

VOLUME 26 SUPPLEMENT 1 MARCH 2015

OSTEOPOROSIS INTERNATIONAL

with other metabolic bone diseases

EDITORS-IN-CHIEF JOHN A. KANIS AND ROBERT LINDSAY

WCO-IOF-ESCEO

World Congress on Osteoporosis, Osteoarthritis
and Musculoskeletal Diseases

26–29 March 2015

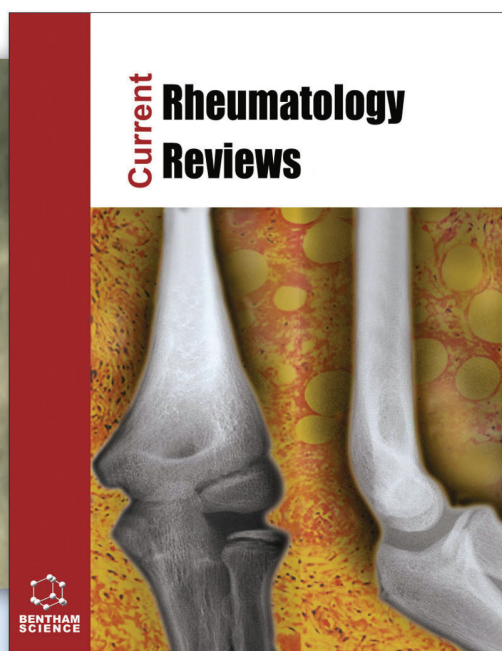
Milan, Italy



International Osteoporosis
Foundation

 Springer

ESSENTIAL JOURNAL ON RHEUMATOLOGY RESEARCH



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WORLD CONGRESS ON OSTEOPOROSIS,
OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

MARCH 26-29, 2015 | MILAN ITALY

MiCo - Fiera Milano Congressi

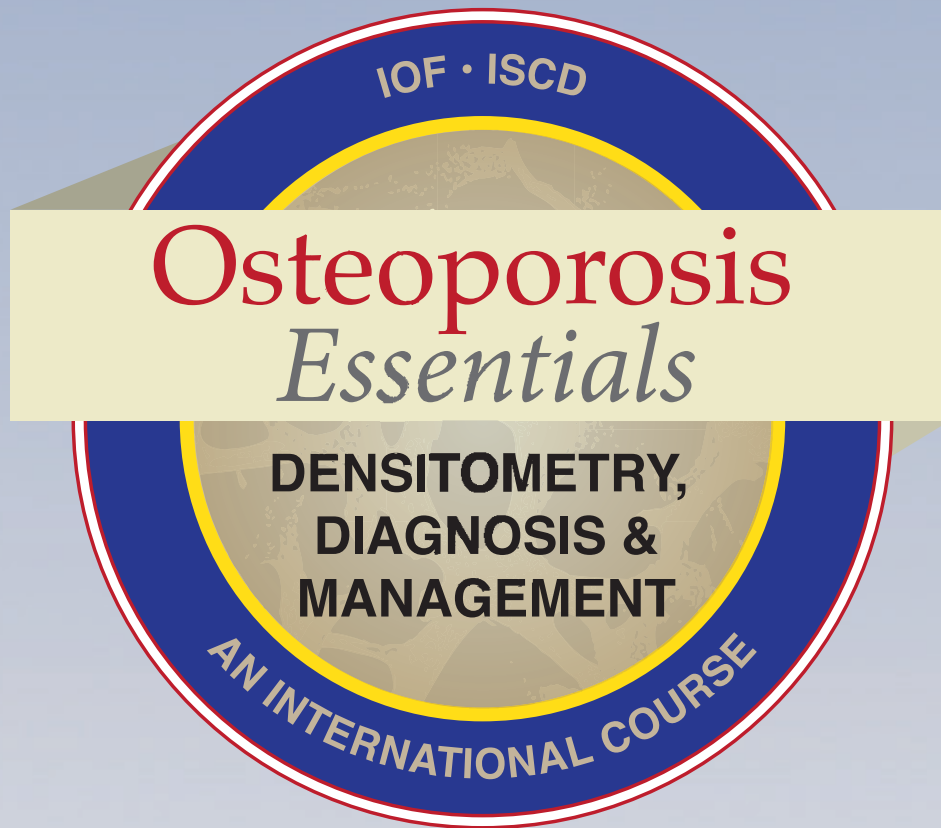
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OSTEOPOROSIS INTERNATIONAL

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**Pagination in this file differs from the version of record (Osteoporosis International vol. 26 supplement 1)
found on link.springer.com**

This supplement was not sponsored by outside commercial interests ;
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Are you getting ENOUGH CALCIUM?

Calculate your average daily intake using the IOF Calcium Calculator. Redesigned with many new features, now available across all your devices.

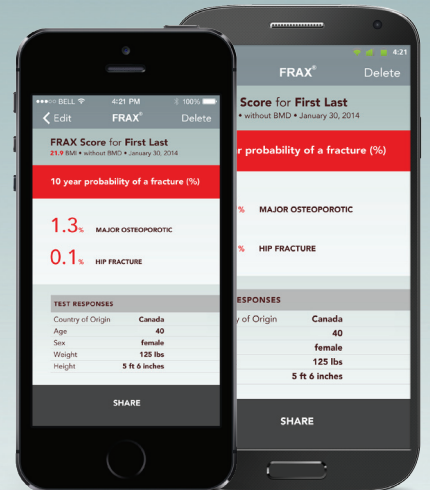


www.iofbonehealth.org/calcium-calculator

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www.shef.ac.uk/FRAX

ABOUT ESCEO

The European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (ESCEO) is a non-profit organization, dedicated to a close interaction between clinical scientists dealing with rheumatic disorders, 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, nongovernmental 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 230 societies in 97 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.



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MESSAGE FROM THE CONGRESS PRESIDENTS

Dear Colleagues,

It is with great pleasure that we welcome you to Milan and the 2015 IOF-ESCEO World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases.

The Congress' scientific programme has been developed by a team consisting of 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 bone field, and takes advantage of the synergies and combined expertise of our two organisations.

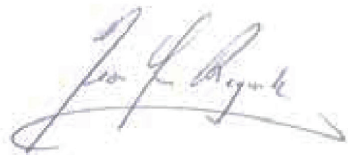
We are all meeting in Milan with a common aim - to gather new knowledge, skills and tools in the prevention and treatment of osteoporosis and osteoarthritis, the two most disabling conditions in elderly people. It is our hope that this Congress will move the field one step forward on all fronts; from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

The core scientific programme consists of 8 plenary lectures by renowned speakers and 50 oral communications selected from the very best of hundreds of submitted abstracts, and 18 oral presentations of selected posters. In addition, participants can choose among 12 different Meet-The-Expert sessions and 16 special sessions and symposia on issues of clinical importance. We also encourage you to attend many of the scheduled poster sessions, 9 industry sponsored satellite symposia and to visit the large commercial exhibition presented by the leading companies in the bone field.

We expect that you will also take the opportunity to enjoy the exquisite cultural treasures of Milan, or simply savour "la bella vita" in this wonderful city!

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

Jean-Yves Reginster
ESCEO President



John A. Kanis
IOF President



CONGRESS ORGANIZATION

CONGRESS CHAIRMEN

Jean-Yves REGINSTER

ESCEO President

John A. KANIS

IOF President

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Cyrus COOPER

Chair, IOF Committee Scientific Advisors (CSA)

René RIZZOLI

Chair, ESCEO Scientific Advisory Board (SAB)

Jean-Yves REGINSTER

ESCEO President

John A. KANIS

IOF President

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CONGRESS ORGANIZATION

CONGRESS ORGANIZER

SINKLAR Conference Management B.V.

Email: secretariat@sinklarc.com

Hogehilweg 7K

1101CA Amsterdam Zuidoost

Netherlands

SECRETARIAT

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Email: info@piettecommunication.com

Bd G. Kleyer, 108

B-4000 Liège, Belgium

Tel: +32 (0)4 254 12 25

Fax: +32 (0)4 254 12 90

Website: www.piettecommunication.com

REGISTRATION AND HOTEL BOOKING

AIM Group INTERNATIONAL

Registration: wco-iof-esceo15.registration@aimgroup.eu

Tel: +39 06 33 053 308

Fax: +39 06 33 053 229

Hotel Booking: wco15hotel@aimgroup.eu

Tel: +39 02 56 60 11

Fax: +39 02 56 60 90 43

ABSTRACT SUBMISSION

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Email: sophie@piettecommunication.com

Bd G. Kleyer, 108

B-4000 Liège, Belgium

Tel: +32 (0)4 254 12 25

SPONSORSHIP OPPORTUNITIES / EXHIBITION

Yolande Piette Communication

Email: rachel@piettecommunication.com

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B-4000 Liège, Belgium

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Fax: +32 (0)4 254 12 90

CONGRESS WEBSITE

www.wco-iof-esceo.org

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CONGRESS INFORMATION

CONGRESS VENUE (27-29 MARCH)

MiCo – Fiera Milano Congressi

Via Gattamelata 5
Entrance Gate 14
20149 Milan, Italy
Tel : +39 02 4997 6275
Fax : +39 02 4801 0265
Website: www.micomilano.it

CONGRESS VENUE ON THURSDAY 26 MARCH 2015

Fondazione delle Stelline

Corso Magenta, 61,
20123 Milano, Italy
Tel: +39 02 4546 2411
Website: www.stelline.it

OPERATING DATES AND HOURS

Congress Opening Hours:

Location : [Fondazione delle Stelline](#)
Thursday, March 26, 2015 15.30-21.05

Location : [MiCo – Fiera Milano Congressi](#)

Friday March 27, 2015 07.30-18.30
Saturday March 28, 2015 07.30-18.30
Sunday March 29, 2015 07.30-12.10

Registration Desks Opening Hours:

Location : [MiCo – Fiera Milano Congressi](#)
Friday March 27, 2015 07.30-18.30
Saturday March 28, 2015 07.30-18.30
Sunday March 29, 2015 07.30-12.10

Congress Exhibition Hours:

Location : [MiCo – Fiera Milano Congressi](#)
Friday March 27, 2015 08.00-18.30
Saturday March 28, 2015 08.00-18.30
Sunday March 29, 2015 08.00-12.10

POSTER VIEWING

Poster Session I (P101-P400)

Friday March 27, 2015 14.00-15.00

Poster Session II (P401-P800)

Saturday March 28, 2015 14:00-15:00

Oral Presentation of Selected Posters

Friday March 27, 2015 14.00-15.00
Saturday March 28, 2015 14.00-15.00

HOW TO REACH THE CONGRESS CENTER?

BY TRAIN

>Central Station – Garibaldi Station

Take the Metro Green Line 2 (Abbiategrosso direction) and get off at “Cadorna”. There take the Metro Red Line 1 (Rho Fiera Milano direction). for the “piazzale Carlo Magno / via Gattamelata” entrance: get off at the “Cadorna” stop, exit the subway and go to the railroad station above : take the first train departing and get off at the “Domodossola” stop – just 600m away from the Congress Centre.

>Stazione Cadorna

Take the Metro Red Line 1 (Rho Fiera Milano direction). For the “piazzale Carlo Magno / via Gattamelata” entrance: get off at the “Cadorna” stop, exit the subway and go to the railroad station above : take the first train departing and get off at the “Domodossola” stop – just 600m away from the Congress Centre.

BY CAR

From any of the ring roads circling Milan follows the signs to Fieramilanocity, or to any of the large Park & Ride car parks located close to these Metro stops:

Cascina Gobba (1800 cars). Green Line
San Donato (1800 cars). Yellow Line
Famagosta (3000 cars). Green Line
Bisceglie (1900 cars). Red Line
Lampugnano (2000 cars). Red Line

PUBLIC TRANSPORT

>Buses & Trams

For the “piazzale Carlo Magno / via Gattamelata” entrance:
Bus no. 78 – get off at Colleoni/Gattamelata
Tram no. 27 - get off at Piazza 6 Febbraio

>Metro

Red Line 1: for the “piazzale Carlo Magno / via Gattamelata” entrance: get off at the “Cadorna” stop, exit the subway and go to the railroad station above : take the first train departing and get off at the “Domodossola” stop – just 600m away from the Congress Centre.

Green Line 2: get off at “Cadorna”.

For the “piazzale Carlo Magno / via Gattamelata” entrance: exit the subway and go to the railroad station above: take the first train departing and get off at the “Domodossola” stop – just 600m away from the Congress Centre.

Yellow Line 3: Get off at “Duomo”, switch to the Red Line 1 (RHO Fiera Milano direction).

For the “piazzale Carlo Magno / via Gattamelata” entrance: get off at the “Cadorna” stop, exit the subway and go to the railroad station above : take the first train departing and get off at the “Domodossola” stop – just 600m away from the Congress Centre.

SPECIAL SERVICES

- Navetta circolare

On request, you can use a shuttle bus that links the Metro Red Line 1, “Amendola” stop (Porta Metropolitana) with the entrance to the Congress Centre.

CONGRESS INFORMATION

ACCREDITATION

European Accreditation

The WCO-IOF-ESCEO 2015 Congress was granted 15 European CME credits (ECMEC) by the European Accreditation Council for Continuing Medical Education (EACCME - www.eaccme.eu)

Belgian Accreditation

(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 28, 2015. 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.

An Internet Corner with computers will be also available to all delegates at level +1 during the Congress Exhibition Hours.

CONGRESS BAGS

Courtesy of Abiogen

ABSTRACT USB KEY

Courtesy of MSD

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 2015 Congress will not provide any Media Centre, however Media representatives are free to use the Internet Corner available during Congress hours.

NOTEBOOK AND PEN

Courtesy of Abiogen

A notebook and a pen are included in the congress bag.

POCKET PROGRAMME

A Pocket programme is included with your badge.

TOURIST INFORMATION

www.visitamilano.it

GENERAL EMERGENCY NUMBER

European Telephone Number : 112

WELCOME COCKTAIL

Courtesy of Meda AB

All WCO-IOF-ESCEO 2015 participants are invited to the Welcome Cocktail on Thursday March 26th, 2015

Venue : [Fondazione delle Stelline](#)

Corso Magenta, 61,
20123 Milano, Italy

FUTURE MEETING

**2016 – WORLD CONGRESS ON OSTEOPOROSIS,
OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES
WCO-IOF-ESCEO 2016**

Malaga – Spain

April 14-17, 2016

LANGUAGE

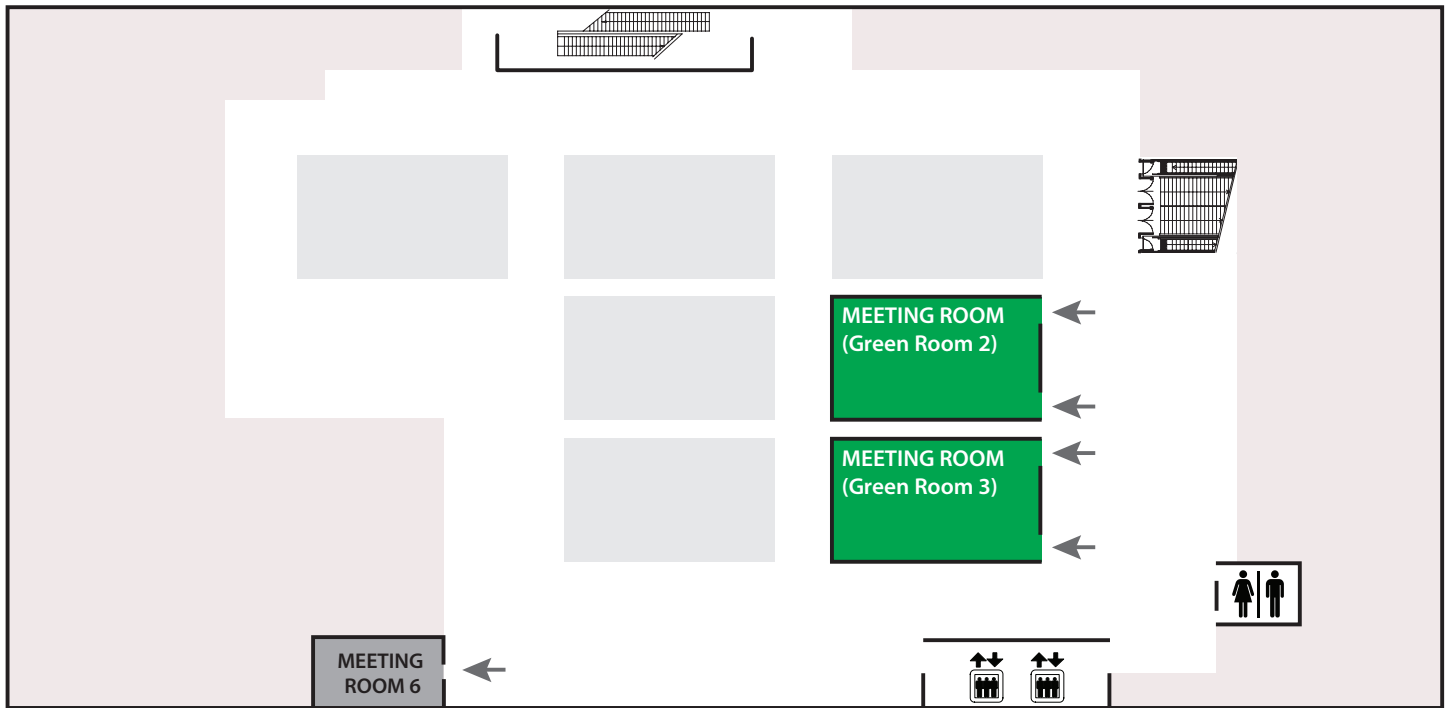
English will be the official language of the Congress. No translation is provided.

CONGRESS VENUE - FLOOR PLAN - LEVEL +1

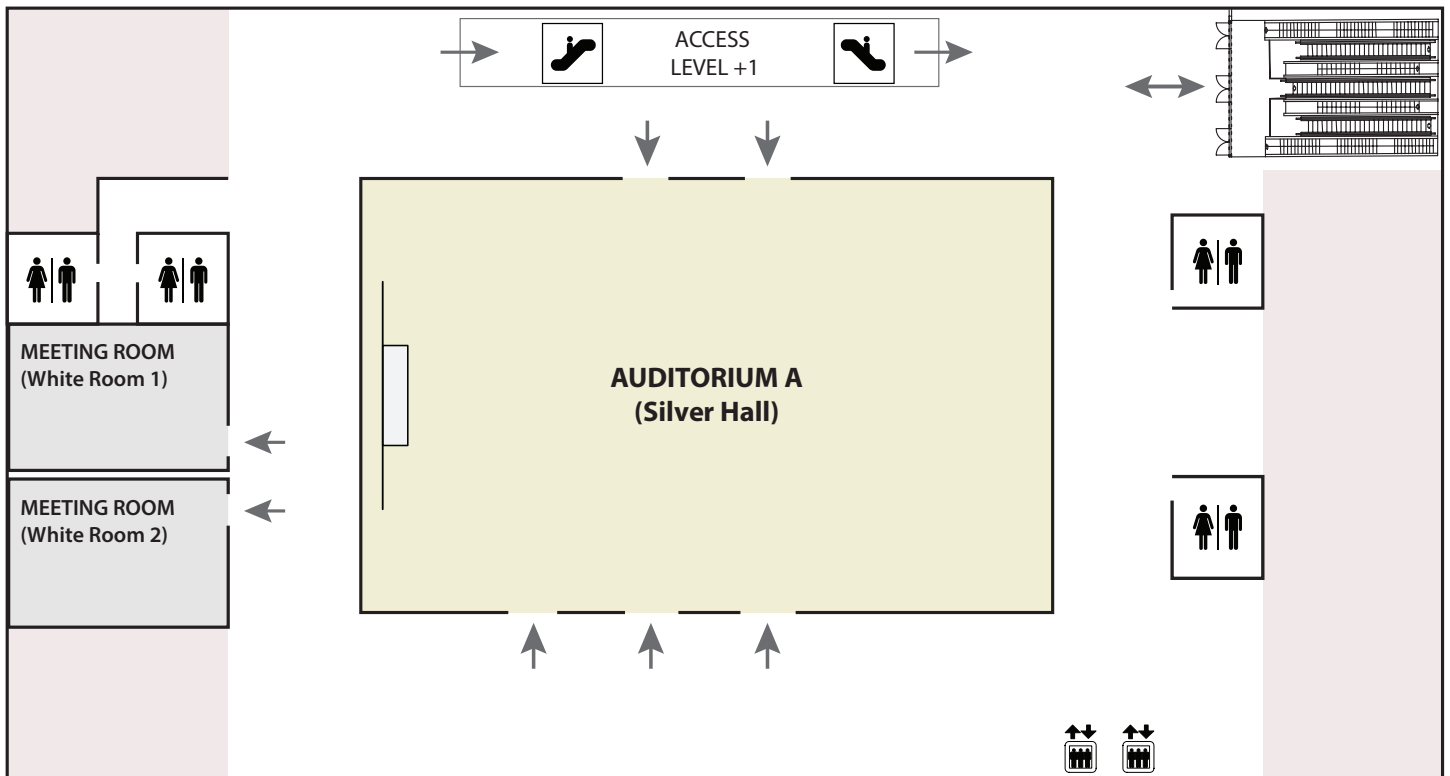


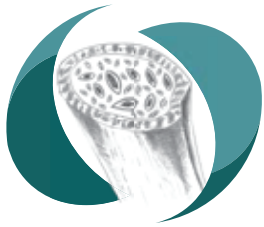
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|-------------------|--------------------|---------------|-------------------------------------|
| 1. SERVIER | 10. MSD | 19. MEDI | A Speakers Preview Room |
| 2. TAKEDA | 11. MEDA | 20. HOLOGIC | B Congress Secretariat |
| 3. AGNOVOS | 13. ABIOTEN PHARMA | 21. ECHOLIGHT | C Podium - Oral Presentation |
| 4. ALEXION | 14. GE HEALTHCARE | 22. IOF | D Internet Corner |
| 5. YPC | 15. MEDIMAPS | 23. FRAX | E CNS Village |
| 6. OSCARE MEDICAL | 16. NOVAMEDICAL | 24. WCO | |
| 7. WISEPRESS | 17. BONEINDEX | 25. ESCEO | |
| 8. ELI LILLY | 18. BIOPHARMA | 26. SCANCO | |

CONGRESS VENUE - FLOOR PLAN - LEVEL -1



CONGRESS VENUE - FLOOR PLAN - LEVEL +2





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More opportunities to share

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WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

WCO-IOF-ESCEO MALAGA 2016

APRIL 14-17, 2016 | MALAGA, SPAIN | PALACIO DE FERIAS Y CONGRESOS DE MALAGA



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ORGANIZED BY SINKLAR CONFERENCE MANAGEMENT B.V.



