms are involved in disease pathogenesis.

Aim: To describe musculoskeletal manifestations in a patient with neuropsychiatric lupus.

Methods: A patient, female aged 50 years presented with SLE with a duration of 20 years. The diagnosis of the disease was made with intense fatigue, hair loss, a light sensitive rash, arthralgias and positive antinuclear and anti-dsDNA antibodies. In the course of the disease the patient developed CNS involvement with epileptic convulsions, permanent dysarthria and delusions. A brain MRI scan was without specific alterations, however an EEG performed was abnormal and a brain single-photon emission CT (SPECT) revealed decreased perfusion of both frontal

and parietal lobes. The patient developed a flare with fatigue, mouth ulcers, convulsions, decreased ability to concentrate, intense delusions and dysarthria. Pulse methylprednisolone i.v. followed by pulse cyclophosphamide i.v. were administered in order to achieve remission. Disease stabilization was induced by pulse cyclophosphamide at bimonthly intervals.

Results: The patient developed musculoskeletal manifestations at many stages of the disease. At diagnosis the patient had arthralgias of both wrists and knees. At disease flare when neuropsychiatric symptoms evolved she had diffuse arthralgias. When remission of the disease was induced by pulse methylprednisolone and cyclophosphamide the patient developed muscle weakness. At disease stabilization with pulse cyclophosphamide at bimonthly intervals the patient developed arthritis of the hand joints.

Conclusion: Neuropsychiatric lupus is a grave and complex manifestation of SLE. The disease may be accompanied by musculoskeletal manifestations.

P1068

THE STUDY ON BONE MINERAL DENSITY MONITORING IN PATIENTS WITH CORTISONE THERAPY

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The many uses of cortisone led doctors to introduce additional amounts of cortisone therapy to combat certain disease. This paper aims to highlight the amount of one in patients under cortisone treatment. The study group included 15 patients being treated with cortisone for at least 6 months between may - November 2016. Monitored parameters were pain by VAS, DAS28, bone mineral density (T score), quality of life - HAQ scales. The results confirm the date of literature as cortisone treatment which leads to lower bone mineral density.

P1069

BONE METABOLISM UNIT AS A MULTI-DISCIPLINARY CLINIC: OUR EXPERIENCE IN QUIRON SALUD MALAGA HOSPITAL

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Introduction: A multidisciplinary clinic has been developed to optimize the diagnosis and treatment of bone metabolism diseases. Initiated in March 2013, it is carried out

simultaneously and once a week by an Endocrinologist and a Rheumatologist.

Objective: To describe the experience of this bone metabolism unit in the last 12 months.

Material and Methods: Cross-sectional observational study. A total of 235 patients were attended from December 2015 to December 2016. In the first visit, we carried out a medical record using a checklist form and impedancemetry. We requested a blood test with bone remodeling markers (CTX-I and P1NP), vitamin D, PTH, sex hormones and 24-hour urine with calciuria and phosphaturia, densitometry and dorsum-lumbar spine x-rays. In the following visit the results were evaluated and the team formed by both specialists agreed the protocol of action. Subsequently we studied treatment tolerance and analytical, radiographic and densitometric changes.

Results: 97% were women with a mean age of 60 ± 9.7 years. Weight 66.3 ± 12.7 kg, size 158.2 ± 5.8 cm, BMI 26.6 ± 4.9 kg/m². Impedancemetry data showed that the mean lean mass was 43.0 ± 5.9 kg and the mean fat mass was 23.3 ± 10.1 kg. 36.2% and 20% of the patients had a personal and family history of fracture, respectively. 15.2% patients had taken previous corticoid treatment; 9.5% had more than 2 falls in the last year. 5.7% were active smokers. 87.4% had menopause; early menopause in 13.4% and surgical menopause in 10.7%. 60% practiced more than 3 days of physical activity per week, 78.8% sunbathed more than 10 minutes a day and 36.2% take adequate dairy milky consumption. Among the digestive antecedents, 39% had gastroesophageal reflux and 16.2% hiatus hernia. We found that 17.5% have had a vertebral fracture. In the densitometric data according to T-score they had osteoporosis 55.06%; Osteopenia 42.76% and normality 2.24%. The FRAX index was 4.3% for major fracture and 0.9% for hip fracture. Among the treatments received prior to the first consultation, 29.5% took bisphosphonates, 9.5% denosumab, 2.9% PTH. 37.5% calcium with vitamin D.

Conclusions: A high percentage of patients received treatment before coming to the clinic. The most used therapeutic group was bisphosphonates. The aggregate management by two specialists in the multidisciplinary clinic is beneficial and improves the quality of care in our patients.

P1070

A CASE OF SYSTEMIC LUPUS ERYTHEMATOSUS PRESENTING AS BILATERAL AVASCULAR NECROSIS OF FEMUR

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Case report: A 65 year old female has been referred to our clinic with right sided hip pain of sub acute onset. Her pain worsened with movement and weight bearing. On clinical

examination, she had restricted range of movement with pain and mild joint tenderness. On plain x-ray she found to have AVN of right femoral head suggested by classical crescent sign with preserved articular margins on plain film and underwent extensive evaluation for a cause. Apart from malaise, fatigability and moderately elevated erythrocyte sedimentation rate (ESR) of 36 mm in 1st h no other symptom or laboratory feature could be found. Her hemoglobin level was 83 g/L and white cell count, platelet count, C-reactive protein was normal. After 6 months she presented with a similar pain in left hip and subsequent work up revealed AVN of left femoral head as well on plain x-ray and findings were similar to the previous right sided hip joint. Her past medical history is pretty significant, she has low back pain for 3 years before her hip pain started, she has anemia, swollen legs, arrhythmia and multiple joint pain. She did not consume alcohol and was a non-smoker. She was not on any form of corticosteroid or other medications prior to the event except nutritional supplements and pain killers. There is family history, her sister died from Lupus. At the time of the second event of hip pain she underwent a comprehensive work up with involvement of a multidisciplinary specialists. In view of persistently high ESR and multiple AVN of bones, she underwent a work up for chronic infections such as tuberculosis, and for autoimmune connective tissue diseases with serological studies including antinuclear antibody (ANA), Anti Smith antibody (Sm), serum complements C3 and C4, Anti Ro and Anti La antibodies. Hematological evaluation for sickle cell disease, thrombophilic conditions including anti-cardiolipin antibodies IgG and lupus anticoagulant test, beta-2 glycoprotein 1 both IgM and IgG. She has been continuously followed up with a future plan of hip joint replacement. During the subsequent period patient revealed that she felt mild fatigability and hair loss continuously, which she considered not significant and did not report to the doctor hence further workup was not done for next 4 years. She did not take any medications except simple paracetamol for hip pains. After about 4 years of above events she reported significant hair loss, which was unusually high according to her. On further assessment she found to have isolated thrombocytopenia of less than $100,000/\text{mm}^3$ on repeated blood counts and also continuously high ESR, at times exceeding 100 mm/1st h. Patient was re-evaluated considering above developments. She had positive ANA with titer above 1:160 and a positive anti double stranded DNA (dsDNA) antibody with titre of 233 IU/mL. Both these tests were negative 3 years back. She did not report abnormality in urinalysis or neuropsychiatric manifestations of SLE. In light of above clinical manifestations and serological studies, definite diagnosis of SLE was made according to SLICC 2012 classification criteria. Her coagulation screening was repeated and was negative although beta-2 glycoprotein 1 was not repeated. Her initial presentation of bilateral AVN of femoral head 4 years back was ascertained as related to

evolving autoimmune disease, since no other etiology was evidenced. Patient was prescribed hydroxy-chloroquine and simple analgesics in her subsequent management and total hip joints replacement surgery was planned.

Discussion: AVN or osteonecrosis is caused by loss of blood supply to a part of bone leading to bone necrosis and collapse. Diverse etiologies have been described for AVN. Chronic inflammatory conditions such as SLE considered as a well known cause. In a patient of SLE, several factors can lead to bone ischemia and AVN include Raynaud's phenomenon, vasculitis, fat emboli, corticosteroids, and the antiphospholipid syndrome. Although the above patient had evidence of a chronic inflammatory disorder such as malaise and high ESR at the outset, she did not have sufficient criteria fulfilling the diagnosis of SLE or any other autoimmune disorder and she was not on any form of corticosteroid treatment. Many reviews observed that AVN often develops shortly after the onset of high-dose corticosteroid therapy. Numerous case reports and case series were reported AVN in already diagnosed SLE patients and after initiation of corticosteroid therapy, some of them reported AVN in multiple sites.

Disclosure: Written informed consent for publication of this case report and any accompanying images was obtained from the patient.

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P1071

EFFECTIVE KINETIC PHYSICAL THERAPY IN CHRONIC VENOUS INSUFFICIENCY

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Venous disorders are progressive evolution and cannot be completely prevented. The therapeutic approach is based on educating patients with bed rest with legs up higher than the rest of the body, applying stockings, lymphatic drainage and kinetic exercises Burger. Educating patients and following hygiene measures associated with the treatment of vascular limb kinetic physical therapy are the key to success with positive results in the long term.

P1072

STUDY OF POLYPHENOLS CONTENTS AND ANTIOXIDANT CAPACITY OF THE MEDICINAL PLANTS SPECIES UTILIZED IN OSTEOPOROSIS

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Objective: From the traditional Romanian medicinal plants there are many species which has proven anti-osteoporotic action. In a previous paper we have shown that the most known and used anti-osteoporotic and osteoporosis preventive medicinal plants are: *Achillea millefolium* (milfoil), *Equisetum arvense* (horsentail), *Urtica dioica* (stinging nettle) and *Hippophäe rhamnoides* (sea-buckthorn) [1]. Many epidemiologic studies in women found positive associations between total dietary flavonoid intake and bone mineral density. Flavonoids may protect against bone loss by upregulating signaling pathways that promote osteoblast function, by reducing the effects of oxidative stress or chronic low-grade inflammation [2, 3, 4].

Material and methods: We studied four species from spontaneous flora of Romania, *Achillea millefolium* (milfoil), *Equisetum arvense* (horsentail), *Urtica dioica* (stinging nettle) and *Hippophäe rhamnoides* (sea-buckthorn) in terms of polyphenols content, the total flavonoid content. Total phenolic content was determined by the Folin Ciocalteu method. The total flavonoid content was determined using a colorimetric method. Antioxidant capacity of the extracts was evaluated by the following methods: Cuprac assay, DPPH method, FRAP method [5].

Results: The amounts of total polyphenols and flavonoids found in the ethanolic extract of plants are shown in Table 1, the antioxidant capacity of samples in Table 2.

Table 1. Total polyphenols and flavonoids content

| Sample | Total polyphenolic content | Total flavonoid content |
|---|----------------------------|-------------------------|
| (mg GAE/100DW) | (mg QE/100 DW) | |
| <i>Achillea millefolium</i> (milfoil) | 97.88±0.35 | 88.17±4.56 |
| <i>Equisetum arvense</i> L. (horsentail) | 85.43±0.07 | 75.53±3.73 |
| <i>Urtica dioica</i> (stinging nettle) | 78.36±0.09 | 68.95±4.18 |
| <i>Hippophäe rhamnoides</i> (sea-buckthorn) | 93.07±0.01 | 82.66±6.13 |

Table 2. The antioxidant capacity

| Sample | FRAP (μmol Trolox equivalent/gDW) (TE) | DPPH% | Cuprac (μmol Trolox equivalent/g DW) (TE) |
|-------------------------------------|--|-------------------|---|
| Achillea millefolium (milfoil) | 85.217 \pm 0.009 | 89.20 \pm 0.023 | 52.7 \pm 0.097 |
| Equisetum arvense (horsetail) | 79.110 \pm 0.035 | 83.40 \pm 0.017 | 49.2 \pm 0.104 |
| Urtica dioica (stinging nettle) | 67.504 \pm 0.007 | 63.10 \pm 0.036 | 36.1 \pm 0.008 |
| Hippophæ rhamnoides (sea-buckthorn) | 86.560 \pm 0.115 | 85.00 \pm 0.100 | 77.3 \pm 0.105 |

Conclusions: Studied medicinal plants represent a rich sources of flavonoids and have strong antioxidant capacity. They contribute on antiosteoporotic activity or osteoporosis prevention activity of these plants. Phytotherapy in osteoporosis treatment is very important due to the absence of secondary effects and it can be used simultaneously with drug therapy.

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P1073

LOW-TRAUMA NON-VERTEBRAL FRACTURES IN UKRAINIAN POSTMENOPAUSAL WOMEN WITH OBESITY AND METABOLIC SYNDROME

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Introduction: Osteoporosis and obesity are two of the worldwide problems, which increase morbidity, disability and mortality among people. Abdominal obesity leads to the metabolic syndrome (MS) development. It was researched that components of MS have influence on bone mineral density (BMD), but data are contradictory.

Aim: To determine frequency of non-vertebral fractures in women with obesity and MS.

Methods: 590 women aged 50-79 yrs (mean age – 64.0 \pm 8.0 yrs; mean body mass index (BMI) – 29.4 \pm 5.3 kg/m², mean

duration of menopause – 14.6 \pm 8.4 yrs) were examined. The women were compared into the three groups: A – 298 women without obesity (BMI \leq 29.9 kg/m²), B – 177 patients with obesity (BMI \geq 30.0 kg/m²), C – 115 female with MS (diagnosed according to IDF criteria, 2005 yr). BMD was measured by the DXA method (Prodigy, 2005). Data were analyzed using Statistical Package 6.0.

Results: We estimated that patients without obesity have significantly lower BMD of lumbar spine (A – 0.931 \pm 0.168g/cm², B – 1.091 \pm 0.191g/cm², C – 1.082 \pm 0.190g/cm², F=55.302, p<0.001), femoral neck (A – 0.772 \pm 0.113 g/cm², B – 0.858 \pm 0.132 g/cm², C – 0.861 \pm 0.135g/cm²; F=36.797, p<0.001) and radius 33% (A – 0.688 \pm 0.123g/cm², B – 0.785 \pm 0.019g/cm², C – 0.768 \pm 0.099g/cm², F=44.122, p<0.001) in comparison with women of the groups B and C. Significant differences among BMD of the B and C group patients were absent. Non-vertebral fractures were found in 37.92% of the A group patients, 29.94% of B group women and 35.65% of the C one. The frequency of non-vertebral fractures did not differ significantly in the groups of patients A and B, A and C, B and C (χ^2 =3.107, p>0.05, χ^2 =0.182, p>0.05 and χ^2 =1.041, p>0.05, respectively).

Conclusion: Despite the fact that BMD indexes were significantly higher in women with metabolic syndrome and obesity, the frequency of non-vertebral fractures did not differ significantly in the groups of patients.

P1074

PRIMARY HYPERPARATHYROIDISM (PHPT) IMPAIRED 3D CORTICAL DENSITY AT FEMUR AS ASSESSED FROM 2D DXA

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Purpose: PHPT is characterized by a chronic hypersecretion of parathyroid hormone (PTH). This hypersecretion impacts bone remodeling process by increasing bone turnover. Cortical compartment is predominantly impacted with a thinning of cortical bone and an increased cortical porosity while contradictory effects have been observed on trabecular compartment. The purpose of the present study was to evaluate the impact of PHPT on bone cortical densities and thicknesses or volumetric trabecular density at the femur.

Methods: Caucasian Italian men and women suffering from PHPT were included between 2011 and 2015. Biochemical analysis that include serum Calcium (sCa), Vitamin D3 (VitD3), PTH 1-84 (PTH) and Phosphorus (P) were performed. Presence of fracture was also recorded. Areal BMDs were measured by dual X-ray absorptiometry using an iDXA (GE-Lunar, USA) at lumbar spine (LS) and at femur (total and neck). Cortical volumetric density or thickness as well as volumetric trabecular density were evaluated from DXA acquisition using 3D-DXA software (Galgo Medical, Spain). Relationships adjusted for age between biochemical dosages, anthropo-morphometric parameters, and bone parameters were assessed (correlations, partial correlations).

Results: 77 men and women (9/68) with a mean age of 59 \pm 13.6 years (27-82 yrs) were assessed. Mean PTH level were 157 \pm 87 pg/mL. A significant negative relationship was obtained between PTH and total volumetric cortical density (tVCD) at femur ($r=-0.25$, $p=0.029$) while no correlations were found with mean cortical thickness (mCT), volumetric trabecular density or BMDs (all $p>0.010$). This negative relationship remained after adjustment for weight and VitD3 ($r=-0.28$, $p=0.017$).

Conclusion: In this study, we observed a negative effect of the PTH level on the volumetric cortical density while no effects have been observed on the trabecular compartment. These results, using a new approach (3D-DXA), are in agreement with the literature.

P1075

AN UNUSUAL LOCALIZATION OF TUMOR INDUCED OSTEOMALACIA

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Introduction: Tumor induced osteomalacia (TIO) is an unusual clinicopathologic entity characterized by abnormal phosphate metabolism caused by tumors that secrete FGF-23, a phosphatonin. Hypophosphatemia, renal phosphate wasting and defective bone mineralization that disappear after the resection of an associated tumor. The causative tumor is often difficult to locate.

Case: We report a case of 43 year old woman with diffuse bone and muscle pain, muscle spasms, progressive weakness over two years and restriction to bed. She had marked

hypophosphatemia (1,3 mg/dL), hyperphosphaturia (TMP-GFR: 0,62 mmol/L) and elevated serum alkaline phosphatase (209 U/L) and parathyroid hormone (74 pg/ml) levels. Her serum calcium, 25 OHD levels were normal. Because of adult-onset hypophosphatemic osteomalacia we suspected TIO. Physical examination, computerized tomography and magnetic resonance imaging failed to localize the tumor. Gallium-68 (Ga-68) DOTA-TATE positron emission tomography/computed tomography (CT) revealed high density of somatostatin receptors in a 10 mm soft tissue lesion between the lateral rectus and the lateral orbital wall. Also orbital magnetic resonance imaging showed an 10x6 mm mass with regular margins, indenting lateral rectus to medial site, T1A hypointense and homogenous in postcontrast images. The tumor was resected by ophthalmologists and histologic features of completely excised lesion was consistent with a phosphaturic mesenchymal tumor with a Ki67 index <5%. Resection of tumor resulted in rapid normalization of the laboratory findings and remarkable symptomatic improvement.

Conclusion: Non-specific symptoms delay the recognition of TIO and patients may become wheelchair- or bed-bound until the correct diagnosis is made. Usually, the combination of functional and anatomical imaging is needed to localize the tumor. Successfully localization and resection of the causative tumor may cure the disease with complete resolution of symptoms. In long follow-up period, measurement of serum phosphorus level is essential to recognize the recurrent disease.

P1076

SARCOPENIA QUALITY OF LIFE QUESTIONNAIRE (SARQOL) IN SARCOPENIC PATIENTS AND OSTEOARTHRITIS OF THE HIP

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Introduction: SarQol questionnaire was recently validated as a useful tool for the clinicians to assess the well-being, physical function, psychological, social implications of sarcopenic patients.

Objective: To evaluate the quality of life of old patients (over 70 years old) with different severity grades of hip osteoarthritis (OA) and sarcopenia.

Material and Method: Study included 42 patients admitted during 2016 in the Internal Medicine Department for a flare up of their hip OA and were also diagnosed with sarcopenia (muscle weakness, low muscle mass, pathologic values in timed up and go test - more than 20 sec.) We divided them in 2 groups: patients with mild-moderate forms and patients with ankyloses of the hip. Sarqol questionnaire was used to evaluate their quality of life.

Results: Patients were aged between 70 and 85 years, with a mean age of $76,7 \pm 0,7$ years. Among them, 63% were women and 37% men. The severity of hip OA was evaluated by clinical examination and pelvic X ray. In mild-moderate group were 28 patients, while the group with ankyloses had 14 patients (some of them immobilized in bed). The SarQol questionnaire had a score between 55 -65 (mean value 60,4) in sarcopenic patients with mild-moderate OA, while the score in patients with severe OA was 47-56 (mean value 51,2). The score was lower in older people and also lower in women. Patients with ankyloses had higher values - more than 30 seconds at up-and-go test than the other group.

Conclusions: SarQol questionnaire represents a valuable method which helps clinicians from multiple specialties to have a more complex evaluation of the quality of life of sarcopenic patients, usually with comorbidities. Lower scores require more intense therapeutic interventions, to prevent the risk of institutionalisation, falls, fractures, etc. The effectiveness of therapy is reflected in increased values of SarQol test.

P1077

DISCOVERY OF A SMALL MOLECULE WNT PATHWAY INHIBITOR (SM04755) AS A POTENTIAL TOPICAL TREATMENT FOR TENDINOPATHY

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Objectives: Tendinopathy is an inflammatory, degenerative condition caused by injuries or overuse. The Wnt pathway, upregulated in tendinopathy, plays an important role in tenocyte differentiation. SM04755, a novel, small-molecule Wnt pathway inhibitor, was evaluated in preclinical studies to determine its potential to inhibit inflammation and induce tenocyte differentiation, thereby promoting tendon healing.

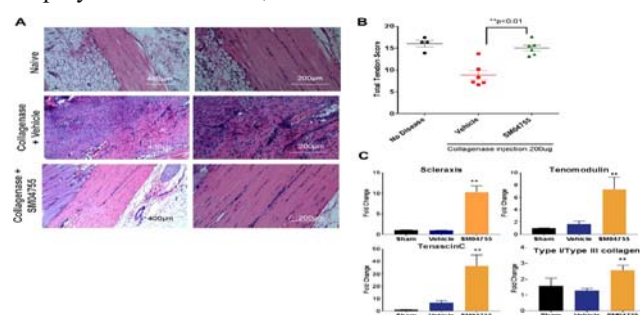
Methods: Wnt pathway inhibition was measured via cell-based reporter assay. Anti-inflammatory activity was evaluated by cytokine secretion using ELISA in lipopolysaccharides (LPS)- and anti-CD3/anti-CD28-stimulated peripheral blood mononuclear cells (PBMCs). Differentiation of human mesenchymal stem cells (hMSCs) and rat tendon derived stem cells (rTDSCs) to tenocytes was measured by immunocytochemistry for tenocyte markers scleraxis A, tenomodulin and tenascin C. Pharmacokinetics were evaluated following topical application in rats. *In vivo* efficacy of topical SM04755 was evaluated in an intra-tendon collagenase-induced rodent tendinopathy model by tendon histology, chemokine ligand 1 (CXCL1) plasma levels, tendon inflammatory markers, and tendon regeneration, by expression of tenocyte markers and Type I/Type III collagen ratio using qPCR.

Results: SM04755 was a potent ($EC_{50}=152nM$) inhibitor of Wnt signaling in hMSCs, and cytokine secretion in LPS and anti-CD3/anti-CD28 stimulated PBMCs ($EC_{50}=500nM$).

SM04755 induced expression of tenocyte markers in differentiated hMSCs and rTDSCs ($EC_{50}=200nM$). Single topical application of SM04755 resulted in tendon concentrations $>EC_{50}$ for up to 24hrs, with minimal systemic exposure or toxicity. In the intra-tendon collagenase injection-induced model, SM04755 treatment significantly increased tendon health score ($p<0.01$) (figure 1A, 1B), decreased plasma CXCL1 ($p<0.05$), reduced gene expression of pro-inflammatory markers (IL-6, TNF-a, IL-1b, INF-g, IL-8) ($p<0.05$), increased expression of tenocyte markers ($p<0.01$) (figure 1C) and improved Type I/Type III collagen ratio ($p<0.01$) in tendon compared to vehicle.

Conclusions: Topical SM04755 reduced inflammation and showed evidence of tendon regeneration compared to vehicle. SM04755 has potential as a therapeutic intervention for tendinopathy. Clinical studies are planned.

Disclosures: Deshmukh, Seo, Ibanez, Stewart, and Yazici are employees of Samumed, LLC.



SM04755 inhibited inflammation and promoted tendon healing in a rat collagenase-induced tendinopathy model

(A) Images of rat tendons stained with HandE from sham or collagenase-injected and vehicle- or SM04755 (0.3 mg/cm^2) treated rats on day 21. (B) Histological score of inflammation, linearity and density of tendon fibers, shape of tenocytes and hemorrhage for the rat tendons. Mean \pm SEM, $n=4$ sham, $n=6$ vehicle and SM04755, $**p<0.01$. (C) Expression of tenocyte markers and Type I/III collagen ratio in the tendon following sham or collagenase injection and treatment with either vehicle or SM04755 (0.3 mg/cm^2) for 21 days as measured by qRT-PCR. $n=12$, Mean \pm SEM, $**p<0.01$.

P1078

VITAMIN D AND VITAMIN D RECEPTORS IN MEN WITH ERECTILE DYSFUNCTION NON-RESPONDING TO SILDENAFIL

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The aim of our study was to assess serum vitamin D as well as vitamin D receptors (VDR) in men with erectile dysfunction (ED) non-responding to oral phosphodiesterase inhibitor (PDE-5I) sildenafil citrate. The study included 160 men that were allocated into; healthy potent men, men with ED responders to sildenafil and men with ED non-responders to sildenafil. Inclusion criteria for sildenafil non-responders were an inadequate erectile response after at least 4 attempts using the highest tolerated drug dose in accordance with manufacturer's guide-lines with respect to timing relative to meals, use of concomitant medications and adequate sexual stimulation/arousal. Exclusion criteria were; diabetes mellitus, smoking, hypertension, cardiovascular disorders, hepatic or renal failures. They were subjected to history taking, clinical examination, International Index of Erectile Function (IIEF) questionnaire, estimation of serum vitamin D by ELISA method and VDR gene expression. The results demonstrated that men with ED non-responding for sildenafil demonstrated significant decrease in IIEF questionnaire scores, mean serum vitamin D as well as serum VDR gene expression compared with healthy potent men as well as men with ED responding to oral sildenafil. Age demonstrated nonsignificant correlation with IIEF, VDR gene expression and serum vitamin D. Serum vitamin D demonstrated significant positive correlation with IIEF and VDR gene expression. Serum VDR demonstrated significant correlation with IIEF and serum vitamin D. It is concluded that men with ED non-responding to oral PDE-5Is have significant decrease in serum vitamin D as well as VDR gene expression.

P1079

FEATURES OF CONNECTIVE TISSUE METABOLISM IN CHILDREN WITH JUVENILE IDIOPATHIC ARTHRITIS

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Objectives: Due to various inflammatory mechanisms in patients with Juvenile idiopathic arthritis (JIA) early expressed metabolic disturbances of structural proteoglycans, collagen and changes of bones reabsorption occur. Its clinical manifestation includes chronic progressive erosive-destructive process and osteoporosis development.

Material and Methods: 58 patients with JIA aged from 2 to 18 years old and 28 the same aged healthy children were included to research. Investigation consisted of measurement of level glucosaminoglycans (GAGs) and chondroitin

sulphate in the blood, excretion rate of uronic acid. Statistical processing was made by program Statistica+.

Results: The much higher level of common chondroitin sulphate in children with JIA was found ($p < 0.01$), that is as an indicator of metabolic activity caused by inflammatory process in the connective tissue. In comparison with control group in investigated patients increased content of the second (chondroitin-4-sulfates and chondroitin-6-sulfates) and third (keratan sulphate and dermatan sulphate) fractions of GAGs was determined ($p < 0.05$). Depending on the gender of patients with JIA, it was established, that described above features were more common for female patients. The average level of total GAGs in girls with JIA was lower, then in boys ($p < 0.01$), while the levels of second ($p < 0.05$) and third ($p < 0.01$) fractions of GAGs were significantly higher. Changes in proteoglycans content in the blood were accompanied by higher levels of excretion of uronic acid in daily urine in female patients compared to male patients ($p < 0.01$). This redistribution of proteoglycans content is more specific for degenerative processes, such as initiation of osteoarthritis. It gives reason to believe that female gender is one of risk factors of early development of osteoarthritis against JIA. It is based on determined correlation of female gender with average level of chondroitin sulphate ($r = 0.57$; $p < 0.05$), level of total GAGs ($r = -0.56$; $p < 0.05$), the first fracture of GAGs ($r = 0.55$; $p < 0.05$), second fracture of GAGs ($r = 0.72$; $p < 0.01$) and third fracture of GAGs ($r = 0.58$; $p < 0.05$), level of excretion of uronic acids ($r = 0.62$; $p < 0.05$). Radiological progression of JIA was accompanied with redistribution of proteoglycans.