15.30-17.30

Italian Session jointly organized by F.I.R.M.O. and E.S.C.E.O. Fondazione Stelline
 Chairpersons: Maria-Luisa Brandi, Bruno Rusticali
 - *Introduction* - Maria-Luisa Brandi
 - *AGENAS Guidelines on Osteoporosis: Methodology and Goals* - Bruno Rusticali
 - *The Reimbursement Policy for Osteoporosis Drugs in Italy* - Ranuccio Nuti
 - *Osteoporosis: The Challenges for the General Practitioner* - Claudio Cricelli
 - *Osteoarticular Disorders: The Multidimensional Approach of the "Società Italiana di Ortopedia e Traumatologia" (SIOT)* - Umberto Tarantino
 - *The Contribution of the "Società Italiana di Reumatologia" (SIR) in the Fight against Osteoarticular Disorders* - Marco Matucci Cerinic
 - *The Projects of the "Società Italiana dell'Osteoporosi e del Metabolismo Minerale e delle Malattie dello Scheletro" (SIOMMMS) in Osteoporosis* - Giancarlo Isaia
 - *Definition and Evaluation of Sarcopenia: The Italian Vision of the Geriatrician* - Stefania Maggi
 - *The Integrated Approach to Prevent refracture: The Fracture Unit Project of the OrtoMed Scientific Society* - Luisella Cianferotti

17.30-18.30

Best clinical papers published in 2014 Fondazione Stelline
 René Rizzoli

18.30-20.00

WCO-IOF-ESCEO - OPENING CEREMONY Fondazione Stelline
 Chairpersons: John A. Kanis, Jean-Yves Reginster

18.30-18.45

Population ageing and health: the importance of policies to tackle musculoskeletal diseases Fondazione Stelline
 Islene Araujo de Carvalho (World Health Organization – Geneva)

18.45-18.50

Opening of the meeting Fondazione Stelline
 John A. Kanis

18.50-19.50

IOF-ESCEO-SERVIER HONORARY LECTURE Fondazione Stelline
 - *Historical genetics of wine grapes* - José Vouillamoz

19.50-20.00

Presentation of the ESCEO-IOF Servier Pierre D. Delmas Prize Fondazione Stelline
 John A. Kanis

20.00-21.00

INDUSTRY-SPONSORED WELCOME COCKTAIL Fondazione Stelline

08.00-09.00

NON-SPONSORED SYMPOSIA

Application of Shape and Appearance Models in Osteoporosis and Osteoarthritis Blue 1

Chairperson: John Sheperd

- *Introduction to Statistical Appearance Modeling for Bone Applications* - Tim Cootes
- *3D to 2D and back again: registration and modeling of 3D bone from 2D images for osteoporosis applications* - Kenneth Poole
- *3D Shape Characteristics of Arthritic Bone* - Tuhina Neogi
- *3D femur shape and appearance for fracture prediction - Is it ready for clinical applications?* - Oleg Museyko

Targeting Osteosarcopenia: a practical approach for the prevention of falls and osteoporotic fractures Blue 2

Chairperson: Neil Binkley

- *Introduction* - Neil Binkley
- *Pathophysiology of osteosarcopenia: Common mechanisms and pathways* - Gustavo Duque
- *How to diagnose osteosarcopenia?* - Bjoern Buering
- *Therapeutic interventions for osteosarcopenia* - Christina Alonso

The personal and societal burden of Osteoarthritis: observations from EPOSA Yellow 1

Chairperson: Elaine M. Dennison

- *Introduction* - Elaine M. Dennison
- *Osteoarthritis and comorbidities as determinants of disability in older populations* - Stefania Maggi
- *Physical performance in later life and its relationship with Osteoarthritis* - Mark H. Edwards
- *Frailty syndrome prevalence and slow walk speed in Osteoarthritis* - Angel Otero
- *The neighbourhood environment and use of neighbourhood resources in older people with and without Osteoarthritis* - Erik Timmermans

NOF WORKSHOP

Calcium Supplementation: Does Protecting Against Fracture Risk Increase the Risk of Cardio-vascular Diseases? Yellow 2

Chairperson: Taylor C. Wallace

- *Calcium Supplementation and the Risk of Cardiovascular Events* - Andrea Singer
- *The Role of Calcium Supplementation in Coronary Artery Disease: What is the Evidence?* - Stephen Kopecky

Special Educational Lecture (supported by an unrestricted educational grant from Shire) Yellow 3

Chairperson: Serge Ferrari

- *Gaucher disease : The role of the bone specialist* - Maria-Luisa Brandi

08.30-09.00

SPECIAL EDUCATIONAL LECTURE

Unexpected non bone effects of vitamin D - Maurizio Cutolo White 1

09.00-10.20

SCIENTIFIC SESSION I

Chairpersons: John A. Kanis, Jean-Yves Reginster Auditorium A

09.00-09.30

Plenary Lecture 1

Osteoporosis and Sarcopenia: two disorders or one? - Roger Fielding Auditorium A

09.30-10.20

Oral communications selected from abstracts Auditorium A

09.30-09.40

OC1

ODANACATIB ANTIFRACTURE EFFICACY AND SAFETY IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: RESULTS FROM THE PHASE III LONG-TERM ODANACATIB FRACTURE TRIAL (LOFT) Auditorium A

Presenting author: M. R. McClung

Authors: B. L. Langdahl, S. Papapoulos, K. G. Saag, S. Adami, H. G. Bone, T. De Villiers, D. P. Kiel, A. Kung, P. Kumar KM, S. K. Lim, X. Ling, K. Lippuner, C. Mautalen, T. Nakamura, J.-Y. Reginster, I. R. Reid, J. A. Rodriguez Portales, C. Roux, J. Walliser, N. B. Watts, J. R. Zanchetta, C. A. F. Zerbini, A. Rybak-Feiglin, D. Cohn, C. A. DaSilva, R. Massaad, A. C. Santora, B. B. Scott, K. D. Kaufman, N. Verbruggen, A. Leung, A. Lombardi

09.40-09.50

OC2

THE BMD RESPONSE TO BLOSUZUMAB IS INDEPENDENT OF INITIAL AGE, BODY MASS INDEX, AND BMD IN POSTMENOPAUSAL WOMEN WITH LOW BMD: RESULTS OF A PHASE 2 RANDOMIZED CLINICAL TRIAL Auditorium A

Presenting author: B. Mitlak

Authors: A. Chiang, F. Marin, J. Krege, C. T. Benson

09.50-10.00

OC3

RESULTS OF 2 YEARS OF ROMOSUZUMAB TREATMENT FOLLOWED BY 1 YEAR OF DENOSUMAB OR PLACEBO IN POSTMENOPAUSAL WOMEN WITH LOW BONE MINERAL DENSITY Auditorium A

Presenting author: M. R. McClung

Authors: A. Chines, J. P. Brown, A. Diez-Perez, H. Resch, J. Caminis, M. A. Bolognese, S. Goemaere, H. G. Bone, J. R. Zanchetta, J. Maddox, O. Rosen, S. Bray, A. Grauer

10.00-10.10

OC4

DENOSUMAB TREATMENT IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS FOR UP TO 9 YEARS: RESULTS THROUGH YEAR 6 OF THE FREEDOM EXTENSION Auditorium A

Presenting author: S. Papapoulos

Authors: C. Roux, H. G. Bone, P. Dakin, E. Czerwinski, D. Frey, D. L. Kendler, E. M. Lewiecki, J. Malouf, D. Mellström, J.-Y. Reginster, H. Resch, N. S. Daizadeh, A. Wang, M. Gavin, R. B. Wagman, M. L. Brandi

10.10-10.20

OC5

THE POSITION OF STRONTIUM RANELATE IN TODAY'S MANAGEMENT OF OSTEOPOROSIS Auditorium A

Presenting author: J.-Y. Reginster

Authors: M. L. Brandi, J. Cannata Andia, C. Cooper, B. Cortet, J. M. Feron, H. K. Genant, S. Palacios, J. D. Ringe, R. Rizzoli

10.20-11.50

SCIENTIFIC SESSION II

Chairpersons: Cyrus Cooper, Jean-Pierre Pelletier Auditorium A

10.20-10.50

Plenary Lecture 2

Management of Osteoporosis in Renal Failure - Marie-Hélène Lafage-Proust Auditorium A

10.50-11.00

Presentation of the ESCEO-MSD Fellowships

Bess Dawson-Hughes Auditorium A

11.00-11.50

Oral communications selected from abstracts Auditorium A

11.00-11.10

OC6

TRACKING OF 25-HYDROXYVITAMIN D STATUS DURING PREGNANCY Auditorium A

Presenting author: R. J. Moon

Authors: S. R. Crozier, E. M. Dennison, S. M. Robinson, H. M. Inskip, K. M. Godfrey, C. Cooper, N. C. Harvey

11.10-11.20

OC7 Auditorium A
EFFECTIVENESS OF MATERNAL VITAMIN D SUPPLEMENTATION: A MULTICENTRE RANDOMISED, DOUBLE-BLIND, PLACEBO CONTROLLED TRIAL (MAVIDOS)

Presenting author: C. Cooper
Authors: N. C. Harvey, M. K. Javaid, N. J. Bishop, S. Kennedy, A. T. Papageorgiou, R. Fraser, S. V. Gandhi, S. D'angelo, S. R. Crozier, R. J. Moon, N. K. Arden, E. M. Dennison, K. M. Godfrey, H. M. Inskip, I. Schoenmakers, A. Prentice, Z. Mughal, R. Eastell, D. M. Reid, The Mavidos Study Group

11.20-11.30

OC8 Auditorium A
COST EFFECTIVENESS EVALUATION OF FRACTURE LIAISON SERVICES FOR THE MANAGEMENT OF OSTEOPOROSIS IN SWEDEN

Presenting author: E. Jonsson
Authors: O. Ström, F. Borgström

11.30-11.40

OC9 Auditorium A
CLINICAL EFFECTIVENESS OF ORTHOGERIATRIC AND FRACTURE LIAISON SERVICE MODELS OF CARE FOR HIP FRACTURE PATIENTS: CONTROLLED LONGITUDINAL STUDY

Presenting author: S. Hawley
Authors: M. K. Javaid, D. Prieto-Alhambra, N. K. Arden, J. Lippett, S. Sheard, C. Cooper, A. Judge

11.40-11.50

OC10 Auditorium A
META-ANALYSIS OF OBSERVATIONAL STUDIES ON THE EFFECT OF INCRETIN TREATMENT ON FRACTURE RISK

Presenting author: J. H. M. Driessen
Authors: F. De Vries, P. Vestergaard, H. Van Onzenoort, J. Van Den Bergh, R. Henry, N. C. Harvey

12.15-13.45

INDUSTRY-SPONSORED LUNCH SYMPOSIUM Auditorium A

ESCEO Algorithm for Osteoarthritis: from treatment guidelines to real life
Chairpersons: Maurizio Cutolo, Jean-Yves Reginster

- Biological and clinical effects of intra-articular hyaluronic acid: meta-analyses and real-life patient studies - Thierry Conrozier
- Prevention and treatment of knee osteoarthritis with glucosamine sulfate: from clinical studies to real life. - Lucio C. Rovati
- How can we help implementing ESCEO algorithm in real life - Jean-Yves Reginster

12.15-13.45

INDUSTRY-SPONSORED LUNCH SYMPOSIUM Auditorium B

Calcium and vitamin D – Fact and fiction

Chairperson: John A. Kanis

- Welcome and introduction - John A. Kanis
- Efficacy of calcium and vitamin D supplementation: Where are we now? - Cyrus Cooper
- Calcium and vitamin D supplementation: Update on safety profile - René Rizzoli
- Bone protective therapies with and without calcium and vitamin D – Does it matter? - Bess Dawson-Hughes
- Meeting summary and close - John A. Kanis

14.00-15.03

Oral presentation of selected posters Podium

Chairperson: Johanne Martel-Pelletier

14.00-14.07

P197 Podium
TEN-YEAR RISKS OF FIRST OSTEOPOROTIC FRACTURES IN CHINESE WOMEN AND MEN

Presenting author: L. Si
Authors: T. M. Winzenberg, A. J. Palmer

14.07-14.14

P760 Podium
PERSISTENCE LONG-TERM OF ALENDRONATE THERAPY ON OSTEOPOROTIC POPULATION IN TUSCANY REGION

Presenting author: G. Marcucci
Authors: L. Cianferotti, G. Gronchi, S. Parri, M. L. Brandi

14.14-14.21

P268 Podium
PERCENTAGE OF WOMEN ACHIEVING NON-OSTEOPOROTIC BMD T-SCORES AT THE LUMBAR SPINE (LS) AND TOTAL HIP (TH) DURING UP TO 8 YEARS OF DENOSUMAB (DMAB) TREATMENT

Presenting author: S. Ferrari
Authors: C. Libanati, C. J. F. Lin, S. Adami, J. P. Brown, F. Cosman, E. Czerwinski, L. H. De Gregório, J. Malouf, J.-Y. Reginster, N. S. Daizadeh, A. Wang, R. B. Wagman, E. M. Lewiecki, S. Cummings

14.21-14.28

P274 Podium
FRAX PREDICTS INCIDENT FALLS IN ELDERLY WOMEN: FINDINGS FROM AUSTRALIA

Presenting author: H. Johansson
Authors: N. C. Harvey, A. Odén, E. V. McCloskey, J. A. Kanis, G. Nicholson, K. M. Sanders

14.28-14.35

P638 Podium
GREATER ACCESS TO FAST FOOD OUTLETS IS ASSOCIATED WITH POORER BONE HEALTH IN YOUNG CHILDREN

Presenting author: C. Vogel
Authors: C. Parsons, K. M. Godfrey, S. M. Robinson, N. C. Harvey, H. M. Inskip, C. Cooper, J. Baird

14.35-14.42

P485 Podium
PROLONGED HYPOVITAMINOSIS D IN ELDERLY WOMEN IS ASSOCIATED WITH LONG AND SHORT TERM MORTALITY: RESULTS FROM THE OPRA COHORT

Presenting author: D. Buchebner
Authors: F. E. Mcguigan, P. Gerdhem, M. Ridderstråle, K. Akesson

14.42-14.49

P753 Podium
COST-EFFECTIVENESS OF DAIRY PRODUCTS SUPPLEMENTED WITH VITAMIN D IN THE PREVENTION OF OSTEOPOROTIC FRACTURES

Presenting author: O. Ethgen
Authors: M. Hilgsmann, O. Bruyère, J.-Y. Reginster

14.49-14.56

P279 Podium
QOL IMPROVEMENT OF OSTEOPOROTIC PATIENTS TREATED WITH ALENDRONATE ALONE OR ALENDRONATE PLUS ALFACALCIDOL THERAPY: RESULTS OF THE JAPANESE OSTEOPOROSIS INTERVENTION TRIAL (JOINT) - 02

Presenting author: H. Orimo
Authors: H. Ohta, M. Shiraki, T. Nakamura

14.56-15.03

P763 Podium
SELF-RATED HEALTH PREDICTS HIP FRACTURES INDEPENDENT OF FRAX

Presenting author: H. Lundin

14.00-15.00

Poster Viewing Session I (P101-P400) Poster area

EDUCATIONAL LECTURE 1

- How to apply for a job in a pharmaceutical company - Lucio C. Rovati Auditorium B

14.00-15.00
ESCEO SYMPOSIA**Revision of the guidelines for the registration of drugs to be used in the treatment of Osteoarthritis** Blue 1

Chairpersons: Andrea Laslop, Susanne Reiter-Niesert
 - *Welcome and introduction* - Andrea Laslop
 - *Current regulatory requirements for registration of drugs to be used in osteoarthritis in Europe and need for clarification* - Jean-Yves Reginster
 - *Suggested clarification by the ESCEO working group* - Francis Berenbaum
 - *Discussion - Leader: Stefania Maggi*
 - *Conclusions and wrap-up* - Andrea Laslop
 Panel: Eric Abadie, Francis Berenbaum, Jaime Branco, Maria-Luisa Brandi, Olivier Bruyère, Cyrus Cooper, Jean-Pierre Devogelaer, Gabriel Herrero-Beaumont, John A. Kanis, Andrea Laslop, Stefania Maggi, Jean-Yves Reginster, Susanne Reiter-Niesert, René Rizzoli, Jean-Marie Robine

Improving Osteoporosis Care with Trabecular Bone Structure (TBS) Blue 2

Chairpersons: David L. Kendler, Claus C. Glüer
 - *Welcome and introduction* - Claus C. Glüer
 - *TBS in fracture risk assessment* - Nicholas Harvey
 - *Other potential applications of TBS* - Neil Binkley
 - *Discussion leaders - Claus Glüer* - John A. Kanis
 - *Conclusions* - John A. Kanis
 Panel: Neil Binkley, Maria-Luisa Brandi, Bruno Muzzi Camargos, Cyrus Cooper, Claus C. Glüer, John A. Kanis, David L. Kendler, Olivier Lamy, Andrea Laslop, Jean-Yves Reginster, René Rizzoli

14.00-15.00
MEET-THE-EXPERT SESSIONS**Sequential/combined therapies in Osteoporosis** Yellow 3

Serge Ferrari

Management of pain in Osteoporosis Yellow 2

Maria-Luisa Brandi

Exercise, nutrition, bone and muscles Yellow 1

Bess Dawson-Hughes

Epidemiology and management of post-menopausal Osteoporosis in Latin America White 1

Patricia Clark

Genetic markers for the prediction of fragility fractures White 2

Fernando Rivadeneira

Role of nutraceuticals in the management of Osteoarthritis Green Room 3

Gabriel Herrero-Beaumont

Imaging of osteoarthritis in daily practice Green Room 2

Philip Conaghan

15.00-16.40
SCIENTIFIC SESSION III Auditorium A

Chairpersons: René Rizzoli, Olivier Bruyère

15.00-15.30
Plenary Lecture 3 Auditorium A- *Bone anabolic therapies for Osteoporosis* - Socrates Papapoulos15.30-15.40
Presentation of the IOF President's Awards Auditorium A

John A. Kanis

15.40-16.40
Oral communications selected from abstracts Auditorium A15.40-15.50
OC11 Auditorium A**WANING LONG-TERM PREDICTIVE VALUE OF FALLS HISTORY FOR INCIDENT FRACTURE: MROS SWEDEN**

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

15.50-16.00
OC12 Auditorium A**PAINFUL KNEE BUT NOT HAND OSTEOARTHRITIS PREDICTS EXCESS MORTALITY IN A COMMUNITY-BASED COHORT OF MIDDLE-AGED WOMEN WITH 23 YEARS OF FOLLOW-UP**

Presenting author: S. Kluzek
 Authors: M. T. Sanchez-Santos, K. M. Leyland, A. Judge, C. Cooper, J. Newton, N. K. Arden, T. D. Spector, D. Hart

16.00-16.10
OC13 Auditorium A**DIACEREIN REDUCES ANTAGONISTS OF WNT ENABLING THIS SYSTEM'S ACTIVITY IN HUMAN OSTEOARTHRITIC SUBCHONDRAL BONE OSTEOBLASTS**

Presenting author: J. Martel-Pelletier
 Authors: F. Mineau, D. Hum, J.-P. Pelletier

16.10-16.20
OC14 Auditorium A**ASSESSMENT AND DETERMINANTS OF AESTHETIC DISCOMFORT IN HAND OSTEOARTHRITIS: THE LIÈGE HAND OSTEOARTHRITIS COHORT (LIHOC)**

Presenting author: A. Neuprez
 Authors: O. Bruyère, N. Dardenne, S. Distèche, E. Maheu, N. Burlet, J.-Y. Reginster

16.20-16.30
OC15 Auditorium A**PREDICTORS OF POST-OPERATIVE MORTALITY FOLLOWING TOTAL HIP ARTHROPLASTY SURGERY: A POPULATION-BASED COHORT STUDY**

Presenting author: D. Prieto-Alhambra
 Authors: C. Tebé, F. Pallisó, A. Judge, N. K. Arden, C. Cooper, M. Espallargues

16.30-16.40
OC16 Auditorium A**BIOMARKERS OF OSTEOCHONDRAL BONE FORMATION ARE INCREASED IN PSORIASIS ARTHRITIS AND SPONDYLOARTHRITIS**

Presenting author: A. C. Bay-Jensen
 Authors: N. S. Gudmann, H. L. Munk, A. F. Christiansen, L. Ejstrup, G. L. Sorensen, A. G. Loft, C. Christiansen, A. S. Siebuhr, P. Junker, M. K. Karsdal

17.00-18.30
INDUSTRY-SPONSORED SATELLITE SYMPOSIUM Auditorium B**Evolving Strategies for Management of Osteoporosis**

Chairperson: Silvano Adami

- *Opening Remarks* - Silvano Adami
- *The Role of Cathepsin K in Bone Homeostasis* - Ego Seeman
- *Odanacatib Antifracture Efficacy in Postmenopausal Women; Results From the Phase 3 Long-term Odanacatib Fracture Trial (LOFT)* - Michael R. McClung
- *Safety and Tolerability of Odanacatib in Post-Menopausal Women; Interim Results From the Phase 3 Long-term Odanacatib Fracture Trial (LOFT)* - Socrates Papapoulos
- *Closing - Panel Question and Answer* - Silvano Adami

17.00-18.30

INDUSTRY-SPONSORED SATELLITE SYMPOSIUM

Blue 1

Management of severe osteoporosis: personalized medicine in practice

Chairpersons: Maria-Luisa Brandi, Jean-Yves Reginster

- *Introduction* - Maria-Luisa Brandi
- *Why is severe Osteoporosis still an unmet medical need 40 years after the discovery of the first drugs?* - Maria-Luisa Brandi
- *Management of patients contra-indicated or not tolerant to anti-resorptive treatments* - René Rizzoli
- *New indication and safety of strontium ranelate: a comprehensive review* - Cyrus Cooper
- *Conclusion* - Jean-Yves Reginster

18.45-19.45

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

08.00-09.00

IOF WORKSHOPS

Bone and Diabetes: Diabetes and Skeletal challenges Blue 2

Chairpersons: Cyrus Cooper, Massimo Massi Benedetti
 - *Epidemiology of Diabetes and Osteoporosis* - Bo Abrahamsen
 - *Pathophysiology of Diabetoporosis* - Serge Ferrari
 - *New Diabetes Treatments and Bone* - Nicola Napoli

IMS-IOF Joint Session: MHT: Menopausal Hormone Therapy revisited Yellow 1

Chairperson: Bess Dawson-Hughes
 - *Menopause: consequences and overall management* - John C. Stevenson
 - *MHT: risks and benefits from the IMS perspective* - Tobie De Villiers
 - *SERM/HRT combinations* - Peyman Hadji

NON-SPONSORED SYMPOSIA

Hands-on on DXA acquisition and analysis: artifactual pitfalls and possible escapes Blue 1

Chairpersons: Bruno Muzzi Camargos, Ben-Hur Albergaria
 - *Dual X-Ray Absorptiometry Basic Principles* - Bruno Muzzi Camargos
 - *Clinical Cases. Lumbar Spine, Femur* - Bruno Muzzi Camargos
 - *Monitoring DXA* - Bruno Muzzi Camargos

The nutritional approach to weight management and musculoskeletal health Yellow 2

Chairpersons: René Rizzoli, Jean-Jacques Body
 - *The benefits of yogurt to manage weight and metabolic diseases* - Arne Astrup
 - *Dairies and sustainable musculoskeletal health* - René Rizzoli

09.00-10.20

SCIENTIFIC SESSION IV

Auditorium A

Chairpersons: Maria-Luisa Brandi, Stefania Maggi

09.00-09.30

Plenary Lecture 4

Auditorium A

- *Can we alter the natural history of Osteoarthritis?* - Marc Hochberg

09.30-09.40

Presentation of the IOF Medal of Achievement

Auditorium A

Cyrus Cooper

09.40-10.20

Oral communications selected from abstracts

Auditorium A

09.40-09.50

OC17

Auditorium A

BONE MICROARCHITECTURE ASSESSED BY HR-PQCT PREDICTS INCIDENT**FRAGILITY FRACTURE IN POSTMENOPAUSAL WOMEN: THE OFELY STUDY**

Presenting author: E. Sornay-Rendu

Authors: S. Boutroy, F. Duboeuf, R. D. Chapurlat

09.50-10.00

OC18

Auditorium A

A META-ANALYSIS OF TRABECULAR BONE SCORE IN FRACTURE RISK**PREDICTION AND ITS INTERACTION WITH FRAX**

Presenting author: J. A. Kanis

Authors: A. Odén, N. C. Harvey, W. D. Leslie, D. Hans, H. Johansson,
 R. Barkmann, S. Boutroy, J. P. Brown, R. D. Chapurlat, P. Elders, Y. Fujita,
 C. C. Glüer, D. Goltzman, M. Iki, M. K. Karlsson, A. Kindmark,
 N. Kurumatani, A. Kwok, J. Leung, K. Lippuner, O. Ljunggren,
 M. Lorentzon, D. Mellström, T. Merlijn, L. Oei, C. Ohlsson, J. A. Pasco,
 F. Rivadeneira, B. Rosengren, E. Sornay-Rendu, P. Szulc, J. Tamaki,
 E. V. McCloskey

10.00-10.10

OC19

Auditorium A

IN VIVO CORTICAL BONE INDENTATION MEASUREMENTS ARE INDEPENDENT**OF AGE, BMD AND CORTICAL MORPHOLOGY IN POSTMENOPAUSAL WOMEN**

Presenting author: J. N. Tsai

Authors: E. W. Yu, N. Derrico, A. Martinez-Betancourt, M. L. Bouxsein

10.10-10.20

OC20

Auditorium A

SENSITIVITY AND SPECIFICITY OF RADIOGRAPHIC CHARACTERISTICS OF**ATYPICAL FEMORAL FRACTURES**

Presenting author: J. Q. Chantra

Authors: A. L. Adams, F. Xue, R. M. Dell, S. M. Ott, S. Silverman,

J. C. Giacconi, C. W. Critchlow

10.20-11.40

SCIENTIFIC SESSION V

Auditorium A

Chairpersons: Jean-Marc Kaufman, Socrates Papapoulos

10.20-10.50

Plenary Lecture 5

Auditorium A

- *Is it time to resurrect menopausal hormone therapy in Osteoporosis?* -

John C. Stevenson

10.50-11.40

Oral communications selected from abstracts

Auditorium A

10.50-11.00

OC21

Auditorium A

COMPARATIVE PERFORMANCE OF CURRENT DEFINITIONS OF SARCOPENIA**AGAINST THE PROSPECTIVE INCIDENCE OF FALLS AMONG COMMUNITY-****DWELLING SENIORS AGE 65 AND OLDER**

Presenting author: H. A. Bischoff-Ferrari

Authors: E. J. Orav, J. A. Kanis, R. Rizzoli, M. Schlägl, H. B. Staehelin,

W. C. Willett, B. Dawson-Hughes

11.00-11.10

OC22

Auditorium A

PHASE 2 RANDOMIZED, DOUBLE BLIND, PLACEBO CONTROLLED TRIAL OF**MYOSTATIN ANTIBODY IN OLDER FALLERS WITH LOW MUSCLE STRENGTH**

Presenting author: S. Ferrari

Authors: C. Becker, S. R. Lord, S. Studenski, S. J. Warden, R. Fielding,

C. Recknor, M. C. Hochberg, H. Blain, E. F. Binder, Y. Rolland,

S. Poiraudreau, C. T. Benson, S. L. Myers, L. Hu, Q. Ahmad, K. Pacuch,

E. Gomez, O. Benichou

11.10-11.20

OC23

Auditorium A

CORRELATION BETWEEN MUSCLE MASS AND MUSCLE STRENGTH AND THEIR**ASSOCIATION WITH PHYSICAL PERFORMANCE AND GAIT SPEED**

Presenting author: C. Beaudart

Authors: J.-Y. Reginster, J. L. Croisier, J. Slomian, F. Buckinx, M. Locquet,

A. Quabron, O. Bruyère

11.20-11.30

OC24

Auditorium A

EFFECT OF AGE AND SEX ON JUMPING MECHANOGRAPHY AND OTHER**MEASURES OF MUSCLE MASS AND FUNCTION**

Presenting author: B. Buering

Authors: E. Fidler, D. Krueger, R. E. Ward, P. Caserotti, E. S. Strotmeyer,

T. B. Harris, N. Binkley

11.30-11.40

OC25

Auditorium A

CRITICAL EVALUATION OF PROMISING MARKERS FOR SARCOPENIA

Presenting author: E. Cavalier

Authors: R. Gadiisseur, S. Geboes, A.-C. Bekaert, A. Carlisi, O. Bruyère,

J.-Y. Reginster

12.15-13.45

INDUSTRY-SPONSORED LUNCH SYMPOSIUM

Auditorium B

Dairy products & bone health: turning facts and beliefs into clinical practice

Chairpersons: Jean-Yves Reginster, René Rizzoli

- *The acid-ash hypothesis and bone health* - Tanis Fenton
- *Dairy consumption, prevention of osteoporosis & fractures: an update* - Olivier Bruyère
- *Dairy product facts & fiction* - Jean-Jacques Body

12.15-13.45

INDUSTRY-SPONSORED LUNCH SYMPOSIUM

Auditorium A

Putting the Patient First: Effective Therapeutic Strategies to Reduce the Burden of Fractures

Chairperson: Maria-Luisa Brandi

- *Welcome & Introduction* - Maria-Luisa Brandi
- *Bridging the Osteoporosis Care Gap: Improving Patient Outcomes with a Fracture Liaison Service* - Maria-Luisa Brandi
- *Understanding the Fragile Patient: Identifying and Addressing the Clinical Challenge* - Astrid Fahrleitner-Pammer
- *Preventing Secondary Osteoporosis: Anabolic vs Anti-resorptive Therapy for Improving Patient Outcomes* - Erik Fink Eriksen
- *Question & Answer. Symposium Close* - Maria-Luisa Brandi

14.00-15.03

Oral presentation of selected posters

Podium

Chairperson: Johanne Martel-Pelletier

14.00-14.07

P288

Podium

ALENDRONATE IMPROVES BONE MATERIAL LEVEL PROPERTIES IN PAIRED HUMAN TRANSILIAC BONE BIOPSY SPECIMENS

Presenting author: P. Ammann

Author: R. Rizzoli

14.07-14.14

P199

Podium

CLUSTER ANALYSIS OF HIGH RESOLUTION PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY PARAMETERS IDENTIFIES BONE PHENOTYPES ASSOCIATED WITH HIGH RATES OF PREVALENT FRACTURE

Presenting author: M. H. Edwards

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

14.14-14.21

P241

Podium

THE EFFECT OF LOCAL ANAESTHETIC INFILTRATION ON CHRONIC POST-SURGICAL PAIN AFTER TOTAL HIP AND KNEE REPLACEMENT: THE APEX RANDOMISED CONTROLLED TRIALS

Presenting author: R. Gooberman-Hill

Authors: V. Wylde, E. Lenguerrand, E. Marques, S. Noble, J. Horwood, M. Pyke, P. D. Dieppe, A. W. Blom

14.21-14.28

P265

Podium

GRIP FATIGUE RESISTANCE AND SELF-PERCEIVED FATIGUE IN RELATION WITH SARCOPENIA AND QUALITY OF LIFE

Presenting author: C. Beaudart

Authors: J.-Y. Reginster, I. Bautmans, J. L. Croisier, J. Slomian, F. Buckinx, M. Locquet, A. Quabron, O. Bruyère

14.28-14.35

P642

Podium

SCLEROSTIN ANTIBODY IMPROVES VERTEBRAE PARAMETERS IN MURINE MODEL OF SEVERE OSTEOGENESIS IMPERFECTA

Presenting author: J.-P. Devogelaer

Authors: M. Cardinal, A. Dessain, D. Chappard, S. Lafont, T. Roels, M. S. Ominsky, B. Lengelé, C. Nyssen-Behets, D.H. Manicourt

14.35-14.42

P669

Podium

SUBCHONDRAL TIBIAL BONE TEXTURE ANALYSIS PREDICTS KNEE OSTEOARTHRITIS PROGRESSION: DATA FROM THE OSTEOARTHRITIS INITIATIVE

Presenting author: T. Janvier

Authors: H. Toumi, A. Valery, L. Delsol, R. Jennane, E. Lespessailles

14.42-14.49

P133

Podium

TRABECULAR BONE SCORE IN PATIENTS WITH CHRONIC GLUCOCORTICOID OSTEOPOROSIS TREATED WITH ALENDRONATE OR TERIPARATIDE

Presenting author: K. G. Saag

Authors: D. Agnusei, D. Hans, L. A. Kohlmeier, K. D. Krohn, E. S. Leib, E. J. Maclaughlin, K. See, C. Simonelli, K. A. Taylor, R. Marcus

14.49-14.56

P551

Podium

RADIOGRAPHIC OSTEOARTHRITIS IS LESS STRONGLY ASSOCIATED WITH PHYSICAL PERFORMANCE THAN CLINICAL OSTEOARTHRITIS IN OLDER INDIVIDUALS

Presenting author: E. M. Dennison

Authors: M. H. Edwards, C. Parsons, A. E. Litwic, C. Cooper, A. Aihie Sayer

14.56-15.03

P447

Podium

DROPPING THE BALL AND FALLING OFF OF THE TREATMENT WAGON: FACTORS CORRELATING WITH NONCOMPLIANCE TO SECONDARY FRACTURE PREVENTION PROGRAMS - EXPERIENCE WITH THE OSTEOPOROSIS PATIENT TARGETED AND INTEGRATED MANAGEMENT FOR ACTIVE LIVING (OPTIMAL) PROGRAM IN SINGAPORE

Presenting author: M. Chandran

Authors: X. F. Huang, M. Tan

14.00-15.00

Poster Viewing Session II (P401-P800)

Poster area

14.00-15.00

INDUSTRY-SPONSORED SATELLITE SYMPOSIUM

Blue 1

Old and new treatments for bone diseases

Chairperson: Socrates Papapoulos

- *Vitamin D: Its expanding role in the maintenance of bone health* - Maria-Luisa Brandi
- *New trends in the treatment of algodystrophy* - Silvano Adami
- *Adherence to treatment in osteoporosis: challenges and new scenarios* - Nicola Napoli

EDUCATIONAL LECTURE 2

Auditorium B

How to write a grant? - Ego Seeman

14.00-15.00

ESCEO SYMPOSIUM*European perspective of the new guidelines for the management of Osteoarthritis - focus on SYSADOAs*

Blue 2

Chairpersons: Jean-Pierre Devogelaer, Gabriel Herrero-Beaumont

- *Introduction and scope of the problem* - Marc Hochberg
 - *Glucosamine and chondroitin salts in the management of osteoarthritis in Europe* - Jean-Yves Reginster
 - *Hyaluronic acid salts in the management of Osteoarthritis in Europe* - Jean-Pierre Pelletier
 - *Discussion - Leader*: Jaime Branco
- Panel: Eric Abadie, Jaime Branco, Maria-Luisa Brandi, Olivier Bruyère, Cyrus Cooper, Jean-Pierre Devogelaer, Gabriel Herrero-Beaumont, Marc Hochberg, John A. Kanis, Emmanuel Maheu, Jean-Pierre Pelletier, Jean-Yves Reginster, René Rizzoli

14.00-15.00

MEET-THE-EXPERT SESSIONS

Diagnosis and treatment of sarcopenia Yellow 1
Marjolein Visser

Physical rehabilitation in Musculoskeletal conditions: which method? White 1
Olivier Bruyère

Use of FRAX worldwide: current challenges and solutions Yellow 2
John A. Kanis

Epidemiology and management of post-menopausal Osteoporosis in the Middle East and Africa Yellow 3
Leith Zakraoui

Monitoring of Osteoporosis treatments White 2
Jonathan D. Adachi

15.00-16.40

SCIENTIFIC SESSION VI

Chairpersons: Johanne Martel-Pelletier, Marc Hochberg Auditorium A

Plenary Lecture 6 Auditorium A
- How long should we treat osteoporotic patients? - Maria-Luisa Brandi

15.30-16.40 Auditorium A
Oral communications selected from abstracts

15.30-15.40 Auditorium A
OC26

PROFESSIONAL ACTIVITY-DEPENDENT REPEATED LOADING INFLUENCES CORTICAL BONE GEOMETRY AND STRENGTH
Presenting author: E. Biver
Authors: G. Perréard Lopreno, M. Hars, S. Ferrari, M. Besse, R. Rizzoli

15.40-15.50 Auditorium A
OC27

HIP AXIS LENGTH IS A FRAX AND BONE DENSITY INDEPENDENT RISK FACTOR FOR HIP FRACTURE IN MEN AND WOMEN
Presenting author: W. D. Leslie
Authors: L. M. Lix, S. N. Morin, H. Johansson, A. Odén, E. V. McCloskey, J. A. Kanis

15.50-16.00 Auditorium A
OC28

THE EFFECT OF GLUCOSE-LOAD ON BONE REMODELING MARKERS AND OSTEOBLAST FUNCTION
Presenting author: I. Levinger
Authors: G. Jerums, G. McConell, M. Rybchyn, S. Cassar, E. Byrnes, P. R. Ebeling, S. Selig, E. Seeman, T. Brennan-Speranza

16.00-16.10 Auditorium A
OC29

IMPAIRED TRABECULAR BONE MICROARCHITECTURE IMPROVES AFTER ONE-YEAR ON GLUTEN-FREE DIET: A PROSPECTIVE LONGITUDINAL HR-PQCT STUDY IN WOMEN WITH CELIAC DISEASE
Presenting author: M.B. Zanchetta
Authors: J. R. Zanchetta, C. Bogado, J. C. Bai, F. Silveira, R. M. Massure, F. Costa

16.10-16.20 Auditorium A
OC30

COMBINING MEASUREMENT OF CORTICAL POROSITY AT THE PROXIMAL FEMUR WITH FRAX IMPROVES THE SENSITIVITY AND MAINTAINS HIGH SPECIFICITY FOR FRACTURE
Presenting author: M. Osima
Authors: R. Joakimsen, R. M. Joakimsen, E. F. Eriksen, Å. Bjørnerem

16.20-16.30

OC31 Auditorium A

WHAT TRIGGERS OSTEOPOROSIS THERAPY IN HIGH RISK RESIDENTS LIVING IN LONG TERM CARE (LTC) HOMES? THE GAINING OPTIMAL OSTEOPOROSIS ASSESSMENTS IN LONG-TERM CARE (GOAL) STUDY
Presenting author: G. Ioannidis
Authors: D. O'donnell, C. Kennedy, H. Navare, L. M. Giangregorio, A. M. Cheung, S. Marr, R. G. Crilly, S. Feldman, R. Jain, S. Jamal, R. G. Josse, S. Prasad, L. Thabane, J. D. Adachi, A. Papaioannou

16.30-16.40

OC32 Auditorium A

CONCORDANCE BETWEEN MUSCLE MASS ASSESSED BY BIOELECTRICAL IMPEDANCE ANALYSIS AND BY DUAL ENERGY X-RAY ABSORPTIOMETRY AMONG ELDERLY PEOPLE: A CROSS-SECTIONAL STUDY
Presenting author: F. Buckinx
Authors: J.-Y. Reginster, N. Dardenne, J. L. Croisier, J. F. Kaux, C. Beaudart, J. Slomian, O. Bruyère

15.00-16.50

COMMITTEE OF NATIONAL SOCIETIES SPECIAL PLENARY SESSION Yellow 1

Healthy Life, Healthy Bones
Chairpersons: Jean-Yves Reginster, Judy Stenmark
- Introduction - J. Stenmark

15.03-15.11 Yellow 1
OCs1

HEALTHY LIFE, HEALTHY BONES
Presenting author: M. Tsagareli
Authors: E. Giorgadze, N. Dolidze, T. Sulikashvili, N. Jeiranashvili

15.11-15.19 Yellow 1
OCs2

A POPULATION-BASED ANALYSIS OF THE POST-FRACTURE CARE GAP IN HONG KONG: THE SITUATION IS NOT IMPROVING
Presenting author: A. W. H. Ho
Author: S. H. Wong

15.19-15.27 Yellow 1
OCs3

"LET'S HOLD THE BONE TOGETHER": ORTHOPEDIC-METABOLIC COLLABORATIVE MANAGEMENT FOR OSTEOPOROTIC HIP FRACTURE
Presenting author: P. Rotman-Pikielny
Authors: M. Frankel, O. Tel-Levanon, M. Tamar, E. Yakobi, D. Nabriski, D. Netzer, Y. Brin, M. Niska

15.27-15.35 Yellow 1
OCs4

HANDGRIP STRENGTH PREDICTS ABILITY TO FUNCTION IN ACTIVITIES OF DAILY LIVING: A PROSPECTIVE STUDY OF 193 WOMEN WITH HIP FRACTURE
Presenting author: M. Di Monaco
Authors: C. Castiglioni, E. De Toma, L. Gardin, S. Giordano, R. Tappero

15.35-15.43 Yellow 1
OCs5

RECENT TREND IN THE INCIDENCE OF HIP FRACTURE IN TOTTORI, JAPAN
Presenting author: H. H. Hagino
Authors: Y. T. Tsukutani, M. O. Osaki, N.H. Nagashima

15.43-15.51 Yellow 1
OCs6

ACCUMULATED ONE YEAR HEALTH UTILITY LOSS AFTER SUSTAINING A HIP FRACTURE IN MEXICO
Presenting author: P. Clark
Authors: L. Girant, F. Carlos, A. Svedbom, F. Borgström, J. A. Kanis

15.51-15.59 Yellow 1
OCs7

RHEUMATOID CACHEXIA, OSTEOPOROSIS AND VERTEBRAL FRACTURES
Presenting author: A. El Maghraoui
Authors: S. Sadni, A. Rezqi, A. Bezza, L. Achemlal, A. Mounach

15.59-16.07

OCs8 Yellow 1
PSYCHOLOGICAL WELL BEING AND QUALITY OF LIFE ASSESSMENT OF WORKING WOMEN WITH OSTEOPOROSIS VERSUS RETIRED WOMEN WITH OSTEOPOROSISPresenting author: D. M. Farcas
Authors: F. Marc, C. Suteu, A. I. Gasparik, L. Sachelarie

16.07-16.15

OCs9 Yellow 1
CAFFEINE, COFFEE AND TEA IN RELATION TO RISK OF HIP FRACTURE IN THE SINGAPORE CHINESE HEALTH STUDYPresenting author: W. P. Koh
Author: Z. J. Dai

16.15-16.23

OCs10 Yellow 1
RISK FACTOR FOR THE FIRST-INCIDENT HIP FRACTURE IN POSTMENOPAUSAL WOMEN

Presenting author: F. Chen

16.23-16.31

OCs11 Yellow 1
NATIONAL BONE HEALTH ALLIANCE: A MULTISECTOR PUBLIC-PRIVATE PARTNERSHIP WORKING TOGETHER TO IMPROVE AMERICA'S BONE HEALTH

Presenting author: D. Lee

16.31-16.39

OCs12 Yellow 1
OVERWEIGHT AND OBESITY AND RISK FRACTURE STUDY IN POSTMENOPAUSAL WOMEN FROM HAVANA AND MADRIDPresenting author: M. Diaz Curiel
Authors: D. Navarro Despaigne, C. Prado Martinez

16.40-16.50

Presentation of the IOF Committee of National Societies Medal Yellow 1
Jean-Yves Reginster

17.00-18.00

ESCEO-EUGMS SYMPOSIUM

Can we identify which patients should be treated in Osteoarthritis? Blue 1Chairpersons: Johanne Martel-Pelletier, Olivier Bruyère
- *Welcome and introduction* - Olivier Bruyère
- *The need for phenotyping patients in Osteoarthritis* - Marc Hochberg
- *Is it possible to phenotype patients in Osteoarthritis?* - Nigel K. Arden
- *Discussion* - Johanne Martel-Pelletier
- *Wrap up and conclusions* - Olivier Bruyère

Panel: Eric Abadie, Nigel K. Arden, Francis Berenbaum, Jaime Branco, Maria-Luisa Brandi, Olivier Bruyère, Philip Conaghan, Cyrus Cooper, Elaine M. Dennison, Jean-Pierre Devogelaer, Gabriel Herrero-Beaumont, Marc Hochberg, John A. Kanis, Stefania Maggi, Johanne Martel-Pelletier, Jean-Pierre Pelletier, Susanne Reiter-Niesert, Jean-Yves Reginster, René Rizzoli

IOF WORKSHOP

ISCD-IOF Joint Session: Latest trends on secondary fracture prevention Blue 2Chairpersons: Neil Binkley, Kristina Akesson
- *Capture the fracture® -update* - Cyrus Cooper
- *Novel diagnostic technologies* - H.P. Dimai
- *Laboratory Work-up Post Hip Fracture Repair, What to Measure and When, the Impact of Surgery on Laboratory Results* - Neil Binkley

17.00-18.30

INDUSTRY-SPONSORED SATELLITE SYMPOSIUM Auditorium B

Hypophosphatasia: a rare disease with heterogeneous presentation

Chairpersons: Maria-Luisa Bianchi, Maria-Luisa Brandi

- *Opening Remarks* - Maria-Luisa Brandi
- *Introduction* - Maria-Luisa Bianchi
- *Characterizing the burden of disease in patients with HPP* - Thomas Weber- *Clinical presentation of HPP in a family with the same mutation: heterogeneous or homogeneous phenotype?* - Francesco Conti
- *Differentiating HPP from other musculoskeletal diseases* - Christian Roux

17.00-18.30

INDUSTRY-SPONSORED SATELLITE SYMPOSIUM Auditorium A

Managing Long-Term Osteoporosis: New Insights

Chairpersons: Serge Ferrari, Ego Seeman

- *Welcome and introduction* - Serge Ferrari
- *Efficacy and safety of long-term therapy with denosumab* - Socrates Papapoulos- *Target for osteoporosis therapy: Supportive evidence from the FREEDOM extension* - Serge Ferrari- *Explaining the differences in long-term BMD gains across therapies* - Ego Seeman

18.00-20.00

EUGMS ESCEO ESPEN IOF SYMPOSIUM-BY INVITATION ONLY Room 6

Identifying cohorts for sarcopenia study

08.00-09.00

NON-SPONSORED SYMPOSIA

Clinical Application of Bone Microindentation Blue 1

Chairperson: Adolfo Diez-Perez

- *Introduction to in vivo Microindentation* - Mary L. Bouxsein
- *Microindentation in diabetes and stress fractures* - Erik Fink Eriksen
- *Microindentation in patients with osteopenia and fractures and in Osteoporosis* - Socrates Papapoulos

Osteogenic Loading, Low-Impact, High Loading stimulus for Bone Density Development Yellow 2

Chairperson: John Jaquish

- *Introduction to impact forces, risks and rewards* - Riku Nikander
- *Osteogenic loading and functional bone performance* - John Jaquish
- *Neural inhibition and safety in static loading* - Lynn Freeman

Links between atherosclerosis and osteoporosis Blue 2

Chairpersons: Sekib Sokolovic, Roberto Jacomelli,

Almira Hadzovic-Dzuvo

- *Atherosclerosis: Degenerative or Inflammatory disease* - Dragan Lovic
- *Osteoporosis: Degenerative or Inflammatory disease* - Ülke Akarimak
- *Atherosclerosis and Osteoporosis: Is there any link?* - Sekib Sokolovic

Non-holiday drug for osteoporosis. Is it possible to calculate the economic impact of anti fracture efficacy versus side effect ? Yellow 1

Chairperson: Elio Tanaka

- *Introduction* - Elio Tanaka
- *The drugs for osteoporosis, past, present and future* - Fernanda Tanaka
- *The anti fracture efficacy and the adverse effects of the osteoporosis drugs* - Claudia Totsugui Mariano
- *The economic impact of anti fracture efficacy versus side or adverse effects* - Alexander Itria
- *The drug for bone event specialty in dismetabolic patients, like chronic kidney failure group of patients* - Fabiana Gatti de Menezes
- *Questions and closing remarks* - Elio Tanaka

09.00-11.10

SCIENTIFIC SESSION VII

Chairpersons: Roger Fielding, Nicholas Harvey

Auditorium B

09.00-09.30

Plenary Lecture 7

- *Inflammation and bone fragility* - Christian Roux

Auditorium B

09.30-09.37

Presentation of the IOF Olof Johnell Science Award

René Rizzoli

Auditorium B

09.37-09.40

Presentation of the Yogurt in nutrition initiative

2014 award

René Rizzoli

Auditorium B

09.40-10.40

Oral communications selected from abstracts

Auditorium B

09.40-09.50

OC33

Auditorium B

SAFETY AND EFFICACY OF ODANACATIB IN THE TREATMENT OF MEN WITH OSTEOPOROSIS: A RANDOMIZED PLACEBO-CONTROLLED TRIAL

Presenting author: R. D. Chapurlat

Authors: E. S. Orwoll, S. Adami, N. Binkley, B. L. Langdahl, S. Doleckyj, H. Gizek, B. B. Scott, A. C. Santora