Conclusion: Results give us the reason to believe that female gender is one of risk factors of early development of osteoarthritis against JIA. It was established that radiological progression is also accompanied by a redistribution of proteoglycans.

P1080

SEXUAL DIMORPHISM OF VERTEBRAL FRACTURE RISK AND ASSOCIATIONS WITH BODY MASS INDEX: THE NEWCASTLE THOUSAND FAMILIES STUDY

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Objectives: A growing number of studies in women are challenging the traditional perception that high body mass index

(BMI) protects against fracture, with risk more likely to be determined by the higher loads to the skeleton on falling. However, further evidence is required to elucidate the relationship between BMI and vertebral fracture (VF), especially in men. This study investigated VF prevalence and BMI in 342 men and women with a mean age of 62.5 (\pm 0.6) years.

Material and Methods: Men (n=152) and women (n=190) from the Newcastle Thousand Families Study birth cohort received anthropometry and a dual energy X-ray absorptiometry (DXA) lateral vertebral assessment (LVA) scan. Deformities, detected using vertebral fracture assessment (VFA) software, were defined using the semi-quantitative Genant scale. Femoral neck bone mineral density (BMD), L1-L4 BMD and FRAX scores were also evaluated. Correlative analysis, independent samples t-tests and logistic regression models were used to explore any sex-specific predictors of VF prevalence.

Results: Men were twice as likely than women to have at least one vertebral deformity (OR 2.81, p <0.01). Additionally, higher-grade deformities (moderate and severe) were more prevalent in men (OR 3.44, p <0.01). Obesity was associated with a higher prevalence of VF in women (OR 3.32, p =0.01), and a higher prevalence of moderate and severe VF in men (OR 5.03, p <0.01). There were no associations with BMD or FRAX score.

Conclusions: We found clear evidence of sexual dimorphism in VF prevalence, although, obesity was associated with a higher likelihood of prevalent VF in both men and women. Further research is required to elucidate this relationship and future studies of VF should consider sex-specific risk factors.

P1081

DISCOVERY OF A SMALL MOLECULE WNT PATHWAY INHIBITOR (SM04690) AS A POTENTIAL TREATMENT FOR DEGENERATIVE DISC DISEASE

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Objectives: Degenerative Disc Disease (DDD), involves degeneration of intervertebral disc structure, including the nucleus pulposus (NP), annulus fibrosus (AF), and cartilage matrix. Wnt signaling plays an important role in DDD, regulating the proliferation and differentiation of resident NP cells. SM04690, a novel, small-molecule, Wnt pathway inhibitor was evaluated in preclinical studies to determine its potential to induce proliferation and differentiation of NP cells, thereby promoting disc healing.

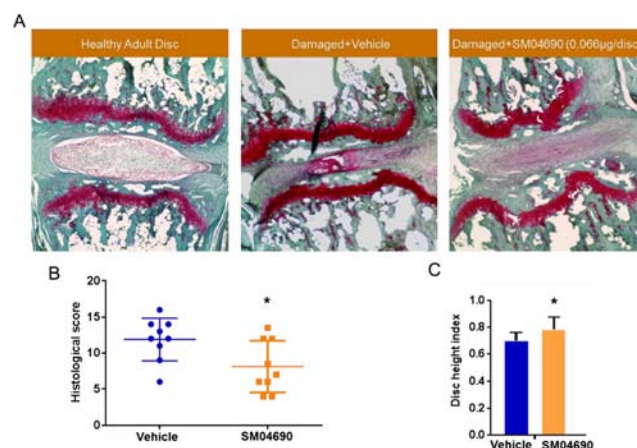
Methods: Wnt pathway inhibition was measured using a cell-based reporter assay. *In vitro* proliferation of rat NP cells was measured by cell doubling index (CDI=cell number/initial cell number/days). Differentiation of NP cells into chondrocyte-like NP cells was measured by Alcian blue staining and absorbance based quantification. Pharmacokinetics were evaluated by intradiscal injection in rats, followed by analysis of compound concentrations in the disc and plasma. *In vivo*

efficacy was evaluated in a rat coccygeal intervertebral disc needle puncture model using radiographic measurement of disc height index (DHI=disc height/vertebral height), and histological scoring of Safranin O- stained sections for AF integrity, AF and NP border, cellularity, and NP matrix.

Results: SM04690 was a potent (EC_{50} =1 nM) inhibitor of Wnt signaling. *In vitro*, SM4690 increased (p <0.05) NP cell proliferation (CDI) ~2-fold vs. vehicle and increased Alcian blue absorbance, indicating differentiation to chondrocyte-like cells (p <0.01). Single intradiscal injection of SM04690 resulted in disc concentrations $>EC_{50}$ for >180 days, with minimal systemic exposure or toxicity, measured as behavioral health, morphology and microscopic changes. In a rat DDD model, SM04690 treatment increased Safranin O-stained cartilage matrix (figure 1A), resulting in increased (p <0.05) DHI (figure 1C), and decreased (p <0.05) histology scores (figure 1B) vs. vehicle control.

Conclusion: In a rat DDD model, SM04690 regenerated NP cells, and cartilage matrix. It also improved disc height, health, and shape compared to vehicle. SM04690 has potential as a treatment for DDD.

Disclosures: Deshmukh, Barroga, Hu, KC, and Yazici are employees of Samumed, LLC



SM04690 stimulated differentiation of NP cells and improved disc height and health in a rat DDD model

(A) Representative images from intravertebral discs treated with vehicle or SM04690 8 weeks post-injury and stained with Safranin O/Fast green show less interrupted and fragmented AF, larger NP and extracellular matrix area, and more NP cells compared with vehicle treatment. (B) Histology scores at week 6 for the vehicle and SM04690-treated discs as determined by the published histological evaluation scale (C) DHI based on radiographic images at week 6 showing significantly higher %DHI with SM04690 treatment as compared to the vehicle treatment. (n=9, Mean \pm SD, * p <0.05).

P1082**ARE NSAID TARGETING TREATMENT IN CHRONIC KNEE OSTEOARTHRITIS?**E. F. Turovskaia¹, L. I. Alekseeva¹, E. G. Filatova²¹Department of Osteoarthritis and Osteoporosis in V.A. Nasonova Research Institute, Moscow, Russian Federation,²Neurological Department I.M. Sechenov First Moscow State Medical University, Moscow, Russian Federation

Introduction: Recent studies have demonstrated that chronic knee OA mechanisms besides nociceptive pain also include central sensitization(CS). CS is characterized with neuropathic(NP) phenomena spontaneous and evoked, referred hyperalgesia, mood disorder and neurophysiological changes (low pressure pain threshold). Currently, pain control in patients with OA cannot provide adequate pain relief. In 27% - 61% case NSAID are not effective.

Aim: to evaluate the efficacy of NSAID in patients with OA.

Materials and methods: 40 women (age 55±75), II-III grade by Kellgren-Lawrence with chronic knee OA were included. Patients were divided in groups in accordance with the results of neuropathic test DN4: 1)patients with positive DN4(n=11) and patients with negative DN4(n=29); in accordance with presence of spontaneous NP phenomena(for ex. burning, tingling, current rush): 2)patients with spontaneous NP phenomena(n=29) and patients without spontaneous NP phenomena. All patients received ketoprofen 100mg twice a day for 4 weeks. Dynamic of OA severity was assessed by WOMAC(mm) and pain intensity by VAS(mm).

Results: Statistical analysis showed significant reduction in pain score after treatment in patients with negative DN4 compared with patients who have signs of clinical CS(mean pain relief 26mm vs. 17 mm, p<0,05). The study revealed significant decrease of WOMAC from baseline to final evaluation in patients without spontaneous NP phenomena(mean WOMAC reduction 315 mm vs. 199 mm, p<0,05).

Conclusion: Patients with clinical signs of CS have suboptimal pain control. Therefore, one of the main ways of controlling pain should also target CNS mechanisms

P1083**THE EFFECTS OF ULTRASOUND THERAPY IN THE MIO-ARTHROPATHY OF THE TEMPOROMANDIBULAR JOINT**C. Bochis¹, C. Nistor Cseppento², L. Lazar², F. Cioara²¹Clinica Oro-Maxilo-Facială, Timisoara, Romania,²University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Introduction: The mio-arthropathy of the temporomandibular joint is a pathology which often occurs in medical practice. Clinically, the most important sign is the pain at the TM

joint, situated at the level of the muscles' insertion or in the auricular region. It can manifest as morning redor or have an acute character. The studies mention stress and cold as factors which increase the intensity of the pain. Together with the evolution of the disorder the limitation of the movement amplitude of the TM joint occurs as well. This clinical sign is accompanied by joint cracments. The movement at the TMJ level is made in three stages: 1. the rotation movement of the condyle on the meniscus round a transversal axis which crosses the centre of the condyles and corresponds to the inferior insertion of the temporomandibular ligament; (2-4 mm); 2. condylo-meniscal rotation and another one of temporo-meniscal translation, 4 cm; 3. supplementary and voluntary the translation movement forward of the meniscus and the rotation movement back of the condyle, another 2 cm, totally 6 cm.

Material and method: We conducted an observing study, of 10 days, on a group of 7 patients who visited the ambulatory surgery for medical recovery of the Emergency Clinical Hospital A Iancu Oradea between 2015-2016. We observed the evolution of the pain, using the VAS scale for pain and the TMJ mobility, after ultrasound treatment in the TM region together with specific kinetotherapy.

Results: The average age of the patients was 39.57. The VAS score decreased from the average 3.71 to 1.42. The TMJ mobility, quantified by the mouth aperture, increases from 4.78 cm to 5.28 cm.

Conclusions: The studied group was 100% made up of women, who, after the complex recovery treatment, associated with special prosthetic treatments, including mouth guards, at the second evaluation, after a 10 days' treatment presented a very low score for pain and an almost quasinormal mobility.

P1084**SHOULDER ULTRASOUND TO DISCRIMINATE STRUCTURAL LESIONS IN PATIENTS WITH FIBROMYALGIA**A. E. Musetescu¹, C. Criveanu¹, F. A. Vreju¹, A. M. Bumbea¹,S. Dinescu¹, C. Gofita¹, C. F. Palici¹, A. Rosu¹, P. L. Ciurea¹¹University of Medicine and Pharmacy, Craiova, Romania

Objective: To discriminate between the structural causes of shoulder pain in patients with fibromyalgia by using musculoskeletal ultrasound, as clinical examination lack specificity. Shoulder pain is a common condition in clinical practice with differential diagnosis being quite challenging, as well as a frequent source of pain in patients with fibromyalgia.

Material and methods: 38 patients with shoulder pain, previously diagnosed with fibromyalgia according to 2010 ACR Criteria were included in the study. Patients with recent trauma, shoulder fracture or local treatment with corticosteroids in the last 3 months were excluded. Complete physical examination and blood analysis were performed for positive diagnosis.

Ultrasound was performed by a trained rheumatologist unaware of the fibromyalgia diagnosis, using an Esaote MyLabSix equipment with a multifrequency linear probe of 6 – 18MHz. The following structures were assessed bilaterally: long head of the biceps tendon, subscapularis, supraspinatus, infraspinatus and teres minor tendons, gleno-humeral joint recess, acromioclavicular joint, subacromial subdeltoid bursa. All pathological findings were recorded regarding tendon thickness, homogeneity, calcifications, entesophytes/osteophytes, cortical irregularities, Doppler signal, and bursitis.

Results: 53 painful shoulders were found among the 76 examined. Subscapularis tendinosis was found in 45.28% of the painful shoulders, in 71.69% tendinosis of supraspinatus and 26.41% tendinosis of infraspinatus and teres minor were identified. In 39.62% osteophytes of acromioclavicular joint and in 28.3% of glenohumeral joint were found, while bursitis of the subacromial subdeltoid bursa accounted for shoulder pain in 32.07%, in patients with fibromyalgia. Tenosynovitis of the long head of the biceps tendon was diagnosed in 41.5% patients reported to painful shoulders examined, 15.09% had partial ruptures, 3.77% complete ruptures of the rotator cuff, 13.2% calcific tendinitis and 11.32% a positive test for subacromial impingement.

Conclusions: In more than 50% of the painful shoulders from patients with fibromyalgia a morphological background for shoulder pain other than a myofascial trigger painful point was identified through musculoskeletal ultrasound. Musculoskeletal ultrasound is a valuable tool in detecting the presence of shoulder pathological structural lesions such as enthesopathy, calcification, bursitis, tenosynovitis even in patients with shoulder girdle pain due to fibromyalgia.

P1085

IS THERE ANY RELATION BETWEEN FRAX AND VITAMIN D IN TERMS OF RESPONSE TO DAILY TERIPARATIDE TREATMENT?

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Background: Teriparatide, as an anabolic agent, is prescribed to treat patients at high risk of fracture. In our study we evaluated the magnitude of the response to teriparatide treatment in conjunction with FRAX risk of fracture and vitamin D level.

Methods: 15 osteoporotic postmenopausal women naïve of osteoporosis treatment or bisphosphonate pretreated were passed by FRAX risk of fracture and vitamin D level at baseline. All the patients received teriparatide 20mcg daily for at least 1 year. Changes in bone mineral density and incidence of new fractures were analyzed and interactions with efficacy of teriparatide treatment were made.

Results: the FRAX-based hip fracture probabilities ranged from 1.2-31.2%. Bone mineral density increased from baseline at 12 month in all patients (lumbar spine 12.4%, total hip 3.2%). Hazard ratios for the teriparatide response did not change significantly with increased risk probability from FRAX model or with vitamin D baseline level.

Conclusions: teriparatide response was not influenced by FRAX risk of fracture alone or in correlation with vitamin D level.

P1086

HIP AVASCULAR NECROSIS OR TRANSIENT OSTEOPOROSIS OF PREGNANCY

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Hip pain during pregnancy is a common symptom women experience. Most often is caused by postural changes and nerve compression.

Aim: To identify the cause of severe and progressive hip pain in women during pregnancy.

Methods: We present the cases of two pregnant women in the third trimester of pregnancy, 31 and 33 years old, highly educated, with a recent onset of hip pain which in short time became very intense and disabling and which was resistant to postural changes and any allowed pain medication. A detailed physical exam was performed and laboratory tests and image exam (MRI) were taken into account.

Results: No history of trauma. High level of pain 8 and 9 on Visual Analogue Scale (0-10). The physical exam revealed postural malalignment – hyperlordosis and anterior pelvic tilt, hip pain on palpation, abduction and rotation of the affected hip were limited by severe pain. No motor or sensorial deficit. After clinical exam we suspected avascular necrosis of the hip – according to medical literature and our former experience. Laboratory tests were normal. MRI revealed bone marrow edema of the femoral head which led to the diagnosis of “Transient osteoporosis of the hip”. In order to prevent a fracture, weight bearing restrictions were applied. Patients remained under medical observation.

Conclusions: Transient osteoporosis should be considered for differential diagnosis of severe hip pain during pregnancy. Early diagnosis and treatment are essential in order to prevent its complication.

P1087

OSTEOPOROSIS IN PATIENTS WITH DIABETES MELLITUS

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Introduction: Osteoporosis is a skeletal disorder characterized by decreased bone strength, deterioration of bone microarchitecture and increased risk of fractures. Diabetes is a chronic metabolic disease characterized by deficient insulin secretion which may be associated with tissue insulin resistance, resulting hyperglycemia. Hyperglycemia directly suppress osteoblast-mediated bone formation, favoring osteoclast-mediated bone resorption, and indirectly due to the accumulation of advanced glycosylation products, leading to deterioration of the quality and bone strength and increased risk of fractures.

Methods: To analyze the interaction between osteoporosis and diabetes, through a retrospective study on patients in the Department of Endocrinology in Sibiu Hospital between 2008-2015. We enrolled 140 patients. We considered two groups depending on the diagnosis of diabetes: a study group of patients with osteoporosis and diabetes that includes 70 patients and a control group of patients with osteoporosis, including 70 non-diabetic subjects. We evaluated this patients by age, gender, type of diabetes mellitus and his complications, T-DXA score and associated pathology.

Results: Osteoporosis and diabetes is more common in the age groups 60-69 years and 70-79 years. The number of patients with type 2 diabetes and T DXA score -3 is significantly increased (47 patients), compared to patients with type 1 diabetes and T-DXA SCORE -3 (3patients), also the patients with type 2 diabetes and T-DXA score <-3 is significantly increased (19 patients), compared to patients with type 1 diabetes and T DXA SCORE <-3 (1 patient). 94% from patients with diabetes mellitus were diagnosed with type 2 diabetes and 6% with type 1 diabetes. 7% of patients diagnosed with type 2 diabetes and osteoporosis, needed insulin. Diabetic retinopathy (42%) and diabetic polyneuropathy (27%) were the most common complications seen in patients with diabetes and osteoporosis. Thyroid pathology is frequently associated with osteoporosis and diabetes, hypothyroidism has an increased frequency in the study group (27 patients) compared with controls (11 patients). Patients with osteoporosis and diabetes are often associated high blood pressure (46 patients), heart failure (10 patients) and angina (30 patients).

Conclusion: This study showed that diabetes mellitus type 2 is more commonly associated with osteoporosis (T-DXA score $>-2,5$) and severe osteoporosis (T-DXA score >-3) than diabetes mellitus type 1. Also these data support the importance of evaluating on a large scale the osteoporosis in patients with diabetes mellitus.

P1088

HYPERPARATHYROIDISM DUE TO A RIGHT "THYROID" NODULE

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We present you the case of a 39 years old female that was referred to us for a large thyroid nodule of the right lobe and mild hypercalcemia in November 2016. At admission, we evaluated a hypo anabolic patient, with an enlarged right lobe of thyroid, normal heart rate and blood pressure. We found high calcemic values (12.2 mg/dl), low normal phosphorus values (2.7 mg/dl), high PTH values (432.2 pg/ml), normal 25 OH vitamin D values; normal TSH, free thyroxin, triiodothyronine, TPO and thyroglobulin antibodies, normal calcitonin values. Ultrasound of the thyroid pointed to an enlarged gland, with a mixt nodule of 4.5/2.6/2.13 cm in the right lobe; thyroid iodine uptake and thyroid scintigraphy revealed a "cold" right nodule. We scheduled a fine needle biopsy of the "right thyroid nodule" that pointed to a parathyroid nodule with high PTH values in the wash out. Because parathyroid scintigraphy was scheduled mid-January 2017 we decided to perform a CT scan of the neck and mediastinum for precise parathyroid tumor localization. This exam confirmed an enlarged right inferior parathyroid gland (4.03/3.42/2.9 cm). Ultrasound of the abdomen revealed a right kidney stone. Our patient is scheduled for a checkup in January, for DXA, parathyroid scintigraphy before surgery (February 2017). The histopathological exam will confirm a parathyroid adenoma or carcinoma.

P1089

THE ROLE OF TERIPARATIDE TO AN ORTHOPEDIC SURGEON AND ITS EFFECTIVENESS ON THE FRACTURE HEALING PROCESS

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Introduction: Despite the use of drugs for osteoporosis can prevent the risk of further fracture in 30-70% of cases, today only about 20% of patients with fragility fractures receive adequate drug therapy at discharge. This is due to several reasons: the working environment of ortho-trauma surgeons, as many orthopedic surgeons do not consider the post-fracture secondary prevention being a responsibility of their daily work; fears that treatment for osteoporosis may interfere with the healing of the fracture and cause adverse reactions or drug interactions, especially in geriatric patients undergoing medical polypharmacy; lack of knowledge about the prescription and

reimbursement criteria, availability to compile dedicated sheets, as well as lack of consideration of the cost-benefit related to the use of anti-osteoporosis drug therapy. In addition, many of these patients often present fragility fractures of the long bones, related to vertebral fractures, with delayed consolidation due to the poor bone stock quality (5-30%), that may require further surgical treatments. Teriparatide results in a rapid and greater increase in vertebral bone mineral density (BMD) and a decreased risk of vertebral and non-vertebral fractures in postmenopausal women and men with osteoporosis, providing also encouraging preclinical results in fracture healing.

Objectives: Pointing out the correct use of PTH, according to the eligibility prescription criteria, and its effectiveness on fracture healing process in fragility fractured patients with complex long bones fracture or refractures, with a high risk of delayed or nonunion.

Methods: We present several patients with severe osteoporosis who reported multiple vertebral fractures and refractures, and complex long bone fractures (Humerus AO12-C1, Femur AO31-B3, AO32-A3, AO33-A3, and Tibia AO42-B1, AO43-C3) with delayed union, who received Teriparatide.

Results: All patients healed (avg follow up 4yrs), without any systemic or local complications on the fracture site.

Conclusion: According to the latest literature data, Teriparatide confirmed, in our clinical series, to improve and accelerate fracture healing and enhance bone formation, even in fragility fractures with a high risk of delayed or nonunion.

P1090

PREVALENCE OF HYPOVITAMINOSIS D IN ADULTS WITH SYSTEMIC LUPUS ERYTHEMATOUS AND RELATIONSHIP WITH SLEDAI-2K COMPONENTS IN PATIENTS ATTENDED IN TWO RHEUMATOLOGY SERVICES, BOGOTA 2016

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Objective: To establish the prevalence of hypovitaminosis D in patients with Systemic lupus erythematosus in Bogotá and the factors that contribute to this condition.

Methodology: A cross-sectional study will be conducted with patients treated at the Rheumatology Services of the Juan N. Corpas Clinic (CJNC) and the Institute of Autoimmune Diseases (IDEARG S.A.S.). A sample size of 70 patients, 95% CI and 5% margin of error were calculated with the EPIDAT statistical package. Patients older than 18 years of age who meet at least 4 of the 11 American College of Rheumatology criteria, 1997, for the diagnosis of SLE (1), who wish to participate in the study, will be included. Patients hospitalized in the Intensive Care / Intermediate Care Unit will be excluded from renal replacement therapy,

pregnancy / lactation and hyperparathyroidism. In a first stage, a form with the recent paraclinics that the patient counts will be started or new ones will be requested as required to calculate SLEDAI-2K and verify levels of 25-hydroxy-vitamin D; In a second stage will complete the completion of the form with the report of requested paraclinics. Patients with Lupus Nephritis will be analyzed independently. The primary outcome variable is the prevalence of hypovitaminosis D in patients with SLE and the secondary outcome variable is the relationship between vitamin D levels or levels and the total score or SLEDAI-2K disaggregated components.

Expected results: we expect to find a high prevalence of hypovitaminosis d in patients with systemic lupus erythematosus in the Latin American population as it has already been identified in Europe and North America

P1091

THE POTENTIAL BENEFITS OF THE ORTHOGIATRIC PREVENTION SERVICE

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Introduction: A gap exists between the evidence-based recommendations and the real-world management of persons at high risk for fractures (1,2). The effectiveness of outpatient orthogeriatric service for the prevention of re-fractures is unknown.

Materials and methods: older persons discharged from an orthopedic ward were assessed within 40 days from the index fracture. Patients underwent clinical assessment and standardized questionnaires by a multidisciplinary team. They receive indications for falls and fracture prevention, and 6-, 12- and 24-month follow-up for adverse events.

Results: 197 persons (78% women and 22% men), mean age 84+3.8 years, were evaluated and these reflect 32% of those discharged from orthopedic ward. Before index fracture, 52% were functionally independent in the Activity of Daily Living (ADL > 5), while 36% in the Instrumental Activity of Daily Living (IADL > 5). At time of orthogeriatric assessment, 40% were cognitively intact (MMSE>24), and 38% had diagnosis of dementia, mainly mild dementia, 79% were on vitamin D and calcium supplements and 5% were on anti-fracture drugs.

After orthogeriatric assessment, 100% had indication for vitamin D and calcium supplements, 67% for the most suitable anti-fracture drug treatment, 40% receive recommendations for appropriate drug treatment of comorbidities, and 80% indications for fall prevention.

Conclusions: The ortho-geriatric outpatient service is a model of care for the management of hip fracture and frail older persons. The effectiveness of this model for the prevention of falls and fractures is under investigation.

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P1092

TRABECULAR BONE SCORE NOT USEFUL IN ELDERLY SWEDISH WOMEN?

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Objective: Trabecular bone score (TBS) has in several different populations been shown to add further predictive information over that obtained from BMD and FRAX alone. Sweden and the other Nordic countries have the highest incidence of fragility fractures worldwide. There are however no studies published on the value of TBS in those populations. The objective of this study was to assess the effect on predictive ability of adding TBS to FRAX.

Material and Methods: Population based cohort study of 342 Swedish women aged 69-79 at inclusion followed for 10 years. The study had a 94% power to detect a difference in mean TBS of 0.06, the difference found in the Manitoba cohort presented in a study by Hans and colleagues in 2011.

Results: During a mean time of follow up of 9.2 years 20% had at least one a major osteoporotic fracture and about half of those were hip fractures (incidence 11%). The median FRAX risk for major osteoporotic fractures was 22% and 10% for hip fractures. Unexpectedly, after adjusting for all risk factors included in FRAX, TBS had no significant relation to neither the risk of major osteoporotic fractures ($p=0.101$) nor of hip fractures ($p=0.215$). After excluding 37 participants who's vertebral BMD could not be assessed because of suspected vertebral fractures or other artefacts according to recommendations of the International Society of Bone Densitometry (ISCD), the p-values were lower but still non-significant. For major osteoporotic fractures the p-value was 0.151 and for hip fractures $p=0.057$. When the median FRAX risk of major osteoporotic fractures, 22%, was used to divide the

population into a high- and a low-risk group, adding TBS to FRAX resulted in a net reclassification index of -0.033 (-0.107 – 0.177).

Conclusions: TBS might be of less value in high-risk populations and that the predictive value of TBS may be improved by applying the criteria for valid vertebral BMD-assessments issued by ISCD, even for TBS analyses.

P1093

A DATA LINKAGE STUDY EXAMINING EMERGENCY DEPARTMENT RE-PRESENTATIONS AMONG OLDER ADULTS HOSPITALISED WITH OSTEOPOROTIC FRACTURES

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Objective: This study examined rates of re-presentation to hospital emergency departments (with or without admission) and mortality among older adults presenting to hospital with osteoporotic fractures, including patient and clinical factors associated with risk of emergency re-presentation (within 2 years) and post-discharge mortality.

Materials and Methods: Linked emergency department and hospital admission records (2009-14) for adults aged >65 years, who presented to public or private emergency departments in Queensland (Australia) with osteoporotic fractures were identified using ICD-10 diagnosis codes. Demographic and clinical characteristics, hospital re-presentation (within 2 years post-discharge) and mortality rates were described. Cox proportional hazards model was used to evaluate patient and clinical factors associated with risk of hospital re-presentations and mortality.