09.50-10.00

OC34

Auditorium B

FRAX-BASED ASSESSMENT AND INTERVENTION THRESHOLDS: AN EXPLORATION OF THRESHOLDS IN WOMEN AGED 50 YEARS AND OLDER IN THE UK

Presenting author: N. C. Harvey

Authors: J. A. Kanis, H. Johansson, A. Odén, A. Cooper, C. Cooper, R. M. Francis, D. M. Reid, P. Selby, J. E. Compston, E. V. McCloskey

10.00-10.10

OC35

Auditorium B

REDUCED FRACTURE RISK IN DANISH WOMEN WITH POLYCYSTIC OVARY SYNDROME: A NATIONAL REGISTER-BASED COHORT STUDY

Presenting author: K. H. Rubin

Authors: D. Grintborg, M. Nybo, M. Andersen, B. Abrahamsen

10.10-10.20

OC36

Auditorium B

IMPACT OF HIP FRACTURE ON HOSPITAL CARE COSTS: A POPULATION BASED STUDY

Presenting author: J. Leal

Authors: A. M. Gray, M. K. Javaid, D. Prieto-Alhambra, N. K. Arden, C. Cooper, A. Judge

10.20-10.30

OC37

Auditorium B

A SYSTEMATIC REVIEW OF THE USE OF SPINAL ORTHOSES IN THE MANAGEMENT OF VERTEBRAL OSTEOPOROSIS AND OSTEOPOROTIC VERTEBRAL FRACTURE

Presenting author: K. L. Barker

Authors: C. Minns Lowe, M. Newman

10.30-10.40

OC38

Auditorium B

EFFICACY STUDY OF THE TREATMENT OF OSTEOARTHRITIS-INDUCED KNEE PAIN WITH AUTOLOGOUS CONDITIONED SERUM: A COMPARATIVE, PROSPECTIVE AND RANDOMIZED STUDY

Presenting author: D. W. Hang

10.40-11.10

Plenary Lecture 8

Auditorium B

- *Guideline diversity in glucocorticoid-induced Osteoporosis* - Cyrus Cooper

11.10-12.10

ESCEO SYMPOSIUM

Guidelines for the registration of drugs to be used in frailty and sarcopenia Auditorium B

Chairpersons: Alfonso Cruz Jentoft, Marjolein Visser

- *Introduction* - René Rizzoli
- *Who should we treat in Sarcopenia* - Antonio Cherubini
- *How to assess diseases in Sarcopenia* - Roger Fielding
- *Discussion leader* - Ivan Bautmans
- *Conclusion* - Jean-Yves Reginster

Panel: Islene Araujo de Carvalho (World Health Organization – Geneva), Ivan Bautmans, Heike A. Bischoff-Ferrari, Maria-Luisa Brandi, Olivier Bruyère, Etienne Cavalier, Antonio Cherubini, Cyrus Cooper, Gaetano Crepaldi, Alfonso Cruz Jentoft, Roger Fielding, Andrea Ildiko Gasparik, John A. Kanis, Alberto Pilotto, Jean-Yves Reginster, Susanne Reiter-Niesert, René Rizzoli, Serge Rozenberg

Thursday, March 26

18.50-19.50
IOF-ESCEO-SERVIER HONORARY LECTURE Fondazione Stelline
- *Historical genetics of wine grapes* - José Vouillamoz

20.00-21.00
MEDA AB WELCOME COCKTAIL Fondazione Stelline

Friday, March 27

12.15-13.45
MEDA AB LUNCH SYMPOSIUM Auditorium A
ESCEO Algorithm for Osteoarthritis: from treatment guidelines to real life
Chairpersons: Maurizio Cutolo, Jean-Yves Reginster
- *Biological and clinical effects of intra-articular hyaluronic acid: meta-analyses and real-life patient studies* - Thierry Conrozier
- *Prevention and treatment of knee osteoarthritis with glucosamine sulfate: from clinical studies to real life.* - Lucio C. Rovati
- *How can we help implementing ESCEO algorithm in real life* - Jean-Yves Reginster

12.15-13.45
TAKEDA LUNCH SYMPOSIUM Auditorium B
Calcium and vitamin D – Fact and fiction
Chairperson: John A. Kanis
- *Welcome and introduction* - John A. Kanis
- *Efficacy of calcium and vitamin D supplementation: Where are we now?* - Cyrus Cooper
- *Calcium and vitamin D supplementation: Update on safety profile* - René Rizzoli
- *Bone protective therapies with and without calcium and vitamin D – Does it matter?* - Bess Dawson-Hughes
- *Meeting summary and close* - John A. Kanis

17.00-18.30
MSD SATELLITE SYMPOSIUM Auditorium B
Evolving Strategies for Management of Osteoporosis
Chairperson: Silvano Adami
- *Opening Remarks* - Silvano Adami
- *The Role of Cathepsin K in Bone Homeostasis* - Ego Seeman
- *Odanacatib Antifracture Efficacy in Postmenopausal Women; Results from the Phase 3 Long-term Odanacatib Fracture Trial (LOFT)* - Michael R. McClung
- *Safety and Tolerability of Odanacatib in Post-Menopausal Women; Interim Results From the Phase 3 Long-term Odanacatib Fracture Trial (LOFT)* - Socrates Papapoulos
- *Closing - Panel Question and Answer* - Silvano Adami

17.00-18.30
SERVIER SATELLITE SYMPOSIUM Blue 1
Management of severe osteoporosis: personalized medicine in practice
Chairpersons: Maria-Luisa Brandi, Jean-Yves Reginster
- *Introduction* - Maria-Luisa Brandi
- *Why is severe Osteoporosis still an unmet medical need 40 years after the discovery of the first drugs?* - Maria-Luisa Brandi
- *Management of patients contra-indicated or not tolerant to anti-resorptive treatments* - René Rizzoli
- *New indication and safety of strontium ranelate: a comprehensive review* - Cyrus Cooper
- *Conclusion* - Jean-Yves Reginster

Saturday, March 28

12.15-13.45
CERIN / CNIEL, EMF, GDP LUNCH SYMPOSIUM Auditorium B
Dairy products & bone health: turning facts and beliefs into clinical practice
Chairpersons: Jean-Yves Reginster, René Rizzoli
- *The acid-ash hypothesis and bone health* - Tanis Fenton
- *Dairy consumption, prevention of osteoporosis & fractures: an update* - Olivier Bruyère
- *Dairy product facts & fiction* - Jean-Jacques Body

12.15-13.45
ELI LILLY LUNCH SYMPOSIUM Auditorium A
Putting the Patient First: Effective Therapeutic Strategies to Reduce the Burden of Fractures
Chairperson: Maria-Luisa Brandi
- *Welcome & Introduction* - Maria-Luisa Brandi
- *Bridging the Osteoporosis Care Gap: Improving Patient Outcomes with a Fracture Liaison Service* - Maria-Luisa Brandi
- *Understanding the Fragile Patient: Identifying and Addressing the Clinical Challenge* - Astrid Fahrleitner-Pammer
- *Preventing Secondary Osteoporosis: Anabolic vs Anti-resorptive Therapy for Improving Patient Outcomes* - Erik Fink Eriksen
- *Question & Answer. Symposium Close* - Maria-Luisa Brandi

14.00-15.00
ABIOTEN SATELLITE SYMPOSIUM Blue 1
Old and new treatments for bone diseases
Chairperson: Socrates Papapoulos
- *Vitamin D: Its expanding role in the maintenance of bone health* - Maria-Luisa Brandi
- *New trends in the treatment of algodystrophy* - Silvano Adami
- *Adherence to treatment in osteoporosis: challenges and new scenarios* - Nicola Napoli

17.00-18.30
AMGEN SATELLITE SYMPOSIUM Auditorium A
Managing Long-Term Osteoporosis: New Insights
Chairpersons: Serge Ferrari, Ego Seeman
- *Welcome and introduction* - Serge Ferrari
- *Efficacy and safety of long-term therapy with denosumab* - Socrates Papapoulos
- *Target for osteoporosis therapy: Supportive evidence from the FREEDOM extension* - Serge Ferrari
- *Explaining the differences in long-term BMD gains across therapies* - Ego Seeman

17.00-18.30
ALEXION SATELLITE SYMPOSIUM Auditorium B
Hypophosphatasia: a rare disease with heterogeneous presentation
Chairpersons: Maria-Luisa Bianchi, Maria-Luisa Brandi
- *Opening Remarks* - Maria-Luisa Brandi
- *Introduction* - Maria-Luisa Bianchi
- *Characterizing the burden of disease in patients with HPP* - Thomas Weber
- *Clinical presentation of HPP in a family with the same mutation: heterogeneous or homogeneous phenotype?* - Francesco Conti
- *Differentiating HPP from other musculoskeletal diseases* - Christian Roux

Bone Research Society Events



BONE RESEARCH SOCIETY TRAINING COURSE

OSTEOPOROSIS

& OTHER METABOLIC BONE DISEASES

OXFORD, UK 13-15 APRIL 2015

This annual 3-day residential training course provides trainees in medical specialties such as rheumatology, endocrinology, care of the elderly, gastroenterology, orthopaedics, respiratory medicine and clinical chemistry with the knowledge and understanding to manage patients with osteoporosis and other metabolic bone diseases.

The course focuses on practical issues relating to patient management and is strongly recommended for any trainee who foresees that patients with these disorders will form a significant part of their workload in future.

Specialist nurses in osteoporosis and falls will also find this course valuable, as well as newly qualified consultants or others wishing to update their knowledge.

To join our mailing list, please contact events@brsoc.org.uk.

ORGANISERS

Tash Masud (Nottingham)
Jon Tobias (Bristol)

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ATTENDED PREVIOUS COURSES:

"Fantastic course, probably the best I have ever been on"

"Brilliant course set at the right level, knowledgeable speakers, will definitely recommend it"

"Very useful, inspiring course ... represents great value for money in terms of both quality and quantity of teaching ... I will certainly be recommending this course"



**1-3 SEPTEMBER 2015
EDINBURGH, UK**



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PROGRAMME HIGHLIGHTS

SYMPOSIA TO INCLUDE:

- Autoimmunity
- Cell signalling in the kidney
- Genetics of musculoskeletal diseases
- Matrix diseases
- Mineralisation

- Muscle and bone
- Osteoporosis
- Paget's disease
- Scaffolds
- Stem cells and regenerative medicine
- Vitamin D

ALSO

- Clinical cases
- New Investigator session
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World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2015): Plenary Lecture Abstracts

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PL1 OSTEOPOROSIS OR SARCOPENIA: TWO DISORDERS OR ONE?

R. Fielding¹

¹Nutrition, Exercise, Physiology, and Sarcopenia Laboratory Jean Mayer USDA Human Nutrition Research Center on Aging Tufts University, Boston, MA, United States

The loss of muscle mass (sarcopenia) and BMD parallel each other throughout the lifespan. Skeletal muscle is required for locomotion, oxygen consumption, whole body energy metabolism, and substrate turnover and storage. Robust skeletal muscle mass is essential for maintaining homeostasis and whole body health. Sarcopenia is associated with declines in physical functioning with advancing age. The underlying causes of sarcopenia are multifactorial and include decreased physical activity, increased cytokine activity, increased irregularity of muscle unit firing, and a decrease in anabolic hormones. There are several parallels with the age-associated declines in BMD and development of osteoporosis that suggest common underlying mechanisms contributing to bone and muscle loss. With the loss of muscle and bone mass and strength, a decrease in physical function and an increased risk of fracture and disability tends to be the result. The final common pathway resulting in fracture sits at the crossroads of bone loss and skeletal muscle dysfunction. Common underlying pathophysiological mechanisms and the large unmet clinical need will necessitate the examination of therapies that target both age-associated muscle and bone loss.

PL2 MANAGEMENT OF OSTEOPOROSIS IN RENAL FAILURE

M. H. Lafage-Proust¹

¹LBTO Inserm U1059 Université de Lyon, Saint Etienne, France

Fractures, together with vascular calcifications constitute the main features of CKD mineral and bone disorders (CKD-MBD) [1], a major complication of chronic uraemia, which severely affects patients' morbidity and mortality [2]. Indeed, fracture risk increases as renal function declines from CKD stages 3 to 5. In dialysed patients, fractures occur roughly 10 years earlier and hip fracture risk is about 4.5 fold compared to that of non-uremic patients. Clinical risk factors for fractures consist of the "classical" ones (age, female gender, low BMI, vascular calcifications, drugs) and those specific to CKD such as dialysis vintage and kidney transplantation or parathyroidectomy history.

The biological mechanisms which underlie the bone histologic lesions (referred to as "renal osteodystrophy"-ROD-) are being progressively unravelled. Overall, ROD involves anomalies of turnover which can be too high (osteitis fibrosa or "mixed uremic lesions") or too low (adynamic bone disease) and defects in bone primary (osteomalacia or "mixed uremic lesions") and secondary mineralisation. They result from the severe dysregulation of calcium and phosphate metabolism which occurs as soon as the glomerular filtration rate (GFR) deteriorates [3]. Briefly, at earlier stages, the phosphate retention due to nephronic reduction, stimulates FGF23 secretion which exerts anti-vitamin D (VD) effects [4]. This, together

with the resulting decrease in calcium intestinal absorption, triggers secondary hyperparathyroidism and leads to high bone turnover. Later on, CKD progressively causes the loss of various cell receptors (R). Indeed, parathormone (PTH)-R expression decreases in bone, which leads to skeletal resistance to PTH and may participate to the development of low bone turnover. In parathyroid glands, expression of VDR, calcium sensing R and FGF23 R wanes over time, which promotes gland autonomisation. Many other mechanisms are currently being explored such as the increase in circulating sclerostin and Dkk1, two members of the wnt signalling system, accumulation of SIBLINGs proteins in bone extracellular matrix, chronic inflammation and dysregulation of energetic metabolism.

Bone status assessment in CKD may be difficult. BMD measurement by DXA was not recommended by KDIGO (the “Kidney Disease Improving Global Outcome” initiative) in 2009 [5] but recent papers showed that it predicts fractures in both dialysis [6], and predialysis [7,8] populations, as it does in the general population. The hip or the wrist may be the best sites, spine measurements being biased by superposition of aortic vascular calcifications. FRAX does not include CKD as a risk factor and may therefore underestimate the 10-year probability of fracture [9]. Interestingly, it was also shown that testing of neuromuscular function may discriminate well among fractured and non-fractured patients with Stage 5 CKD on dialysis [10]. HRpQCT studies showed that cortical bone is affected early, with a reduction in cortical thickness and an increase in cortical porosity, as compared to control populations, which was positively correlated to the time-averaged levels of serum PTH [11]. PTH serum levels have long been a surrogate albeit flawed marker for evaluating bone turnover, due to the more or less marked skeletal resistance to PTH. When associated to serum PTH, Bone Alkaline Phosphatase serum levels, which do not depend on GFR, are better predictors of bone turnover than PTH alone [12]. Because of the lack of specificity of biological markers, iliac crest bone biopsy may be sometimes necessary for histological diagnosis of the ROD type especially when administration of anti-osteoporotic drug is considered. The aim of CKD-induced osteoporosis treatment is triple: 1) to fight against phosphate retention (diet and chelation of dietary phosphate) 2) to prevent secondary hyperparathyroidism via vitamin D (cholecalciferol and also one-alpha Vitamin D derivatives), calcium supplementation or even cinacalcet, a calcium sensing receptor agonist, 3) to treat bone fragility with anti-osteoporotic molecules. While the post-hoc analyses of pivotal studies suggested that bisphosphonates [13], denosumab [14] or teriparatide [15] are rather safe and efficacious in patients at CKD stage 2 and 3 (i.e., GFR >30 ml/min), there is no available information about drug safety or efficacy at stage 4 and 5 and all the more so in dialysed patients.

Conclusion: Prospective studies evaluating anti-osteoporotic molecules, especially in patients at the later stages of the

disease, are sorely lacking, making difficult if not impossible to rationally take care of CKD-associated osteoporosis. Thus, thorough tracking of secondary hyperparathyroidism and other fracture risk factors in CKD patients at early as possible in order to prevent worsening of bone fragility seems a reasonable recommendation.

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PL3 BONE ANABOLIC THERAPIES FOR OSTEOPOROSIS

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The aim of pharmacological management of osteoporosis is the reduction of the risk of fractures and associated clinical consequences. Most currently available agents inhibit bone resorption and bone turnover to varying degrees and decrease the risk of fractures. However, these agents do not stimulate the formation of new bone that is essential for the management of patients with severe disease and only modestly decrease the risk of nonvertebral fractures, the most frequent osteoporotic fractures that occur predominantly at cortical bone sites. For such patients, agents capable of stimulating new bone formation are required. Teriparatide, the most extensively studied bone forming treatment, stimulates not only bone formation but also bone resorption, acts mainly at bone sites undergoing active remodeling and increases cortical porosity. Studies with teriparatide raised the question whether concurrent inhibition of bone resorption might improve its effect on bone mass, particularly at cortical sites. Combination treatment with teriparatide and

denosumab increased BMD at all skeletal sites considerably more than either monotherapy alone after 1 year suggesting that for optimal therapeutic outcome bone formation and bone resorption should be modulated in opposite directions. Human and animal genetics indicated that this aim may be achievable. The recognition of the role of the Wnt signaling pathway in bone formation provided a number of potential targets for the development of new bone-building pharmaceuticals. Such targets include sclerostin, Dkk1 and LRP4. For clinical use, however, treatments should not only modify the expression of target molecules but need also to have bone specificity to avoid potential off-target effects. The restricted expression of sclerostin in the skeleton and the lack of abnormalities in organs other than the skeleton in animals and patients with sclerostin deficiency made this protein the most attractive target for the development of new therapeutics. Inhibition of sclerostin in animal models stimulated trabecular and cortical bone formation and increased bone mass and strength. The majority of new bone formation was modeling-based, at quiescent surfaces, a property that differentiates anabolic from a bone-forming therapy. Increased bone formation by treatment was not associated with an increase in bone resorption. Instead, a decrease of osteoclast surface was observed suggesting a functional uncoupling of bone resorption and formation with treatment. Two humanized antibodies to sclerostin, blososumab and romosozumab, were investigated in phase I and II clinical studies. These antibodies given by subcutaneous injections every 2 or 4 weeks showed impressive increases in BMD at the spine and the hip after 1 year of treatment which exceeded increases previously observed with any other monotherapy. In addition, these studies provided important insights into the mechanism of action of these inhibitors and confirmed the transient dissociation of bone formation and resorption with treatment. Phase III clinical studies with fracture outcomes are currently underway with romosozumab. Apart from establishing the efficacy of these new molecules in the management of osteoporosis a critical issue for their introduction into clinical practice will be their tolerability and safety profile.

PL4

CAN WE ALTER THE NATURAL HISTORY OF OSTEOARTHRITIS?

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Osteoarthritis (OA) can be defined as “a progressive disease representing the failed repair of joint damage that, in the preponderance of cases, has been triggered by abnormal intra-articular stress.” This presentation will review data from both observational epidemiologic studies and randomized clinical trials that support the use of nonpharmacologic, including surgical, and pharmacologic modalities in the alteration of the progression of OA.

PL5

IS IT TIME TO RESURRECT MENOPAUSE HORMONE THERAPY IN OSTEOPOROSIS?

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Objective: Bisphosphonates are a widely used treatment for postmenopausal osteoporosis. However, long term safety issues have become apparent.

Material and Methods: An increased incidence of atrial fibrillation has been found in some clinical trials; osteonecrosis of the jaw has been increasingly seen particularly following dental extractions, and inflammatory eye disease has also been reported. These adverse effects, fortunately rare, are found mainly, or exclusively, with intravenous bisphosphonates. There are increasing numbers of reports of fragility fractures of the femur with long-term bisphosphonate use. These are probably due to over-suppression of bone turnover in certain susceptible individuals, and have also been seen with denosumab. Bisphosphonates have an extremely prolonged skeletal retention time, and since unexpected adverse effects could yet arise in the future they should be avoided where possible in women aged below 60 years.

Results: Serious side-effects have been noted with strontium ranelate. Even calcium and vitamin D supplements have been shown to have safety issues with increases in renal calculi and possible increased risks for cardiovascular disease. Hormone replacement therapy (HRT) should remain the first-line therapy for primary prevention of osteoporosis, and is an effective and safe therapy providing it is used appropriately. There are no cardiovascular risks, and likely coronary benefits, when HRT is initiated early in the menopause; venous thrombo-embolic events can be avoided with low dose or non-oral HRT, and any possible small increased risk of breast cancer remains controversial and unproven. Newer agents which affect the Wnt-LRP signal to osteoblasts or block the osteoclast-produced cathepsin K protease are under development, but again there are safety issues. Thus newer agents may prove to have very potent bone effects but what will be their adverse effects?

Conclusion: For most women, except for the elderly with severe osteoporosis, a step back to HRT seems the best management.

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PL6

HOW LONG SHOULD WE TREAT OSTEOPOROTIC PATIENTS?

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The agents shown to reduce the risk of fragility fractures include the bisphosphonates alendronate, ibandronate, risedronate and zoledronic acid; raloxifene; strontium ranelate; teriparatide and denosumab. Currently available treatments are all very effective, with several agents safety yielding 40 to 69 % reductions in the risk of fractures. The choice of the drug is based on BMD and clinical risk factors, effectiveness, costs, reimbursement policy and adverse effects.

The length of treatment is, however, not defined. Should the patients be treated lifetime? Should the treatment be safe if prolonged over the duration of the controlled clinical trials (a minimum of 3 years)? Do validated surrogate measures exist? Establishing treatment targets, often intended as “treat to target” would simplify clinical decision making. There are not validated surrogate measures in osteoporosis and this is becoming an area of ongoing and much needed research.

At the moment reasons for interrupting a therapy include treatment failures, as in patients who lose bone density or fracture on treatment. However, BMD alone cannot be considered an adequate surrogate measure for clinically relevant endpoints: QOL, function, or survival. Similarly, FRAX is not responsive enough to be used as a target for goal-directed treatment.

Another factor influencing duration of treatment is the recognition of side effects that emerge in long-term use, as it happened for bisphosphonates and denosumab. Because bisphosphonates accumulate in bone and are released for years after treatment interruption, it make sense to consider the practical question of how long to treat. The indication is that patients at mild risk might interrupt the therapy after 3–5 years and remain without treatment as long as BMD is stable and no fractures occur. Conversely, high risk patients should be treated even longer and probably be on a non-bisphosphonate treatment during drug holiday.

The only drug for which an indication for length of treatment exists is teriparatide, that cannot be administered for more than 2 years.

In conclusion, there is considerable controversy regarding the optimal duration of therapy and the length of the holiday, both

of which should be based on individual assessment of risk and benefit.

PL7

INFLAMMATION AND BONE FRAGILITY

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Systemic inflammation as observed in inflammatory rheumatic disorders is associated with increased risk of osteoporosis and fractures. In rheumatoid arthritis, periarticular bone loss, bone erosions, and systemic osteoporosis are observed, with an increased risk of fractures. Determinants of fractures are underlying conditions (as RA has a female preponderance and an increased prevalence with age), severity of the disease, and use of glucocorticoids. However, bone loss can occur even in glucocorticoid-naive patients. Prospective data show that the optimal control of inflammation in RA is associated with decrease in structural damage and bone loss. There is a strong rationale for these clinical observations, as osteoclastogenesis and osteoclasts activity are under the control of RANK L produced by other cells than osteocytes, such as fibroblasts and activated T lymphocytes. Moreover auto antibodies against citrullinated proteins can also activate bone resorption. Finally inflammatory cytokines up regulate sclerostin and thus produce a decrease in bone formation. Thus the consequence of inflammation is an uncoupling bone remodeling. These data must be taken into account in patients with glucocorticoid therapy; their dramatic increased risk of fracture must be assessed in the perspective of the deleterious effect of the underlying inflammation.

PL8

GUIDELINE DIVERSITY IN GLUCOCORTICOID-INDUCED OSTEOPOROSIS

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Oral glucocorticoids are prescribed for a wide variety of medical disorders, and the prevalence of use has been estimated as 4.6 % among postmenopausal women. Fracture risk increases during the first 6 months of glucocorticoid therapy; decreases following withdrawal; and is strongly associated with dose. Guidelines for GIOP stress the importance of initiating osteoporosis prophylaxis in patients receiving chronic glucocorticoid therapy. The most recent recommendations from the

American College of Rheumatology stratify intervention by glucocorticoid dose and fracture risk, based on the FRAX risk assessment tool. Low and medium risk patients (<20 % probability of a major fracture) are treated at a glucocorticoid threshold dose of 7.5 mg daily. High risk patients (FRAX >20 %) are treated at a glucocorticoid dose of 5 mg daily. In contrast, the IOF/ECTS guidelines recommend that all post-

menopausal women and men aged 50 years and over who are exposed to 3 months or more of oral glucocorticoids should undergo risk assessment by FRAX, and therapeutic intervention on the basis of fracture history, age and glucocorticoid dose. Intervention thresholds are country-specific. The use of these guidelines will permit the delivery of effective pharmacological interventions for GIOP in a rational and cost effective manner.

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OC1

ODANACATIB ANTIFRACTURE EFFICACY AND SAFETY IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: RESULTS FROM THE PHASE III LONG-TERM ODANACATIB FRACTURE TRIAL (LOFT)

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Objective: The Phase III Long-Term Odanacatib (ODN) Fracture Trial (LOFT; NCT00529373) is a randomized, double-blind, placebo-controlled, event-driven trial evaluating the efficacy and safety of ODN, an oral selective inhibitor of cathepsin K, in reducing osteoporotic fracture risk.

Material and methods: Postmenopausal women ≥ 65 years with BMD T-score ≤ -2.5 at total hip (TH) or femoral neck (FN), or with prior radiographic vertebral fracture (VFX) and T-score ≤ -1.5 at TH or FN, were randomized to ODN 50 mg/week or placebo. Patients received vitamin D (5600 IU/week), plus calcium to achieve intake of 1200 mg/d. Primary endpoints were: new/worsening morphometric VFX; hip fractures; nonvertebral fractures. Secondary endpoints included clinical VFX; BMD; bone turnover markers. Safety/tolerability measures included independent adjudication of adverse events (AEs) of special interest.

Results: 16,713 women were randomized; 16,071 were included in analysis. Mean age was 72.8 years; 46.5 % had prior radiographic VFX. Mean BMD T-scores were: TH -2.4 ; FN -2.7 ; lumbar spine (LS) -2.7 . Mean follow-up was 34.5 months. Versus placebo, ODN treatment resulted in relative risk reductions of: 54 % for new/worsening morphometric VFX; 47 % for hip fractures; 23 % for nonvertebral fractures; 72 % for clinical VFX (p

Conclusion: ODN significantly reduced osteoporotic fracture risk versus placebo in women with postmenopausal osteoporosis.

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OC2

THE BMD RESPONSE TO BLOSOZUMAB IS INDEPENDENT OF INITIAL AGE, BODY MASS INDEX, AND BMD IN POSTMENOPAUSAL WOMEN WITH LOW BMD: RESULTS OF A PHASE 2 RANDOMIZED CLINICAL TRIAL

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Objective: In a recent double-blind study of women with low BMD, 52 weeks of treatment with bloszumab, a humanized antibody targeted to sclerostin, increased lumbar spine (LS) and total hip BMD.1 BMD decreased after stopping treatment, but remained significantly higher than placebo after 52 weeks of follow-up in the prior bloszumab 270 mg every 2 weeks (Q2W) and 180 mg Q2W groups.2 In the same cohort, we evaluated the relationship between treatment effect and the patient's initial age, BMI, and BMD.

Material and Methods: Patients were randomized in parallel to bloszumab 180 mg Q4W, bloszumab 180 mg Q2W, bloszumab 270 mg Q2W, or placebo. BMD was assessed by DXA after 52 weeks of treatment. Absolute change in spine and total hip BMD from baseline to 52 weeks was evaluated within each treatment group for women above and below the median age and BMI, and above and below a LS T-score of -2.5 for the overall cohort, as predefined in the study protocol. Statistical analyses were conducted using a repeated measures model with Dunnett's multiplicity adjustment.

Results: Of 120 randomized patients, 108 had efficacy measures at 52 weeks. The median baseline age was 65.9 y (range 50.2-83.5 y); BMI was 23.0 kg/m² (range 14.8-40.5 kg/m²);

and LS T-score was -2.76 (range -4.03 to -1.52). The effect of bloszumab to increase spine and total hip BMD at 52 weeks was similar for women above and below the median age and BMI, and a LS T-score -2.5 (each interaction $p > 0.10$).

Conclusion: In this phase 2 study cohort, bloszumab increased spine and total hip BMD similarly across a range of age, BMI, and disease severity.

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OC3

RESULTS OF 2 YEARS OF ROMOSUZUMAB TREATMENT FOLLOWED BY 1 YEAR OF DENOSUMAB OR PLACEBO IN POSTMENOPAUSAL WOMEN WITH LOW BONE MINERAL DENSITY

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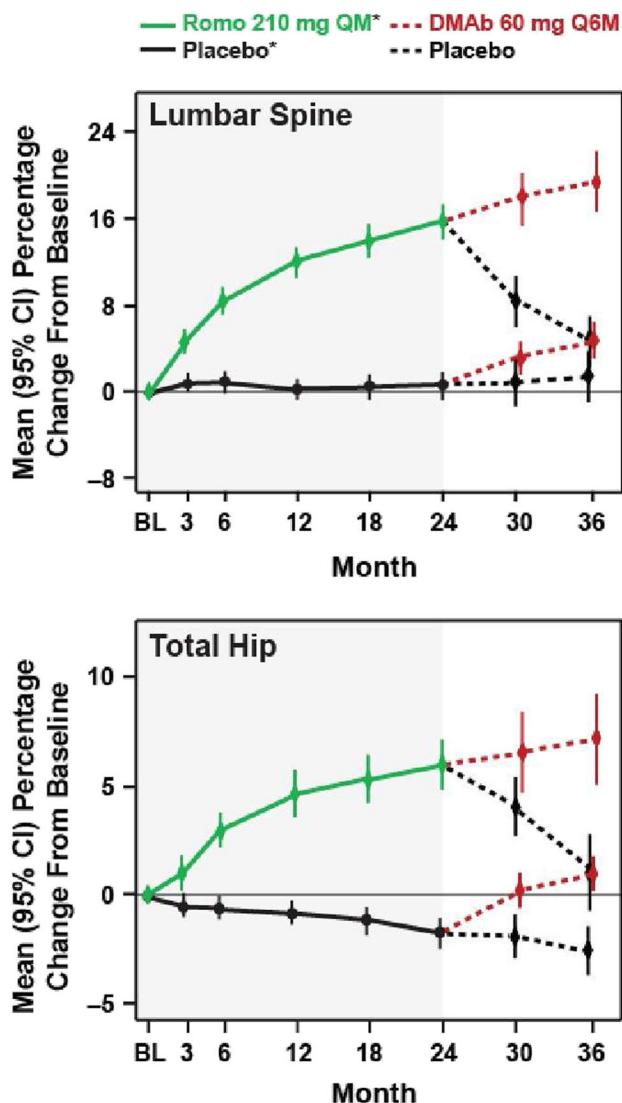
Objective: Romosuzumab (Romo) increased BMD and bone formation, and decreased bone resorption after 1 yr in postmenopausal women with low BMD (McClung NEJM 2014). Here, we report results of 2 yrs of Romo treatment, followed by 1 yr of denosumab (DMAb) or placebo (pbo).

Methods: This study enrolled 419 postmenopausal women with a lumbar spine (LS), total hip (TH), or femoral neck T-score ≤ -2.0 and ≥ -3.5 . For the results here, women received Romo (70 mg QM, 140 mg QM, 210 mg QM, 140 mg Q3M, or 210 mg Q3M) or pbo for 2 yrs. After 2 yrs, eligible women entered a 1-yr extension and were re-randomized within their original groups to DMAb or pbo.

Results: Romo led to rapid and marked increases in BMD during yr 1 and continued increases through yr 2. Largest gains were observed with Romo 210 mg QM, with increases of 15.7 % (LS) and 6.0 % (TH) (Figure). Women receiving

Romo 210 mg QM who transitioned to DMAB continued to accrue BMD at a rate similar to that in the 2nd yr of Romo; in those transitioned to pbo, BMD returned toward pretreatment levels. Romo induced rapid stimulation of bone formation (P1NP) and decreased bone resorption (CTX). Increases in P1NP were transitory, returning toward baseline (BL) within 6–12 months and remaining below BL through yr 2. CTX remained below BL through yr 2. For those receiving Romo 210 mg QM who transitioned to DMAB, P1NP and CTX decreased; for those transitioned to pbo, P1NP gradually returned to BL, while CTX initially increased above BL and gradually returned toward BL. Adverse events were balanced between the Romo and pbo groups during the first 2 yrs of the study (except for injection site reactions, most reported as mild) and during yr 3.

Conclusion: The treatment effects observed with Romo are further augmented by follow-on treatments like DMAB.



*Randomized treatment group up to month 24
BL=baseline

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OC4

DENOSUMAB TREATMENT IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS FOR UP TO 9 YEARS: RESULTS THROUGH YEAR 6 OF THE FREEDOM EXTENSION

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Objective: To report the results through year 6 of the FREEDOM open-label Extension (Ext), representing up to 9 years of continued denosumab (DMAB) for the treatment of postmenopausal osteoporosis.

Material and Methods: During the Ext, all women received 60 mg DMAB every 6 months, and daily calcium and vitamin D. At Ext year 6, bone turnover markers, nonvertebral fracture

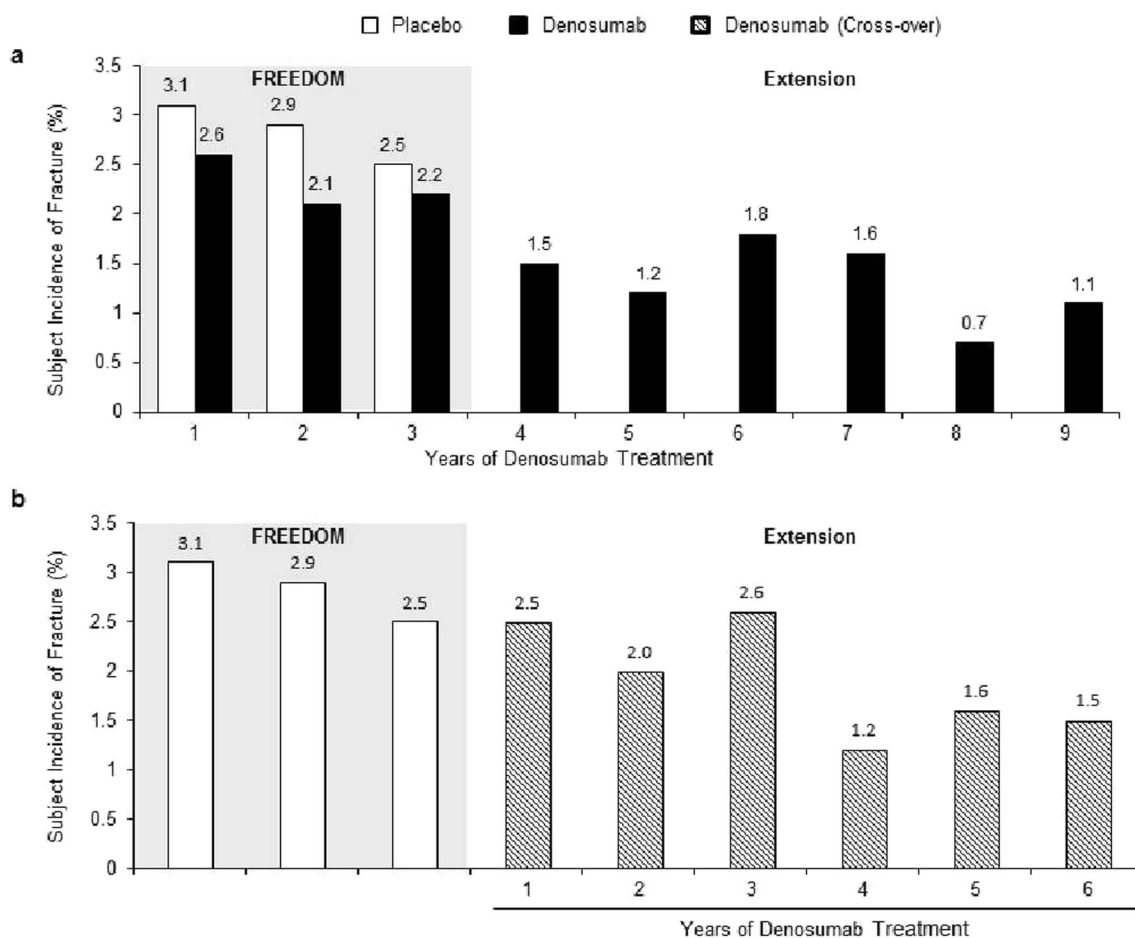
incidence, and adverse events were evaluated. In these analyses, women in the long-term group received up to 9 years of DMAB (3 years in FREEDOM and up to 6 years in the Ext); women in the cross-over group received up to 6 years of DMAB (3 years of placebo in FREEDOM and up to 6 years of DMAB in the Ext), allowing replication of results from the long-term group.

Results: Of the women who enrolled in the Ext, 3,098 (68 %) were still on study at the beginning of year 6, with a mean age of 79 years (range 68–98 years). In both groups, serum CTx and P1NP were similarly reduced after each DMAB dose. The characteristic attenuation was observed through each dosing period and reductions were sustained through Ext year 6. The yearly incidences of nonvertebral (Figure) and major nonvertebral fractures remained low in both groups. Rates of adverse events and serious adverse events were consistent with previously reported Ext data. In Ext year 6, 2 events were adjudicated positive for ONJ in the cross-over group; there were no cases of atypical femoral fracture in either group.

Conclusion: In this aging population, DMAB treatment for up to 9 years maintained reduced bone turnover and was associated with continued low incidence of nonvertebral and major nonvertebral fractures. The benefit/risk profile remained favorable.

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Figure. Yearly Incidence of Nonvertebral Fractures in the (a) Long-term and (b) Cross-over Groups Through Extension Year 6



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OC5

THE POSITION OF STRONTIUM RANELATE IN TODAY'S MANAGEMENT OF OSTEOPOROSIS

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Osteoporosis accounts for about 3 % of total European healthcare spending. The low proportion of costs for the pharmacological prevention of osteoporotic fracture means that it is highly cost-saving, especially in patient with severe osteoporosis or patients who cannot take certain osteoporosis medications due to issues of contraindications or tolerability. Following recent regulatory changes, strontium ranelate is now indicated in patients with severe osteoporosis for whom treatment with other osteoporosis treatments is not possible and without contraindications including uncontrolled

hypertension, established, current, or past history of ischaemic heart disease, peripheral arterial disease, and/or cerebrovascular disease. We review here today's evidence for the safety and efficacy of strontium ranelate. The efficacy of strontium ranelate in patients complying with the new prescribing information (i.e. severe osteoporosis without contraindications) has been explored in a multivariate analysis of clinical trial data, which concluded that the antifracture efficacy of strontium ranelate is maintained in patients with severe osteoporosis without contraindications and also demonstrated how the new target population mitigates risk. Strontium ranelate is therefore an important alternative in today's management of osteoporosis, with a positive benefit-risk balance provided the revised indication and contraindications are followed and cardiovascular risk is monitored. The bone community should be reassured that there remain viable alternatives in patients in whom treatment with other agents is not possible, and protection against the debilitating effects of fracture is still feasible in patients with severe osteoporosis.

OC6

TRACKING OF 25-HYDROXYVITAMIN D STATUS DURING PREGNANCY

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Objective: When assessed in pregnancy studies, 25(OH)D is usually measured only once. However, it is unknown whether the ranking of an individual's 25(OH)D is maintained across pregnancy, which crosses several seasons. We therefore assessed the tracking of 25(OH)D from early to late pregnancy in a prospective mother-offspring study, the Southampton Women's Survey.

Material and Methods: At 14 and 34 weeks gestation, serum 25(OH)D was measured, and diet and lifestyle questionnaires completed. We modelled seasonal variation in 25(OH)D separately for each gestation using Fourier transformations, and then calculated the difference between actual 25(OH)D and the modelled value corresponding to the sampling date for each individual [denoted 25(OH)D_{dev}]. We used Spearman's rank correlation to test tracking of 25(OH)D_{dev} from 14 to 34 weeks gestation. Multivariate linear regression was used to determine factors associated with changes in 25(OH)D_{dev} ranking.

Results: 25(OH)D was available in 2060 and 2332 women at 14 and 34 weeks, respectively, with 1756 women included at both gestations. 25(OH)D_{dev} tracked moderately from 14 to 34 weeks ($r=0.57$, $p<0.0001$), although some women had marked changes in 25(OH)D_{dev} across pregnancy (median: -0.8 ; range: -150.1 to 129.6 nmol/l). Vitamin D supplementation was the strongest influence on tracking: compared with

women who never used supplements, discontinuing supplementation after 14 weeks was associated with negative change in 25(OH)_{dev} ($\beta = -7.2$ nmol/l, $p < 0.001$), whereas commencing ($\beta = 12.2$ nmol/l, $p < 0.001$) or continuing ($\beta = 8.0$ nmol/l, $p < 0.001$) supplementation were positively associated. 25(OH)D tended to fall with higher pregnancy weight gain (25(OH)D_{dev} $\beta = -0.4$ nmol/l per kg, $p = 0.02$), and to rise with greater strenuous activity in late pregnancy ($\beta = 1.0$ nmol/l per hour/week, $p = 0.03$).

Conclusion: Stability of an individual's gestational 25(OH)D relative to the population is modest, and affected by vitamin D supplementation, weight changes and activity levels.

OC7

EFFECTIVENESS OF MATERNAL VITAMIN D SUPPLEMENTATION: A MULTICENTRE RANDOMISED, DOUBLE-BLIND, PLACEBO CONTROLLED TRIAL (MAVIDOS)

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Objective: We evaluated the efficacy of 1000 IU/d cholecalciferol in preventing maternal gestational vitamin D insufficiency in a multicentre randomised double-blind placebo-controlled trial (MAVIDOS, ISRCTN82927713).

Material and Methods: Pregnant women with a plasma 25-hydroxyvitamin D [25(OH)D] 25–100 nmol/l at 12 weeks gestation were randomised to 1000 IU cholecalciferol/d or matched placebo until delivery. Babies had DXA assessment of bone mass within 14 days of birth. 25(OH)D was measured centrally at 14 and 34 weeks gestation (Diasorin Liaison).

Results: In 900 women with measures at both times, (mean \pm SD) baseline 25(OH)D was similar in treatment and placebo groups (45.2 \pm SD vs. 46.2 \pm SD nmol/l, $p = 0.32$). At 34 weeks gestation, women in the treatment group had a greater mean 25(OH)D (68.1 \pm 22.0 vs. 43.6 \pm 22.3 nmol/l, p

Conclusion: Antenatal supplementation with 1000 IU/d cholecalciferol reduces the prevalence of vitamin D insufficiency, and prevents the gestational reduction in 25(OH)D in women who deliver in winter or spring.

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OC8

COST EFFECTIVENESS EVALUATION OF FRACTURE LIAISON SERVICES FOR THE MANAGEMENT OF OSTEOPOROSIS IN SWEDEN

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Objective: In Sweden, only 14.1 % of women with fracture age 50 years and older receive osteoporosis treatment. Fracture Liaison Services (FLS) have been shown to provide an efficient means to facilitate BMD testing of patients with fracture and assess these patients for secondary prevention treatment. The objective of this study was to evaluate the cost effectiveness of FLS compared to usual care in a Swedish setting.

Material and Methods: A Markov microsimulation model was developed and populated with Swedish costs and fracture risks, complemented with data derived from other published literature and expert opinion. Costs were included from a healthcare perspective. FLS was assumed to increase the proportion of patients identified with bone mineral testing to 50 %. All patients started the model with a previous fracture and a T-score lower than an age-matched population. Each year, patients were at risk of suffering a new fracture, death or remaining healthy. Identified patients started treatment if T-score was ≤ -2 . In the base-case scenario, 70-year old women were analysed with a 10-year time horizon and with an assumed treatment length of 2 years.

Results: In a hypothetical cohort of 1000 patients, 383 started treatment in the FLS. In total, FLS saved 22 fractures (5.5 hip, 7.3 vertebral, 6.0 wrist and 3.6 other fractures), saving 19 quality-adjusted life years and 40 added life years. The cost of fractures, assessment and treatment for FLS vs. usual care

was estimated at 66,739 vs. 69,401, 5664 vs. 1567 and 1651 vs. 608, respectively. The incremental cost per QALY for FLS vs. usual care was estimated at SEK 130,420.

Conclusion: This analysis suggests that widespread implementation of FLS has the potential to prevent a large number of fractures in Swedish patients with a moderate cost per QALY.

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OC9

CLINICAL EFFECTIVENESS OF ORTHOGERIATRIC AND FRACTURE LIAISON SERVICE MODELS OF CARE FOR HIP FRACTURE PATIENTS: CONTROLLED LONGITUDINAL STUDY

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Objective: To evaluate orthogeriatric (OG) and nurse-led Fracture Liaison Service (FLS) models of post-hip fracture care in terms of all-cause mortality at 30 days and 1 year and second hip fracture risk within 2 years.

Material and Methods: Data were obtained from the HES database linked to ONS mortality records for 11 acute hospitals in a region of England. We studied a cohort of primary hip fracture patients admitted during financial years 2003/4 to 2012/13. Interventions were the appointment of an orthogeriatrician or setup/increase of a FLS as reported in a service evaluation carried out prior to analysis. Hospitals were analysed separately and acted as their own control in a before-after time series design. Cox regression was used to describe the association between the intervention and time to death. For the outcome of second hip fracture, a competing risks survival model was used accounting for the competing risk of death. Estimates were pooled using meta-analysis.

Results: A total of 33,152 primary hip fracture patients were identified, of whom 1288 (4.2 %) sustained a second hip fracture within 2 years, and 3033 (9.5 %) and 9662 (29.8 %) died within 30 days and 1 year, respectively. Overall, post-hip fracture mortality decreased significantly across the region, from 33.1 to 26.0 % dying within 1 year from 2003/4 to 2011/12. In contrast, the proportion of patients sustaining a second hip fracture remained stable throughout the study period. Pooled estimates of impact of OG and FLS models are presented in Table 1.

Table 1 Hazard ratios for mortality and second hip fracture incidence among patients after compared to before service model interventions, pooled by intervention type using a fixed effects meta-analysis

	Orthogeriatrician		Osteoporosis nurse specialist	
	Hazard ratio	95 % Confidence interval	Hazard ratio	95 % Confidence interval
Mortality (30-days)	0.73	0.65–0.82	0.80	0.71–0.91
Mortality (1-year)	0.81	0.75–0.87	0.84	0.77–0.93
Hip re-fracture (2-year)	0.95	0.79–1.15	1.03	0.82–1.31

Conclusion: The introduction and/or expansion of OG and FLS models of post-hip fracture care has a large beneficial effect on subsequent mortality rates. It is likely that these effects partly reflect wider underlying changes to service delivery leading up to the successful implementation and change in model of care. There was no evidence for a reduction of second hip fracture. The effect on non-hip fractures remains unanswered and is a subject for further study.