Results: 12,224 unique patients (70% female, mean (SD) age 81(8)) with emergency department presentations for osteoporotic fractures were identified from 153 hospitals. 7,155 patients (59%) were readmitted at least once and $n=5,895$ (48%) had died (censored at 2015). Hip fractures ($n=2,705$, 14%) were the most common reason for subsequent emergency department presentations followed by cardiovascular diseases ($n=1,289$, 7%) and head trauma ($n=798$, 4%). At the emergency re-presentations, approximately half were discharged without admission to hospital ($n=6,477$, 52%). The Cox proportional hazards model indicated (HR; 95%CI, p-value): age at index admission (0.93; 0.89, 0.96, $p<0.001$), longer length of stay (1.01; 1.00, 1.01, $p<0.001$),

and a range of comorbidities including myocardial infarction, peripheral vascular disease, congestive heart failure, and dementia (all $p < 0.05$) were associated with risk of ED re-presentation within 2 years. Age (1.38; 1.33, 1.42, $p < 0.001$), longer length of stay (1.01; 1.00, 1.01, $p < 0.001$) male gender (0.82; 0.76, 0.88, $p < 0.001$), as well as dementia, COPD, diabetes, presence of metastatic cancer (all $p < 0.05$) at their index hospitalisation were associated with post-discharge mortality.

Conclusion: This study was novel in reporting findings not only for hospital re-admissions, but also emergency re-presentations to ED (without admission) and mortality rates, which were high.

P1094

DISCRIMINATIVE POWER OF ROMANIAN VERSION OF SARQOL QUESTIONNAIRE: PRELIMINARY RESULTS

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Introduction: SarQol (Sarcopenia Quality of Life) is the first disease-specific questionnaire for sarcopenia and has been developed and validated, initially in French language followed a year later in English. Recently we provided a translated and culturally adapted version of the original SarQol questionnaire in Romanian language.

Objective: This study addressed the need to evaluate the discriminative power of the Romanian SarQol questionnaire.

Material and Methods: The sample size included 46 volunteers of both sexes, 65 years old or above who completed the Romanian SarQol questionnaire. To assess muscle strength we used a hand dynamometer; the Cut off values suggested by EWGSOP were used: a muscle strength < 20 kg for women and < 30 kg for men assessed.

Results: Mean age was 71.71 years \pm 9.02. Gender distribution: 36 female volunteers (78%) and 10 male volunteers (22%). Among subjects with positive Handgrip Test ($n = 23$), mean SarQol scores were significantly lower compared with individuals ($n = 23$) with Handgrip test below the mentioned cut-off values (60.2 \pm 20.2 vs. 81.2 \pm 14.2, $p = 0.0002$).

Conclusion: In our study, subjects with a positive Handgrip Test reported a reduced global quality of life compared to those with a negative Handgrip Test. We found also a good, positive, statistically significant correlation between SarQol Mean scores and hand grip strength.

P1095

3D OPTICAL SCANS FOR ASSESSMENT SARCOPENIA, OBESITY, AND OSTEOPENIA

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Of all markers of functional decline, the most intuitive is decline in body lean mass and body shape. Tools to accurately access and monitor change in lean appendicular muscle mass, fat mass, and bone density are typically expensive and difficult to access for regular clinical visits (i.e. DXA).

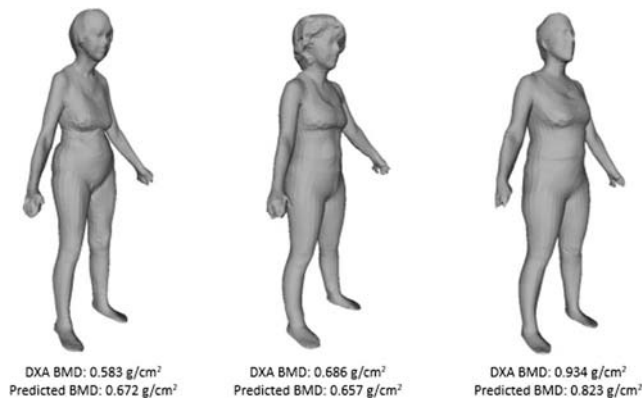
Objectives: Our long term goal of the Shape Up! Skeletal Health Study is to provide phenotype descriptors of skeletal health using body shape, and provide the tools to visualize and quantify body shape in research, clinical practice, and personal health assessment. In this study we investigate the rapid technological developments in inexpensive, fast 3-dimensional (3D) optical whole body scanning to characterize high-fall risk body shape phenotypes related to lean, fat, and bone status.

Methods: To date, we have recruited a pilot population of 60 women of slightly younger women (age = 59 \pm 8 years, BMI = 26 \pm 6 kg/m²). Each participant received a total body, spine, and femur DXA and whole body 3D optical image. The optical images are represented as a high resolution mesh of over 7,000 nodes. The images were spatially registered using 75 fiducial marks manually placed by a trained reader. After registration, variance in the node positions was described using principal component analysis (PCA) to generate modes of variation. The PCA modes were associated to body composition measures from DXA using simple linear regression to generate optically-derived body composition estimates related to appendicular lean mass index (sarcopenia), femur neck BMD (osteosarcopenia), fat mass index (sarcopenic obesity).

Results: We found that 11 PCA modes captured 95% of the body shape variation. Seven PCA modes described 87% of the variance ($R^2 = 0.87$) in ALMI, and nine modes described 98% of the variance ($R^2 = 0.98$) in FMI. One PCA mode was highly significant to BMD at the femur total, neck and spine ($P < 0.005$), and two modes explained 35% of the variance of femur neck BMD. Using the PCA modes and the prediction equations, avatars were created for specific measures of ALMI, FMI, and BMD. Figure 1 shows representations of ALMI at the (mean - 3 standard deviations), mean, and (mean + 3 standard deviations).

Conclusions: We conclude that body composition and bone density estimates from 3D whole body optical scanning are accurate to DXA-derived measures. 3D optical cameras may be an inexpensive non-invasive method for classifying

populations into at-risk categories of sarcopenia, obesity, and osteopenia.



P1096

DIETARY INTAKE OF CALCIUM AND VITAMIN D: CORRELATION WITH BIOCHEMICAL AND NUTRITIONAL STATUS

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Objectives: To assess calcium and vitamin D status in a rheumatic outpatient setting. To characterize the calcium and vitamin D food ingestion and its relation with BMI and serum levels of 25(OH)D and calcium.

Material and Methods: Observational, transversal, retrospective study including rheumatic outpatients with at least one 25-hydroxyvitamin D serum determination. Data ascertained included gender, age, body mass index (BMI), oral supplementation on calcium and vitamin D and their serum levels. Dietary ingestion was assessed by food frequency questionnaire (fish, egg, meat, milk, yogurt and cheese) applying a software with an algorithm for calcium (mg) and vitamin D (μg) daily ingestion quantification.¹ Statistics: Mann-Whitney, Kruskal-Wallis, ANOVA, Chi-Squared tests and Spearman's correlation; $p < 0.05$. Software: SPSS 17.

Results: 91 patients were included, 91.2% female, mean age 62.6 ± 13.7 years; 45.1% were < 65 years old. Mean BMI was $25.5 \pm 3.9 \text{ kg/m}^2$, 48.4% overweight (BMI > 25). Mean calcium was 9.36 mg/dL ; daily calcium ingestion was $996 \pm 393 \text{ mg}$; 76.9% patients with $\text{Ca} < 1200 \text{ mg}$ and 57.1% $\text{Ca} < 1000 \text{ mg/d}$. Mean vitamin D was $30.2 \pm 21.9 \mu\text{g/L}$; 61.5% patients had vitamin D levels under $30 \mu\text{g/L}$ and 35.2% under $20 \mu\text{g/L}$. Daily mean dietetic vitamin D was $4.1 \pm 1.7 \mu\text{g}$, with no relation to serum levels of calcium or 25(OH)D. We compared vitamin D in normal BMI vs. obese patients and found significant differences of 25(OH)D levels, higher in normal weight patients, in the 65-87 years subgroup ($p = 0.037$). Vitamin D levels were positively correlated to age ($p < 0.05$). Obese patients revealed

significant lower ingestion of dietetic vitamin D ($p = 0.002$). There were no significant differences in oral supplemented patient group vs. non-supplementation of vitamin D. There was no correlation between dietetic and serum levels of vitamin D or calcium.

Conclusions: In this study, vitamin D levels $< 30 \mu\text{g/L}$ were found in nearly 2/3 of patients and 3/4 revealed calcium intake $< 1200 \text{ mg/d}$. There was a tendency for higher vitamin D levels in elderly patients, which may be related to previous supplementation. There was a significant negative correlation between 25(OH)D levels and BMI, consistent with literature. We could not find any relationship between 25(OH)D levels, dietary intake of calcium or vitamin D.

A potential bias is the fact rheumatologists request vitamin D dosing in patients with risk factors/clinical features of hypovitaminosis D. Another potential bias is the previous use of supplements.

P1097

THE CONNECTION BETWEEN DIASTASIS RECTI ABDOMINIS EVOLUTION AND LOW-BACK PAIN FROM CHILDBIRTH TO 6 MONTHS POSTPARTUM

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Diastasis recti abdominis is a common condition that affects many women during childbearing and in postpartum period and represent the midline separation of the rectus abdominis muscles along the linea alba. There is poor knowledge on prevalence, risk factors for development of this condition. Later, suck weakness influence the biomechanical posture causing back pain.

The aim of this study is to see if women with DRA who started exercise program after delivery had a comparable reduction of back pain at 6 month postpartum.

We realized a retrospective study of 43 women (27 with C section delivery and 16 with vaginal delivery) with low back pain and DRA in the late pregnancy period which started a rehabilitation program after delivery (postural training, stretching, isometric contraction of the transverse abdominis, resistance training, education). All patients were similar in ethnicity, full term deliveries and with no comorbidities. DRA was measured in the postpartum period using clinical examination at the anterior sheath of the rectus abdominis, in the region above the umbilical scar. Low back pain was quantified using VAS scale.

At each level of measurement, the results were statistically analyzed using Student-t which showed that both group (C-section delivery and vaginal delivery) exhibited significant improvement ($p < 0.05$) in the reduction of diastasis abdominis. There wasn't found any significant differences in pre-

pregnancy body mass index (BMI), weight gain, child birth weight or type of delivery. Women with DRA at 6 month postpartum are more likely to report low back pain than women without DRA at this moment.

The limitation of the study is the relatively small number of the patients and a lack of the longer follow-up period. Also it must be mentioned that it is not a multicenter study.

References:

1. Benjamin DR et al. *Physiotherapy* 2014;100:1.
2. Pascoal AG et al. *Physiotherapy* 2014;100:344.

P1098

COLLAGEN OF MEDIAL MENISCUS RESISTS ACL TRANSECTION TRAUMA IN OA MODEL DIFFERENTLY FROM ARTICULAR CARTILAGE

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Objective: This study aimed to evaluate the biochemical alterations of the articular cartilage matrix and meniscus in the onset of knee osteoarthritis (OA) in rabbits, using the OA transection model of anterior cruciate ligament (ACL).

Methods: Three groups of animals were used: ACL transection (ACLT), Sham (S), and control (C). The animals of the ACLT and S groups were submitted to surgical intervention. All animals from ACLT and S groups were anesthetized. The ACL from ACLT group was broken while the ACL from S group was sustained intact. After surgery, the animals received intramuscular injection of 10% ketofen for 72 hours. The animals were euthanized by anesthetic deepening after 7 days of follow-up. Then, the left knee was removed to articular cartilage and medial menisci analysis. The medial menisci and cartilage of the femur, tibia, and patella were scraped from the bone and stored in an -80°C freezer. Total Proteins and glycosaminoglycan sulfate (GAGs) were extracted from the cartilage and were quantified using colorimetric methods, the dimethylidimethylene blue. Absorbance was measured at 595 nm. The components of GAGs were dosed by agarose gel electrophoresis. Total collagens from cartilage and medial meniscus were quantified by hydroxyproline, and the absorbance measured at 550nm per spectrophotometer.

Results: The cartilage from C group presented more GAGs per mg of dry tissue than S group ($p < 0.05$). For hydroxyproline, the ACLT group presented higher total collagen concentration per mg of dry tissue in the articular cartilage than C groups ($p < 0.01$). There were no differences between the groups in the total collagen concentration and in the GAGs concentrations per mg of dry tissue of the medial meniscus.

Conclusion: The results pointed that the meniscus resists trauma facing the rupture of the anterior cruciate ligament during

the first week especially in relation to collagen rupture; Unlike GAGs that break and expose the cartilage. Therefore, clinical proposals should be predicted to protect the breakdown of GAGs in the acute phase of knee trauma.

P1099

CALCIFICATIONS IN DERMATOMYOSITIS: A CLINICAL CASE WITH AN ALTERATION OF PHOSPHATE HOMEOSTASIS, CARRIER OF A NEW FGF23 GENE MUTATION

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Objectives: The periarticular calcinosis of the soft tissues is a unique but not rare radiographic finding. The Tumoral Calcinosis (TC) is a rare genetic disorder characterized by periarticular cystic and solid tumorals calcifications. The gene coding FGF23, its cofactor Klotho or GALNT3, are involved in the regulation of phosphate homeostasis and mutations of these genes are responsible of the pathogenesis of TC. However, the dystrophic calcification, may mimics TC, occurring in either a localized or generalized pattern, and results from an underlying inflammatory process and is found in patients with normal serum chemistry levels. Dermatomyositis (DM) is one of the diseases where calcification may be present. Both juvenile and adult forms of DM have been described. The disease may present at any age with a bimodal distribution of patients under the age of 18 and between the ages of 45 and 65 is most common. Females are more commonly affected than males. Dystrophic calcinosis is seen in up to 30% of patients with DM and is characterized by normal calcium and phosphate levels in serum and appears as a result of local tissue damage. In the present study we described a Caucasian 67 yrs old women affected by DM with Raynoud syndrome. She presented to our attention with left and right arms, buttocks and peri-sternal calcifications. The laboratory tests showed serum Pi of 4.6 mg/dL (n.v.:2.5-4.5) Urine Phosphate 228 mg/24 h (530-850), high bone resorption marker deossipiridinoline and normal bone formation marker bone alkaline phosphatase. Patient showed and inappropriate levels of 1-25(OH)₂ D₃ (48,1pg/mL; v.n.:16-65) and low levels of 25 OH D (19.9 ng/ml; sufficient: 30-100). Due to the presence of these finding we decided to perform a genetic analysis of FGF23.

Material and Methods: DNA was extracted from peripheral blood by automatic method. The 3 FGF23 exons, including the intron-exon boundary regions, were PCR-amplified and

analyzed on ABI Prism 3130 Genetic Analyzer (Applied Biosystems, Foster City, CA. Primer sequences were as follows: exon 2for ATCAATCCAGGGAGGTTTCA; exon 2rev GGAAACAGGTCACCAGGTA; exon 1for GGGGTCTT TGCACCTTCTTTC; exon 1rev GGTTGGATTAGCCC TCCAGT; exon 3for AGGAGGAGCTGGGGAGTG and exon 3rev GACCTGGTCCTTGGGAAGA. PCR was performed with 1.5 mM magnesium chloride, 0.2 mM deoxynucleotide triphosphates, 0.2 μ M of each primer, 1 U of Taq polymerase and 100 ng of genomic DNA as template (with T annealing 58 and 60°C).

Results: DNA analysis shows a C insertion in the intronic region between -36 and -37 nucleotide close to the exon 2 (rs3832879: IVS-36insC) and a new variant at codon 108 exon 3 (TTC>TTT Phe>Phe) not so far described in the literature.

Conclusions: Finally, we described a case of calcinosis in a patient with DM and alteration of phosphate homeostasis with a new mutation of FGF23 gene. Understanding the functional significance and molecular physiology of this novel mutation can reveal critical information regarding the role of FGF-23 in states of normal and of disorder of phosphate homeostasis and in patients with DM.

P1100

REPRODUCIBILITY OF BONE MINERAL DENSITY AND TRABECULAR BONE SCORE WITH DIFFERENT SCAN MODES ON PHANTOM: THE EFFECT OF A FICTITIOUS SOFT-TISSUE INCREASE
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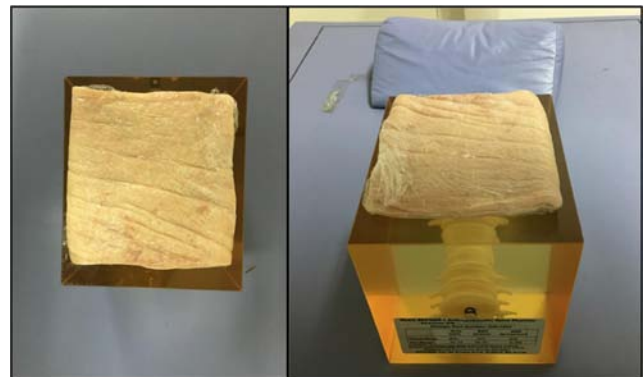
Objective: Trabecular Bone Score (TBS) is a textural score that provides an indirect index of trabecular microarchitecture from lumbar spine (LS) dual energy x-ray absorptiometry (DXA). TBS mean values have been reported to be negatively influenced by body mass index (BMI), due to the increased thickness of superimposed soft tissue. In this phantom study we evaluated the effect of a fictitious increase of soft tissue thickness on TBS and bone mineral density (BMD) reproducibility (REP).

Material and Methods: An Hologic spine phantom was scanned with a QDR-Discovery W Hologic densitometer. Fresh pork rind layers of 5mm were used to simulate the in-vivo soft tissues. For each scan mode [fast array (FA), array, high definition (HD)] 25 scans were consecutively performed, without phantom repositioning, at 0 (no

layers), 1 and 3cm of thickness. The coefficient of variation (CoV) was calculated as the ratio between standard deviation and mean; % least significant change (LSC%) as $2.77 \times \text{CoV}$; REP as the complement to 100% of LSC%. BMD unit: g/cm², TBS is unitless. Data are provided as mean \pm standard deviation.

Results: REP at 0cm: 99.0%-99.4% (BMD), 98.2%-98.8% (TBS). REP at 3-cm: 98.7%-98.9% (BMD), 97.4-98.2% (TBS). The difference in terms of REP decrease between BMD and TBS was comparable at 0 and 3 cm of soft-tissue thickness (-0,8 at 0 cm, -0,7 at 3 cm). Both BMD and TBS significantly decreased with increasing soft tissue, but the reduction was more pronounced for TBS. The greatest difference for BMD and TBS was found at FA: BMD=0.987 \pm 0.010 (0cm) - 0.980 \pm 0,013 (3cm), difference of -0,007 (-0.67%, p<0.001); TBS=1.420 \pm 0.026 (0cm) - 1.337 \pm 0.024 (3cm), difference of -0.083 (-6,17%, p<0.001). BMD mean differences between 0-3 cm were always lower than BMD LSC, while TBS mean differences were always higher than TBS LSC.

Conclusions: TBS REP was overall lower compared to BMD REP. There was a comparable decrease between BMD REP and TBS REP whit increasing soft-tissue layers. Both BMD and TBS are negatively influenced by increased soft tissue thickness, but only TBS variations exceed the LSC. Thus, for an identical bone quality, TBS may be lower in patients with high BMI.



P1101

VITAMIN D SUPPLEMENTATION WITH CALCIDIOL AND CHOLECALCIFEROL AMONG OLDEST-OLD PERSONS

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Introduction: Increasing evidence shows that calcidiol increases more rapidly vitamin D plasma levels, as well as decrease more rapidly PTHi, with positive effects on inflammation and muscle performance (1).

Materials and methods: prospective observational study among community-dwelling men and women, aged 75 years and older, consecutively admitted to the acute care ward of a geriatric department. Participants had hypovitaminosis D, underwent vitamin D supplementation with calcidiol or cholecalciferol, and blood sampling to measure plasma levels of 25(OH)D, 1-25(OH)D and PTHi during the short-term in-hospital stay and up to 6-months in the ambulatory follow-up.

Results: 33 persons were on cholecalciferol and 34 were on calcidiol, mean age 82.63 ± 5.42 , with median 25(OH)D at baseline equal to $7.39(9.04)$ and $7.40(9.92)$ ng/ml, respectively. During hospital stay (mean length of stay 12.5 ± 3.2 days) we found similar increase of 25(OH)D, 1-25(OH) and PTHi plasma levels among both groups. At 3 and 6-month evaluations, persons taking calcidiol had slightly higher increase in 25(OH)D, with slightly decrease in PTHi plasma levels than those on cholecalciferol. There were no statistical changes in calcium plasma levels among both groups.

Conclusions: vitamin D supplementation based on calcidiol has effectiveness and safety profile similar to that of cholecalciferol among oldest-old persons in a real world observational study.

Reference: 1. Meyer O et al. *Osteoporos Int* 2015;26:373.

P1102

ASSOCIATION OF ERECTILE DYSFUNCTION AND OSTEOPOROSIS IN EGYPTIAN PATIENTS

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The aim of this study was to investigate the occurrence of Osteoporosis in males with Erectile Dysfunction (ED). Forty ED patients and 40 controls with normal sexual function were included in the present study. The erectile function of all males was evaluated by the Arabic validated form of the International Index of Erectile Function-5 questionnaire (IIEF-5). Bone mineral density (BMD) measurement for Osteoporosis was done to all men using Dual Energy X-ray Absorptiometry (DXA). Statistical analysis was done. Results showed a significantly higher occurrence of Osteoporosis in ED patients as compared to controls with normal erectile function. In conclusion, males with ED should be evaluated for the presence of Osteoporosis.

P1103

A NEW MUTATION ON VDR FOR HEREDITARY VITAMIN D RESISTANT RICKETS

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Objective: Hereditary vitamin D resistant rickets (HVDRR) is an autosomal recessive disease caused by mutations in vitamin D receptor (VDR). We described two siblings with likely pathogenetic mutation in Intron 7 c.905+1 G>A in the VDR that results in HVDRR.

Material and Methods: Informed consent was obtained from patients and their parents. Leukocytes were cultured from whole blood cells. Intron 7 of the VDR gene was amplified by PCR and sequenced at the protein and nucleic acid facility.

Results: Patient's clinical history; 22 year-old-man attended to our clinic for routine control of HVDRR. Alopecia, curves on his waist and leg were presented at the first year of his life. He was gotten suspicious about HVDRR with reduced serum calcium, elevated alkaline phosphatase level, ruling out nutritional vitamin D deficiency and 1α -hydroxylase deficiency. Treatment with vitamin d, calcium and phosphorous were started. At the age of eight the treatment was changed as calcitriol and calcium lactate. His sister was also diagnosed with HVDRR when she was one month old. She was presented with alopecia. Bone scans revealed rickets. Due to her brother was HVDRR she was started calcitriol and calcium lactate treatment. Their parents were intermarriage. Alopecia was determined on his scalp and whole body. Yellowish milia on the xerotic base of face, upper and lower extremities were established. Postinflammatory millimetric hyperpigmented areas were determined. Serum calcium, phosphorous and vitamin D3 levels were in normal range under the therapy. Genetic study of the patient revealed with homozygous mutation on Intron 7 c.905+1 G>A. We also determined homozygous mutation on Intron 7 c.905+1 G>A on his sister.

Conclusion: We described a likely pathogenetic homozygous mutation in the VDR. The findings of this study support heterozygous parents. We could not find this mutation on the literature. This can be described as a new mutation in VDR for HVDRR patients.

P1104

BENEFITS OF USING DYNAMIC TAPE IN ANKLE SPRAIN REHABILITATION PROGRAM

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Objectives: Ankle sprains represent highly prevalent pathology, with risk of recurrence. Consequently, there are a significant number of research reports examining strategies for treating and preventing acute and recurrent sprains (otherwise known as chronic ankle instability). Worldwide, approximately one ankle sprain occurs per 10,000 person-days, an estimated two million acute ankle sprains occur each year in the United States.

Dynamic tape is a biomechanical tape that stretches 4-ways with strong elastic resistance and recoil of variable degrees that absorbs and injects force to reduce the workload on the body. The aim of this study is to assess the effects of using dynamic tape in the rehabilitation program of patients with ankle sprain.

Material and method: We assessed a group of patients (32) with ankle sprains (grade 1 and 2) who were treated in our clinic over a period of 2 months; they were usually evaluated in our clinic for the first time 2 weeks after the acute injury. Patients treated with cast immobilization were excluded. After clinical and functional evaluation, we obtained informed consent for treatment and divided the patients in 2 subgroups for the rehabilitation program. The first group (15) received kinetotherapy and electrotherapy and the second group of patients (17) received electro- kinetotherapy and additional application of dynamic tape.

The rehabilitation program consisted in the application of high frequency streams and specific kinetotherapy program for 10 days. In the second group, Dynamic tape was applied on the first and sixth day of treatment. We evaluated pain using the VAS scale (days 1,5,10). For functional evaluation we used the FAAM questionnaire (days 1 and 10). We performed another evaluation 4 weeks after the completion of the treatment.

Results: In the first group average VAS=7,26 at day 1, VAS=4,6 at day 10 and VAS=2,66 at 4 weeks. In the second group average VAS=7,47 at day 1, VAS=4,17 at day 10 and VAS=2,05 at 4 weeks. Average FAAM evaluation was 47% at day 1, 73% at 10 days, 87% at 4 weeks in the first group. Average FAAM evaluation was 44% at day 1, 76% at 10 days, 91% at 4 weeks in the second group.

Conclusions: In the group treated with dynamic tape we observed better improvement in the activities that require stability of the ankle. These conclusions can sustain the use of dynamic tape in the treatment of ankle sprain, especially for the improvement of joint stability (ankle sprain frequently recurs).

P1105

AGING ISSUES IMPACT ON SPINAL CORD INJURY
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Background: Continued development and progress in terms of technology, especially medicine, so the emergency, modern surgical techniques and rehabilitation medicine have made new meanings in the life expectancy and quality of life in patients after spinal cord injury. In the past, hope for life after a spinal lesion was burdened by multiple complications that led to a drastic shortening in life expectancy of these patients. Currently, the survival of many decades after spinal cord injury is no longer an exception but a rule. This confronts us with more and more cases of patients living in wheelchair for many years and which require our special attention. The idea that the patient's organism that lives in a wheelchair after a spinal lesion, remains an open premature aging and faster deterioration of different organs and systems based on the finding in these patients.

Objective: Analysis of complex consequences of medullary lesions on the physiological process of aging, the effects on life expectancy and quality of life of patients living a long time in wheelchairs.

Material and method: They were taken 40 patients into retrospective, observational study, patients after spinal injury, all hospitalized and treated in Rehabilitation Hospital Felix in the last 3 years. The patients were: 17.5% female, 82.5% male, 67.5% paraplegics, quadriplegics 32.5%, the main criterion for admission being the time since the injury, more than or equal to 5 years. We analyzed the lot in terms of the impact that life in a wheelchair had on different organs and systems, quantifying complications and disorders in musculoskeletal, respiratory, gastrointestinal, urinary, dermatological, cardiovascular, endocrine, neurological dysfunction, early aging, social reinsertion social issues, life expectancy and quality of life (QoL).

Results and conclusions: They were noted as the most common causes of damage to the overall health of these patients, lesions sores type IV, urinary infections followed by fragility fractures and neuropathic pain.

P1106

ASSESSMENT OF WALKING DEFICIT INTO ARTHROSIS HIP

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Objectives: The present study aimed to assess the impact on the course of hip osteoarthritis and the quality of life and comparing the values obtained from the test drive with the initial assessment and after finishing medical rehabilitation therapy.

Material and Methods: We conducted a prospective observational study on 55 patients with osteoarthritis secondary

primitive stage II radiological hospitalized in Medical Rehabilitation Felix in the period January 2016 - June 2016. Patients were divided into two groups Group I 29 patients with osteoarthritis primitive and group II 26 patients with osteoarthritis secondary. Each patient had a record of study that included, besides demographics, quality of life using the questionnaire MOS-SF 36 (Health Survey) and the impact on functional capacity and hence on walking - highlighted by walk test conducted BTS device G walk.

The average age of the batches was 59.63 ± 10.63 years, males being in proportion of 60%.