OC10

META-ANALYSIS OF OBSERVATIONAL STUDIES ON THE EFFECT OF INCRETIN TREATMENT ON FRACTURE RISK

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Although patients with type 2 diabetes mellitus (T2DM) have an increased BMD as compared to healthy patients, their risk of fracture is elevated. It has been suggested that a relatively new type of antihyperglycemic drugs, the incretin agents, might reduce fracture risk. Incretin agents, on the market since 2007, include two classes, the glucagon-like peptide 1 receptor agonists (GLP1-ra) and dipeptidyl peptidase-4 inhibitors (DPP4-I). A meta-analysis of randomized clinical trials showed a 40 % reduced risk of fracture with use of DPP4-I. However, real-life data on the effect of incretin agents on fracture risk is lacking. Therefore, the objective of this study was to investigate the effect of incretin agents on fracture risk in real-life data.

Methods: For both exposures (DPP4-I and GLP1-ra) we performed a cohort study using data (2007–2012) from the world's largest primary care database, CPRD, representative

for the UK population. In addition, we performed for both exposures a case-control study using data about all fractures between 2007–2011 ($n=229,145$) in Denmark. In this study we combined the results and performed a meta-analysis. Hazard and odds ratios and their corresponding 95 % confidence intervals were extracted from the data and combined using generic inverse variance methods assuming a random effects model.

Results: There was no decreased fracture risk with use of incretin agents (adj. pooled risk ratio DPP4-I 0.89; 95%CI 0.76-1.03, adj. pooled risk ratio GLP1-ra 1.03; 95%CI 0.86-1.20). Stratification of DPP4-I use according to cumulative dose (0–18.2, 18.2-36.5, 36.5-54.7, >54.7 mg sitagliptin equivalences) using the UK data resulted in an adj. Hazard Ratio (HR) of 1.07; 95%CI (0.90-1.27) for the lowest, an adj. HR of 0.84; 95%CI (0.67-1.06) for the second lowest, an adj. HR of 1.05; 95%CI (0.81-1.37) for the second highest and an adj. HR of 0.97; 95%CI (0.78-1.20) for the highest cumulative dose group.

Conclusion: The present study shows that use of incretin agents was not associated with a decreased fracture risk. Our results are in line with a large randomized clinical trial ($n=16,492$) which compared sitagliptin, a DPP4-I, to placebo and showed a RR of 1.00 for fracture risk. Further research investigating the effect of incretin agents on fracture risk is probably not needed.

OC11

WANING LONG-TERM PREDICTIVE VALUE OF FALLS HISTORY FOR INCIDENT FRACTURE: MROS SWEDEN

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Objective: A history of falls is a strong risk factor for future falls but the predictive value decreases with time. The aim of the present study was to determine whether the predictive value of past falls for fracture remained stable or waned with increasing follow-up time.

Material and Methods: We studied 1836 elderly men recruited from the Swedish population to the MrOS study. Baseline

data included falls history, clinical risk factors, BMD at femoral neck and calculated FRAX probabilities. 187 incident osteoporotic fractures were captured during an average of 5.5 years follow-up. An extension of Poisson regression was used to investigate the relationship between falls history and FRAX to the time-to-event hazard function of fracture. All associations were adjusted for age and time since baseline. To enable comparison with past falls, FRAX probability (without BMD) was dichotomised to above (high risk) and below (low risk) 15 % for major osteoporotic fracture, which equalised the prevalences of high risk categories.

Results: At enrolment 15.5 % of the men had fallen during the preceding 12 months (past falls). After one year follow-up the HR of past falls vs. no past falls for incident osteoporotic fracture was 2.21 (95%CI: 1.37, 3.56) and after 3 years was 1.56 (95%CI: 1.10, 2.23), with $p=0.081$ for the interaction between past falls and follow-up time. In contrast, after one year the HR for osteoporotic fracture amongst participants with FRAX probability for major osteoporotic fracture above vs. below 15 % was 1.58 (95%CI: 0.95, 2.64) and after 3 years was 1.53 (95%CI: 1.04, 2.17). Thus the predictive ability of high versus low FRAX probability at baseline appeared to be stable with time (p for interaction between fracture probability and time >0.30).

Conclusion: Although a history of falls is predictive of future fracture, the magnitude of this risk wanes with time, suggesting that inclusion of falls history in algorithms for calculation of long-term fracture risk may have limited utility.

OC12

PAINFUL KNEE BUT NOT HAND OSTEOARTHRITIS PREDICTS EXCESS MORTALITY IN A COMMUNITY-BASED COHORT OF MIDDLE-AGED WOMEN WITH 23 YEARS OF FOLLOW-UP

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Objective: To assess overall and disease specific mortality in women with and without painful knee and hand radiographic osteoarthritis (ROA).

Material and Methods: Participants were from the Chingford Study, a prospective population-based longitudinal study selected from the community and followed for 23 years. Four subgroups were identified based on presence and absence of pain and ROA: Pain -/ROA -, Pain +/ROA -, Pain -/ROA +, Pain +/ROA +. Pain was defined as having any side-specific pain in the preceding month. ROA was defined as a K-L Grade of 2 or more. Vital status and overall, cardiovascular and cancer-related mortality were assessed based on study follow-up in 2014 and data from death certificates. Associations between subgroups and overall/cause-specific mortality were assessed using Cox regression model, adjusting for age, Framingham Risk Score factors and socioeconomic, physical activity, biological factors and medication use (including NSAIDs).

Results: During the median follow-up of 21.7 years (range: 21.2-22.3), 166 and 163 total deaths (20.2 %) among 821 and 808 women included in knee and hand OA and pain analysis, respectively. The Pain+/ROA-group had an increased risk of mortality compared to the Pain-/ROA- group, with a hazard ratio (HR) of 1.44 (95%CI, 0.99-2.08) for overall and 2.93 (95%CI, 1.47-5.85) for CVD-specific mortality. A more pronounced association with overall and specific mortality was found among women with painful knee and ROA, with a HR of 1.97 (95%CI, 1.23-3.17) for overall and 3.57 (95%CI, 1.53-8.34) for CVD-specific mortality. There was no association between hand pain with or without ROA and mortality.

Conclusion: Knee pain with or without ROA changes but not radiographic knee OA alone was associated with a very significant excess of overall and CVD-specific mortality. No relationship was found between painful hand OA and mortality risk. Any knee pain (with or without ROA) in the middle-aged women may be an early sign of metabolic changes strongly associated with long-term excess of cardiovascular mortality.

Disclosures: The authors declare that there are no conflicts of interest.

OC13

DIACEREIN REDUCES ANTAGONISTS OF WNT ENABLING THIS SYSTEM'S ACTIVITY IN HUMAN OSTEOARTHRITIC SUBCHONDRAL BONE OSTEOBLASTS

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Objective: Clinical and in vitro studies suggest that altered subchondral bone remodeling is involved in the progression and/or onset of osteoarthritis (OA). As therapeutic strategies aimed at modifying the metabolism of subchondral bone may be indicated in the treatment of OA, we investigated diacerein, which has been shown to positively impact the abnormal subchondral bone metabolism in OA. Here, we further explored the effect of this drug, and its active metabolite rhein, on elements of the Wnt system in human OA subchondral bone osteoblasts.

Materials and Methods: Therapeutic concentrations of diacerein/rhein (5–20 µg/ml) were used to assess their effects on the levels of β-catenin and the Wnt antagonists Dickkopf (DKK)-1 and -2. The β-catenin expression, its nuclei translocation, as well as DKK-1 and -2 expressions were assessed after 20 hours of incubation. DKK-1 protein production was determined after 48 hours in the culture medium using a specific ELISA.

Results: The RNA level of β-catenin expression was increased in diacerein ($p \leq 0.01$) and rhein ($p \leq 0.014$) treated cells. For the β-catenin nuclei translocation, the Wnt ligand most potent in bone tissue was added at a concentration of 100 ng/ml, and increased this activity by only 50 %. Both diacerein and rhein increased β-catenin nuclei translocation (diacerein, $p \leq 0.04$; rhein, $p \leq 0.06$). DKK-1 and DKK-2 mRNA expressions were dose-dependently decreased with both drugs ($p \leq 0.009$). Compared to DKK-1, the expression level of DKK-2 demonstrated a more marked decrease (90 % vs. 60 %). Both drugs also markedly and significantly decreased DKK-1 protein levels ($p \leq 0.02$) in a dose-dependent manner.

Conclusion: Diacerein and rhein positively impact the abnormal Wnt system in OA by increasing the level of β-catenin in the nuclei. This effect is likely mediated via a decrease in the DKK-1 and -2. This study infers that these drugs may be appropriate for positively modulating the abnormal metabolism of human OA subchondral bone osteoblasts.

OC14

ASSESSMENT AND DETERMINANTS OF AESTHETIC DISCOMFORT IN HAND OSTEOARTHRITIS: THE LIÈGE HAND OSTEOARTHRITIS COHORT (LIHOC)

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Whereas hand osteoarthritis (OA) is a frequent disease, which may lead to considerable pain and physical limitations, limited research has been performed, compared to lower limbs OA. The primary complaint of patients is frequently related to the disgraceful appearance of their hand joints. However, few studies have been conducted to identify the magnitude and the determinants of aesthetic discomfort in hand OA. The Liège Hand Osteoarthritis Cohort (LIHOC) is a prospective cohort of 203 patients diagnosed with hand OA which are prospectively followed to better understand the impact of hand OA on quality of life and health resources utilization. At baseline, these patients were asked to rate their aesthetic discomfort related to hand OA on a 100 mm Visual Analog Scale and also use a seven-point Likert scale (0–7), commonly used in forensic medicine, to quantify the magnitude of their aesthetic damage. The median value of the aesthetic discomfort VAS was 35.0 (Q1: 6.0-Q3: 59.0). Correlation analyses were performed between these scorings and clinical hand parameters. The median damage was rated at 3.0 (1.0-4.0), corresponding to a “moderate” level. Aesthetic discomfort (VAS) and the magnitude of the aesthetic damage (Likert) were significantly ($p < 0.02$) correlated with the gender of the patients, the duration since the diagnosis of hand OA, the radiological assessment using the Verbruggen and Kellgren-Lawrence scales, the Australian Canadian Osteoarthritis Hand Index (AUSCAN), assessing the three dimensions of pain, disability and joint stiffness, of hand function based on the Functional Index for Hand Osteoarthritis (FIHOA), the spontaneously recorded global pain (VAS) and the number of joints presenting with erosive or severe lesions, bony deformations or the number of articulations, spontaneously reported as painful (Likert only) or painful at pressure. However, when a stepwise analysis procedure was applied, the only parameters which remained significantly correlated to the aesthetic discomfort were the number of erosive joints ($p < 0.0001$) the total AUSCAN score ($p < 0.0001$) and the gender of the patients ($p = 0.0026$). For the assessment of aesthetic damage, the parameters which remain significantly associated were the AUSCAN total score ($p < 0.0001$), a duration of hand OA above the 10 years ($p = 0.01$) and the number of erosive joints ($p < 0.0001$). In conclusion, aesthetic discomfort and aesthetic damage are significant complaints in patients presenting with hand OA. The major determinants of their impact are gender, duration of hand OA, number of erosive joints and the Australian Canadian Osteoarthritis Hand Index.

OC15

PREDICTORS OF POST-OPERATIVE MORTALITY FOLLOWING TOTAL HIP ARTHROPLASTY SURGERY: A POPULATION-BASED COHORT STUDY

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Objective: Data from the UK National Joint Registry have reported on predictors of post-operative mortality following Total Hip Arthroplasty (THA) [1]. We aimed to develop and validate a predictive model for post-THA mortality using data from primary care and hospital records linked to the Catalan Arthroplasty Registry (RACat).

Methods: Setting and participants: RACat collects information on patient, centre, and implant-related variables for patients undergoing THA in Catalonia (Spain). Patients aged ≥ 40 years undergoing THA in the period 2005-June/2012 in RACat were eligible. Primary care and hospital records together with pharmacy dispensations data were extracted for the linked population from SIDIAP, a large representative database including $>80\%$ of the population of Catalonia. Patients in RACat but not present in SIDIAP, and those undergoing THA for hip fracture or malignancy were excluded. Outcome: 6-month all-cause mortality following THA. Potential predictors: a list of pre-operative potential risk factors was pre-defined: age, sex, BMI, smoking, alcohol drinking, Charlson comorbidity index (CCI), healthcare resource use (number of GP visits), hospital volume (THAs per annum), drugs used in the previous year, and indication. Analyses: Backwards logistic regression (p exit 0.1) was used to identify key predictors, and the obtained coefficients combined to derive a predictive tool. Area under the ROC curve (AUC-ROC) and Hosmer-Lemeshow test (HL) were used to estimate discrimination and calibration.

Results: 156/11,427 (1.4 %) subjects died in the 6 months post-THA. Key predictors of mortality are detailed in Table 1. A predictive tool based on these variables had good discrimination (AUC ROC 87.3 %), and calibration (HL $p = 0.83$).

Conclusion: Pre-operative patient characteristics can be used to identify high-risk patients for early post-THA mortality. The proposed tool could be used to improved informed decision making.

References: 1.Hunt LP et al. Lancet 2013;382:1097.

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OC16

BIOMARKERS OF OSTEOCHONDRAL BONE FORMATION ARE INCREASED IN PSORIASIS ARTHRITIS AND SPONDYLOARTHRITIS

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Background/Purpose: Psoriasis arthritis (PsA) and spondyloarthritis (SpA) are both inflammatory joint diseases in which the pathogenesis is not fully understood. However, both pathologies are associated with extracellular matrix (ECM) remodeling favoring cartilage and osteochondral bone formation (type II and X collagen formation) in the affected joints. Treatment of the diseases has improved within recent years, but the therapeutic response at the level of the individual cannot be adequately predicted. Hence, there is an increasing interest in diagnostic and prognostic biomarkers to further characterize the patients to achieve personalized medicine. The biomarker ProC2 measures the level of propeptide type II collagen and C-Coll10 measures type X collagen. Collagen type X is exclusively expressed by hypertrophic chondrocytes and is a measure of hypertrophic cartilage. The aim of this study was to evaluate the level of two novel biomarkers of cartilage formation (ProC2) and hypertrophy (C-Coll10) in SpA, PsA and healthy controls, and to investigate whether these markers would have diagnostic potential.

Methods: 99 PsA patients, 94 SpA patients and 120 age-matched healthy controls were included in the study. Demographic and clinical disease measures were recorded. ProC2 and C-Coll10 were quantified in serum by newly developed and specific competitive ELISAs based on monoclonal antibodies. One way analysis of variance and Tukeys multiple comparison test were performed on log-transformed data. Receiver operator characteristics (ROC) curve analysis was carried out to evaluate the discriminative power of the biomarkers.

Results: The serum levels of P2BNP had a mean level of 0.59 ng/ml for healthy controls, but were significantly increased in patients with either SpA (mean 1.25 ng/ml) or PsA (mean 1.35) compared to controls (p

Conclusion: These findings indicate that both SpA and PsA arthritis have enhanced cartilage formation reflected by increased levels of PIIBNP levels in serum compared to healthy controls. In addition, an increased level of the hypertrophic

chondrocyte collagen type X marker was found in SpA only, indicating a difference in cartilage turnover between the two diseases. This difference could aid in the differentiation between SpA and PsA.

OC17

BONE MICROARCHITECTURE ASSESSED BY HR-pQCT PREDICTS INCIDENT FRAGILITY FRACTURE IN POSTMENOPAUSAL WOMEN: THE OFELY STUDY

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Objective: Several cross-sectional studies have shown that alterations of bone microarchitecture (MA) contribute with low areal BMD to skeletal fragility but the independent contribution of cortical and trabecular (Tb) architecture to the risk of fracture (Fx) has not been evaluated prospectively in women. The aim of this study was to prospectively investigate the prediction of fragility Fx by bone MA assessed by HR-pQCT in postmenopausal women.

Material and Methods: We measured at the 14th annual follow-up of the OFELY study bone MA at the distal radius and tibia with HR-pQCT (XTreme CT, Scanco Medical AG, Bassersdorf, Switzerland) in addition to areal BMD with DXA in 589 postmenopausal women, mean(SD) age 68(9) yr.

Results: During a median[IQ] 8.1[0.9] yr of follow-up, 111 postmenopausal women sustained 127 incident fragility Fx, including 68 women with a major osteoporotic Fx (MOP Fx: hip, clinical spine, shoulder or wrist). After adjustment for age, women who sustained Fx had significant impairment of total, cortical and Tb volumetric densities (vBMD) at both sites, cortical area and thickness at the radius, trabecular number (TbN), and connectivity, stiffness and estimated failure load at both sites and trabecular distribution at the tibia, compared with control women. After adjustment for age, prevalent Fx, total hip T-score, menopausal age and current tobacco use, each quartile decrease of several baseline values of bone MA at the radius was associated with a significantly increased fracture risk with adjusted hazard ratios [HR(95%CI)] of 1.27(1.02-1.59) for Tt.vBMD, 1.41(1.14-1.75) for Tb.vBMD, 1.33(1.06-1.64) for TbN and a decreased fracture risk for TbSpSD [0.76(0.61-0.93)]. For MOP Fx, Tb.vBMD or TbN in the lowest quartile were associated with increased fracture risk with adjusted HR of 1.87(1.04-3.39) and 1.91(1.05-3.47), respectively. At the tibia, each quartile decrease of Tt.vBMD, stiffness and failure load was associated with adjusted HR of 1.43(1.06-1.96), 1.49(1.09-2.04) and 1.52(1.10-2.08), respectively, for MOP Fx.

Conclusion: Impairment of bone MA predicts the risk of fracture in postmenopausal women. Their assessment may play an important role in identifying women at high risk of fracture

who could not be adequately detected by BMD measurement alone, and who may benefit from a therapeutic intervention.

OC18

A META-ANALYSIS OF TRABECULAR BONE SCORE IN FRACTURE RISK PREDICTION AND ITS INTERACTION WITH FRAX

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Trabecular bone score (TBS), a grey-level textural index of bone microarchitecture derived from lumbar spine DXA images, is a BMD-independent predictor of fracture risk. The objective of this meta-analysis was to determine whether TBS predicted fracture risk independently of FRAX probability and to examine their combined performance by adjusting the FRAX probability for TBS.

We used individual level data from 17,809 men and women in 14 prospective population-based cohorts. Baseline evaluation included TBS and the FRAX risk variables and fracture outcomes during follow up (mean 6.7 years) comprised major osteoporotic fractures. The association between TBS, FRAX probabilities and fracture risk was examined using an extension of the Poisson regression model in each cohort and for each sex and expressed as the gradient of risk (GR; hazard ratio per 1SD change in risk variable in direction of increased risk). FRAX probabilities were adjusted for TBS using an adjustment factor derived from an independent cohort (the Manitoba Bone Density Cohort).

Overall, the GR of TBS for major osteoporotic fracture was 1.44 (95%CI: 1.35-1.53) when adjusted for age and time since baseline and was similar in men and women ($p > 0.10$). When additionally adjusted for FRAX 10-year probability of major osteoporotic fracture, TBS remained a significant, independent predictor for fracture (GR 1.32, 95%CI: 1.24-1.41). The adjustment of FRAX probability for TBS resulted in a small increase in the GR (1.76, 95%CI: 1.65, 1.87 vs. 1.70, 95%CI: 1.60-1.81). A smaller change in GR for hip fracture was observed (FRAX hip fracture probability GR 2.25 vs. 2.22).

TBS is a significant predictor of fracture risk and provides information independently of FRAX. The findings of the study support the use of TBS as a potential adjustment for FRAX probability, though the quantum of effect of the adjustment remains to be determined in the context of clinical assessment guidelines.

OC19

IN VIVO CORTICAL BONE INDENTATION MEASUREMENTS ARE INDEPENDENT OF AGE, BMD AND CORTICAL MORPHOLOGY IN POSTMENOPAUSAL WOMEN

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Until recently, there were no methods to assess bone material properties in vivo. Reference point indentation (RPI) is a minimally invasive approach that allows measurement of the indentation distance of a test probe relative to a reference point on the bone surface. A hand-held device (Osteoprobe) is now available for in vivo, percutaneous measurements at the

anterior surface of the mid-tibia (1, 2). Prior studies have reported worse indentation properties in postmenopausal women with prior fragility fracture and in those with diabetes (2–4). However, the factors that influence the indentation measurements are currently unknown. We aimed to determine whether age, hip and spine BMD, as well as volumetric density and microarchitecture by high-resolution peripheral QCT (HR-pQCT) are associated with cortical bone indentation properties in older women. We recruited 73 postmenopausal women: 24 had received at least 5 yrs of oral and/or intravenous bisphosphonates (BP) within a year of enrollment and 49 were treatment-naïve controls (CON). Areal BMD (aBMD) of the hip and spine were assessed by DXA; cortical volumetric BMD (Ct.vBMD), tissue mineral density (Ct.TMD), and porosity (Ct.Po) of the distal tibia were assessed by HR-pQCT; and bone material strength index (BMSi) of the anterior tibia was assessed by RPI using the Osteoprobe device. Compared to CON, the BP-treated women were younger (66 ± 5 vs. 73 ± 9 years), shorter (158 ± 8 vs. 163 ± 7 cm), weighed less (54.7 ± 8.3 vs. 77.7 ± 16.4 kg), had lower femoral neck aBMD (0.61 ± 0.11 vs. 0.75 ± 0.15 g/cm²) and spine aBMD (0.81 ± 0.10 vs. 1.21 ± 1.31 g/cm²) (p

References: (1) Bridges et al., 2012; (2) Farr et al., 2014; (3) Diez-Perez et al., 2010; (4) Guerri-Fernandez et al., 2013.

OC20

SENSITIVITY AND SPECIFICITY OF RADIOGRAPHIC CHARACTERISTICS OF ATYPICAL FEMORAL FRACTURES

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Objective: To estimate the sensitivity and specificity of radiographic characteristics of atypical femoral fractures (AFF) distinguishing AFF from other subtrochanteric or diaphyseal fractures.

Materials & Methods: Radiographs of a sample of physician-validated AFFs ($n=55$) and non-AFFs ($n=39$) that occurred among female members of a large integrated health care organization during the years 2010–2012 were identified. Osteoporosis experts representing 4 medical specialties - internal medicine, rheumatology, orthopedics, radiology - each reviewed one image per subject. Using a standardized data collection tool based on the ASBMR 2013 revised AFF case definition, reviewers blinded to AFF status indicated the presence or absence of the following radiographic characteristics: subtrochanteric or diaphyseal fracture location, fracture

pattern, non-comminution, periosteal and/or endosteal thickening, and cortical thickening. Sensitivity and specificity for each characteristic was calculated for each reviewer and summarized across reviewers with the mean and range.

Results: The most highly sensitive radiographic characteristics distinguishing between AFF and non-AFF were fracture location (mean 99.4 %, range 97.7–100 %), lateral cortex transverse fracture pattern (mean 95.3 %, range 90.2–97.7 %), medial cortex transverse or oblique fracture pattern (mean 94.0 %, range 83.3–100 %), and minimal or noncomminution (mean 94.2 %, range 88.6–97.7 %). Of these characteristics, specificity was greatest for lateral cortex transverse fracture pattern (mean 72.8 %, range 69.6–76.0 %), while medial cortex transverse or oblique pattern was least specific (mean 11.2 %, range 0–42.6 %). Localized endosteal/periosteal reaction and generalized increase in cortical thickness were only moderately sensitive and specific.

Conclusion: Fracture location and transverse fracture pattern in the lateral cortex were the most sensitive characteristics for distinguishing AFF and were most highly agreed upon across reviewers in clinical settings. Other characteristics were less readily agreed upon across reviewers. Measurement of discrete combinations of individual characteristics may enhance sensitivity and/or specificity.

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OC21

COMPARATIVE PERFORMANCE OF CURRENT DEFINITIONS OF SARCOPENIA AGAINST THE PROSPECTIVE INCIDENCE OF FALLS AMONG COMMUNITY-DWELLING SENIORS AGE 65 AND OLDER

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Sarcopenia is the age-related loss of skeletal muscle mass and strength, heralding the development of functional decline and frailty. Research that aims to prevent sarcopenia is slowed down by the lack of an accepted operational definition of

how to measure sarcopenia. While several definitions have been suggested, these definitions lack comparative validation against important endpoints such as falls. Purpose: To compare the extent to which 7 available definitions of sarcopenia and 2 related definitions predict the prospective rate of falling.