Results: Average score MOS - SF36 Health Survey is a moderate impairment of quality of life, in primitive and secondary osteoarthritis cases with radiological stage II. Assessment of gait phases using BTS G walk in patients with osteoarthritis of the hip disclose material changes thereof. Cases with osteoarthritis of the hip variables studied media test drive investigated were changed more or less, except static phase which shows normal right foot.

Conclusions: In this study using clinical evaluation by SF-36 questionnaire and walk test performed with the computerized BTS G WALK device, draws attention on the impact of radiologic stage II hip osteoarthritis on the functional capacity on quality of life in patients suffering from hip osteoarthritis, compelling early diagnosis and rehabilitation therapy in patients predisposed to hip osteoarthritis.

P1107

CONCOMITANT PATHOLOGIES AND VITAMIN D LEVEL IN ELDERLY PATIENTS WITH FRAGILITY FRACTURES FROM THE REPUBLIC OF MOLDOVA

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Background: Aging is accompanied by a reduction in muscle mass and muscle strength. Vitamin D deficiency is associated with muscle weakness, slow movements and is common in elderly people.

Aim: To evaluate concomitant pathologies and vitamin D level in elderly patients with fragility fractures.

Materials and methods: The study included 40 patients aged over 65 years old, mean age 73.77 ± 1.13 y.o. with fragility

fractures after a fall from the proper height admitted to the department of emergency medicine (group I) and 125 patients aged over 65 years old with mean age 71.5 ± 1.1 without falls in background admitted to the department of gerontology (group II) during October - December 2016. Patients with risk factors for secondary osteoporosis were excluded from the study. Both groups were identical by age and sex. We analyzed concomitant pathologies and tested vitamin D level with both groups.

Results: We determined the presence of most common concomitant pathologies in both groups and attested the following: arterial hypertension 87,5%, vs. 85,9%, coronary artery disease (CAD) 52,69% vs. 32% ($p < 0,05$), diabetes mellitus type 2 in 22,5% vs. 21,6%, patients after stroke 20% vs. 22,4%, radiculopathies 22,5% vs. 19,2%, obstructive chronic bronchopneumopathy 12% vs. 8%. 94% of patients in our study had suboptimal vitamin D level, mean $23,4 \pm 0,5$ ng/ml. Testing of vitamin D level in group I found mean level $18,6 \pm 0,9$ ng/ml and in group II $28,4 \pm 0,7$ ng/ml, $p < 0,05$. Lower vitamin D level positively correlated with the presence of CAD, $r = 0,58$ ($p < 0,05$).

Conclusions: Almost all the patients in the study had suboptimal vitamin D level. Elderly patients with fragility fracture have lower vitamin D level what can have a negative influence on the risk of falls. Lower vitamin D level in the group of study correlated positively with the presence of CAD.

P1108

THE ROLE OF ROBOTIC WALKING ASSIST THERAPY IN PATIENTS WITH INCOMPLETE SPINAL CORD INJURY

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Purpose: The purpose of the study was to investigate the therapeutic efficacy of the Lokomat robotic gait training device in patients with spinal cord injury and physical-kinetic therapy in the Medical Rehabilitation Hospital Felix.

Material and Methods: We included 18 patients in the study Medical Rehabilitation Hospital of Felix during January to March 2016. Patients were selected based on the diagnosis of incomplete spinal cord injury. Each patient had a record of study that included, besides demographics, and clinical data obtained with the aid of specific assessment scales (FIM ASIA Scale, Barthel Scale) and evaluation Lokomat.

Results: In the study group of predominantly male rate of 89%, the average age was 39 years, all patients underwent incomplete lesions of the spinal cord, in terms of the level of trauma predominates the thorax with 55%, followed by lumbar 28% and 17% of cervical. Nine (50%) patients from all the

patients taken in the study, benefited of robotic therapy, 78% had positive developments; 22% of them are still at the initial stage. At the end of the period all cases were able to travel at the same time a longer distance. 89% of them walking longer distances than in the first session and gradually increasing in speed. All patients were able to increase the body weight support force by the guidance was 95% to 100%, one patient having guiding force 90%. Functional independence, investigated the FIM is severely impaired in 40% of cases studied, they require help from a person both self-service transfers and to walk, moderate to others 40% - requiring partial help, and almost independent 20%. Performance of activities of daily life are affected in patients with incomplete spinal injuries TVM from 2/3 study group needing assistance from a person.

Conclusions: Patients who received a 14 days of Lokomat therapy have succeeded to undergo the same time a longer distance after therapy. The decrease in spasticity in patients with spinal cord injury is one of the reasons why walking assisted by Lokomat is achieved with greater speed and force to support its own weight increases. We can say that Lokomat therapy was a success, helping patients with spinal cord injury to be more optimistic in order to recover medical and be one step closer to a life as independent.

P1110

OSTEOPATHIA STRIATA WITH CRANIAL SCLEROSIS IN ONE TWIN

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Background: Osteopathia striata with cranial sclerosis (OS-CS) is a rare skeletal dysplasia characterized by longitudinal striations of the long bone diaphyses and sclerosis of the cranial vault and base. OS-CS is an X-linked dominant condition. This conditions, in combination with a sex ratio in favor of females and an increased morbidity and mortality in males. Patients can be asymptomatic or present with typical facial dysmorphism, sensory defects, internal organs anomalies, growth and mental retardation, depending on the severity of the disease.

Results: Here, we present the case of two twins 42 year old woman and man. Woman initially evaluated for heel pain and pain in the both hips. Her physical examination was normal. All laboratory parameters were in the normal range. Radiographs of the humerus, radius, femur, tibia and fibula revealed longitudinal striations. X-rays of the skull showed osteosclerosis, especially of the vault. Cervical and dorsal spine, as well as ribs also showed sclerosis. Lumbar spine and pelvis showed sclerosis and longitudinal striations. X-rays of the feet showed spina tendinis Achillis bilateralis. Bone mineral density (BMD)

showed osteopetrosis (spine T-score/Z-score was +6.1/+6.0 and hip +5.1/ +5.2). Her twin brother had a normal skeleton. His spine BMD was -0.3 and hip BMD was -0.7.

Conclusion: We present a case of OS-CS discovered incidentally in a young woman studied for clinical manifestations unrelated to this disease. OS-CS is not a serious disease, although it is often associated with other kinds of disorders and extraskelatal malformations that can affect the prognosis. The diagnosis was confirmed by X-rays examination showing typical longitudinal striation.

P1111

NEUROLOGICAL MANIFESTATIONS OF THE PATIENTS WITH SJÖGREN'S SYNDROME

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Introduction: Sjögren's syndrome is a rare immunological disorder, primary or secondary, characterized by chronicle lymphocyte infiltration of the exocrine glands, tissues or organs. This disorder can be associated with some other disorders: rheumatoid arthritis, systemic erythematous lupus, polymyositis, dermatomyositis or scleroderma. Human body is frequently the target of the external aggressions like viruses, bacteria, allergens, toxic substances, that can negatively influence it. Even worst is when the body's protection cells fight against the body itself or against its tissues due to not recognizing them as being part of the body. There are major differences between different patients. The implication of the central and peripheral nervous system into this disorder is proven by different other studies. Peripheral neurological symptoms are weakening of the body muscles and it seems to be related with the lymphocyte infiltrations of the small blood vessels that supply the peripheral nerves. Frequent of psychological symptoms that were reported are cognitive and memory disorders, depression and anxiety.

Material and methods: We retrospectively reviewed patients with Sjögren's syndrome, known in database of rheumatology department of Pelican hospital Oradea, in the last 5 years. Of the 38 patients with this immunological disease, only 2 patients had peripheral neurologic impairment. Because symptoms can overlap and coexist even with manifestations of other diseases, Sjögren's syndrome diagnosis can be made sometimes difficult. Peripheral neurologic impairment is unusual and controversial and is characterized by the occurrence of peripheral neuropathy secondary inflammation of blood vessels witch supplying the nerves in proportion variable between 0-60% of cases. Systemic damage generally occurs between 5 and 15 years after the first manifestations of the disease, and neuropathy and muscle wasting secondary is present in about 20% of cases.

Conclusions: The evolution of Sjögren's syndrome is unexpected, different from patient to patient, and the peripheral neurologic

impairment may be difficult to differentiate from other neurological entities. The patients who were evaluated and have shown neurological and muscles disorders, like polyneuropathy of the hands and feet, myalgia, myopathy, were few compared to the number of cases in the given timeframe, likely due to polymorphic symptoms and diagnostic difficulties.

P1112

ULTRASOUND CHANGES IN FEMORAL HYALINE CARTILAGE OF THE OSTEOARTHRITIS PATIENTS

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Background: Management of osteoarthritis (OA) has evolved lately, in part due probably to new pharmacological and physical therapies that act on cartilage and bone and part because of the new imaging techniques that can depict earlier changes in the joints and tendons.

Objectives: To evaluate, by ultrasonography (US), the femoral hyaline cartilage of the patients with OA, in the three compartments: medial and lateral condyle and intercondylar area and to find if there is a correlation with clinical findings for each.

Methods: Eighteen patients with mild knee OA (disease duration <2 years and low changes in knee conventional radiography) were included in the study and they underwent clinical and biological evaluation, including HAQ, WOMAC. The US evaluation included anterior scan, with the knee fully flexed, in transverse scan, but with longitudinal confirmation. The cartilage was identified as the hypochoic line superficial to hyperechoic bone cortical line.

Results: The loss of cartilage was clearly higher in the medial compartment, especially compared to central, intercondylar area. Thus, the cartilage thickness was statistically significant higher in the central area (1.944±0.68) compared to medial condyle (1.50±0.46, p=0.0037). We found no significant difference between the intercondylar area, compared to lateral one, with only a tendency for the cartilage to be thicker in (1.944±0.68 vs. 1.708±0.53, p=0.127). There is no difference between the dominant and non-dominant knee as both in general cartilage thickness, but in the specific compartment too. There is a high correlation between overall cartilage thickness (r=0.98) and functional impairment of the patients, except in the medial compartment (r=0.12). It seems that the disability index is more correlated with cartilage thickness in the dominant knee (r=0.82).

Conclusions: This study reveals that the US might be an important tool in the evaluation of OA patients in daily practice and that the medial compartment is the compartment with the most important loss of cartilage. In the same time, we can speculate that the patients might report disability depending on dominant knee changes.

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P1113

SIMULTANEOUS BILATERAL ACUTE FEMORAL OSTEOMYELITIS: A CASE REPORT

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Introduction and Objective: The simultaneous presentation of osteomyelitis in more than one bone is very unusual and is commonly accompanied by a severe chronic disease. Even in such cases, other conditions that usually arise in the long bones of patients must be ruled out such as immunodeficiencies. Acute hematogenous osteomyelitis is the most common type of bone infection. It arises characteristically in the metaphysis of long bones, such as the femur, tibia, and humerus (1). Surgery followed by antibiotic therapy is a suitable approach for patients who do not respond to parenteral antibiotics (1). The simultaneous involvement of two or more bones has rarely been reported in the literature. When it does occur, it is usually accompanied by an underlying chronic disease, such as sickle cell anemia (2). In this report, we present a case of osteomyelitis with bilateral femoral involvement that developed in a man with an acute lymphoblastic leukemia.

Material And Methods: Case report of a 48-year-old man presented to our institution with a complaint of pain, swelling, and redness in both legs. He suffered multiple complications of the chemotherapy such as sepsis due to *Pseudomonas* because of the central catheter. We could see a purulent arthrocentesis in both knees and the MR revealed a bilateral osteomyelitis on both distal femurs. The patient received intravenous antibiotics. The recommended duration of antibiotic therapy is 4 to 8 weeks (3). The infection healed after several surgical curettages and antibiotic impregnated allograft incorporation in the joint (imipenem, amikacin and colistin).

Results and Conclusions: The simultaneous presentation of osteomyelitis in more than one bone is rare and is commonly accompanied by a chronic disease. Early diagnosis, appropriate antibiotic therapy, and timely surgical intervention all increase the chance of a successful outcome for these patients.

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P1114**AN OVERVIEW OF THE ETIOLOGY, CLINICAL MANIFESTATIONS, MANAGEMENT STRATEGIES AND COMPLICATIONS OF HYPOPARATHYROIDISM FROM THE CANADIAN NATIONAL HYPOPARATHYROIDISM REGISTRY**

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The Canadian National Hypoparathyroidism Registry was formed in 2014 and enrolment began following approval by McMaster University Ethics Review Board.

Objectives:

- identify the etiology and presenting symptoms of patients with hypoPTH.
 - evaluate current treatment practice in Canada.
- assess differences in presentation based on etiology of the disease.
- compare parameters of calcium homeostasis amongst those developing complications of nephrolithiasis or nephrocalcinosis vs. those without complications.
 - assess fracture risk in Canadian patients with hypoPTH.

Material and Methods: 91 patients aged >18 years registered in the Canadian National Hypoparathyroidism Registry were reviewed as per the following inclusion criteria:

1. Chronic HypoPTH (low PTH in the presence of low serum calcium for at least 6 months prior to enrolment)
2. HypoPTH requiring calcium/calcitriol replacement to maintain normal calcium level for at least 6 months prior to enrolment
3. Post-surgical HypoPTH currently treated with calcium/calcitriol supplements in order to maintain a low normal calcium level for at least 6 months prior to enrolment.

Patients with Pseudohypoparathyroidism were included. We reviewed etiology, clinical presentation, biochemical profile, management strategies, markers of skeletal health including fractures, bone mineral density (BMD), fracture risk and complications including nephrolithiasis/nephrocalcinosis, and basal ganglia calcification.

Results: Most patients (62/91) had postsurgical hypoparathyroidism, followed by idiopathic/autoimmune disease (26/91) and pseudohypoparathyroidism (3/91). The mean age of onset was 41.1 years. Almost all patients were receiving calcium supplements (91.2%) with calcitriol being used by 89% and 3 patients were receiving parathyroid hormone. Complications were reviewed (nephrolithiasis or nephrocalcinosis) and were present in 26.6% of treated patients despite a mean calcium phosphate product <4.4 mmol²/L².

Basal Ganglia calcification was present in 30% of the patients reviewed.

Hospitalization had been required in 40.7% of the patients.

Conclusion:

1. HypoPTH is associated with a significant disease burden and leads to hospitalization in a large number of patients.
2. Renal complications were present in 26.6% of treated patients despite maintenance of a calcium phosphate product in the desired range (<4.4 mmol²/L²). The ideal calcium phosphate product needs to be reconsidered.
3. Fracture risk was low in the absence of traditional osteoporosis risk factors.

P1115**MUSCULOSKELETAL SYSTEM MORBIDITIES IN ROMANIA**

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Objectives: In Romania morbidity patterns have undergone significant changes in the past decades through the higher prevalence of chronic diseases in the elderly population.

Thus in the 1970s, the predominant class of diseases were the digestive, respiratory and infectious diseases, which decreased over time, since they are kept under control nowadays, through specific measures. An increasing trend in the last decades is observed in endocrine, nutritional and metabolic diseases (+ 44% average increase per decade), circulatory diseases (+ 31%), tumors (+ 30%), mental disorders (+ 25%) and musculoskeletal system (+25%). The study aimed to analyze the incidence of musculoskeletal system disorders in Romania.

Materials and Methods: In studying the general morbidities indicators of incidence and newly registered cases were used, the data are based on INSP- CNSISP, Annual Health statistics 2014. The analysed period was 1970-2014.

Results: In 1970 there were 269291 newly registered cases of musculoskeletal system disorders, while in 2014, there were

1302469 of cases, representing 1.8% of the total number of newly registered cases, and 2014 this percentage increased to 8.87%. In the study period, the highest reported number of cases were in 2012 (1377755). In Romania the specific incidence of diseases (per 100 000 inhabitants) shows the following values: 1329‰ (1970), 6868,1‰ (2012) and 6542,3‰ (2014). These diseases are in the 4th place nowadays after pulmonary diseases, gastrointestinal diseases, neurological diseases and sensory diseases.

In 1970, the number of discharged patients from these diseases were 136000 (3.3%), in 2009 - 284008 (5.9%) and in 2014 - 248466 (6.7%). The discharged patients from the hospital per 1000 inhabitants (frequency of discharged patients) represented 6.5‰ (1970), 13.9‰ (2009) si 12.5‰ (2014).

Conclusion: Musculoskeletal system diseases morbidities between 1970-2014 has registered a constant increase without significant differences from year to year. However, in the last 45 years, the number of cases has increased significantly (+ 25% average increase per decade).

P1116

DETERMINANTS OF MSDS RELATED PAIN IN TUNISIAN NURSES

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Objectives: Work related musculoskeletal disorders (MSD) are a common health problem and an increasing cause of disability, especially among hospital staff. The aim of the present study was to assess the determinants of musculoskeletal disorders related pain in Tunisian healthcare workers.

Methods: This is a cross-sectional study conducted in a sample of 293 healthcare workers representative of 1181, based on a comprehensive questionnaire about socio-professional characteristics, the NORDIC questionnaire commonly used to screen for MSDs by occupational physicians, an 8-item work capacity evaluation (WAI) and on the SF8 health survey for the quality of life.

Results: Fifty one% (51.2%) of our participants complained about an MSD related pain. The occurrence of the MSD in healthcare workers was in relationship with the increase of the duration of household work ($p < 10^{-3}$), with the mental ($p < 10^{-3}$) and physical ($p < 10^{-3}$) decline of quality of life scores and the work ability index decline ($p < 10^{-3}$). The final model of binary logistic regression was made of the duration of household work ($p < 10^{-3}$, OR=1.04, CI=[1.02 - 1.05]), the physical quality of life ($p = 0.001$, OR=0.9, CI=[0.91 - 0.97]) and the work ability index ($p < 10^{-3}$, OR=0.89, CI=[0.85 - 0.94]).

Conclusion: According to our results, occupational preventive majors should be implemented to reduce long exposure to risky physical postures leading to MSD. The management of the duration of household work is also a compulsory determinant in preventing the occurrence of MSDs in healthcare workers. Based on these measures, we can prevent premature aging by MSD-related pain and the decline of physical quality of life.

P1117

FRACTURE AND DEMENTIA: FROM EPIDEMIOLOGICAL TO BIOLOGICAL CONNECTIONS

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Cognitive decline, dementia, and fragility fractures are devastating conditions afflicting the elderly, that result in disability, reduced independence, and considerable burden to patients, caregivers, and the healthcare system.

The incidence of Alzheimer disease (AD) and fragility fractures increases exponentially after age 70. Some estimates indicate that one-third of adults in their ninth decade will be diagnosed with either dementia or AD, and that by the ninth decade, one-third of women and one-sixth of men will fracture a hip.

The number of affected individuals continues to rise, especially in developing countries. This trend has become an urgent public health challenge with growing medical, social, emotional, and economic consequences. It is apparent that the incidence of hip fracture and dementia will pose a healthcare challenge in the decades to come.

Additionally, several studies indicate an increased fall risk among AD patients. This has been attributed to progressive loss of memory and cognitive function, the generalized weakness associated with sarcopenia, and alterations in posture, gait, and stability seen in the advanced stages of AD. Tangled connections exist between brain and bone. Several hormones and cytokines have been identified as mediators of the complex pathophysiological pathways, as well as integrated central and peripheral neurological networks. Ultimately, evidence shows that vitamin D supplementation may be useful for brain disease prevention.

We aim to review the relationship between cognitive impairment, dementia and both osteopenia and fragility fractures by highlighting some biological connections between bone and brain metabolism. In addition, we will focus on the interplay of antifracture and antidementia treatment options on brain functions and bone mass and quality.

P1118**FRAILTY SYNDROME AND FRACTURE RISK IN ELDERLY PATIENTS FROM THE REPUBLIC OF MOLDOVA**

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Aim: To evaluate the presence of frailty syndrome and fracture risk in elderly patients from the Republic of Moldova.

Materials and methods: The study included 156 elderly patients aged over 65 y.o. admitted consecutively to the Department of Gerontology during September – December 2016. Frailty syndrome was evaluated by Rockwood stages. Fracture risk was calculated using FRAX score.

Results: In the group of study predominated females 76,92% vs. males 23,07%. Mean age constituted 76,44 ±1,12 y.o. We determined that elderly non-frail patients constituted 26,92%, slightly frail elderly patients made 32,05%, moderately frail were 23,71% and severe frailty was found in 17,30% of patients. We determined that medium value of FRAX score in non-frailty patients constituted 12±0,1, and this was lower in comparison with the patients with frailty syndrome. Thus elderly patients slightly frail had value of FRAX score 14±0,2, moderately frailty patients showed FRAX score 22,0±0,1 and patients with severe frailty syndrome had FRAX score of 23,2±0,2.

We have determined that the presence of frailty syndrome correlated with age of patients, the number of concomitant pathologies. Severity of frailty syndrome correlated positively with the risk of osteoporotic fracture by FRAX, $r=0,64$, ($p<0,05$).

Conclusions: Frailty syndrome is a common in elderly. It correlates positively with increased age, the presence of concomitant pathologies and risk of osteoporotic fractures.

P1119**EFFECTIVENESS AND SAFETY OF VISCOSUPPLEMENTATION ADMINISTERED AS SINGLE INJECTION IN THE TREATMENT OF SYMPTOMATIC KNEE OA**

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Objectives: To investigate the clinical effectiveness and safety of a new crosslinked viscosupplement administered as single injection to patients with symptomatic knee OA.

Materials and Methods: 30 patients (16 women, 14 men) from two clinical sites in Germany were recruited and clinically followed over a period of 6 months post injection. As study design a non interventional study (NIS) was chosen. The administered single shot viscosupplement was a medical class III device consisting of 3,3% crosslinked hyaluronic acid of non animal origin. Clinical evaluations to follow the symptomatic status of patients and the safety of the product were done within 1 day, 1 month, 3 months and 6 months post treatment. Lequesne Index (LI), Visual Analogue Scale (VAS) and the Western Ontario McMaster Universities (WOMAC) Osteoarthritis Index were the main parameters to evaluate the status of OA symptoms.

Results: Viscosupplementation with a single injection resulted in a significant improvement of symptomatic knee OA based on LI. This result was supported by evaluation of VAS and WOMAC, which showed decreased severity of OA symptoms as well. Local adverse events common to application of hyaluronic acid were at the same level compared to viscosupplementation applied as 3-5 injection treatment. No systemic adverse reactions were observed.

Conclusion: These NIS results are encouraging to apply this "single shot" viscosupplement in patients with knee OA and to continue with larger numbers of patients and a prospective controlled study design.

P1120**ASSESSMENT OF THE LEVEL OF KNOWLEDGE REGARDING OSTEOPOROSIS AND ITS PREVENTION METHODS**

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Objectives: One of the priorities of health policy in the field of osteoporosis is the use of telecommunication technologies that facilitate the spread of information among the population about ways to prevent osteoporosis. The study aimed to analyze the level of knowledge about osteoporosis and its prevention methods.

Material and Methods: A questionnaire with 15 items was used to evaluate whether people know this disease and its prevention possibilities. 423 women were included in the study, aged between 45-75 years, from urban area, highly and middle educated, between March 2015 - September 2016.

Results: After processing the questionnaires, 15% of women do not know this disease and have never heard of osteoporosis, 58% can not specify the nature of osteoporosis, 76% do not know the risk factors for the disease, 12% are diagnosed

with this condition and 8% are following treatment for osteoporosis. Regarding the prevention methods: 40% do not know any prevention method, 18% know the names of medications and drugs, 52% nutrition, 26% physical exercises, 29% have discussed about it with their physician and 15% have been screened for osteoporosis. The main source of information was the mass media 36% and 23% General Practitioners.

Conclusion: The level of knowledge of the investigated group on osteoporosis, is quite low, in terms of knowledge of risk factors and prevention methods. It is needed to increase the activities regarding health care education. Regarding the content of the health care education activities, they should start with information and continue with the second stage which is the breakthrough of information by inducing a correct, hygienic-sanitary aware of those people who are receiving health education.

P1121

BONE MINERAL DENSITY CHANGE IN CHILDREN WITH OBESITY

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Aim: To evaluate bone mineral density (BMD) and its relationship with calcium (Ca) and phosphorus (P) metabolism in children with obesity.

Methods: We examined 92 children in the University Hospital (Minsk) from 2011 to 2015 yrs. Body composition with evaluating of mineral component were made by dual energy X-ray absorptiometry with the calculation of feet, hands, ribs, hips BMD (g/cm²), Z-test. All children were divided into 2 groups: group1 – children with obesity (n=72, boys(B)/girls(G)=47/25, age 15,24±2,02 yrs, weight 96,8±22,5 kg, height 1,71±0,1, BMI 32,7±5,3 kg/m²; group2 – normal – weight control (n=20, B/G=9/11, 15,08±2,47 yrs (p=0,3), 52,3±11,6 kg (p=0,0001), 1,63±0,1 cm (p=0,04), 19,4±2,4 kg/m² (p=0,0001)).

Results: Legs BMD were increased in boys with obesity (0,94±0,11 g/cm² vs. 1,13±0,17 g/cm² (p=0,03)) compared to control group without significant differences in G (1,29±0,12 g/cm² vs. 1,23±0,02 g/cm² (p=0,5)). Ribs BMD were higher in group1 children compared to group2 (B 0,72±0,08 g/cm² vs. 0,59±0,06 g/cm² (p=0,02); G 0,71±0,05 g/cm² vs. 0,65±0,06 g/cm² (p=0,05)). There were no significant differences in hand BMD (G 0,87±0,10 g/cm² vs. 0,85±0,13 g/cm² (p=0,836); B 0,93±0,14 g/cm² vs. 0,85±0,15 g/cm² (p=0,360)); pelvis (G 1,22±0,13 g/cm² vs. 0,98±0,14 g/cm² (p=0,12); B 1,19±0,15 g/cm² vs. 1,04±0,21 g/cm² (p=0,09)); total (G 1,18±0,09 g/cm² vs. 1,11±0,13 g/cm² (p=0,29); B 1,17±0,13 g/cm² vs. 1,06±0,14 g/cm² (p=0,21)) in obese children compared to control. A significant increase in Ca levels were in obese B

compared to control (2,48±0,07 vs. 2,41±0,001 mmol/l (p=0,001)) with no difference in G 1,23±0,22 vs. 0,95±0,64 mmol/l (p=0,78); B 1,32±0,27 vs. 1,30±0,18 mmol/l (p=0,85)), and AIP (G 108,06±26,66 vs. 85,13±65,64 IU/l (p=0,46); B 217,93±57,24 vs. 157,27±26,41 IU/l (p=0,68) in two groups. We found that AIP were correlated with BMI levels (r_s=0,9, p=0,04) and legs BMD (r_p=0,9, p=0,04) in G with obesity. A direct correlation of feet BMD and Ca (r_s=1,0, p=0,05); Ca and spine BMD (r_s=1,0, p=0,05) were found in group 1B.

Conclusions: A significant increase in ribs and legs BMD, Ca levels were found in children with obesity compared to normal weight control.

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PULSED ELECTROMAGNETIC FIELDS MODULATE SCLEROSTIN LEVELS IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

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Objective: Pulsed electromagnetic field (PEMF) could promote in vivo and in vitro osteogenesis and enhance bone healing with unknown mechanism. Aim of our study was to evaluate the circulating canonical Wnt signaling antagonists sclerostin and DKK-1 in a setting of Caucasian women with postmenopausal osteoporosis receiving PEMFs.

Materials and Methods: 30 participants with sufficient vitamin D and no other diseases were recruited and randomized into two groups. PEMFs group received PEMFs treatment by a dedicated waistcoat applied to the trunk (50 min treatment session/day, 5 treatment sessions/week, for a total of 25 times as one course of treatment), while those assigned to control group received sham PEMF treatment with the same device. Blood sample for evaluation of surrogate markers of bone turn-over were obtained at the beginning and at the end of the PEMFs treatment period.