Methods: We studied a cohort of 445 seniors (mean age 71 years, 45 % men) living in the community who were followed with a detailed fall assessment for 3 years. For comparing the rate of falls in sarcopenic versus nonsarcopenic individuals, we used multivariate Poisson regression analyses adjusting for gender and treatment (original intervention tested vitamin D plus calcium against placebo). Of the 7 available definitions, 3 were based on low lean mass alone (Baumgartner, Delmonico1 and 2) and 4 required both low muscle mass and decreased performance in a functional test (Fielding, Cruz-Jentoft, Morley, Muscaritoli). The 2 related definitions were based on low lean mass alone (Studenski1) and low lean mass contributing to weakness (Studenski2).

Results: Among 445 participants, 231 fell, sustaining 514 falls over the 3-year follow-up. The prospective rate of falls in sarcopenic versus nonsarcopenic individuals was best predicted by the Baumgartner definition based on low lean mass alone (RR=1.54; 95%CI: 1.09-2.18) with 11 % prevalence of sarcopenia and the Cruz-Jentoft definition based on low lean mass plus decreased functional performance (RR=1.82; 95%CI: 1.24-2.69) with 7.1 % prevalence of sarcopenia. Consistently, fall rate was non-significantly higher in sarcopenic versus nonsarcopenic individuals based on the definitions of Delmonico, Fielding and Morley.

Conclusion: Among the definitions investigated, the Baumgartner definition and the Cruz-Jentoft definition had the highest validity for predicting the rate of falls. Notably, the somewhat enhanced prediction of fall incidence by the composite definition suggested by Cruz-Jentoft and colleagues is counterbalanced by the low percentage of individuals identified with sarcopenia by this definition.

OC22

PHASE 2 RANDOMIZED, DOUBLE BLIND, PLACEBO CONTROLLED TRIAL OF MYOSTATIN ANTIBODY IN OLDER FALLERS WITH LOW MUSCLE STRENGTH

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Objective: To test whether a myostatin monoclonal antibody increases appendicular lean body mass (aLBM) and improves physical performance in elderly individuals having recent falls and low muscle strength. NCT01604408.

Material and Methods: Eligible subjects were aged ≥ 75 yrs, had ≥ 1 fall in the past yr, low hand grip strength and low performance on a 5-time chair rise test. Patients received myostatin monoclonal antibody LY2495655 (LY) 315 mg or placebo (pbo) injections every 4 wks for 20 wks, followed by 16 wks of observation. The primary endpoint was the change in aLBM from baseline to 6 months for LY versus pbo. Secondary and exploratory outcomes included a battery of performance based measures. The 2-sided alpha level was set *a priori* at 0.05 for the primary analysis (ITT including all subjects with a baseline and ≥ 1 post baseline value) and 0.1 for all performance based measures (PBMs).

Results: Subjects randomized ($N=201$) were aged 82 ± 5 yrs, 70 % women, with BMI= 27 ± 4 kg/m². Study groups were balanced for baseline aLBM (women: 15 ± 2 kg; men: 22 ± 3 kg) and PBMs. LY subjects tended to have more pre-existing conditions and a higher risk of falls and fractures. Treatment was discontinued early in 19 % of LY vs. 14 % of pbo group. The change in aLBM from 0 to 6 months was + 0.43 kg (SE 0.12; p

Conclusion: Six months of LY treatment increased aLBM and improved power intensive PBMs in older fallers with low muscle strength.

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OC23**CORRELATION BETWEEN MUSCLE MASS AND MUSCLE STRENGTH AND THEIR ASSOCIATION WITH PHYSICAL PERFORMANCE AND GAIT SPEED**

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Objective: To determine the cross-sectional relationship between muscle mass and muscle strength but also to assess their association with physical performance and gait speed.

Material and Methods: Participants were community-dwelling subjects aged 65 years and older enrolled in the SarcoPhAge study, a 5-year prospective Belgian study. Lean mass was measured by DXA. Handgrip strength was measured by a hydraulic dynamometer. Physical performance was measured by the Short Physical Performance Battery (SPPB) test and gait speed was measured on a 4-m distance.

Results: Among the 534 subjects recruited in the SarcoPhAge study, 322 (60.5 %) were women. The population mean age was 73.5±6.16 years. Total muscle mass was strongly correlated with muscle strength ($r=0.71$, p

Conclusion: Total muscle mass and appendicular muscle mass were significantly associated with muscle strength. Based on these results, therapeutic strategies against sarcopenia focused on both aspects of muscle (i.e., muscle mass and muscle strength) should be investigated. Moreover, interestingly, measuring the muscle strength in the upper limbs seems linked to the measures of lower limbs muscle performance such as gait speed or the SPPB test.

OC24**EFFECT OF AGE AND SEX ON JUMPING MECHANOGRAPHY AND OTHER MEASURES OF MUSCLE MASS AND FUNCTION**

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Sarcopenia is a risk factor for falls and fractures. As muscle function predicts disability and mortality better than muscle mass, recent consensus sarcopenia definitions include measures of both muscle mass and function. Clinical trials of sarcopenia prevention/treatment require sensitive quantitative tools to evaluate muscle function; jumping mechanography

(JM) is likely to be one such tool. However, prior to use of JM in prospective trials, it is necessary to evaluate comparability with existing functional tests in men and women. As such, the purpose of this study was to evaluate the impact of sex and age on classic muscle function tests and JM. We hypothesized that JM parameters of muscle function would be lower in older adults and in women.

Methods: Community dwelling individuals age 25+ performed muscle function tests including JM, the Short Physical Performance Battery (SPPB) and grip strength. JM measures force and calculates body weight corrected peak power and jump height. Appendicular lean mass (ALM) was measured using DXA. T-tests, multivariate regressions, and Tukey-Kramer HSD analyses were performed.

Results: Participants included 213 females and 119 males (mean age 65.4 years, range 27–97). Sex differences were present with men having higher (p

Conclusion: In this cohort, men performed better than women in tests of muscle strength, but not in physical function tests. Muscle and physical function was poorer in older adults irrespective of sex. Of all tests studied, JM had the best correlation with age. This may be due to the fact that JM requires maximal leg power, which does decline with age. As such, it shows promise to be a valuable tool in the evaluation and monitoring of sarcopenia. Future studies need to examine whether JM is also correlated with hard health outcomes such as falls and fractures.

OC25**CRITICAL EVALUATION OF PROMISING MARKERS FOR SARCOPENIA**

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¹Department of Clinical Chemistry, University of Liège, CHU Sart-Tilman, Liège, Belgium, ²Department of Public Health, Epidemiology and Health Economics, Liège, Belgium, ³Department of Public Health and Health Economics, University of Liège, Liège, Belgium Different potential biomarkers to identify elderly subjects at risk for sarcopenia have recently been described. A thorough analytical validation is mandatory before using in clinical research. We tested and validated Irisin (IRI), Myostatin (MYO), PIINP, Osteoglycin (OGN), TMEM119 (TMEM) and Activin A (AA).

Material and Methods: We established the analytical performance (5 samples run in triplicate for 5 days), reference range (on 60 healthy male and 60 non-menopause female) and stability (10 subjects, serum and EDTA plasma 24H at +4 °C, 1 month at -20 °C and -80 °C) of IRI (ELISA, Phoenix Pharmaceuticals), MYO and AA (ELISA, R&D), PIINP (RIA, Orion), OGN and TMEM (ELISA, Cusabio). A matrix (serum or plasma) was considered as unstable if more than 20 % increase/decrease in the levels was observed in more than 10 % of the samples, using, as the comparator, a freshly analyzed one.

Results: Our experienced team was unable to obtain a valuable calibration curve with the Cusabio kits. The inter-assay CVs were too high for IRI (CV ranging from 17–30 %), so we discontinued the evaluation of the test. Cvs were $\leq 10\%$ for the 3 other analytes. AA and PIIINP were stable 24 h at $+4\text{ }^{\circ}\text{C}$ whereas MYO was not stable in serum. MYO and AA were not stable in serum 1 month at $-20\text{ }^{\circ}\text{C}$. PIIINP was not stable in serum 1 month at $-80\text{ }^{\circ}\text{C}$. PIIINP levels did not differ between men and women and the RR was (median, 90%CI) 1.2 (0.8–1.6) - 6.0 (5.6–6.4) $\mu\text{g/L}$. The RR for MYO was 845 (437–1312) - 6067 (5524–6552) pg/mL for men and 600 (268–1027) - 4438 (4026–4837) pg/mL for women and the RR for AA was 177 (132–210) - 622 (580–661) pg/mL for men and 98 (49–147) - 480 (430–525) pg/mL for women. PIIINP and AA accumulated in CKD as values observed in 10 hemodialyzed patients was higher than the normal individuals, whereas it does not seem the case for MYO.

Conclusion: Three potential biochemical markers (PIINP, Myostatin and Activin A) of frailty and sarcopenia met the analytical standards requested to be further investigated in clinical settings. Additional research is now needed to assess their value as diagnostic or monitoring tools.

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PROFESSIONAL ACTIVITY-DEPENDENT REPEATED LOADING INFLUENCES CORTICAL BONE GEOMETRY AND STRENGTH

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Repeated loading influences bone mass, geometry and/or microstructure. Whether chronic loading in the frame of professional activity may impact bone, particularly cortical bone which markedly contributes to bone strength, is not known. Using a very original model, we investigated the effects of professional activity-dependent various load intensities on geometry and biomechanical properties of upper limbs bones.

Methods: Using CT scan, we ex vivo measured cross sectional areas (CSA), medullary and cortical areas, and biomechanical parameters (cross-sectional and polar moments of inertia, and section modulus) on 9 cross-sections of bilateral humerus and radius from 219 men skeletons (age of death 20–93 years), with adequate preservation and information on profession. The skeleton specimens belong to a homogeneous anthropologic collection of the 20th century collected in a well-defined geographical area. Professional activity was categorized according to intensity and lateralization of physical loading applied on upper limbs⁽¹⁾. Handedness was assessed from the directional

asymmetry profile of bone parameters of the upper limbs. Bone geometry and calculated strength were analyzed in relation to professional activity loading intensity.

Results: At the dominant limb, men with heavy-loading professional activity, who died between the age of 20 and 45, had higher humerus and radius CSA ($+10.1\%$, $p<0.05$ and $+10.6\%$, $p<0.01$, respectively) and cortical areas ($+6.2\%$, $p=0.14$ and $+5.7\%$, $p<0.05$), and higher bending and torsional strengths ($+15.6\%$ to $+35.3\%$, $p<0.05$), compared with men with light-loading professional activity. These differences were not detected in men who died at older ages. Asymmetry of humerus bone parameters between the dominant and non-dominant limbs increased with age and was higher in men with unilateral rather than bilateral heavy-loading professional activities, who died after the age of 65, especially asymmetry of medullary area and of the cortical area/CSA ratio ($p<0.01$ for both). This greater asymmetry resulted mainly from a larger distal humerus medullary area of the non-dominant limb in men with unilateral heavy-loading ($+18.4\%$, $p<0.05$), suggesting that mechanical loading of professional activity may attenuate endocortical bone loss.

Conclusion: Repeated loading during professional activity may influence cortical bone, mainly during late adolescence and early adulthood, and slow down the advanced age-related endocortical bone loss. (1) Perréard Lopreno G et al.

OC27

HIP AXIS LENGTH IS A FRAX AND BONE DENSITY INDEPENDENT RISK FACTOR FOR HIP FRACTURE IN MEN AND WOMEN

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Objective: Some but not all studies report that greater hip axis length (HAL) is associated with increased hip fracture risk in women, but comparable data in men are sparse. Whether HAL confers significant information when adjusted for BMD or FRAX score is uncertain.

Material and Methods: A registry of all DXA results for Manitoba, Canada identified 4738 men and 50,420 women age >40 years with baseline hip DXA results, HAL measurements (Prodigy, enCore version 14.x, GE Healthcare) and FRAX scores (Canadian tool version 3.7). Population-based health service records were assessed for a subsequent hospitalization with a primary diagnosis of hip fracture.

Results: During mean 6.2y follow up, 70 men and 1020 women developed incident hip fractures. HAL showed significant discrimination in hip fracture risk (area under the curve men 0.58 [95%CI 0.51–0.65, $p=0.023$] vs. women 0.60 [95%CI 0.59–0.62, p

Conclusion: Greater DXA-derived HAL is associated with incident hip fracture risk in both men and women, and this risk is independent of BMD and FRAX score.

OC28

THE EFFECT OF GLUCOSE-LOAD ON BONE REMODELING MARKERS AND OSTEOBLAST FUNCTION

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Objective: Bone remodeling markers (BRMs) are suppressed following a glucose load. We examined whether exercise attenuates this suppressive effect in pre- and postmenopausal women and assessed whether there is a direct effect of glucose and insulin on osteoblast apoptosis, viability and alkaline phosphatase (ALP) activity in vitro.

Material and Methods: Eight pre- (age=36.1±2.7 years, BMI=25.5±0.8, SEM) and 10 postmenopausal women (age=62.8±2.6 years, BMI=28.3±1.3 kg/m²) had an oral glucose tolerance test (OGTT) at rest and 60 min after 30 min cycling at 70-75 % of VO₂ peak. Blood samples were analysed for serum insulin, glucose, total osteocalcin (tOC), undercarboxylated OC (ucOC), procollagen type I N-terminal propeptide (PINP) and β-isomerized C-terminal telopeptides (β-CTX). Cultured human osteoblasts (HOBs) were treated for 2 h with increasing glucose concentrations with or without insulin. HOBs apoptosis, viability and ALP activity were measured.

Results: In both groups, tOC, PINP and β-CTX were suppressed following OGTT regardless of whether the subjects performed exercise or not (8 %-14 %, p

Conclusion: OGTT suppresses remodeling as determined by BRMs in women, an effect not prevented by exercise perhaps due to a direct detrimental effect of glucose in reducing osteoblast survival.

Disclosures: Dr Levinger was supported by Future Leader Fellowship (ID: 100040) from the National Heart Foundation of Australia and Dr Brennan-Speranza was supported by an NHMRC Early Career Research Fellowship (ID: 1013295). This study was partly funded by the LEW Carty Charitable Foundation.

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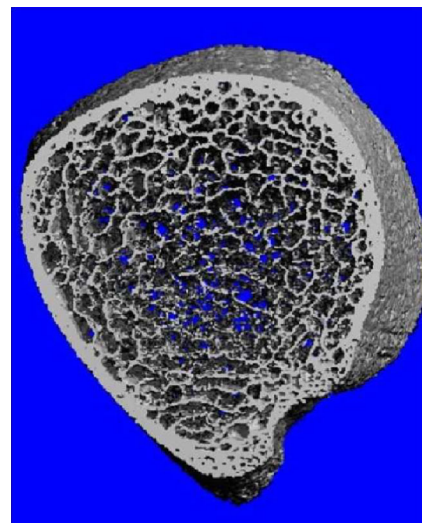
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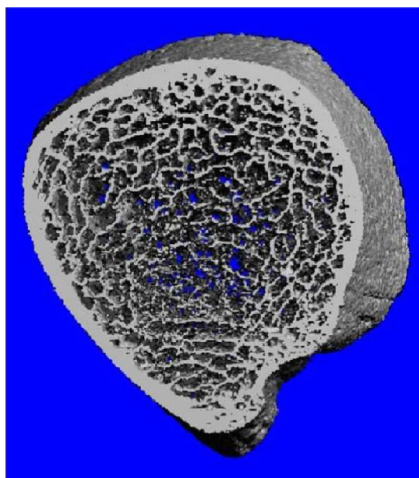
IMPAIRED TRABECULAR BONE MICROARCHITECTURE IMPROVES AFTER ONE-YEAR ON GLUTEN-FREE DIET: A PROSPECTIVE LONGITUDINAL HR-PQCT STUDY IN WOMEN WITH CELIAC DISEASE

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We have recently identified a significant deterioration of trabecular and cortical microarchitecture in peripheral bones of patients with undiagnosed celiac disease (CD) using HR-pQCT. Such affectionation was mainly produced in the trabecular bone. Up to now, the effect of the gluten-free diet (GFD) on microstructural parameters of peripheral bones has not been assessed. Our aim was to explore one-year changes of bone microstructure produced by GFD in a prospective cohort of premenopausal women with newly diagnosed CD. We prospectively enrolled 31 consecutive females with newly diagnosed CD. Up to now, 26 patients were reassessed one-year after diagnosis. Clinical and biochemical status, CD specific serology, bone densitometry and microstructural determinations (HR-pQCT) were performed at both time points. Trabecular microstructure in radius and tibia was significantly improved (Radius: D trab 120±24.3 vs. 131±24.3 (+10 %) p





OC30

COMBINING MEASUREMENT OF CORTICAL POROSITY AT THE PROXIMAL FEMUR WITH FRAX IMPROVES THE SENSITIVITY AND MAINTAINS HIGH SPECIFICITY FOR FRACTURE

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Objective: The FRAX tool has improved identification of persons at risk for fracture. However, cortical porosity is associated with fracture independent of FRAX. We wanted to test the sensitivity and specificity for fracture using two cutoff for cortical porosity combined with FRAX, and to compare the additional fracture cases captured by measurement of cortical porosity, with those captured by FRAX.

Material and Methods: We quantified FRAX score with femoral neck areal BMD (FN aBMD), and femoral subtrochanteric architecture in 211 postmenopausal women aged 54–94 years with nonvertebral fractures and 232 controls in Tromsø, Norway.

Results: Of 211 fracture cases, FRAX score >20 % identified 45 women (sensitivity 21 % and specificity 93 %), while porosity cutoff >80th and >90th percentile identified 61 women (sensitivity 29 % and specificity 88 %) and 34 women (sensitivity 16 % and specificity 95 %). When porosity >80th percentile was combined with FRAX, the sensitivity was 43 % and specificity 83 %. When porosity >90th percentile was combined with FRAX, the sensitivity was 32 % and specificity 90 %. The additional fracture cases identified by porosity >80th percentile exhibited lower FRAX score (12.3 vs. 27.4 %) than those identified by FRAX alone, were younger, a smaller proportion had prior fracture (15.9 vs. 69.7 %), all p

Conclusion: Combining cortical porosity with FRAX increased the sensitivity and maintained high specificity for fracture. Women with fracture not identified by FRAX but by cortical porosity had an architecture that offset the positive impact of larger bone size on bone strength.

OC31

WHAT TRIGGERS OSTEOPOROSIS THERAPY IN HIGH RISK RESIDENTS LIVING IN LONG TERM CARE (LTC) HOMES? THE GAINING OPTIMAL OSTEOPOROSIS ASSESSMENTS IN LONG-TERM CARE (GOAL) STUDY

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Objective: The GOAL initiative was developed to assess high risk residents and recommend appropriate pharmacotherapy to reduce fractures by utilizing multifaceted knowledge translation strategies. These strategies were directed at the interprofessional team in the LTC homes.

Methods: GOAL is a delayed entry stepped wedge cluster randomized controlled trial in 50 LTC homes in Ontario. De-identified clinical/prescribing data were downloaded from the database of a large pharmacy provider that services all study homes. Chart audits were performed and the Resident Assessment Instrument Minimum Data Set (RAI-MDS) data were examined to determine the number of high risk residents for fracture. In this baseline analysis, we calculated the proportion of high-risk residents who were receiving osteoporosis medications and vitamin D (≥ 800 mg/d), according to specific high risk categories. Based on osteoporosis guidelines, high-risk was identified as individuals who had at least one spine/

hip fracture, 2 or more non-hip/non-spine fractures, or were currently taking corticosteroids (>7.5 mg/d prednisone equivalent). Residents who had a previous diagnosis of osteoporosis were also considered at high risk.

Results: Of the 6862 residents from 50 LTC homes who were evaluated, a total of 2949 (43.0 %) were considered at high risk. High risk residents had a mean age (SD) of 85.9 (9.0) years, weighed 64 (17.1) kg and were 158.5(10) cm tall. Osteoporosis medications were taken by 47 % (151/320), 34 % (294/874), 38 % (51/136), 43 % (58/134) and 41 % (976/2395) of residents who had a prior spine fracture, hip fracture, two or more non-hip or non-spine fractures, were taking corticosteroids, or had a diagnosis of osteoporosis, respectively. In addition, 77 % (2255/2949) of high risk residents were on vitamin D therapy.

Conclusion: Residents with prior spine fractures had the highest and those with prior hip fractures had the lowest percentages of receiving osteoporosis medications. Our findings suggest a potential osteoporosis treatment gap that may be reduced through knowledge translation strategies.

Conflict of Interest: D O'Donnell - Employee of Medical Pharmacies Group Limited; H Navare - Employee of Medical Pharmacies Group Limited; L.M. Giangregorio-Merck Frosst; A.M Cheung- Amgen, Eli Lilly, Merck Frosst; R.G Crilly- Actavis; S Feldman- Amgen; S Jamal-Amgen, Merck Frosst, Novartis, Sanofi-Aventis; RG Josse-Amgen, Eli Lilly, Merck Frosst, Novartis, Sanofi-Aventis, Servier; J.D Adachi - Amgen, Eli Lilly, Merck Frosst, Novartis, Sanofi-Aventis, Servier, WarneChilcott; A Papaioannou - Amgen, Eli Lilly, Merck Frosst, Novartis, Sanofi-Aventis, Servier

OC32

CONCORDANCE BETWEEN MUSCLE MASS ASSESSED BY BIOELECTRICAL IMPEDANCE ANALYSIS AND BY DUAL ENERGY X-RAY ABSORPTIOMETRY AMONG ELDERLY PEOPLE: A CROSS-SECTIONAL STUDY

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Objective: Besides magnetic resonance imaging, DXA seems the most reliable tool to evaluate body composition and is

often considered as the gold standard in clinical practice. Bioelectrical impedance analysis (BIA) could provide a simpler, portable, and less expensive alternative. Because the body composition assessment by BIA is device-dependent, the aim of this study was to appraise the concordance between the specific bioelectrical impedance device InBody S10 and DXA for the body composition evaluation among the elderly.

Material and Methods: Body composition, included appendicular lean mass divided by height squared (ALM/ht^2) was measured by DXA (Hologic QDR Discovery device) and by BIA (InBody S10 Biospace device). Agreement between tools was assessed by means of the Bland Altman method and reliability was determined using the IntraClass Coefficient (ICC). ICC was also computed to assess the reliability of the test-retest performed by the same operator or by two different ones.

Results: A total of 48 subjects aged 65 years or older were enrolled in this study (mean age: 71.3 ± 5.14 years old, 60.4 % of women). For the ALM/ht^2 , reliability of the test-retest of the BIA was high with an ICC of 0.82 (95%CI: 0.72-0.90) when performed by the same operator and moderate with an ICC of 0.60 (95%CI: 0.39-0.75) when performed by two different operators. Agreement between ALM/ht^2 assessed by DXA and BIA was low ICC=0.42 (95%CI: 0.16-0.62)). Mean ALM/ht^2 was 8.54 ± 1.23 kg/m² with BIA and 7.03 ± 1.30 kg/m² with DXA, (p

Conclusion: Our results show that the measure of muscle mass by BIA, using the InBody S10, is reproducible, when performed by the same operator and when performed by two different ones. Nevertheless, the concordance between muscle mass measured by BIA and by DXA is low. Indeed, BIA seems to overestimate muscle mass compared to DXA.

OC33

SAFETY AND EFFICACY OF ODANACATIB IN THE TREATMENT OF MEN WITH OSTEOPOROSIS: A RANDOMIZED PLACEBO-CONTROLLED TRIAL

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Objective: Osteoporosis in men is an important clinical problem, associated with significant morbidity, mortality and societal expense. Odanacatib (ODN), a selective oral inhibitor of cathepsin K, is currently being investigated as a treatment for osteoporosis. This Phase III, double-blind, randomized,

placebo- controlled, 24-month study investigated the safety and efficacy of ODN for the treatment of men with osteoporosis (NCT01120600).