Results: At baseline, the two groups were not significantly different for age, age since menopause, BMI, BMD, ALP, CTX and baseline sclerostin and DKK-1 values. After treatment, sclerostin but not DKK-1 levels were significantly reduced only in the PEMFs group (-20%, p<0.05) and this was associated with an increase of ALP (+8%, p=0.10).

Conclusion: In women with postmenopausal osteoporosis, our preliminary data provide the first evidence of a modulation of sclerostin levels by PEMFs suggesting a possible explanation for PEMFs effects on bone.

P1123**VALIDATION OF THE IOF'S CALCIUM CALCULATOR TOOL FOR THE ASSESSMENT OF CALCIUM INTAKE IN AN ITALIAN POPULATION OF OSTEOPOROTIC PATIENTS AT HIGH RISK FOR FRACTURE**

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Objectives: To validate the Calcium Calculator tool for the assessment of calcium intake in an Italian population of osteoporotic patients at high risk for fracture.

To assess dietary calcium intake in a sample of osteoporotic patients at high risk for fracture.

Material and Methods: 153 consecutive patients having suffered a major osteoporotic fracture (67% with vertebral, 22% with hip fracture, 11% with vertebral and hip fractures), aged more than 50 years, of both sexes (133 females and 20 males) were recruited in a Metabolic Bone Diseases Unit in the University Hospital of Florence. The Calcium Calculator (CC), a short questionnaire developed by IOF which can be self-administered, appropriately translated into Italian, was validated by comparing the results with a validate frequency food questionnaire (QC) commonly used in clinical practice as a gold standard to assess calcium intake. Calcium intake from water (tap or bottled water) sources (CW) was also considered by itself, since not included by CC and included just in part by QC. Data were expressed as mean±SD. Statistical analysis by calculation of Pearson correlation coefficients.

Results: Average daily calcium intake (DCI) estimated by CC was 773±374 mg/day, while DCI estimated by QC was 811±329 mg/day. The two estimate are correlated, as demonstrated by Pearson's r value ($r=0.246$, $p<0.01$). The correlation was more significant when CC corrected for CW and QC corrected for CW were compared (904±385 mg/day vs. 816±336 mg/day, $r=0.348$ mg/day, $p<0.01$). While serum 25OH vitamin D levels were in the normal range (31.4±17.7 ng/ml) because of widespread supplementation, just 20-24% of patients at high risk for re-fracture have a sufficient DCI.

Conclusions: This study validates the use of IOF's CC to estimate DCI in an Italian population of osteoporotic patients at high risk for re-fracture. This questionnaire can be easily implemented by the addition of estimated CW. CW may constitute an important source of calcium in the Italian population. The majority of osteoporotic subjects have insufficient DCI, while the majority is vitamin D sufficient.

P1124**NECK PAIN IN HEALTHCARE WORKERS: IS NOT AN OCCUPATIONAL DISEASE?**

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Objectives: Uncertainty exists with regards to the extent of prevalence of work related neck pain in healthcare workers. The aim of this study was to estimate the prevalence of neck ache in Tunisian nurses, to specify its determinants and to assess its severity.

Methods: This is a cross-sectional study conducted in a sample of 293 healthcare workers representative of 1181, from two teaching hospitals, based on a comprehensive questionnaire about socio-professional characteristics, the perceived physical and mental strain, and psycho-social factors at work based on "KARASEK scale".

Results: Forty three% (43.3%) of healthcare workers complained about a neck ache within the previous year. The latter group had a greater Body Mass Index ($p=0.002$). Neck pain was related to gender ($p=0.009$) and more frequent in elder groups of age whatever the gender was ($p<10^{-3}$). The final model of binary logistic regression was made of Body Mass Index ($p=0.001$, OR=1.11, CI: [1.04, 1.18]) and gender ($p=0.006$, OR=0.5, CI: [0.3, 0.8]). Regarding the severity of neck ache, the group with the most intense pain had Greater body Mass Index ($p=0.024$); and the pain intensity was in relationship with the index of seniority in shift work ($p=0.033$).

Conclusion: Our results show that neck pain in healthcare workers had no occupational determinants. Preventive measures should be focused on the lifestyle and dietary habits to maintain a correct body Mass Index.

P1125**HIP JOINT INVOLVEMENT IN PATIENTS WITH SPONDYLARTHRIITIS: AN ULTRASOUND STUDY**

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Background: Spondylarthritides (SA) are a group of inflammatory joint diseases, with both axial and peripheral involvement.

Hips are between most frequent joints involved, early identification of coxitis with new imaging techniques as ultrasonography (US) or magnetic resonance imaging permits an optimal management and avoids evolution to femoral head osteonecrosis.

Objectives: To evaluate, by ultrasonography (US), the prevalence of the coxitis in patients with spondylarthritides.

Methods: Thirty-one consecutive patients with SpA were included in the study (12 with ankylosing spondylitis - AS, 11 with psoriatic arthritis - PsA and 8 with reactive arthritis - ReA) naïve to disease modifying antirheumatic drugs (DMARDs) and with low disease duration (less than 2 years). Twenty healthy age-matched controls without inflammatory diseases were examined as well. The US was performed with patients placed in reclined position, with lower limbs extended, in a slight external rotation and heels close to each other. The presence of US findings indicative of synovitis in coxofemoral joint was investigated. Thus, the distance between the hyperechoic bone cortical and the capsule should be less than 7 mm in normal joints and in the same time, the symmetry between the two sides is important, as right-left difference shouldn't be more than 1 mm.

Results: Synovitis in at least one site, was statistically significant more frequent in patients with SpA than in controls ($p < 0,001$). Between patients with SpA, it was more frequent in AS patients, followed by PsA patients, compared to those with ReA. We found bone cortical irregularities of the femoral head in 4 patients with PsA (36.36%) and 3 with AS (25.0%).

Conclusions: This study reveals the high frequency of hip involvement in patients with spondylarthritides and can guide the further assessment in the evaluation of those patients in daily practice.

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MUSCULOSKELETAL ULTRASOUND DISCRIMINATIVE FOR ANKLE PAIN IN OBESE POSTMENOPAUSAL WOMEN

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Objective: Essential for patients stability and mobility ankle joints are a frequent source of pain. The main purpose of the study was to evaluate the ankle joint pathology through power Doppler ultrasound in postmenopausal women with a BMI of 30 or greater.

Methods: 50 consecutive obese female patients with ankle pain were reviewed. Patients underwent clinical examination and ultrasound of the ankle joints using an Esaote MyLabSix equipment with a multifrequency linear probe of 6 – 18MHz. Fluid, synovitis, tenosynovitis and power Doppler were scored on a 0–3 semi-quantitative scale. A total number of 100 ankle joints were examined using MSUS. Talonavicular, intertarsal- and tarso- metatarsal joints as well as flexor and extensor tendons, Achilles tendon, were also investigated.

Results: Pathology detected was osteoarthritis of the tibiotalar and/or talonavicular joint in 72% of the patients (36 out of 50), followed by tendinosis of the Achilles tendon in 56% of the patients (28 out of 50). Gray scale findings were observed in 90.3% of the symptomatic patients for Achilles tendinosis (28/31) as well as in 53% of the asymptomatic patients for Achilles and calcaneal pain (10/19) ($p < 0.01$). PDUS activity was higher in symptomatic patients - 35% (11/31) compared to 21% in asymptomatic patients (4/19) ($p < 0.01$). Tenosynovitis of the flexor tendons was found in 16 patients and of the peroneal tendons in 8 patients. Edema of the subcutaneous tissue was identified in 18 patients while crystal deposition was found in 21 patients.

Conclusions: Ultrasonographic Doppler imaging can easily detect degenerative and inflammatory conditions associated with ankle pain in obese female patients. Most frequent pathologies detected by MSUS were osteoarthritis of the tibiotalar and talonavicular joint, followed by tendinosis of the Achilles tendon. Pathologic findings are also very common in asymptomatic structures of the ankle and can be best identified using ultrasound.

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THE EFFECT OF ALENDRONATE ON VERTEBRAL FRACTURE RISK IS INDEPENDENT OF BASELINE FRAX FRACTURE PROBABILITY: A POST HOC ANALYSIS OF THE FIT STUDY

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Alendronate significantly decreases the risk of vertebral and non-vertebral fracture compared with placebo in women with or without prior vertebral fracture but with low bone mineral density (Donaldson 2012). The aim of this study was to determine the efficacy of alendronate on vertebral fracture as a function of baseline fracture risk, assessed using the FRAX tool, in the Fracture Intervention Trials (FIT). Baseline clinical

risk factors (age, BMI, prior fracture, glucocorticoid use, rheumatoid arthritis, smoking and parental history of hip fracture) were used to calculate the 10-year probability of major osteoporotic fractures (MOF) with inclusion of femoral neck BMD (FRAX), in both arms of the FIT study [vertebral fracture (VF) arm and clinical fracture (CF) arm]. The interaction between FRAX probability of a MOF and treatment efficacy for the outcome of clinical vertebral fracture was examined by an extension of Poisson regression model. The interaction between FRAX probability and treatment efficacy for new radiographic vertebral fracture was examined by logistic regression. All associations were adjusted for age and study. 5245 women had a calculable FRAX probability (1609 in VF arm and 3636 in CF arm). 2588 women randomized to the placebo group and 2657 women to alendronate were followed for up to 3 years for VF arm and 4 years for CF arm. At baseline, the 10-year probability of MOF (with BMD) ranged from 3.4–77.5%. Treatment with alendronate was associated with a 60% decrease in clinical vertebral fracture compared to placebo treatment (95%CI: 37, 74%). The risk of radiographic vertebral fracture decreased by 57%; (95%CI: 44, 67%). The effect of alendronate on fracture outcome did not change significantly with increasing FRAX probability ($p>0.30$ for both clinical and radiographic vertebral fracture). As in Donaldson et al Alendronate significantly decreases the risk of clinical and radiographic vertebral fracture in women included in the FIT study, irrespective of baseline fracture probability. Reference: Donaldson MG et al, *J Bone Miner Res* 2012;27:1804

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A LONG-TERM ACENOCOUMAROL TREATMENT IS ASSOCIATED WITH OSTEOCALCIN SUPPRESSION AND VITAMIN D DEFICITS BUT WITHOUT REDUCTION IN BONE MINERAL DENSITY

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Objective: Published data on skeletal effects of anticoagulant therapies, including vitamin K antagonists, are inconsistent. The aim of this study was to assess bone mineral density and biochemical markers of bone and mineral metabolism in patients on long-term acenocoumarol (AC) treatment.

Participants and Methods: The cross-sectional study was carried out in 36 patients (19 males, 17 females; mean age 63.5 ±8.6 years), treated with acenocoumarol, and 25 age- and sex-matched controls. Serum osteocalcin (OC), osteoprotegerin (OPG), receptor activator of nuclear factor- κ B ligand (RANKL)

concentrations, 25-hydroxyvitamin D [25(OH)D] levels and total alkaline phosphatase (ALP) activity were measured. Bone mineral density (BMD) in the lumbar spine and femur regions was measured using dual-energy X-ray absorptiometry.

Results: No significant differences in terms of menopausal status, BMI, smoking habits and fracture prevalence were found between AC users and controls. No differences in femoral or lumbar BMD were found either, whereas T-scores and Z-scores for BMD remained within normal range. Concentrations of osteocalcin were significantly lower in patients treated with AC compared with controls (4.5±1.8 vs. 10.2±4.7 ng/ml), and 25(OH)D was also lower (21.6±6.8 vs. 28.3±6.6) (both $P<0.001$), whereas higher ALP activity was found, compared with controls. When sex-specific associations were studied, the female AC users, but not male, had significantly higher total ALP and increased OPG levels. Multiple regression models, performed among 36 AC users, showed that osteocalcin level was independently the most predictive variable for changes in OPG, log RANKL and log RANKL/OPG ratio.

Conclusions: A long-term regular use of acenocoumarol is not associated with apparent bone loss or reduction in BMD. However, the prolonged therapy may negatively affect bone metabolism and vitamin D status by leading to a decreased bone formation via osteocalcin inhibition. An increased OPG concentration, found in women treated with AC, reflects a possible compensatory mechanism preventing excessive bone resorption. Metabolic deteriorations may considerably precede changes in BMD and, thus, seem clinically important in monitoring acenocoumarol treatment.

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USING CHI-SQUARED AUTOMATIC INTERACTION DETECTION (CHAID) MODELLING TO IDENTIFY THE RISK FACTORS OF OSTEOPOROSIS AMONG OLDER ADULTS WITH INTELLECTUAL DISABILITY.

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Objective: To identify the contributing risk factors for osteoporosis among older adults with intellectual disabilities using chi-squared automatic interaction detection modelling.

Material and Methods: The data was drawn from the longitudinal study investigating ageing among people with intellectual disability in Ireland (IDS-TILDA). A quantitative heel ultrasound (QUS) was utilised to determine the bone status of the participants (N=578). The CHAID method was applied to identify the contributing predictors for osteopenia and osteoporosis. This type of analysis is a decision tree technique which classifies

the sample into subgroups to determine the relationship between the dependent (bone status) and predictor variables (risk factors) using multivariate technique. The technique identifies the size and rank of statistically significant differences to determine the best split based on logic 'if then'. The decision tree algorithm partitions the data into statistically significant subgroups that are mutually exclusive and exhaustive.

Results: Over 70% of participants were identified within either the osteopenic or osteoporotic categories based on the QUS. Three major predictor variables reached significance for the CHAID osteoporosis model. These included, difficulty walking (p -value<0.0001), taking antiepileptic medicines (p -value=0.004) and taking proton pump inhibitors, (p -value=0.043). This model had an overall classification accuracy of 70.8% with its ability to classify osteoporosis at 72.5%.

Conclusion(s): The contributing factors identified in this study differ from the commonly identified risk factors observed among the general population such as smoking, alcohol, and corticosteroid use. To note the CHAID technique is a user-friendly method that could be easily applied in clinical practice.

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VITAMIN D RECEPTOR POLYMORPHISM AND BONE MINERAL DENSITY IN TURNER SYNDROME PATIENTS

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Turner syndrome patients generally have alteration in bone mineral density and osteoporosis.

Aim: To analyze the distribution of polymorphism rs7975232 of VDR gene and BMD in girls with TS.

Methods: TS patients were studied. Total Body corporal, Lumbar and femoral BMD were determined by dual-energy X-ray absorptiometry (DXA). The genetic study was performed with TS patients and 79 controls girls with 46XX. We determined the SNP rs7975232 of VDR gen by the KASP method.

Results: Fifty-four TS patients (36 with 45X) and 18 patients with other genetics profile were included. The patients with 45X have low mineral bone content ($p=0.072$). The genomic distribution of SNP rs7975232 was different from the controls. The wild-type gen CC predominated in the girls with ST(46.2% vs. 30.2%) and have low mineral bone content ($p=0.01$). The patients with AA (9% vs. 18.4%) have lower BMD in the three regions and the total body BMD was the lower ($p=0.02$).

Conclusions: Our results point out that the distribution of polymorphism rs7975232 of VDR gen can explain the variability of bone health in TS.

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OSTEOPOROSIS, FALLS AND FRACTURES IN CHILEAN OLDER PEOPLE

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Objective: to describe the prevalence of osteoporosis and its association with the incidence of falls and fractures in community-living Chilean elders.

Methods: Follow up of ALEXANDROS cohorts designed to study disability associated with obesity in community dwelling people 60y and older living in Santiago/Chile. At baseline 1119 from 2372 participants had DXA scan measurements. At baseline home interviews including history of chronic diseases, self-reported disability/functional limitations, falls and fractures. Physical performance, anthropometry, dynamometry and blood pressure were measured. WHO standards for Bone Mineral Density (BMD) classified them in normal, osteopenia and osteoporosis. Nutritional state was determined by WHO standards of BMI. The participants were followed from 5 to 10 years to determine the incidence of falls and fractures according BMD. Logistic regression analysis was performed to adjust the association between falls, fractures and osteoporosis.

Results: The sample was composed by 1119 subjects (68.6% women) mean age 72.0±6.8, min 60y max 92y. The prevalence of osteoporosis at baseline was 23.2%, higher in women (29.3%) than in men (9.7%). Osteoporosis increased from 16.3% in the group 60-69y, to 26.5% in the group 70-79y and 33.6% in people 80y and older. At follow up 37.8% of people reported falls (men 28.4%; women 42.6%, $p=0.016$). In the subjects with osteoporosis the frequency of falls was 35.1% vs. 21.6% in the normal ones ($p=0.035$). From the people reporting falls, 11% had a fracture as direct consequence. The frequency of incident fractures was 22.2% (men 15.8%; women 24.8%, $p=0.010$), increasing with age reaching 40% in people 80y and older. Fractures were 16.4% in people with normal BMD, 22.7% in subjects with osteopenia and 30.9% in the osteoporotic. After adjustment by age, sex, diabetes and BMI categories, the risk of falls was double in subjects with osteoporosis (RR=2.1; 95%CI:1.01-4.24, $p<0.05$). For fractures the crude association with osteoporosis was RR=2.3; 95%CI:1.4-3.9. After adjustment by age, sex, diabetes and nutritional state the RR was 1.8; 95%CI 1.0-3.2.

Conclusion: Osteoporosis, falls and fractures are highly prevalent in Chilean older people. Programmes for the prevention of falls are compulsory to prevent fractures in older people.

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THE OBESITY INFLUENCES QUANTITATIVE ULTRASOUND PARAMETERS IN HIP OSTEOARTHRITIS PATIENTS SCHEDULED FOR TOTAL JOINT REPLACEMENT

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Introduction: Osteoarthritis (OA) is a common and disabling joint disorder affecting millions of people worldwide. The co-existence of osteoporosis (OP) and osteoarthritis (OA) remains obscure. Some studies have demonstrated an association between higher bone mineral density (BMD) and OA. No systematic studies have been carried out to exclude the possibility that osteoarthritic patients at the end stage of severe hip osteoarthritis waiting for total hip arthroplasty (THA) suffer from primary or secondary OP. Calcaneal quantitative ultrasound (QUS) is recognized as the attractive prescreening tool for osteoporosis, an alternative to dual-energy X-ray absorptiometry. Calcaneal QUS in a prescreening or stratification algorithm must be based on device-specific cutoffs that are validated in the populations for which they are intended to be used. Frost et al. in 2000 concluded, the WHO threshold of $T=-2.5$ for diagnosing osteoporosis requires modification when using QUS to assess skeletal status. There are a few suggested cutoff parameters used for distinguishing osteoporotic cases. The T-score threshold of -1.80 for three QUS devices was determined by Frost et al. McLeod et al. found a Calcaneal Quantitative Ultrasound stiffness index cutoff value <65 indicating a high likelihood of osteoporosis. Wang et al. identified the value 76 of the SI threshold for best identifying osteoporosis, with sensitivity being 0.800 and specificity 0.741. Vallipakorn et al. suggested to determine the optimal cut-off point of quantitative ultrasound (QUS) of the calcaneus to screen osteoporosis at stiffness index determined by T-score of ≤ -2.6 . Anthropometric measurements may influence the bone density. Obesity is often considered to have a protective effect against osteoporosis. Berg et al. have found that BMI is positively associated with bone stiffness in the general population. The aim of the study was to evaluate the calcaneus quantitative ultrasound (QUS) measures to diagnose the quantity of bone in patients at the end stage of severe hip osteoarthritis.

Methods: The speed of sound (SOS), broadband ultrasound attenuation (BUA), and stiffness index of the calcaneus by quantitative ultrasonography (QUS) (Achilles Express, GE Healthcare) were measured in 89 patients (17 males and 72 females; average age 64,75 from 35 to 86). All patients were scheduled to undergo total hip arthroplasty for end-stage OA (Kellgren-Lawrence score 3 or 4). Patients were classified with Normal weight if BMI ranged from 18.5 to 25, Overweight if BMI ranged from 25 to 30 and Obese for higher values. A group of patients (average age, years) with advanced primary hip OA waiting for THA were recruited for QUS exam. Calcaneal

Stiffness Index, BUA, and SOS were measured. BMI was measured. To my knowledge, the relationship between QUS of the calcaneus and BMI was never studied before. McLeod's, Vallipakorn's, Wang's and Frost's cut-off values were used to differentiate osteoporosis cases from normal cases. At the calcaneus, significant differences were observed between the BMI groups. Stiffness Index in the hip OA-affected calcaneus presented significant differences ($F(2, 86)=6,48$; $p<0,005$) - The mean Stiffness Index in Normal weighted patients was 78,2 (Std.Err-3,9); in Overweighted 79,8 (3,1) and in obese cases 97,7 (4,5).

Results: BUA in the hip OA-affected calcaneus presented significant differences ($F(2, 86)=5,8$; $p<0,005$) - The mean BUA in Normal weighted patients was 105,1 (Std.Err-3,1); in Overweighted 107,1 (2,4) and in obese cases 119,7 (3,5). SOS in the hip OA-affected calcaneus presented significant differences ($F(2, 86)=6,48$; $p<0,005$) - The mean SOS in Normal weighted patients was 1529,2 (Std.Err-8,2); in Overweighted 1530,5 (6,4) and in obese cases 1564,5 (9,4). There were no significant differences in BMI between groups differentiated using McLeod and Vallipakorn stiffness index cut-off values. SOS, BUA, and stiffness index obtained by QUS were significantly higher in the obese OA group than in normal or overweight patients. There were forty-four normal bone cases (49,5%). Osteopenia was found in 31 (34,8%) cases and osteoporosis in only 14 (15,7%). The basic anthropometrics of 26 patients (29,3%) shown their normal weight. Forty-four cases (48,3%) were overweighted, and 20 cases were (22,4%) obese. Wang's cut-off distinguished a significant BMI differences $F(1, 87)=5,1182$, $p<0,05$. In 35 patients the mean BMI was 26,18 (Std.Err. 0,64) in osteoporosis group distinguished with Wang's cut-off values. In 54 patients the normal bone group was characterized by mean BMI 28,05 (Std.Err. 0,52). BMI presented no significant differences in BMI between groups differentiated using McLeod and Vallipakorn stiffness index cut-off values.

Conclusion: Increased bone mineral density (BMD) in a hip with osteoarthritis (OA) has been anticipated. Against a general belief, osteoporosis/osteopenia may infrequently occur in patients suffering severe hip OA. The obesity has an influence on calcaneal ultrasonic measures in hip osteoarthritis cases. The observed prevalence of reduced bone quantity parameters corresponds to the lower weight of the patient suffering the hip osteoarthritis. The normal weighted patients scheduled for THA may require bone density testing. Obesity significantly increases calcaneal ultrasonic bone parameters in patients suffering severe hip osteoarthritis.

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P1133**MORE FREQUENT BACK PAIN IS ASSOCIATED WITH INCIDENCE OF MODERATE FACET JOINT OSTEOARTHRITIS, BUT NOT DISC HEIGHT NARROWING**

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Spinal degeneration is common, with high public health burden. Despite the clinical importance, little is known about longitudinal changes in facet joint osteoarthritis (FJOA) and disc height narrowing (DHN), evaluated by CT, in community-based populations.

Objective: To determine incidence of FJOA and DHN over 6yr in a community-based cohort and evaluate the association with baseline back pain.

Methods: Participants included 885 cohort members of the Framingham Study: 491 women, 394 men, 40-85 yr (mean=63, SD=±8 yr). At baseline, participants reported frequency of back pain in the past 12 months as none, some days, most days, or all days. A musculoskeletal radiologist (MJ) evaluated DHN and FJOA from T4/T5 to L4/L5 on baseline and 6yr follow-up CT images, using a 4-point semi-quantitative (SQ) scale as: grade 0=normal, 1=mild, 2=moderate, and 3=severe. Incidence of moderate (SQ2+) FJOA and DHN was defined as an increase at any spinal level from grade 0 or 1 at baseline to grades 2 or 3 at follow-up.

Results: 23% of participants reported having back pain on some days in the past 12 months, 7% on most days, and 13% on all days. 6-year incidence was 33% for moderate FJOA and 40% for DHN. More frequent back pain at baseline was associated with greater Incidence of FJOA but not with DHN (Table).

Conclusions: Incidence of moderate FJOA occurred in more than one third of the participants over 6 years in our community-based study and was 60% higher in those reporting back pain on all days in the past year. Incidence of moderate DHN was 40% and was not associated with frequency of back pain.

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P1134**RELATION OF SERUM VITAMIN D WITH LEPTIN, BODY COMPOSITION AND CALORIC INTAKE IN HEALTHY INDIVIDUALS**

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Background: Leptin is secreted by adipose tissue and is part of a signaling system that indicates the size of adipose tissue and affects energy expenditure. This study aimed to investigate the associations between serum leptin concentrations and Vitamin D levels, body composition and caloric and nutrient intake in healthy young adult Pakistani medical students.

Methods: Socio-demographic information was collected from medical students at AKU from June-August 2014 through interviewer administered questionnaires; dietary intake of fat, protein and calcium and total energy intake, was elicited using a validated regional food frequency questionnaire. Weight, height and body composition (via bioelectrical impedance analysis) were measured. A 4-day phlebotomy camp was held at the Multidisciplinary Laboratory and 10 mL of blood was drawn, serum was separated and stored at -30 °C. Leptin was measured using a kit from DIALsource on manual ELISA. 25-hydroxy Vitamin D (25OHD) was analyzed on an automated analyzer using a kit from Siemens.

Results: Mean age of the students (n=101) was 20±0.9 years, median leptin 1.59 (0.06 – 25.4) ng/mL, mean 25OHD 15.0 ±8.61 ng/mL, mean body fat% 20.0±8.15%, median energy intake 2105 (649 – 6139) kcal and median daily fat intake 61.8 (24.5 – 192) g. Serum leptin was positively correlated with total body fat%, BMI and metabolic age ($P<0.05$). Inverse correlation was found between leptin and 25OHD levels, daily energy intake and daily fat intake ($P<0.05$).

Conclusion: This study reaffirms the role of leptin as a useful biomarker of obesity and associated Vitamin D deficiency, particularly in the young Pakistani population. This study provides initial evidence that the distribution of fat may be associated with vitamin D status, but this relation may be dependent on metabolic factors.

P1135**THE SHIFTING PARADIGMS: VITAMIN D DEFICIENCY TO HYPERVITAMINOSIS AND TOXICITY**

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Aim: There has been increasing awareness of Vitamin D deficiency, but due to lack of clear guidelines for the optimum doses of Vitamin D in deficient states, there is inadvertent use

of higher doses of Vitamin D in patients resulting in toxicity of Vitamin D. This study was done to estimate the prevalence of vitamin D toxicity in samples submitted for 25OHD analysis.

Material and Methods: An observational study was conducted at the section of Chemical Pathology, Department of Pathology and Microbiology AKUH. Laboratory data analysis of serum 25OHD performed from Jan2010 to Oct2014 was performed. Only initial test results were included in analysis for subjects with repeated testing for 25OHD. The cutoffs used for deficient, insufficient, optimal, hypervitaminosis and toxic levels were, ≤ 20 , 20-30, ≥ 30 , ≥ 100 and ≥ 150 ng/ml respectively.

Results: The increase in 25OHD testing since 2010 to 2014 was 68%. Total 333,862 tests were performed over 5 years period, average age being 35 years. Cumulative prevalence of deficiency, insufficiency, sufficiency and toxicity over three years were 65.1%, 16.5%, 17.8% and 1.5%. There was a significant increase in samples with 25OHD toxicity over the 5 years from 0.37% in 2010 (n=167) to 0.4% in 2014 (n=278); of them 45% were of pediatric age group (age <18yrs). While hypervitaminosis in 0.8% in 2010 (n=351) to 1% in 2014 (n=700); with 35% of <18yrs age. Three% subjects (n=10601 in 5 years) were of ages ≤ 1 years, among them 38% (n=4069), 24% (n=2590), 30% (n=3209), 4% (n=424), 3% (n=308) had deficient, insufficient, optimal, hypervitaminosis and toxic vitamin D levels respectively.

Conclusions: Although prevalence of deficiency, insufficiency and sufficiency remains high but increasing hypervitaminosis and toxicity of vitamin D, especially in infantile age group is alarming. These findings suggest that vitamin D replacement therapies by concentrated Vitamin D injections, tablets or oral drops should be used with caution.

P1136

SYSTEMIC LUPUS ERYTHEMATOSUS. MUSCULOSKELETAL AND IMMUNOLOGICAL MANIFESTATIONS: SUCCESSFUL TREATMENT WITH BELIMUMAB

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Introduction: Systemic lupus erythematosus (SLE) is a multisystem autoimmune disease affecting primarily women in the reproductive age. The disease may also have musculoskeletal manifestations. Until recently, there was a paucity of specific drug treatment for the disease.

Aim: To describe a cohort of SLE patients on treatment with belimumab and its effect on disease manifestations, namely, musculoskeletal and immunological manifestations.

Methods: A cohort of 10 patients with SLE, 9 female and 1 male, is described. The patients were diagnosed with SLE and

had arthralgias, cutaneous manifestations, fatigue and in one case pulmonary fibrosis. The patients had decreased C₃ and C₄ levels. Belimumab was administered to all of the patients.

Results: After belimumab administration arthralgias improved, cutaneous manifestations improving in all patients. Fatigue decreased significantly in all patients, except in the patient with pulmonary fibrosis, the aforementioned patient experiencing only marginal improvement. C₃ and C₄ levels increased significantly ($p < 0.001$) after treatment with belimumab, ESR levels decreasing after belimumab. Corticosteroid dosage was decreased significantly in all patients.

Conclusions: Belimumab is a novel therapeutic agent in SLE management. It improves clinical manifestations of the disease, namely musculoskeletal, cutaneous and systemic manifestations, such as fatigue. Characteristic laboratory features of the disease such as complement levels and inflammation indices also improve. The novel therapeutic agent belimumab appears to be a useful addition in the armamentarium for the management of systemic lupus erythematosus.

P1137

THE ROLE OF FERRITIN AND ADIPONECTIN AS A PREDICTORS OF CARTILAGE DAMAGE ASSESSED BY ARTHROSCOPY IN PATIENTS WITH SYMPTOMATIC KNEE OSTEOARTHRITIS

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Aim: To evaluate whether circulating ferritin as well as adiponectin in serum and synovial fluid correlate with cartilage damage severity assessed by arthroscopy in patients with knee osteoarthritis.

Methods: The 40 subjects with symptomatic knee osteoarthritis were divided into four groups according to arthroscopy assessed cartilage damage, using Outerbridge (OB) grading. Metabolic parameters and insulin resistance markers were determined.

Results: Parameters of bone homeostasis such as PTH, Alc Phosphatase, levels of 25OH vit D, serum calcium, and phosphorus were similar in the four groups. Significant difference in terms of serum ferritin was found: ferritin levels increased from Group 1 to Group 4 in a continuous fashion ($p < 0.035$). Significant by-group differences in circulating ferritin persisted even after adjustment for age. Although all groups were similar in terms of serum adiponectin levels, significant between groups difference in synovial fluid ADP was found ($p < 0.037$). However, after controlling for the age, there was no between-group difference in terms of synovial ADP levels.

Conclusions: Serum ferritin is associated with cartilage damage severity assessed by arthroscopy, a more reliable evaluation than radiography. This association was independent of age, sex, BMI, and CRP levels and suggests that ferritin is actively involved in the progression of cartilage damage in patients with symptomatic knee osteoarthritis.

P1138**PSORIATIC ARTHRITIS COEXISTING WITH CHRONIC SPONTANEOUS URTICARIA. MUSCULOSKELETAL AND OTHER MANIFESTATIONS**

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The term chronic spontaneous urticaria has been employed to indicate chronic urticaria that is endogenous and independent of any external physical stimulus. There is a clear association of a subpopulation of such patients with autoimmunity.

Aim: To describe two cases of patients with chronic spontaneous urticaria coexisting with psoriatic arthritis.

Methods: The first patient developed psoriatic arthritis, with low back pain and sacroiliitis and was treated with adalimumab. Adalimumab was stopped due to a pregnancy. After delivery the patient developed a psoriatic rash involving the upper extremities and the trunk. In the meantime the patient developed chronic persistent urticaria affecting the back. The second patient had chronic spontaneous urticaria with a migratory rash involving many areas of the body appearing and disappearing after 48 h. The patient developed psoriatic arthritis with arthralgias, myalgia and a psoriatic rash.

Results: Both patients received cyclosporine for the treatment of psoriatic arthritis and omalizumab for the treatment of chronic spontaneous urticaria with excellent results.

Conclusions: Chronic spontaneous urticaria is associated with autoimmunity in many cases. In the present study the association of chronic spontaneous urticaria with psoriatic arthritis is described. Cyclosporine, which in the cases described herein was used for the treatment of psoriatic arthritis, is also indicated for chronic spontaneous urticaria.

P1139**CORTICAL SCAFFOLDING CHARACTERISTICS OF VERTEBRAE: PRELIMINARY QCT STUDY OF CORTICAL BONE DENSITY IN INTACT LUMBAR VERTEBRA OF ELDERLY PATIENTS WITH AND WITHOUT PREVIOUS VERTEBRAL FRACTURE**

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Introduction: The participation in carrying axial loads within the vertebral column by cortical bone increases as a trabecular bone of vertebrae diminishes. An attempt to analyze cortical bone using QCT was made in patients with or without a history of previous vertebral fracture.

Material and methods: In a group of 33 female patients (mean, 70.98±9.1 years) with back pain, 94 intact vertebrae were analyzed. Patients average height was 161,4 cm; and weight 61,82

kg. One mm-thick ROI's were selected for finding differences between upper endplate, lower endplate and frontal cortex of the vertebral body. Patients underwent CT scan due to the history of low back pain after minor trauma. The BMD protocol and phantom for each CT examination of the lumbar spine. The data were used for analysis of vertebral bone mineral density using QCTPro Software (Mindways Software Inc, Austin, TX).

Results: Within our group, 38 vertebrae belonged to patients with a history of previous vertebral fracture. Mean BMD of the upper, lower endplates, and frontal cortex were 154.22, 163.08, 223.31 mg/cm³ respectively in a group with no history of fracture, while these were 138.78, 143.61, 177.45 mg/cm³ in the group who sustained a fracture in the past. Wilcoxon Two-Sample Test proved differences were statistically significant for all mentioned variables. Although significant, the differences between groups were more easily seen if trabecular BMD was concerned. Cortical parameters of all vertebra were less correlated with t-score than trabecular ones, yet were statistically significant in Spearman Correlation Coefficient calculation.

Conclusions: Vertebral fracture prediction is usually derived from trabecular bone mineral density analysis. The role of cortical bone in preventing vertebrae from failure is still to be investigated.

P1140**SIDERITIS SCARDICA EXTRACT PREVENTS BONE LOSS IN OVARIECTOMIZED RATS**

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Background: While it is believed that estrogen replacement therapy is safe in most healthy postmenopausal women, there are still existing concerns regarding increased risk for breast and endometrial cancer as well risk for cardiovascular and thromboembolic disease. Therefore, many natural compounds with estrogen like properties have been considered as alternative to classic hormone replacement therapy and useful to preserve bone loss.

Objectives: To assess the influence of *Sideritis scardica* (mountain tea) extract on bone loss induced by ovariectomy in rats.

Methods: The study included 24 rats divided in three groups: ovariectomized treated (n-8), ovariectomized non-treated (n-8) and sham operated (n-8) rats. Ovariectomized rats were treated with 200 mg/kg *S. scardica* extract for 24 weeks and compared to non-treated ovariectomized rats as well to sham operated controls. Bone mineral density, morphometric properties of

the femurs, resistance to mechanical stress and plasma levels of calcium, phosphorus, alkaline phosphatase and osteocalcin.

Results: Ovariectomized rats treated with *S. scardica* extracts had higher BMD on trunk, pelvis, spine as well total BMD compared to non-treated rats ($p < 0.05$). Rats treated with *S. scardica* extracts had significant different architecture of femur neck with more pronounced proximal width 7.73 ± 0.21 mm (distance between great trochanter and medial surface of femoral head) than ovariectomized non-treated animals 7.38 ± 0.23 , as well distal width (mediolateral distance across distal femoral condyles) 7.27 ± 0.34 mm vs. 6.87 ± 0.35 mm respectively ($p < 0.01$). All rats had similar plasma levels of calcium and phosphate. Alkaline phosphatase was significantly higher in treated group (165 ± 32 U/L) than in ovariectomized (119 ± 10 U/L) or Sham group (116 ± 22) ($p < 0.05$). Ovariectomized animals had lower resistance to mechanical stress (ultimate load 96.3 MPa vs. 171.4 MPa for control animals) while treatment with *S. scardica* increased mechanical resistance (142.8 MPa).

Conclusions: Treatment with *S. scardica* prevents bone loss associated with ovariectomy.

P1141

PEDIATRIC REFERENCE VALUES FOR BONE MINERAL DENSITY IN MEXICAN CHILDREN

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Introduction: Paediatric assessment of "growth and development" has been made by anthropometric measurements (i.e. weight, height) adjusted for age. Technological developments have made possible further assessments, like densitometry for bone mineral density. However, there have not been described reference values for Mexican children. Such values are needed to identify abnormal individuals.

Objective: Establish reference values for total body (TB) and lumbar spine (LS) bone mineral density (BMD) for Mexican paediatric population (5-20 years old).

Methods: Population based cross-sectional study. Polyetapic randomised, stratified sampling recruiting healthy Mexican children aged 5-20yo. Subjects that fulfilled inclusion criteria were scheduled for assessment including: paediatric clinical history, 24-hour diet record, physical examination, anthropometry measurements (weight, height, waist circumference, standardised plicometry), TB and LS dual X-ray absorptiometry with iDXA

by General Electric. Statistical analysis: We used descriptive statistics for demographic data. We created age- and gender-specific smoothed percentile curves for TB and LS BMD by generalized additive models for location, scale and shape regression method (gamlss) in RStudio Version 1.0.44.

Results: We measured 834 subjects from 4.6 to 20 years old and constructed the smoothed percentile reference curves for TB and LS BMD adjusted by age and sex.

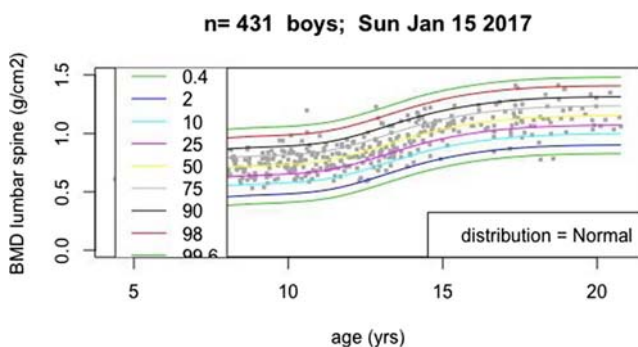
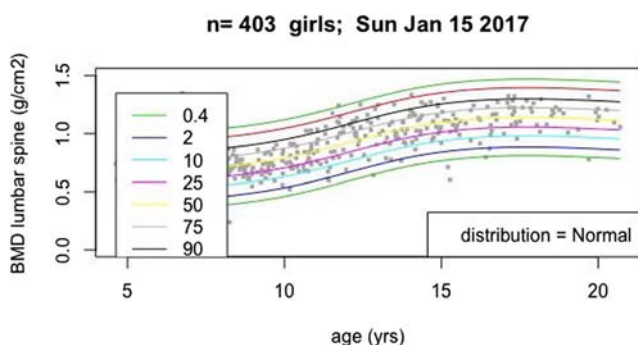
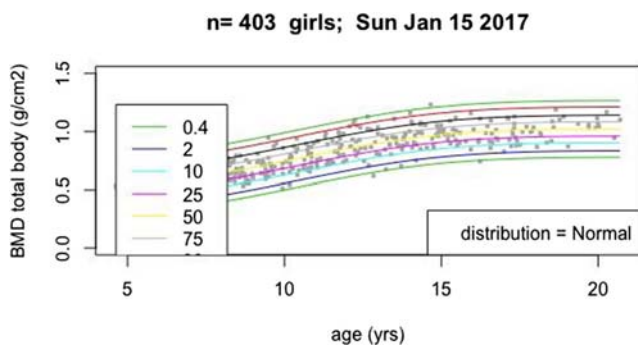
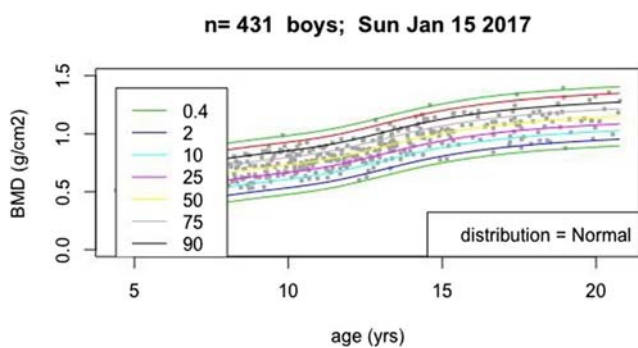
Conclusions: The existence of population-specific reference values allows for comparisons between different populations. Various ethnic groups behave differently in health and disease. Current medicine should take into consideration such differences and adapt accordingly. This work has created TB and LS BMD reference values for Mexican children aged 5-20 years old.

BMD Total Body (g/cm²)

| AGE | Female | | Male | |
|-----|--------|-------|--------|-------|
| | Medium | SD | Medium | SD |
| 4 | 0.503 | 0.059 | 0.531 | 0.054 |
| 5 | 0.548 | 0.074 | 0.561 | 0.081 |
| 6 | 0.585 | 0.098 | 0.605 | 0.091 |
| 7 | 0.642 | 0.089 | 0.634 | 0.08 |
| 8 | 0.655 | 0.071 | 0.673 | 0.09 |
| 9 | 0.706 | 0.092 | 0.745 | 0.101 |
| 10 | 0.762 | 0.092 | 0.752 | 0.082 |
| 11 | 0.832 | 0.097 | 0.787 | 0.077 |
| 12 | 0.917 | 0.128 | 0.839 | 0.103 |
| 13 | 0.917 | 0.104 | 0.923 | 0.088 |
| 14 | 0.980 | 0.102 | 1.011 | 0.104 |
| 15 | 0.985 | 0.085 | 1.027 | 0.113 |
| 16 | 0.956 | 0.092 | 1.057 | 0.100 |
| 17 | 0.998 | 0.093 | 1.069 | 0.121 |
| 18 | 0.979 | 0.168 | 1.132 | 0.129 |
| 19 | 1.032 | 0.077 | 1.098 | 0.124 |
| 20 | 1.068 | 0.094 | 1.196 | 0.117 |

BMD Lumbar Spine (g/cm²)

| AGE | Female | | Male | |
|-----|--------|-------|--------|-------|
| | Medium | SD | Medium | SD |
| 4 | 0.602 | 0.085 | 0.645 | 0.086 |
| 5 | 0.664 | 0.096 | 0.638 | 0.061 |
| 6 | 0.702 | 0.155 | 0.668 | 0.158 |
| 7 | 0.727 | 0.097 | 0.700 | 0.136 |
| 8 | 0.706 | 0.102 | 0.703 | 0.085 |
| 9 | 0.730 | 0.090 | 0.745 | 0.094 |
| 10 | 0.804 | 0.109 | 0.765 | 0.120 |
| 11 | 0.907 | 0.169 | 0.776 | 0.091 |
| 12 | 1.023 | 0.149 | 0.832 | 0.136 |
| 13 | 0.997 | 0.118 | 0.927 | 0.167 |
| 14 | 1.096 | 0.120 | 1.024 | 0.120 |
| 15 | 1.052 | 0.162 | 1.083 | 0.070 |
| 16 | 1.071 | 0.143 | 1.098 | 0.127 |
| 17 | 1.188 | 0.105 | 1.114 | 0.132 |
| 18 | 1.116 | 0.168 | 1.154 | 0.188 |
| 19 | 1.110 | 0.174 | 1.155 | 0.107 |
| 20 | 1.095 | 0.079 | 1.139 | 0.109 |



P1142

EVALUATION OF BONE MINERAL DENSITY IN IRANIAN PATIENTS WITH INFLAMMATORY BOWEL DISEASE

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Background: Individuals with inflammatory bowel disease (IBD) are at higher risk of developing osteopenia and osteoporosis. Steroids are one of the main treatments in IBD patients which may lead to reduced BMD.

Aim: The present study was to evaluate unchangeable factors like gender, age, disease duration, IBD type and the effects of steroids on patient's BMD.

Material and Methods: A total of 74 patients referred to Imam Reza Hospital were examined in this study. Gender distribution was 51.36% male and 48.64% female with an average age of 35.6 years. Minimum age was 15 and maximum age was 52 years. A total of 37 (50%) ulcerative colitis (UC) and 37 (50%) Crohn's disease (CD) patients were enrolled to the study. Bone density was measured by dual-energy x-ray absorptiometry technique. Stepwise regression analysis was used to find predictive variables for bone mineral density (BMD).

Results: All IBD patients in the study (74 patients) had diminished bone mineral density at either spine or femur. Femoral BMD analysis showed that 26 (35.13%) patients were encountered with osteoporosis, 40 (54.05%) with osteopenia and 8 (10.81%) had normal BMDs. Spinal BMD analysis also showed that 49 (66.21%) of patients had osteoporosis, 19 (25.6%) osteopenia and 6 (8.10%) normal BMDs. There was a significant difference in spinal BMDs between Crohn's disease and ulcerative colitis groups, but no significant difference in femoral BMDs was seen. Also there was a significant association between duration of steroid administration and BMD lowering in femur and spine of ulcerative colitis and Crohn's disease suffering patients.

Conclusions: Direct correlation between sex, age and reduced BMD was observed in both quantitative and qualitative surveys. The duration of both Crohn's disease and ulcerative colitis have a significant relationship with

BMD reduction; however, the association was high in Crohn's disease patients. In the present study, we saw a direct relationship between duration of steroid administration and decrease in BMD of the patients. Finally, reduced BMD in the spine and femur of IBD patients were compared in this study and it was found that reduced BMD in the spine is more than the femur.

Keywords: Inflammation Bowel Disease, Crohn's disease, Ulcerative colitis, Bone Mineral Density, Femur, Spine.

P1143

A QUICK AND FREELY AVAILABLE INSTRUMENT FOR ALL PRACTITIONERS AND RESEARCHERS TO ASSESS HAND DYSFUNCTION IN HAND OSTEOARTHRITIS (OA): THE FUNCTIONAL INDEX FOR HAND OA WEBSITE FIHOA.NET

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Background: Although Hand OsteoArthritis (HOA) is a frequent polyarticular disease, which may lead to considerable pain and physical limitations, limited research has been performed, compared to lower limbs OA. It may radiologically affect more than 67% of women and 55% of men aged over 55 years old, of whom 20% will have symptoms (Dahaghin S et al. Ann Rheum Dis 2005). Applied to the almost 500 million inhabitants of the European Union, with people over 60 which will grow up to 33% by 2020, this might represent 150 million radiographic hand OA affected individuals of which 30 million will suffer from hand pain, stiffness, deformities and impaired function. HOA burden is very high: pain, functional impairment, deformities and aesthetic damage may impact patient' quality of life as much as Rheumatoid arthritis (RA) (Slatkowsky-Christensen B et al. Arthritis Rheum 2007).

The functional Index for hand OsteoArthritis (FIHOA) has been validated to assess functional impairment in HOA, both in daily clinical practice and in studies or clinical trials (Dreiser RL and Maheu E. Rev Rhum (Engl Ed) 1995; Dreiser RL and Maheu E. OA & Cart 2000) and is currently the recommended instrument to be used for clinical studies/therapeutic trials (Kloppenbunrg M, Maheu E, et al. OA & Cart 2015).

Aim and method: Computerization makes easier clinical data collection in ambulatory practice and in clinical studies or trials, and in particular allows for using easily validated evaluation tools to assess patient' status. We aimed at providing all practitioners and the rheumatologic/orthopedic research community with the FIHOA, under a free-of-charge, free-of-copyright and rapidly accessible numeric format, by conceiving a free FIHOA website under the responsibility of the instrument's coauthors and developers.

Results: FIHOA website provides the FIHOA scoring for daily clinical practice use, allows for a rapid assessment of the functional impairment of symptomatic hand OA patients, makes easier the efficacy judgement of treatments used in practice, or in the context of a therapeutic trial or a survey/cohort of HOA patients. It contains 17 different linguistic versions. Other linguistic versions are under development. It results in a direct calculation of the score, available for the patient's file either in a numeric or paper format. The website also provides users with a short history of the instrument and all references available in the international literature. Last, it allows for contacting directly the authors by email.

Conclusion: We hope that the FIHOA.net website will be helpful to practitioners for hand OA patients management in ambulatory practice, and will also help the entire scientific community involved in the field of researches in hand OA, and OA in general.

P1444

BIOMARKERS OF OSTEOARTHRITIS: PRACTICAL CONSIDERATIONS

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Introduction: In 2013, the European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (ESCEO) exhaustively reviewed the value of different biomarkers for the diagnosis, prognosis and follow-up of osteoarthritis. In this work, we aimed to share our experience on the potential availability of commercially available kits for the biomarkers highlighted by the review and/or our experience with some of these assays in order to help different teams that would be willing to run them.

Materials and Methods: The different biomarkers discussed in the paper were : **Biomarkers related to collagen metabolism** :C-terminal telopeptide of collagen type II (CTX-II), Type II collagen α chains collagenase neopeptide (α -CTX-

II), Type II collagen propeptides (PIINP, PIIANP, PIIBNP, CPII), Pyridinoline and Glc-Gal-PYD, Type II collagen cleavage product (C2C), Collagen type II-specific neoepitope (C2M), C-terminal telopeptide of collagen type I (CTX-I, α -CTX-I), N-terminal telopeptide of collagen type I (NTX-I), Aminoterminal propeptide of collagen type I (PINP), Types I and II collagen cleavage neoepitope (C1,C2); **Biomarkers related to aggrecan metabolism** :Core protein fragments (aggrecan neoepitopes, ARGS and FFGV fragments), Chondroitin sulfate epitope 846 and monoclonal antibody 3B3; **Keratan sulfate Biomarkers related to other non-collagenous proteins** :Cartilage oligomeric matrix proteins (COMP and its deamidated form D-COMP), Fibulin (peptides of fibulin 3, Fib3-1, Fib3-2), Follistatin-like protein 1 (FSTL-1), Hyaluronan (hyaluronic acid), Matrix metalloproteinases (MMP-1, MMP-3, MMP-9, MMP-13 and TIMPs), YKL-40 (cartilage glycoprotein 39), Soluble receptor for advanced glycation endproducts (sRAGE) and **Biomarkers related to other processes**:Inflammatory biomarkers (hs-CRP, IL-1 β and IL-6 and COX-2), Adipokines (adiponectin, leptin, visfatin), Soluble receptor for leptin (sOB-Rb), Cellular interactions in bone (periostin), Wnt inhibitors (DKKs and SOST) and Uric acid.

Results: CTX-II can be determined on IDS Elisa, but is also be available on an automated method, on IDS iSYS. This is very important since using automated methods definitely decreases the lab-to-lab variations and thus increases the consistency of the results. Among the type II collagen propeptides, PIIANP can be commercially available as an Elisa, proposed by Merck-Millipore and CPII is also available as an Elisa commercialized by IBEX. Pyridinium crosslinks can be measured on serum and urine with a MicroVue Elisa from Quidell. C2C is available at IBEX and CTX can be measured with various Elisa and two automated methods, Roche Cobas and IDS iSYS. NTX in serum and urine (Osteomark) can be determined with an Elisa from Alere. PINP is available as a RIA assay from Orion Diagnostics but can also be available with two automated methods, Roche Cobas and IDS iSYS. Of note, the Orion and IDS assays do recognize the « intact » PINP whereas the Roche one recognizes the « total » one and cross-reacts with monomers that accumulate in patients suffering from renal diseases. Finally, C1-2C is commercialized by IBEX. We have validated all these assays and have already a good experience with their use in routine. The CVs are all <15%, and are even better for automated methods, <8%. Regarding the biomarkers related to aggrecan metabolism, CS846 is available as a Elisa from IBEX and we have also validated this assay. LifeSpan Biosciences proposes a elisa for

keratan sulfate in serum and urine, but we haven't had the opportunity to validate this assay. There are basically two different Elisa for COMP determination, one using a rabbit polyclonal antibody (Wieselab), the other a mouse monoclonal one (Biovendor). We have validated the first one and, to the best of my knowledge, no paper has compared the clinical performances of these two assays. LifeSpan Biosciences propose different elisa kits for serum and urine fibulin 3, possessing different measuring range, but we do not have experience with these kits. Many Elisa kits are available for hyaluronic acid determination (Corgenix, Teco, CisBio, R&D) but these kits haven't been compared to each other. We have validated the YKL-40 Elisa assay from Quidel MicroVue but not sRAGE from NeoScientific.

Conclusions: Some automated, but many Elisa methods exist for the determination of osteoarthritis biomarkers. The automated methods seem correctly analytically validated, but the Elisa have generally been poorly validated. However, reference intervals for many of these biomarkers have been recently published in a very good paper by Krause et al in Ann Rheum Dis. This is mandatory for a thorough use of these markers in the future.

P1445

RHEUMATOID LUMBAR SPINE CASE PRESENTATION

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Background: Rheumatoid arthritis is common in cervical spine and there are few studies in the literature have described the rheumatoid lumbar spine. Managing these patient needs complete identification of patient needs and special attention to their comorbidities.

Purpose: To describe the Radiological features of rheumatoid lumbar spine and to give surgical tips in management of such osteoporotic vulnerable spine.

Study design: Case Presentation of known rheumatoid patient presented with secondary inability to walk with significant back and leg pain. Radiologically She has lumbar spine instability, perivertebral joint erosions and disc erosion, with porotic spine. On MRI She has spinal canal stenosis and multiple disc prolapse. Patient Underwent decompression and fusion with improvement of her neurological state.

Conclusion: Wound complications occur in up to 25% of patients. Generalized osteopenia can cause difficulties with instrumentation so augmented screws with bone cement is recommended.

Risk include non-union and recurrent instability (adjacent segment disease). The current perioperative mortality is reported at 5–10%. Strict image studying and understanding the patient needs is mandatory. Medical treatment for rheumatoid and osteoporosis must be considered.

P1146

ASSOCIATION BETWEEN MUSCLE MASS AND POLYUNSATURATED FATTY ACIDS IN FREE LIVING ELDERLY

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Objective: To analyze the association between skeletal muscle mass index and polyunsaturated fatty acids in free living elderly. **Material and Methods:** A cross-sectional study was conducted involving 331 elderly (≥ 60 yr) who attended community groups in a South Brazilian city. Muscle mass (MM) was estimated by the Janssen et al. (2000) equation, which uses electrical bioimpedance data (reactance and resistance). Skeletal muscle mass index (SMMI) was calculated using the equation $MM/height^2$ (values < 6.76 kg/m² for women and < 10.76 kg/m² for men were considered inadequate). The polyunsaturated fatty acids [ω 3 (n-3), ω 6 (n-6)] and the n-6/n-3 ratio, expressed as a percentage of the total fatty acids identified were determined by gas chromatography with flame ionization detection. Statistical analyses were performed using SPSS[®]22.0. **Results:** The sample was mainly female (84.9%), and the mean age was 70.4 ± 6.4 yr (60–89 yr), and they were. The SMMI mean was 7.70 ± 1.47 kg/m² and median 7.45 kg/m² (interquartile range 6.70–8.32), with 37.5% (n=124) being considered inadequate. The percentage means for n-3 and n-6 were 3.47 ± 1.03 and 39.33 ± 4.12 , respectively. The n-6/n-3 ratio was $12.23:1 \pm 3.46:1$. No significant difference was found between individuals with adequate and inadequate SMMI in terms of the percentage mean for n-3 (3.44 ± 1.00 vs 3.52 ± 1.09 ; $P=0.683$; median 3.28 vs 3.17), n-6 (39.17 ± 3.95 vs 39.60 ± 4.38 ; $P=0.493$; median 39.40 vs 39.87) and the n-6/n-3 ratio ($12.19:1 \pm 3.25:1$ vs $12.28:1 \pm 3.79:1$; $P=0.816$, median $12.16:1$ vs $12.62:1$). In the binary logistic regression analysis (Backward Stepwise method), only gender was associated with the SMMI (men were 4.64% more likely to have inadequate SMMI than

women). **Conclusion:** No associations were found in the present study between the SMMI and polyunsaturated fatty acids. We suggest to conduct further longitudinal studies, given the role inflammation plays in modulating sarcopenia and the anti-inflammatory potential of polyunsaturated fatty acids.

Acknowledgments: We thank the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) for Karen M. M. Margutti's scholarship.

Reference:

JANNSEN, I. et al. Estimation of skeletal muscle mass by bioelectrical impedance analysis. *J Appl Physiol* 2000; 89(2):465-71.

P1147

COMPARISON OF BONE DENSITY MEASUREMENTS IN TWO DIFFERENT POINTS OF THE SKELETON IN MALE GENDER SAMPLE

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Objectives: Osteoporosis is a condition that has been extensively studied in postmenopausal women. Guidelines for osteoporosis in men have only recently been published (2012). The aim of this study is to evaluate the bone density in the male population when measured at two different points of the skeleton. The primary outcome is to find the point that is more representative of the bone mineral density (BMD) of the whole skeleton.

Material and Methods: 1390 adult males were measured by the DXA method (Lunar device). Their mean age was 41 ± 13.9 years and their mean BMI was 26.4 ± 3.0 kg/m². None of the subjects had previously been diagnosed with osteoporosis. None of them were taking medication that affects BMD (thyroxine, cortisone). T-score, Z-score and bone density were measured in all subjects in order to identify the best point for the DXA method in males.

Results: 23,8 % of the males examined were found to have osteopenia ($-1 < T\text{-score} < -2,5$) on the lumbar spine, and 3,4 % had osteoporosis ($T\text{-score} < -2,5$). In the femoral neck, 22,1 % had osteopenia and 1,7 % osteoporosis. Of the subjects that had a normal T-score on the spine (n=1011), 14,3 % were found to have osteopenia and 0,6% had osteoporosis in the femoral neck. Moreover, of the males with normal T-score on the femur (n=1058), 17,9 % had osteopenia in the spine and 0,5 % had osteoporosis. 38,1 % of the subjects presented with a difference in T-score of > 1 SD between the lumbar spine and femoral neck. The relative risk was 2,81 (95% CI: 2,4-3,3), $p < 0,001$, for measuring only the lumbar spine, and 3,07 (95%

CI: 2,56 – 3,68), $p < 0,001$ for measuring only the femur, meaning that if we were to measure only one point in the skeleton, we would have a three-fold risk to make a false diagnosis.

Conclusions: A not insignificant number of men have a reduced bone density (osteopenia or osteoporosis). 38.1% of the examined patients showed a difference between T-score of the lumbar spine and the femoral neck > 1 SD. A patient having low bone density in a section of the skeleton, has an increased tendency to also have low bone density on the other point of the skeleton. Nevertheless, a significant proportion of men having normal bone density in one point, is found to have reduced bone density in the other. Therefore, the measurement of both sites leads to a more accurate diagnosis of osteopenia or osteoporosis in the male gender.

Disclosures: none

P1148

TRANSIENT OSTEOPOROSIS OF THE HIP DURING THE PREGNANCY. THE IMPORTANCE OF SCREEING AND THE EARLY DIAGNOSIS DURING THE RUTINARY PREGNANCY CHECK-UP

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Introduction and Objectives: Transient osteoporosis (TO) of the hip is an not a common condition and causes temporary bone loss in the upper portion of the femur. *It is very different from the much more common age-related osteoporosis. Age-related osteoporosis is a painless, progressive condition that leads to a weakening of the bones throughout the body meanwhile people with transient osteoporosis experience a sudden onset of pain that intensifies with walking or other weight-bearing activities symphoms that overlaps with the typical pregnancy conditions due to a fisiological weight gain and uterous position complicating the diagnosis. It is known that Transient Osteoporosis can put patients at greater long-term risk for fractures in different areas of the body.*

Painful symptoms gradually subside and usually end within 6 to 12 months. Bone strength in the hip also returns to normal in the majority of people, however if not diagnosed on time may lead to bone fractures.

Methods:

Case Report: Presentation of two cases of Transient Osteoporosis of the hip during pregnancy with its different resolution.

Patient 1: 31 – year – old female in her third trimester of pregnancy, with medical history of mild asthma and migraines. Nausea and vomiting during her first term of pregnancy.

Examination: bilateral hip pain exacerbated by activity, motion of the hip limited.

Review of systems was negative for fever, chills, fatigue, headache, chest pain, palpitations, abdominal pain, paresthesias, or any other symptoms.

During her third term of pregnancy the patient suffered from severe pain and physical disability. Generalized osteopenia was revealed in x -ray image, confirmed by a densidometry. The patient was referred from primary care to a specialist for further tests and medical follow up (MRI, densidometry) and treatment that in ocasions includes intravenous biphosphonates with beneficial effects on both clinical symptoms and bone density. The features of this rare and sometimes underdiagnosed condition are reviewed. Intravenous biphosphonates seem to be an effective therapy for TOH.

Patient 2: 35 - year- old female in her third trimester of pregnancy, with no significant medical history, presented to her clinician with a 3 week long left hip pain associated with knee pain that became more severe in the last 24h. Treated with analgesics (paracetamol and opioids) for the last two weeks that did not alleviate her symptoms.

Examination: left hip pain exacerbated by activity, which limits motion of the hip.

Review of systems was negative for fever, fatigue, headache, chest pain, palpitations, nausea, vomiting, abdominal pain, paresthesias, or any other symptoms. She was evaluated by physical therapy, and assigned physical exercises as well as recommended to use a walker. Given her unrelenting pain, which had progressively worsened over time, an X -rays of the pelvis and hips was performed that revealed subcapital left hip fracture and necrosis of femoral head that needes to undergo a surgical treatment.

Abbreviations: X-rays, plain radioghaphy, CT, computed tomography; MRI, magnetic resonance imaging

Results: Both patients were examined with x-rays, densidometry and MRI.

(Patient 1: T-score - 2.5, Z - score - 1,9; Patient 2: T-score 3,2, Z – score 2,3)

CONCLUSION: Transient osteoporosis of the hip (TOH), also known as bone-marrow edema syndrome, is a rare skeletal disorder of unknown etiology. It can occur in women and middle-aged men, but most often occurs in previously healthy women during the third trimester of pregnancy. It is essentially a diagnosis of exclusion. An early diagnosis may prevent bone fractures and reduce its risk.

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2. Vester H. et al Fractures due to transit osteoporosis of pregnancy. Orthopedics, 2013, Jul. 36 912 – 6.

P1149**IMPACT OF THE RENAL FUNCTION ON SCLEROSTIN DETERMINATION: ILLUSTRATION WITH FOUR DIFFERENT ELISA METHODS IN PATIENTS UNDERGOING GFR DETERMINATION WITH IOHEXOL**E. Cavalier^{1,2}, J.-Y. Reginster^{1,2}, P. Delanaye^{1,2}¹University of Liège, Liège, Belgium, ²CARES sprl, Liège, Belgium

Introduction: Sclerostin (SCL) is a promising biomarker for bone research. It has also been associated, in some studies, with mortality in hemodialyzed (HD) patients. However, literature is conflicting on that point and some authors have pointed out that assays used for SCL might explain these discrepancies. It remains unclear whether these discrepancies come from a lack of clearance or a lack of specificity of the antibodies used in the assays.

Patients and methods: We have measured SCL concentrations in 150 healthy and CKD patients who had undergone GFR determination with the iohexol method. We have also measured SCL before and after a single dialysis session in 44 patients. Each sample has been measured with 4 different ELISA: Biomedica (B), MSD (M), R&D (R) and Teco (T).

Results: Median [IQR] SCL concentration in the non-HD patients were very different according to the method: B : 1017 [546], M : 36 [21], R : 160 [101] and T: 629 [325] pg/mL. We did not observe any systematic differences between the methods. In univariate analysis, we observed a significant and inverse relation between GFR and SCL when measured by B, R and T but not with M. The different assays also showed a wide variation in HD patients. With B and R methods, HD patients presented median values higher than those whose GFR was >45 mL/min, but were similar with those presenting GFR >45 mL/min. With T method, the median observed in HD patients was higher than in non-HD patients, whatever the GFR. On the contrary, median SCL was lower in HD than in non-HD patients with the M method. After a dialysis session, a significant decrease was observed in HDF, but not in HD mode and was always more important if SCL was measured with T, B and R methods, compared to the M one.

Discussion: SCL determination in CKD patients is challenging and any conclusion is method-depending. Previously described relations between GFR and SCL levels may be an analytical artifact with inactive SCL fragments that would accumulate when GFR decreases and would be recognized by T, B and R, but not M method.

Conclusion: SCL determination clearly impacts finding previously observed in CKD and HD patients.

P1150**LOW BONE MINERAL DENSITY IS A MAJOR CONTRIBUTOR IN THE GLOBAL HEALTH BURDEN DUE TO ROAD TRAFFIC ACCIDENTS IN PEOPLE AGED 50 YEARS AND ABOVE**N. M. Wilson¹, L. Sanchez-Riera², D. Prieto-Alhambra³, C. Cooper⁴, P. Halbout⁵, A. Woolf⁶, L. March¹

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Objectives: To measure the proportion of the worldwide health burden of road traffic accidents (RTA) in people aged 50 years and above attributable to low bone mineral density (BMD), as part of the Global Burden of Diseases (GBD) study.

Methods: The estimates followed the Counterfactual Risk Assessment Methodology used in the GBD study (1). Systematic review was performed seeking population-based studies with femoral neck BMD (FNBMD) measured by Dual-X-Ray-Absorptiometry in people 50 years and over. Age- and sex- specific levels of mean FNBMD \pm SD (g/cm²) were extracted from eligible studies, and this was used as the exposure variable. The age and sex-specific 99th percentile from non-Hispanic whites in National Health and Nutrition Examination Survey (NHANES) 2009-2010 was used as theoretical minimum risk factor exposure distribution, to estimate the potential impact fraction (PIF) of FNBMD for fractures. Relative risks of FNBMD for fractures were obtained from a previous meta-analysis (2). Attributable deaths due to RTA-related fractures were obtained through coded hospital data. Disability levels were established by applying disability weights to each type of fracture. Then, PIFs were applied to obtain attributable deaths and disability due to low BMD.

Results: Globally, in 2015, 12.0% (95% CI: 10.5-13.3%) and 29.2% (29.0-30.3%) of deaths caused by RTA were attributable to low BMD in the population aged 50-69 and 70 years and above, respectively. This represents a 64% and 97% increase in absolute deaths from 1990 data, respectively. The percentage of global health burden caused by RTAs attributable to low BMD in the population aged 50-69 was 13.6% (11.6-15.4%) and for 70 and over 26.2% (24.9-27.5%). This represents a 64% and 80% increase, respectively, from 1990 data. For disability, in the population aged 50-69 was 22.3%

(19.2-25.2%) and for 70 and over 28.2% (26.3-29.8%). This represents 64% and 84% increase, respectively, from 1990.

Conclusions: This data shows the non-previously reported important role of low BMD as a preventable risk factor for RTAs' health burden in population 50 years and over, and its growing trends, which requires urgent attention.

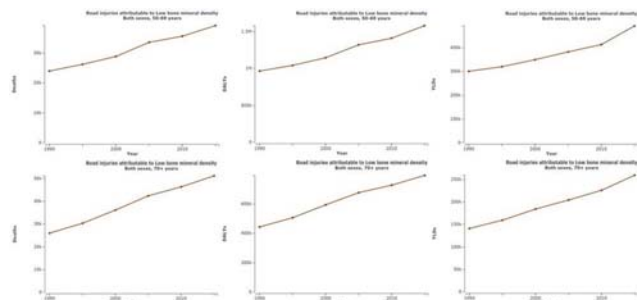


Fig. 1 Deaths, DALYs and YLDs caused by road injuries attributable to low BMD among age groups 50-69 and 70 years and older (Available at <http://vizhub.healthdata.org/gbd-compare/>)

References: 1. Forouzanfar M et al, Lancet 2016; 2. Johnell O et al, JBMR 2005.

P1152

A LARGE NUMBER OF FRAIL OLDER ADULTS LIVING IN LONG TERM CARE HOMES ARE AT HIGH RISK FOR HIP FRACTURE

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Objectives: To determine the percent distribution of LTC residents among the 8 individual risk levels of our hip fracture prediction outcome scale and to examine if the distribution would be beneficial for the potential transformation of our instrument to a Clinical Assessment Protocol (CAP).

Material and Methods: Our outcome scale was developed using the Resident Assessment Instrument – Minimum Data Set 2.0 (RAI-MDS) for all residents with a LTC admission assessment from Ontario, Canada from April, 1, 2006 to March, 31, 2010 (N=29,848). The scale was created using decision tree analysis and includes traditional risk factors for fracture such as prior fractures and fall, age, gender, height and weight, and LTC specific risk factors for the frail elderly such as cognitive function,

falls, wandering and, transfer status. The outcome scale is capable of both discriminating and predicting residents at risk for hip fracture over a one year time period. The scale will be implemented within the RAI-MDS and potentially converted into a CAP. CAP's are used to assist health care providers to interpret systematically information that is recorded within the RAI-MDS and to provide recommendations for care planning of frail older adults. For the current analysis, the distribution of LTC residents among the 8 individual risk levels of our scale will be examined.

Results: Approximately 45% of LTC residents were 85 years and older, 2/3 were women, 1/3 had a prior fall within the past 180 days, and 3% had a prior hip fracture within the past 180 days. A total of 1553 (5.2%) new fractures (including hip, spine humerus, forearm, and pelvis) and 959 hip fractures (3.2%) were reported over the one year time period. The outcome scale has 8 risk levels of absolute hip fracture risk, which range from 0.6 to 12.6%. The distribution of residents within each risk level decreased as the risk level for hip fracture increased (Table). The distribution property of the scale allocates 56% of the assessed residents into the lowest three risk levels, 36% for risk levels 4 to 6, and 8% for the two highest risk levels.

Conclusion: The large population of lower risk residents is important because the management of too many high risk individuals may quickly overwhelm LTC resources that are needed for clinical care. The scale's properties are beneficial for the potential transformation of our tool to a CAP, which will assist clinicians in resident care planning for hip fracture.

Table 1 Distribution of Residents Within Each Risk Level of our Outcome Scale

| Hip fracture risk level categories | % (n) in each level |
|------------------------------------|---------------------|
| Hip fracture risk level 1 | 13.5 (4,014) |
| Hip fracture risk level 2 | 18.3 (5,446) |
| Hip fracture risk level 3 | 24.1 (7,198) |
| Hip fracture risk level 4 | 17.0 (5,065) |
| Hip fracture risk level 5 | 16.6 (4,948) |
| Hip fracture risk level 6 | 2.1 (636) |
| Hip fracture risk level 7 | 8.0 (2,382) |
| Hip fracture risk level 8 | 0.5 (159) |

P1153

TITLE: MATERNAL WEIGHT GAIN DURING PREGNANCY AND OFFSPRING BONE PROPERTIES: A DIFFERENTIAL ASSOCIATION IN OVERWEIGHT WOMEN

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Objective: Weight management strategies during pregnancy have been shown to reduce maternal and child cardiometabolic risk. However, since maternal body size has an overall positive correlation with offspring bone mass, pregnancy weight management may also affect offspring skeletal health. Our objective was to assess whether bone physical properties of the offspring at 7 years of age (7y) were associated with maternal gestational weight gain (GWG), particularly in women who were overweight before pregnancy.

Material and Methods: We analyzed prospective data from a subsample of 1953 participants from the Generation XXI birth cohort who underwent whole-body DXA scan at 7y. Using prepregnancy weight (self-reported) and height (measured or abstracted from ID card) maternal prepregnancy BMI was calculated. Gestational weight gain was computed as the difference between self-reported pre-delivery weight and prepregnancy weight. In the whole sample and for each BMI category (under/normal weight and overweight/obese), associations between GWG and offspring subtotal BMC and aBMD were estimated through linear regression coefficients (95%CI), crude and adjusted for maternal age, height and education.

Results: Mean (SD) GWG was 14.4 (4.1) kg in under/normal weight and 13.1 (4.4) kg in overweight/obese mothers. Overall, GWG was positively associated with offspring BMC and aBMD at 7y of age [standardized β (95%CI): 0.04 (0.00, 0.08) and 0.05 (0.01, 0.09)]. After BMI stratification (figure 1), the association between GWG and child's BMC and aBMD remained significant among under/normal weight mothers, in both crude [0.08 (0.03, 0.13) and 0.10 (0.04, 0.15)] and adjusted models [0.06 (0.00, 0.11) and 0.07 (0.02, 0.12)]. However, among overweight and obese mothers, we observed no beneficial effect of higher GWG on offspring bone properties, in either crude or adjusted models [crude: 0.03 (-0.05, 0.10) and 0.04 (-0.04, 0.12) and adjusted: -0.01 (-0.08, 0.07) and 0.00 (-0.07, 0.08), for BMC and aBMD, respectively].

Conclusion: We estimated a differential effect of GWG on offspring bone properties according to maternal weight before pregnancy. Our results suggest that weight management among overweight and obese pregnant women is unlikely to have a negative repercussion on offspring bone physical properties.

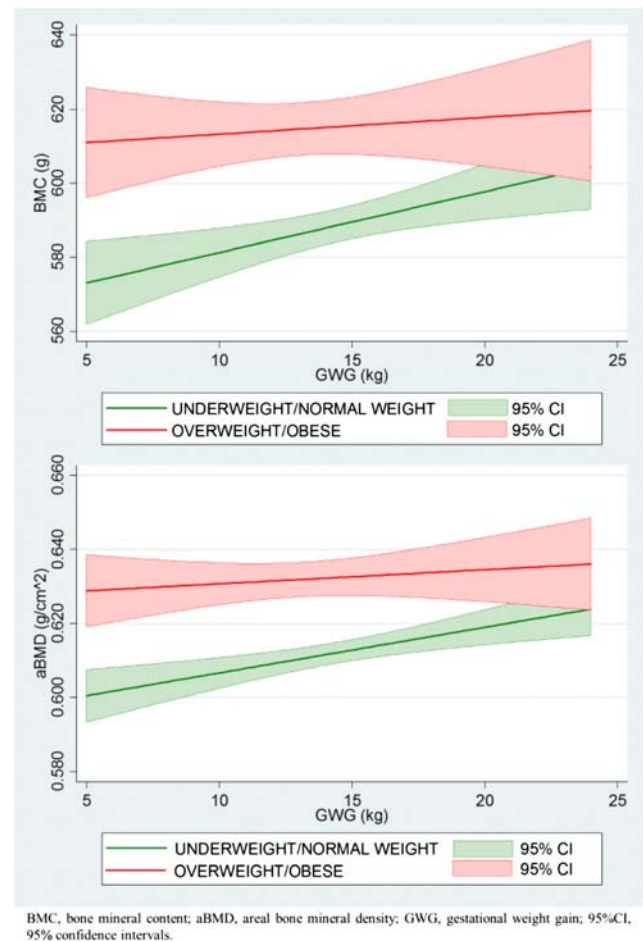


Fig. 1 Associations between gestational weight gain and offspring bone properties by prepregnancy body mass index

P1154

ASSOCIATION OF CIRCULATING MIRNAS WITH OSTEOARTHRITIS

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Background: Sensitive and specific blood biomarkers to detect the initial stages of osteoarthritis (OA) and to predict the future development of the disease are not available in clinical routine. Consequently, there is a considerable interest in the identification of new markers. In this study, we analyzed the differential expression of circulating microRNAs (miRs, small non-coding RNAs) in subjects with and without OA in the OFELY cohort.

Methods: The study group included French women belonging to the population-based cohort OFELY (Os des Femmes de LYon). Expression levels of serum miR were measured in 10 healthy women without OA at any site (knee, lumbar spine, hip and hand) and in 10 women with a Kellgren & Lawrence score of 2 and 3 (early and intermediate knee OA) and OA at others sites (spine disc, hand, hip). These evaluations have been performed at the same visit, 8 years after recruitment of the cohort. Both groups were matched for age (healthy: 61.9 ± 3.03 and OA: 63.9 ± 3.4 $p=0.17$) and menopausal status. The expression of the serum micro-RNAs was measured by the Next Generation Sequencing (NGS) method according to the manufacturer's protocol (EXIQON, Denmark). Measurements were expressed as Tags per million (TPM), the number of reads for a particular miR is divided by the total number of mapped reads and multiplied by 1 million.

Results: We identified 421 miRs with an expression level ≥ 1 TPM and 241 with an expression level ≥ 10 TPM. When we compared the two groups, 22 miRs showed differential expression ($p < 0.05$) between controls and OA patients. After Benjamini-Hochberg False Discovery Rate (FDR) correction has-miR-139-5p, has-miR-1299 and has-miR-200a-3p remained significantly different between OA patients and controls ($p < 0.05$, FDR at 5%) (Table).

| names | Log Fold change | P-value | FDR | Healthy average TPM | OA average TPM |
|-----------------|-----------------|----------|----------|---------------------|----------------|
| has-miR-139-5p | 0.734682 | 0.000126 | 0.043432 | 90.1 | 143.3 |
| has-miR-1299 | -3.38328 | 0.000201 | 0.043432 | 12 | 0.8 |
| has-miR-200a-3p | -1.881 | 0.000328 | 0.047335 | 77.2 | 29.4 |

Conclusion: With a NGS screening approach, we identified 3 miRs that are differentially expressed in women suffering from OA compared to healthy women. The next step will be the measurement of these specific miRs in the entire cohort to determine the clinical utility of these markers.

P1155

BOTH A NOVEL HYBRID COMPOUND LLP2A-ALE AND hPTH (1-34) PREVENTED GLUCOCORTICOID-INDUCED OSTEONECROSIS AND REDUCTION IN VASCULARITY IN A MOUSE MODEL

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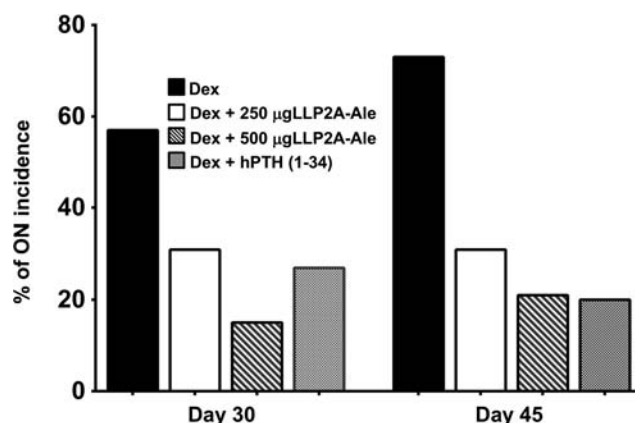
Objective: Glucocorticoids (GCs) prescribed for inflammatory diseases are a major risk factor for osteoporosis

and atraumatic osteonecrosis (ON). Presently, there is no effective medical treatment for GC-induced ON. We have previously shown that treatment with both LLP2A-Ale and hPTH (1-34) directed mesenchymal stem cells to the bone surface and prevented GC-induced bone loss and reduction in vascularity in mice. The aim of this study was to determine if LLP2A-Ale and hPTH (1-34) could prevent GC-induced ON and maintain the vasculature within the distal femur.

Methods: Seven-week-old male BALB/c mice were randomized into Placebo, GC (4 mg/L dexamethasone in drinking water), GC + 250 $\mu\text{g}/\text{kg}$ LLP2A-Ale (every 2 weeks), GC + 500 $\mu\text{g}/\text{kg}$ LLP2A-Ale (every 2 weeks), and GC + 40 $\mu\text{g}/\text{kg}$ hPTH (1-34, 5x/week). Mice were sacrificed on day 30 or day 45. Study endpoints included bone mass, histologic evidence of ON, prevalent blood vessels (CD31 and Endomucin expression) in the distal femur. Non-parametric Kruskal-Wallis tests were used to determine the differences between the groups.

Results: GCs significantly reduced trabecular bone volume and trabecular thickness compared to placebo on day 30 and 45 ($p < 0.05$). Trabecular number was significantly reduced on day 45 ($p < 0.05$). Both LLP2AAle and hPTH (1-34) treated animals had higher bone volume and lower trabecular separation compared GC group on day 30 and 45 ($p < 0.05$). The incidence of GC induced ON was 57% on day 30 and 73% on day 45 and both LLP2A-Ale and hPTH (1-34) prevented incident GC-induced ON lesions (Figure 1). Compared to LLP2A-Ale, hPTH (1-34) and placebo, GCs decreased the staining intensity of both CD31 and Endomucin expression on day 30 and 45.

Conclusion: GCs induced trabecular bone loss and ON lesions in BALB/c mice. Both LLP2A-Ale and hPTH (1-34) reduced the incidence and severity of GC-induced ON and maintained vascular integrity. Therefore, both LLP2A-Ale and hPTH (1-34) could be potent agents in the treatment and prevention of GC-induced ON.



P1156**BONE MINERAL DENSITY AND BODY COMPOSITION AMONG ATHLETES: LIGHTWEIGHT VERSUS HEAVYWEIGHT SPORTS**

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Objectives: Energy restriction and weight loss techniques are associated with adverse effects on bone mineral density (BMD) whilst participation in sports is known to be beneficial for skeletal health. However, it is not entirely clear the skeletal health status in lightweight sports where participants often use weight management techniques to attain relatively low mass. Therefore, the aim of this study is to evaluate the differences in BMD and body composition among athletes engaged in weight restricted and non-weight restricted sports.

Methods: A total of 177 athletes (18 runners, 28 rugby players, 84 rowers and 47 ballet dancers) were recruited. BMD and body composition was assessed by Dual-energy X-ray absorptiometry (DXA), utilising either the GE Lunar iDXA or the GE Lunar Prodigy. Participants were categorised into two groups according to their sport characteristics: lightweight (sports where a categorical weight restriction is applied or where low mass is deemed advantageous, e.g., lightweight rowers, ballet, long distance running) and heavyweight (sports with no weight restrictions, e.g., rugby, heavyweight rowing and sprinters). Means with standard deviations (\pm SD) were calculated for each measurement in males and females, separately. Student t-test was used to determine mean differences between weight groups.

Results: Eighty-two males (45.1% lightweight) and ninety-five females (53.7% lightweight), median (IQR) age: 22.9 (20.7-26.8) years, were analysed. In heavyweight males, BMD was significantly higher in lumbar spine (1.326 ± 0.158) and body without head (1.267 ± 0.111) compared with lightweights (1.248 ± 0.147) and 1.164 ± 0.093 , respectively) at $p < 0.05$. Significant differences were also found between female heavyweight and lightweight participants at the same measured sites

($p < 0.05$). There was no significant difference for BMD at the femoral neck and total hip between weight classes. Heavyweight athletes had significantly higher body mass index, lean mass and fat mass compared to their lightweight counterparts ($p < 0.05$).

Conclusions: The present findings suggest that weight classification in sports may be an important determinant of bone health. Further research will bring together collaborative groups to create a comprehensive view on the effects of sport weight-restriction on BMD and body composition.

Table 1 Bone mineral density information according to gender and weight group (n=177)

| | Male | | Female | |
|---|--------------------------------|----------------------------------|--------------------------------|---------------------------------|
| | Heavy-weight (n=45) | Light-weight (n=37) | Heavy-weight (n=44) | Light-weight (n=51) |
| <i>Spine (L1-L4)</i> BMD(SD) | 1.326 (0.158) | 1.248 (0.147)* | 1.263 (0.149) | 1.198 (0.156)* |
| <i>Femoral-Neck</i> ¹ BMD (SD) | 1.228 (0.171) | 1.209 (0.151) | 1.129 (0.109) | 1.092 (0.131) |
| <i>Total Hip</i> ¹ BMD (SD) | 1.224 (0.149) | 1.196 (0.130) | 1.149 (0.120) | 1.095 (0.159) |
| <i>Whole Body</i> ² BMD(SD) | 1.267 (0.111) | 1.164 (0.093)** | 1.097 (0.085) | 1.052 (0.083)* |

-
V00198-017-3950-2Fhbdc.tif' values are mean (SD)
BMD measured in g/cm²

SD Standard Deviation

¹ Left side only

² Whole body minus head

Significant values are highlighted in bold:

* $p < 0.05$, ** $p < 0.001$

Note: 5 lightweight male and female did not have data available for BMD at total hip, 7 and 5 lightweight male and female, respectively, did not have data available for BMD at whole body

P1157**PRELIMINARY RESULTS OF THE ESCAPE TRIAL: EARLY SURGERY VERSUS CONSERVATIVE TREATMENT WITH OPTIONAL DELAYED MENISCECTOMY FOR PATIENTS OVER 45 YEARS WITH NON-OBSTRUCTIVE MENISCAL TEARS**

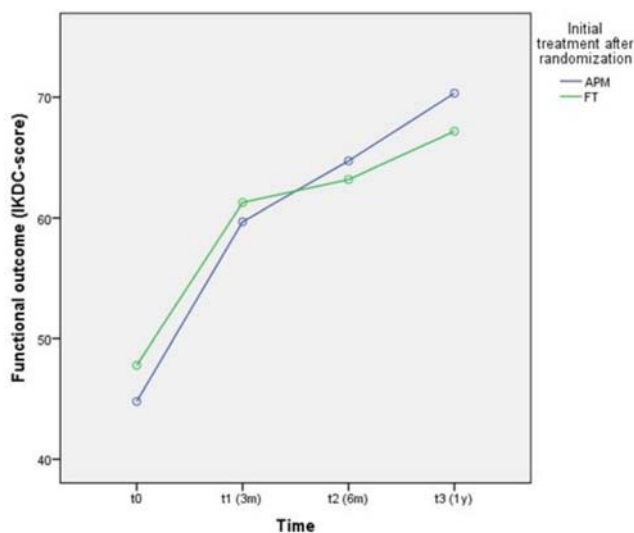
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Objectives: Purpose of the present study is to compare the functional outcome of Arthroscopic Partial Meniscectomy (APM) and Physical Therapy (PT) in patients between 45 and 70 years with a degenerative meniscal tear. Although APM is currently under scrutiny, it is still the most performed surgical procedure in orthopaedic surgery with approximately 700,000 performances annually in the United States of America. In this trial we aim to prove non-inferiority of conservative treatment compared with surgery.

Material and Methods: We conducted a multicentre randomised controlled trial (RCT) in seven hospitals in The Netherlands and included 321 participants with an MRI-confirmed symptomatic, non-obstructive meniscal tear. Patients were randomly assigned to either APM or PT. As primary outcome we used the International Knee Documentation Committee 'Subjective Knee Form' IKDC SKF. Secondary outcomes included change in general health, quality of life, pain, level of activities and patient-specific complaints. Follow-up assessment were performed at 3, 6 and 12 months after randomization.

Results: In the intention-to-treat analysis, the mean improvement in the IKDC score after 1 year was 25,6 points (95% confidence interval [CI], 22,3 – 28,8) in the APM group and 19,0 (95% CI, 16,0 – 22,0) in the PT group, which resulted in a significant mean difference of 6,55 points (95% CI 2,1 – 11,0; $P = ,004$) in favour of surgery. The repeated measures analysis of variance showed a large main effect of time ($P = ,000$; ES, ,600) but no significant main effect of groups ($P = ,984$; ES ,000) (Figure I). Also, there was an interaction effect between time and treatment group ($P = ,031$).



Conclusion: After one year, both APM and PT showed significant improvement in physical function in middle aged patients with an obstructive meniscal tear. There is no significant benefit of APM over PT for physical function. Therefore, an initial conservative approach with physical therapy should be

considered in patients between 45 and 70 years with a non-obstructive meniscal tear.

P1158

PERSISTENCE WITH TREATMENTS FOR OSTEOPOROSIS: A REAL-WORLD STUDY IN THE PHARMO DATABASE NETWORK

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Objectives: To describe persistence with treatments for osteoporosis in a real-world setting.

Material and Methods: From PHARMO's General Practitioner Database, patients with an osteoporosis (OP) drug prescription between 2007-2013 were selected and included in one or more of the following cohorts: (daily or weekly) alendronate, half-year subcutaneous injection denosumab, (intravenous (IV)) or oral) ibandronate, (daily, weekly or monthly) risendronate, raloxifene, teriparatide, or yearly IV zoledronic acid. Persistence was defined as the number of days of uninterrupted use (gap between prescriptions <60 days) of the OP treatment defining the cohort. Persistence rates were determined after one and two years (for patients with complete follow-up).

Results: The study included 37,018 patients of which the majority used weekly alendronate (60%) followed by weekly risendronate (28%). The majority of patients was female (between 74-99% across cohorts) and mean age ranged between 63-72 years across cohorts. Approximately half of the patients had at least two years of follow-up. After one year, by definition the zoledronic acid cohort had a persistence rate of 100%. The persistence rate at one year was 79% for the denosumab cohort. After two years of follow-up, the persistence rate for zoledronic acid cohort was 65% followed by the denosumab cohort (59%). The persistence rate was higher for weekly versus daily antiresorptive treatment. Median time until treatment change ranged from 133 days for daily alendronate to 664 days for IV ibandronate. Zoledronic acid and denosumab had a median time until treatment change of >730 days. Similar results were found for patients ≥ 70 years of age.

Conclusion: It is likely that the prescription regimen of zoledronic acid and denosumab has a positive contribution to the high persistence rates; zoledronic acid is infused once a year and denosumab injected twice a year. This study showed that less frequent dosing of OP treatments results in better persistence. This is also applicable for elderly patients using OP treatments.

Disclosures: JK, JO and FP are employees of the PHARMO Institute which performs financially supported studies for government and related healthcare authorities and several pharmaceutical companies. GW and MI are employees of Amgen and own stock in Amgen.

World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2017): Satellite Symposia Abstracts

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Real-life endorsement of the ESCEO algorithm for the management of knee OA

Sponsor: MYLAN

SY1

SURVEY OF ESCEO ALGORITHM: METHODOLOGY AND RESULTS

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In 2014, the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) published a stepwise algorithm for the management of knee osteoarthritis (OA) in clinical practice.¹ At the 2015 ESCEO congress, a survey was conducted with the aim of assessing attitudes towards the ESCEO algorithm. Almost 200 clinicians from across Europe completed the survey (N=198). Among participants, 83% routinely treated patients with OA, and 67% saw patients with OA on a daily basis. The results identified that paracetamol is still a first-line treatment choice of 55% of participants, among whom 60% prescribe paracetamol on a regular basis and 34% prescribe paracetamol in addition to a symptomatic slow-acting drug for OA (SYSADOA). Of the SYSADOAs, there was a clear preference among 66% of responders to use prescription crystalline glucosamine sulfate (pCGS) first line, with chondroitin sulfate (CS) as the second-line choice of 46% of responders, diacerein third choice (29%) and avocado soybean unsaponifiables (ASU) fourth choice (30%). pCGS was afforded the highest rating of effectiveness among SYSADOAs and given a mean effectiveness score of 6.2 by responders (on a scale of 1–10 with 10 the most effective) as compared with 5.4 for CS, 4.1 for diacerein, and 3.9 for ASU. A high proportion of participants (58%) considered that pCGS acts both on symptoms and disease structure. For treatment with

non-steroidal anti-inflammatory drugs (NSAIDs), 90% of responders prescribe topical NSAIDs, and 78% of responders prescribe oral NSAIDs for intermittent use. Intra-articular (IA) hyaluronic acid (HA) was prescribed by 85% of participants and was afforded a high level of effectiveness (mean score 7.8), with the opinion that HA provides both restoration of lubrication and long-term symptom improvement. To achieve maximal benefit, the majority of clinicians (54%) favoured multiple injections with a medium molecular weight HA (500 to 4000 kDa). IA corticosteroids were prescribed by 80% of participants with a mean effectiveness rating of 6.8. Overall, responders rated the ESCEO algorithm with a mean score of 7.7 for utility, feasibility and suitability. Further survey results will be presented and discussed during this symposium.

1. Bruyère O et al. *Semin Arthritis Rheum* 2014;44:253–63.

SY2

THE NEED FOR EVIDENCE-BASED ASSESSMENT OF THE LONG-TERM EFFICACY OF MEDICATIONS IN KNEE OSTEOARTHRITIS: A NEW SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS

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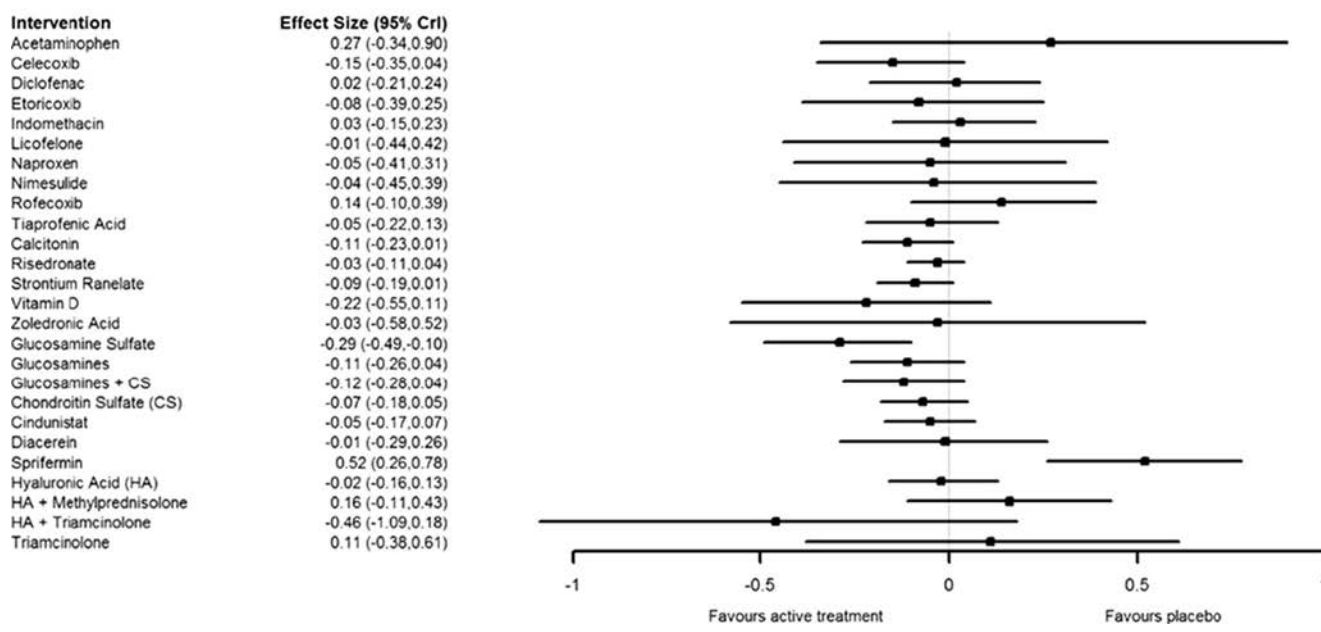
Osteoarthritis (OA) is a chronic and progressive degenerative disease, whose management requires long-term interventions to control disease progression with respect to symptoms and joint structure changes. Conversely, most medications have been studied in clinical trials mainly for the relief of pain and function over limited treatment durations, commonly ≤6 months. This is reflected in the many meta-analyses of trials, whose results can hardly be extrapolated to the usefulness of these medications for the appropriate management of the

disease. Moreover, the effect size (ES) e.g. on pain control of available OA medications is seldom higher than small-to-moderate, which further questions their utility even when limited to short-term treatment. Thus, the most widely used pharmacological class of symptomatic medications, i.e. Cox-2 selective or non-selective non-steroidal anti-inflammatory drugs (NSAIDs) have ES usually below 0.40 (Bjordal 2007) and only recently differences have been identified among the different agents, but always with small ES and, above all, for short-term treatments usually ≤ 3 months (da Costa 2016): their efficacy in the long run is unknown, while we know the long-term safety issues on the cardiovascular, renal and gastro-intestinal systems. The simple analgesic paracetamol has an ES in mostly short-term trials that is even below 0.20 (da Costa 2016) and is no longer recommended by many practice guidelines. In other meta-analyses, intra-articular (i.a.) treatments are superior to NSAIDs, but this is possibly due to the integrated i.a. placebo effect (Bannuru 2015): i.a. hyaluronic acid (HA) is the most efficacious intervention in trials of 6 months mean duration, where its efficacy trajectory can be well differentiated e.g. from that of i.a. corticosteroids (Bannuru 2011).

We have therefore recently performed a systematic review and network meta-analysis of randomized controlled trials (RCTs) of at least 12-month duration, assessing published evidence of medications for knee OA symptoms and/or joint structure changes. A total of 38 RCTs involving 18833 patients met the long-term eligibility criteria. All available pharmacological intervention categories were represented, including paracetamol, NSAIDs, corticosteroids, bone acting agents, Slow Acting Drugs in OA and putative disease-modifying drugs. There was no evidence of efficacy for most interventions vs placebo, with the exception of prescription glucosamine sulfate that was significant on pain (Figure) and physical function, with Glass' Delta ES of -0.29 [95% credibility interval: -0.49 ; -0.10] and -0.32 [-0.52 ; -0.12], respectively. Glucosamine sulfate, chondroitin sulfate and strontium ranelate were the only interventions able to significantly reduce radiologic joint space narrowing (ES 0.42 [0.20; 0.64], 0.20 [0.08; 0.31] and 0.20 [0.06; 0.35], respectively).

The management of OA should involve effective chronic medications and drugs for the short term control of symptom flares.

Estimates of long-term treatments compared with placebo (primary outcome - Pain)



Advancing the management of osteoporosis

Sponsor: RADIUS HEALTH

SY3

ADVANCING THE MANAGEMENT OF OSTEOPOROSIS

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Objectives: To review the mechanisms by which pharmacologic interventions can improve bone strength; to identify and

describe the unmet needs in osteoporosis management and the burdens they impose on patients and healthcare systems; to understand and consider the relative strengths and limitations of treating to goal in osteoporosis.

Bone fragility can be caused by increased bone remodeling and unbalanced coupling between resorption and formation as well as by decreased modeling of new bone. Osteocytes play an important, if incompletely understood, role in these processes, and bone-forming agents can impact modeling, remodeling, and osteocytes directly. Given this context, Dr Sergio Ferrari will focus on the details of, and potential differences in, the mechanisms of parathyroid hormone receptor agonists as applied to the treatment of osteoporosis.

With the aging of the population, a gap in the treatment of osteoporosis is growing, including in the efficacy of osteoporosis drugs to reduce the risk of nonvertebral fractures. Dr René Rizzoli will discuss this unmet need and how it may be mitigated by enhanced identification and management of immediate fracture risk.

Treating to goal is a concept that has gained prominence in many therapeutic areas and has gained attention in the management of osteoporosis. Dr Michael McClung will review the objectives of osteoporosis treatment approaches and discuss goals of therapy and the feasibility of specific patient types reaching treatment goals. Informed by this understanding, he will analyze the strengths and limitations of the treat-to-goal concept as it pertains to osteoporosis.

Conclusions: Osteoporosis is associated with a great deal of unmet medical need and patient burden. By understanding the processes that cause bone fragility, the mechanisms of drugs to treat it, and the application of personalized approaches to management, we can hope to fill the unmet need and improve the lives of patients who have osteoporosis.

Acknowledgment: This program was funded by Radius Health Inc.

Disclosures: Dr Sergio Ferrari acknowledges receipt of consulting fees and speaking fees from AgNovos Healthcare, Amgen Inc, Eli Lilly and Co, Merck Sharp & Dohme Corp, Radius Health Inc, and UCB SA.

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Dr René Rizzoli acknowledges receipt of consulting fees and speaking fees from Danone, EffRx Pharmaceuticals, Nestlé, ObsEva SA, and Radius Health Inc.

Time to improve the management of osteoarthritis: let us forget the old stereotypes

Sponsor: IBSA

SY4

ADVANCED KNEE OSTEOARTHRTIS: SURGICAL THERAPY VS PHARMACOLOGIC THERAPY

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Objective: To compare and contrast interventions for advanced osteoarthritis (OA) of the knee.

Results and Discussion: Osteoarthritis (OA) accounts for 2.4% of all years lived with disability (YLD) and has been ranked as the 10th contributor to global YLDs. Disability associated with OA from 1990 to 2013 showed a 75% increase. In addition, untreated, ongoing pain leads to increase all cause mortality in individual patients.

Surgical replacement of the knee or limited surgical correction of cartilage, meniscal, ligamentous, or bone damage remains a mainstay of therapy for patients with advanced OA suffering intractable pain and/or associated disability. Not all such patients are eligible for surgery likely due to comorbid medical conditions. There are also risks associated with such surgical interventions. These risks include acute and chronic post-surgical events such as infection, thromboembolism, stroke risk in, delirium, osteomyelitis, loosening or fracture of the replaced joint.

Presently, the pharmacologic therapy for advanced OA of the knee remains palliative. Treatment guidelines suggest non pharmacologic followed by pharmacologic step wise therapy. These pharmacologic treatments include chondroitin sulfate and glucosamine, available in the European markets as drugs, while in US as Food Supplements, topical capsaicin, topical non steroidal antiinflammatory drugs (NSAIDs), simple analgesics such as acetaminophen (US), paracetamol (Europe), tramadol, systemic NSAIDs, and various opioids. Intra articular injections of various forms of glucocorticoids and various forms of hyaluronic acid are also useful. Some of these therapies have been demonstrated to provide symptom relief in randomized controlled trials relatively rapidly and others take more time. Some evidence demonstrates that chondroitin sulfate, in comparison to NSAIDs, has a slower but gradually increasing clinical activity in knee OA that goes well beyond the end of treatment (carry-over effect). The variable defined safety of all of these therapies plays a role in choice.

The development of drugs to alter the natural history of the fundamental progression of OA is very important. Structure modifying drugs or disease modifying OA drugs (DMOADs) could be targeted to altering the progression of change in the subchondral bone, the overlying hyaline cartilage or both.

SY5

OSTEOARTHRTIS-RELATED INCREASE IN ALL-CAUSE MORTALITY: IMPLICATIONS FOR PHARMACOLOGICAL MANAGEMENT

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Osteoarthritis is the most common joint disorder worldwide. It comprises a group of overlapping conditions that may have different causes, but which result in joint failure subsequent to morphological changes in articular cartilage, subchondral bone, synovium and other joint structures. Osteoarthritis typically affects the hands, knees, hips, spine and feet. The lifetime risk of OA-specific morbidity is about 25% for the hip and 45% for the knee; the disorder is a major contributor to the 150,000 knee and hip arthroplasties undertaken each year in the UK. In contrast to the well-established morbidity attributed to osteoarthritis, less is known about its effect on mortality. Rheumatoid arthritis, the most common inflammatory joint disorder, is associated with a threefold excess mortality, specifically attributable to cardiovascular disease, infection, respiratory and gastrointestinal dysfunction. Until recently, it was thought that OA was not associated with increased mortality; previous studies have attributed higher death rates in patients with OA to concomitant risk factors for the disorder (most notably obesity) or to treatment with non-steroidal anti-inflammatory drugs. These early studies had important limitations which have been overcome in recent analyses. In the first, 1163 participants aged 35 years and over with symptomatic radiographically defined osteoarthritis at the knee or hip, were found to have a significant elevation in all-cause mortality (SMR 1.55; 95% CI 1.41 to 1.70). Cause-specific mortality was particularly high for cardiovascular disease and dementia. In the second, 821 women in the Chingford Cohort Study were followed up for all-cause mortality over 23 years. Significant increases in the risk of death were observed among women experiencing knee pain, with or without radiographic manifestations of osteoarthritis. These findings confirm the importance of both underlying biological ageing; comorbidity; and therapeutic intervention; as contributors to mortality in patients with osteoarthritis.

SY6

DAILY MANAGEMENT OF KNEE OSTEOARTHRITIS: FROM THE ESCEO ALGORITHM TO THE CONCEPT STUDY

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Objectives: To assess the efficacy and safety of Pharmaceutical-grade Chondroitin Sulfate (800 mg/d) (CS) in the symptomatic management of knee OA.

Methods: Prospective randomized 6-month, 3-arm double-blind, double dummy, placebo (PL) and celecoxib (CE) (200 mg/d)-controlled trial, assessing changes in pain, on a 100 mm Visual Analog Scale (VAS), and in function, by the Lequesne Index (LI), as co-primary endpoints. Secondary endpoints included Minimal Clinically Important Improvement (MCII), Patient-Acceptable Symptoms State (PASS), as well as patients and investigators global assessment.

Results: 604 patients recruited in 5 European countries, with knee osteoarthritis (OA) in accordance with the ACR criteria, were followed for 182 days. In the intention to treat analysis, pain (VAS) was significantly reduced, at D182, in the CS group (−52%) and in the CE group (−52%) compared to PL group (−42%) ($P < 0.05$ for both). No difference was observed between CS and CE. The LI, pain and function, showed similar results with CS (−37%) and CE (−36%) being significantly different from PL (−28%) ($P < 0.05$ for both) and no difference between CS and CE.

All treatments were safe, on clinical and biological endpoints.

Conclusion: Pharmaceutical grade CS, 800 mg/d, improves pain and function over 6 months, in knee OA, to the same extent as celecoxib and better than placebo.

Making fracture prevention a priority

Sponsor: AMGEN

SY7

MAKING FRACTURE PREVENTION A PRIORITY

M. L. Brandi¹, J. Compston², S. Ferrari³

¹University of Florence, Florence, Italy, ²University of Cambridge, Cambridge, United Kingdom, ³University of Geneva, Geneva, Switzerland

This educational symposium will be chaired by Professor Maria Luisa Brandi (Italy).

Professor Juliet Compston (UK) will discuss the under-treatment of patients at high risk of fracture, its possible causes, and strategies to improve treatment rates.

Professor Serge Ferrari (Switzerland) will focus on how to optimise treatment of these patients, including the aims and means of short/long term management.

The symposium will include a patient case / open discussion time and the audience will be able to ask questions and participate in interactive voting.

Disclosures: Maria Luisa Brandi: Consultant fees and grants from Alexion, Abiogen, Amgen, Eli Lilly, Shire

Juliet Compston: Honoraria and speaking fees from Gilead
Serge Ferrari: Consultant and speaker fees from Amgen, UCB, Radius, Agnovos

Treating patients with severe osteoporosis – What's new?

Sponsor: ELI LILLY

SY8

ELI LILLY SYMPOSIUM: TREATING PATIENTS WITH SEVERE OSTEOPOROSIS - WHAT'S NEW?

Eli Lilly Symposium

We hope you can join us and our distinguished faculty for what promises to be an exciting symposium. We are sure you agree

whilst progress has been made in recent years in the assessment of fracture and fracture risk in patients with osteoporosis, much remains to be understood about the bone tissue specific features of osteoporosis and the effects of different therapies, and how these factors may impact on patient evaluation and management. This symposium will address a number of recent advances, including the use of bone tissue histomorphometric analyses to determine the effects of osteoporosis treatments, with special emphasis in the differences between on bone forming agents vs antiresorptives using new technologies and endpoints.

In addition we will discuss the results of a recently completed active-controlled, head-to-head clinical trial to compare the antifracture efficacy of teriparatide and a bisphosphonate in postmenopausal women with severe osteoporosis.

A distinguished faculty of speakers will review the latest data and provide their expert opinion on these topics.

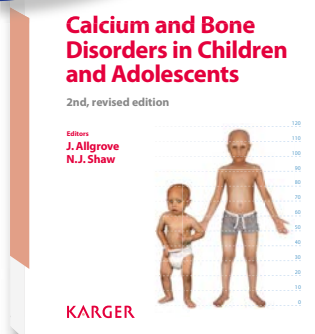
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2nd, revised edition

Editors
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2nd, revised edition

Editors: Allgrove, J. (London); Shaw, N. (Birmingham)

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There has been a rapid expansion of knowledge in the field of paediatric calcium and bone disorders over the past twenty years. Advances have been made in the underlying genetic basis for many conditions in conjunction with progress in bone density and geometry imaging and the development of new treatment options.

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Providing a comprehensive update, this book is a useful clinical resource for paediatricians and specialists in endocrinology, metabolic bone disease, nephrology, rheumatology, radiology, orthopaedics and clinical genetics who may be faced with a child with a calcium and/or bone disorder.

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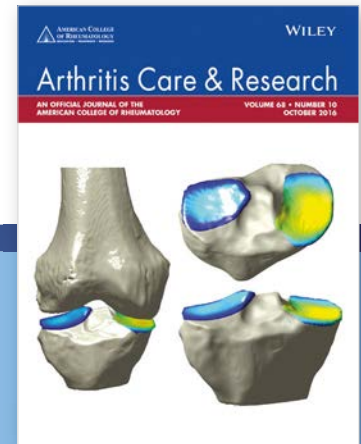
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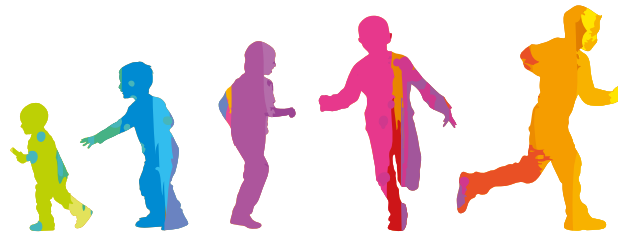
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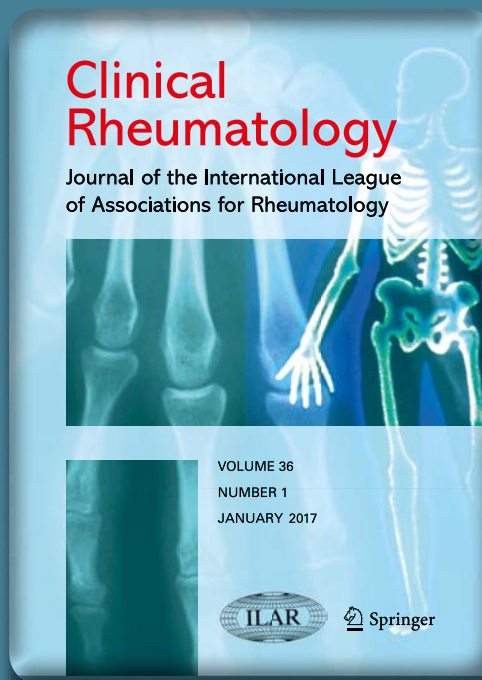


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