Material and Methods: Eligible patients were men 40–95 years of age with idiopathic osteoporosis or osteoporosis due to hypogonadism, who had a lumbar spine (LS), femoral neck (FN), or total hip (TH) T- score of ≤ -2.5 to ≥ -4.0 without prior vertebral fracture (VFX), or ≤ -1.5 to ≥ -4.0 with one prior VFX. Participants were randomized (1:1) to ODN 50 mg weekly or placebo. All received vitamin D (5600 IU/week) and calcium up to 1200 mg/d, if required. The primary efficacy outcome measure was the percent change from baseline in LS BMD. Secondary outcomes included changes in BMD at the FN, TH, and trochanter, bone turnover markers, and safety and tolerability.

Results: In total, 292 men were randomized and treated (mean age 68.8 years; 5.8 % total testosterone levels)

Conclusion: ODN is a promising potential therapy for the treatment of osteoporosis in men.

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Author conflicts of interest: RC: research grants: Merck; consulting fees or speaker honoraria: Lilly, Amgen, Pfizer, Roche, BMS, Bioiberica; EO: research grants and consulting fees: Merck, Lilly, Amgen; SA: consulting fees: Abiogen, Amgen, Eli Lilly, Merck, Roche; NB: research grants and consulting fees for advisory boards: Merck; BL: rewards / research grants / consulting fees / speakers' bureau: Amgen, Eli Lilly, Merck; SD, HG, BBS, ACS: employment: Merck & Co., Inc

OC34

FRAX-BASED ASSESSMENT AND INTERVENTION THRESHOLDS: AN EXPLORATION OF THRESHOLDS IN WOMEN AGED 50 YEARS AND OLDER IN THE UK

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Several international guidelines set age-specific intervention thresholds at the 10-year probability of fracture equivalent to a woman of average BMI with a prior fracture. At older ages (≥ 70 years), women with prior fracture selected for treatment are at lower average absolute risk than those selected for treatment in the absence of prior fracture, prompting consideration of alternative thresholds in this age group. Using a simulated population of 50,633 women aged 50–90 years in the UK, with a distribution of risk factors similar to that in the European FRAX derivation cohorts and a UK-matched age distribution, the current NOGG intervention and assessment thresholds were compared to one where the thresholds remained constant from 70 years upwards. Under current thresholds, 45.1 % of women aged ≥ 70 years would be eligible for therapy, comprising 37.5 % with prior fracture, 2.2 % with high risk but no prior fracture and 5.4 % selected for treatment after BMD measurement. Mean hip fracture probability was 11.3 %, 23.3 % and 17.6 %, respectively, in these groups. Under the alternative thresholds, the overall proportion of women treated increased from 45.1 % to 52.9 %, with 8.4 % at high risk but no prior fracture and 7.0 % selected for treatment after BMD measurement. In the latter group, the mean probability of hip fracture was identical to that observed in women with prior fracture (11.3 %). The alternative threshold also reduced the need for BMD measurement, particularly at older ages (>80 years). The alternative thresholds equilibrate fracture risk, particularly hip fracture risk, in those with or without prior fracture selected for treatment and reduce BMD usage at older ages.

OC35

REDUCED FRACTURE RISK IN DANISH WOMEN WITH POLYCYSTIC OVARY SYNDROME: A NATIONAL REGISTER-BASED COHORT STUDY

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Objective: To investigate fracture risk in patients with polycystic ovary syndrome (PCOS). We hypothesized that fracture risk could be lower in patients with PCOS than in healthy controls due to hyperandrogenemia and obesity.

Material and Methods: Women with PCOS or hirsutism (ICD-10 codes L680 and E282) were identified in the Danish National Patient Register (NPR) from 1995–2012. Three age-matched controls were included per patient and were assigned the same index date as their matched PCOS

case. Subjects with a history of hyperprolactinemia, acromegaly, Cushing's disease, adrenogenital syndrome, and Turner syndrome were excluded. We identified incident fractures by ICD10 codes and used conditional Cox regression analysis to compare fracture risk. We focused on overall fracture risk and fractures of the appendicular skeleton rather than fractures of the spine or hip, which are rare in the age group.

Results: We included 19,199 patients with PCOS and 57,483 control subjects. The mean (range) age was 30.6 (12–60) years. The overall risk of fractures was significantly lower in PCOS (HR 0.74; 95%CI 0.70–0.78, *p*

Conclusion: This study demonstrates that women with PCOS have a substantially reduced risk of fractures, in particular of the appendicular skeleton, which could perhaps be accounted for by hyperandrogenism or obesity. However, the reduced incidence of fractures of the face and hands may also suggest a difference in the exposure to direct trauma such as for example in contact sports. Additional research is needed to determine the mechanism behind the risk reduction.

OC36

IMPACT OF HIP FRACTURE ON HOSPITAL CARE COSTS: A POPULATION BASED STUDY

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Objective: Hip fracture is a major public health problem with the majority of sufferers being old, female and vulnerable. Understanding its costs is essential to aid decisions about improvements to health and social care services. We aim to estimate UK hospital costs of hip fracture up to two years post fracture and compare costs before and after the index fracture.

Material and Methods: A cohort of patients with hip fracture were identified from the Hospital Episode Statistics database and followed until death or administrative censoring. All records (inpatient stay, day cases, outpatient consultations, emergency attendances, and critical care) between 2003 and 2013 were extracted before and after index admission and valued using 2012/13 unit costs. Non-parametric censoring methods were used to adjust for censoring when estimating average annual costs and a generalised linear model was used to examine the main variables associated with cost variations.

Results: 33152 patients were identified as having a hip fracture. Mean age was 83 years (SD 8.2) with women

accounting for 75 % of the sample. Mean censor-adjusted 1- and 2-year hospital costs after index hip fracture were £14,163 (95%CI: £14,008 to £14,317) and £16,302 (95%CI: £16,097 to £16,515) respectively. Index admission due to hip fracture accounted for 60 % (£8613; 95%CI: £8565–£8661) of total 1-year hospital costs, and index hip fracture and refracture (second) costs were very similar. In the year of hip fracture, the mean annual hospital costs increased by £10,964 compared to the year pre-event (*p*<0.0001). The main variables associated with cost variations were the occurrence of second hip fractures and hip fracture related complications, although these were not common across the cohort.

Conclusion: Long-term hospital costs following hip fracture are high and mostly occur in the first year after the index hip fracture. Experiencing a second hip fracture after the index fracture accounted for much of the increase in costs. We estimate that total annual hospital costs due to hip fracture in the UK are approximately £1.1 billion. There is a strong economic incentive to prioritise research funds towards identifying the best approaches to prevent index and subsequent hip fractures.

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OC37

A SYSTEMATIC REVIEW OF THE USE OF SPINAL ORTHOSES IN THE MANAGEMENT OF VERTEBRAL OSTEOPOROSIS AND OSTEOPOROTIC VERTEBRAL FRACTURE

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Objective: Vertebral osteoporosis and osteoporotic vertebral fractures (OVFs) are associated with increased mortality and morbidity. Spinal orthoses are a traditional treatment but their effectiveness is uncertain. We aimed to systematically review the evidence of effectiveness for spinal orthoses for adults with vertebral osteoporosis.

Material and Methods: A literature search of electronic databases was conducted and complemented with citation tracking. Randomised controlled trials (RCTs) and

prospective nonrandomised controlled studies of spinal orthoses for people with vertebral osteoporosis or osteopenia with and without OVF were eligible. Two reviewers independently evaluated eligibility and methodological quality using a domain-based risk of bias approach

Results: Thirteen studies were included: 9 RCTs or pilot RCTs and 4 non-randomised studies involving 699 participants. Four ($n=196$) evaluated orthoses following acute OVF; none was high quality. There was no evidence an orthosis could alter vertebral deformity. Complications were greatest with rigid orthoses. Limited evidence indicated a Spinomed orthosis might be tolerable and benefit pain and function. Nine studies ($n=473$) of mixed quality considered spinal orthoses in rehabilitation. Three RCTs suggested a Spinomed orthosis could benefit strength, pain, posture and quality of life. A further study found adding a weighted kypho-orthosis (WKO) to an exercise programme improved balance. Two RCTs reported small improvements in strength, pain and gait stability using an Osteomed orthosis but no change in functional mobility or quality of life.

Conclusion: The limited evidence about spinal orthoses following acute OVF is inconclusive; higher quality evidence for efficacy is needed, particularly in light of complications. Promising evidence to support the use of the Spinomed orthoses and WKO needs to be explored in further studies of sufficient size and quality

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OC38

EFFICACY STUDY OF THE TREATMENT OF OSTEOARTHRITIS-INDUCED KNEE PAIN WITH AUTOLOGOUS CONDITIONED SERUM: A COMPARATIVE, PROSPECTIVE AND RANDOMIZED 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 bilateral knee pain secondary to osteoarthritis.

Material and Methods: 34 patients ($N=68$ knees) with bilateral knee pain secondary to osteoarthritis were followed prospectively after intra-articular knee injection of either corticosteroid (group 1) or ACS (group 2).

Every patient received a series of six intra-articular injections with ACS into one of the randomly selected knee over a three week period. The other contra-lateral knee received a one-time only standard regime of corticosteroid injections (dexamethasone).

Results: In group 1, 23.5 % of the 34 knees experienced 50-100 % pain reduction at 12 months after injection. Average VAS pain relief was 41.0 %. The WOMAC score showed significant (p

Conclusion: Therapy with both steroid and ACS effectively reduces pain in osteoarthritic knees. Both treatments have beneficial effects on pain, function, and mobility in osteoarthritic knees. In addition, the risk profile is minimal for both treatment regimens.

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SE1

INTEGRATED APPROACH TO PREVENT REFRACTURE: THE FRACTURE UNIT PROJECT OF THE ORTOMED SCIENTIFIC SOCIETY

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Hip fractures are serious events often leading to long-term functional impairment, nursing home admission, increased major morbidity and mortality and representing a heavy financial burden for healthcare systems. The risk of a re-fracture after a hip fracture is high (up to 20 % within two years). An appropriate management for bone health can decrease re-fracture rate after the first major event. Accordingly, secondary prevention must be routine care for hip fracture patients. Unfortunately, secondary prevention is poorly addressed in surgery departments, where patients are discharged without osteoporosis assessment and proper therapeutic indications. In this respect, the objective of the Fracture Unit Project endorsed by the Italian Society of Orthopaedics and Medicine (OrtoMed) has been to assess the feasibility and the efficacy of a systematic model of care for elderly patients (≥ 65 years of age) admitted in hospital for a hip fracture. The core of each Fracture Unit is the closed collaboration between the orthopaedic surgeon and the bone specialist, who is ultimately responsible for the diagnostic workflow and the subsequent antifracture treatment for the patient. This program has been run in eight university hospitals distributed throughout Italy in three phases: 1) establishment and implementation of the Fracture Unit in clinical practice; 2) enrolment, follow-up of 900 patients admitted for a hip fracture within the three months after the constitution of the integrated care model; 3) retrospective study on the subjects admitted for a hip fractures in the three months preceding the setting up of the Fracture Unit (considered as the control group). A comparison of key performance indicators has been performed, in order to assess the efficacy of the implementation program versus the usual

care. The analysis has shown a significant increase in the percentage of patients for which a secondary diagnostic-therapeutic prevention program within the Fracture Unit has been established. In a subgroup of subjects enrolled in the program, a significant increase in the appropriateness of prescribed treatments and an improvement in adherence up to 12 months after the hip fracture has been demonstrated, independently of confounding factors. A parallel project, named T.A.R.Ge.T. (Trattamento Appropriato delle Rifratture Geriatriche in Toscana, i.e. "Appropriate treatment of geriatric refractures in Tuscany") has been run to get information for statistical and epidemiological analyses. For this purpose, data have been retrieved from the individual anonymous Regional Prescription Database, which has been built and administered by the Region of Tuscany to monitor and control health expenditure. In conclusion, the constitution of a multidisciplinary model of care such as the Fracture Unit has been shown to be feasible in all the participating Centres and able to ameliorate the diagnostic-therapeutic procedures in elderly subjects with a hip fracture, increasing both the appropriateness and the adherence to anti-osteoporotic medication aimed to secondary fracture prevention.

SE2

ANTIOSTEOPOROTIC DRUGS AND THEIR REIMBURSEMENT IN ITALY

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Osteoporosis treatment should be aimed at reducing the risk of fracture. The use of drugs is always associated with potential risks so their use should be reserved for patients at higher risk, for which there is adequate documentation of efficacy. The use of drugs is also influenced by the relationship between the advantages and disadvantages, whose individual estimate is often complex and must take into account important social

and economic aspects. In Italy the note 79 provides the criteria for the reimbursement of the pharmacological treatment of osteoporosis by the SSN for patients with high risk of fracture. Patients with a history of osteoporotic fractures are most at risk for further fractures (>20 % at 10 years). Additional criteria for the reimbursement of the drug in Italy are low values of BMD measured by DXA or reduced QUS values associated with additional risk factors such as family history of vertebral and/or femoral fractures, rheumatoid arthritis and other connective tissue disorders, previous osteoporotic wrist fracture, early menopause. In these cases, patients may be treated with bisphosphonates, SERMs, strontium ranelate associated with supplementation of calcium and vitamin D. A further condition of similar risk has also been documented for patients >50 years in chronic corticosteroid treatment. The documentation of efficacy for some drugs in this type of secondary osteoporosis therefore justifies the extension of Note 79 to women and men being treated with medium to high doses of corticosteroids. Moreover, the parathyroid hormone and teriparatide are reserved for patients with severe osteoporosis and high risk of new fragility fractures. This level of risk is identified by the presence of multiple or severe vertebral fractures and/or by the appearance of new fractures after a reasonable period of therapy with other drugs. The note states that a patient can be in note 79 to teriparatide or parathyroid in case of multiple previous moderate-severe vertebral or femoral fractures or, limited to teriparatide, if there are previous moderate-severe fractures and the patient is on chronic steroid therapy. Recently, taking into account the new algorithms for estimating the risk of fracture, a revision of the note 79 has been proposed; it is currently under evaluation but certainly it will improve the therapeutic approach of osteoporotic patients.

SE3

THE ITALIAN SOCIETY OF ORTHOPAEDICS AND TRAUMATOLOGY (SIOT) IN THE MULTIDIMENSIONAL PATHWAY OF CLINICAL AND BIOLOGICAL KNOWLEDGE OF THE OSTEOARTICULAR SYSTEM

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Over the last 50 years in the world an aging population has been recorded with an increasing number of individuals over 65. In Italy in particular, they reached the 21 % of the entire population, growing by 17 % over the past 10 years, with an inevitable increase of incidence of chronic osteoarticular diseases. In particular osteoporosis and osteoarthritis compromise the quality of life of affected subjects in an important way. The aging population will result in a further increase in

the incidence of these two diseases with a major impact on the economic health of our country. Different scientific societies tried to respond to this need of health by the elderly population through targeted initiatives to promote prevention and to identify patterns of treatment to improve the management of these patients. The Italian Society of Orthopaedics and Traumatology (SIOT) created a committee for research and technological innovation in which different committees work and act on different areas of the bone and joint diseases. The Osteoporosis and Orthogeriatrics Study Group works with other groups such as the Metabolic and Rare Diseases Study Group, the Appliances and Biomechanics Commission, the Studies on Biology and Tissue Regeneration Commission and the Trauma Center Study Group. These promote the application in medicine of the important scientific advances achieved in engineering and basic science. The study of new materials in the field of prosthetics, innovative osteoconductive or osteoinductive strategies and less invasive surgical techniques will allow to implement the options available to the orthopedic surgeon in the management of elderly patients with musculoskeletal disorders. The intense work of the various SIOT committees and collaboration between them will surely get more results, in line with the activities of other European and international scientific societies.

SE4

ACTIVITIES AND FUTURE PERSPECTIVES OF ITALIAN OSTEOPOROSIS AND METABOLIC BONE DISEASES SOCIETY (SIOMMMS)

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Italian Society for Osteoporosis and Metabolic Bone Diseases counts about 550 members; during the last year the society developed many activities aimed to spread knowledge about osteoporosis and bone metabolism diseases among medical personnel and awareness of osteoporosis negative consequences in the public opinion. The scientific society was reorganized by creating Regional and Interregional sections, lead by a coordinator, in order to increase local initiatives such as congresses, update courses, information campaigns and contacts with public authorities. Through dedicated Commissions, several initiatives were realized: – Considerable funding (€ 100000) has been allocated to two research projects (one in basic science and one in clinical research) and to a young researcher internship abroad. - Two update courses have been performed on a national basis, one addressed to doctors first approaching bone metabolism diseases, and one focused

on more advanced topics. Every event included both basic science and clinical sections, in order to improve clinical approaches and therapy through better pathophysiology mechanisms comprehension. - The society got better visibility through a new website (www.siomms.it), with the support of a specialised communication company, allowing a closer contact with members and Italian doctors in general (about 1000 website visitors per week). The website hosts scientific updates and abstracts, case reports, congress programs, legislation updates, interviews to opinion leaders, the list of specialised centers affiliated to SIOMMS. Members have free access to Calcified Tissue International and Osteoporosis International papers through the website. - Position papers and review collections (Syllabus) on particularly interesting topics are available on the website. - The National Congress took place in Rome in November 2014 with over 450 participants and joint session with other Italian scientific society and with the American Society for Bone and Mineral Research ASBMR. - A congress side event called “Fellow Day” allowed 10 young Italian researchers to meet American principal investigators and expose their projects, receiving basic science talks and feedback on their future research. During the next year, we aim to build an effective cultural alliance with General Practitioner, Orthopaedics, Rehabilitation physicians, out to improve appropriateness in diagnosis and therapy of Osteoporosis; moreover we will create a nursing section, to improve medical services to patients and support to national institutions through better knowledge diffusion to all medical personnel.

SE5

RECOMMENDATIONS FOR AN UPDATE OF THE CURRENT (2010) EUROPEAN REGULATORY GUIDELINE ON CLINICAL INVESTIGATION OF MEDICINAL PRODUCTS USED IN THE TREATMENT OF OSTEOARTHRITIS AND REFLECTIONS ABOUT RELATED CLINICALLY RELEVANT OUTCOMES

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Objective: The European Society on Clinical and Economic aspects of Osteoporosis and Osteoarthritis (ESCEO) organised a working group to evaluate the need for updating the current European guideline on clinical investigation of drugs used in the treatment of osteoarthritis (OA).

Material and Methods: Areas of potential attention were identified and the need for modifications, update or clarification was examined. Proposals were then developed based on literature reviews and through a consensus process.

Results: It was agreed that the current guideline overall still reflects the current knowledge in OA, although two possible modifications were identified. The first relates to the number and timing of measurements required as primary endpoints during clinical trials of symptom-relieving drugs, either drugs with rapid onset of action or slow acting drugs. The suggested modifications are intended to take into consideration the time related clinical need and expected time response to these drugs - i.e. a more early effect for the first category in addition to the maintenance of effect, a more continuous benefit over the long-term for the latter - in the timing of assessments.

Secondly, values above which a benefit over placebo should be considered clinically relevant were considered. Based on literature reviews, the most consensual values were determined for primary endpoints of both symptom-relieving drugs (i.e. pain intensity on a visual analogue scale) and disease-modifying drugs (i.e. radiographic joint-space narrowing).

Conclusion: This working document might be considered by the European regulatory authorities in a future update of the guideline for the registration of drugs in OA.

SE6 CURRENT REGULATORY REQUIREMENTS FOR REGISTRATION OF DRUGS TO BE USED IN OSTEOARTHRITIS IN EUROPE AND NEED FOR CLARIFICATION

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The European Society for Clinical and Economical Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) organized a working group to evaluate the need for updating the current European guideline on clinical investigation of drugs used in the treatment of osteoarthritis. A first European regulatory document aimed at providing advice for the development of drugs in osteoarthritis was issued in 1998. The latest version of the EMA Guidance adopted in 2010 is a revision of that document. Several elements of the guidelines are the subject of much debate. They are many related to the cutoff values that should define the clinically relevant symptomatic or structural improvement and to the timing of assessments that should be collected throughout confirmatory clinical trials. The consensus of the ESCEO working group, which might be possibly considered in future guidelines, will be presented during the discussion of this paper.

SE7 TRABECULAR BONE SCORE (TBS) AS A NEW COMPLEMENTARY APPROACH FOR OSTEOPOROSIS EVALUATION IN CLINICAL PRACTICE

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TBS is a novel analytical tool that performs grey-level texture measurements on lumbar spine DXA images, appearing to capture information relating to trabecular microarchitectural indices. In this symposium, findings of a comprehensive literature review relating TBS to fracture risk assessment, performed by a Working Group of the European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis, will be presented. Thus, studies have demonstrated associations between low TBS and an increase in both past and incident fractures, with relationships appearing at least partly independent of BMD. Further investigations have documented modest changes in TBS with osteoporosis treatment, but that the magnitude of this change is much lower than that of lumbar spine BMD; it is currently not clear how change in TBS relates to fracture risk reduction. Finally, recent work has suggested that TBS might have an adjunctive role in assessment of fracture probability using the FRAX algorithm. In conclusion, evidence in support of a potential role of TBS in fracture risk assessment is accruing. However, further exploration and validation of TBS-based approaches in prospective studies are required to inform optimal use of TBS in routine clinical assessment of fracture risk.

SE8 GLUCOSAMINE AND CHONDROITIN SALTS IN THE MANAGEMENT OF OSTEOARTHRITIS IN EUROPE

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Despite the near concurrent publication by influential scientific organizations in rheumatology of guidelines for the management of knee osteoarthritis, there are important differences in interpretation of the evidence base and the conclusions derived therefrom. These differences may arise in part from the different regulatory status for same treatments in the USA compared to Europe. This is particularly evident for glucosamine sulfate and chondroitin sulfate. In Europe and in several other countries, the original products (crystalline glucosamine sulfate and chondroitin sulfate) are available, are of pharmaceutical grade and are approved by the European Medicines Agency or the relevant competent authorities as prescription drugs. ESCEO recommend prescription chondroitin sulfate and/or glucosamine sulfate as chronic background treatment in the first step of its algorithm

guidelines for the management of knee osteoarthritis, based on the available evidence.

SE9

HYALURONIC ACID SALTS IN THE MANAGEMENT OF OSTEOARTHRITIS IN EUROPE

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The treatment of osteoarthritis (OA) often requires the use of both non-pharmacological and pharmacological agents. The latter includes drugs/agents that may be administered systematically or locally. Among locally administered pharmacological agents, corticosteroids and hyaluronic acid (HA) are by far the most commonly used. Hyaluronic acid is a naturally occurring polysaccharide compound with viscoelastic properties responsible for water retention and cushioning as well as lubrication of the joint. In OA, the mode of action of HA injections is believed to be mediated through an anti-inflammatory action. Hyaluronic acid has been demonstrated to be an effective treatment for knee OA in a number of clinical trials. The clinical activity onset and duration of action as well as safety, which is generally very good, may vary between treatments and could be related to a number of factors such as the composition and/or molecular weight of HA. The results of several meta-analyses on the benefits of HA therapy, more specifically, the recent review of meta-analyses by Campbell et al. (1) and the recent Cochrane report (2), are supportive that viscosupplementation in knee OA provides long term positive benefits (up to 6 months) for pain and function. Viscosupplementation with HA has a low risk of significant side effects. However, until now, there has been no definite proof that viscosupplementation may have disease modifying properties. Moreover, it has been demonstrated in a number of studies that the treatment can retard the indication for total joint replacement. In summary, viscosupplementation provides a positive risk/benefit therapeutic option for the treatment of knee OA. It could be particularly useful in patients who have failed other therapeutic options and/or in patients with monoarticular presentation of osteoarthritis of the knee.

References: 1. Campbell J et al., *Osteoarthritis Cartilage* 2007;14:1424. 2. Evaniew N, Simunovic N, *Clin Orthop Relat Res* 2014;472:2028.

Disclosures: Dr Pelletier is a shareholder in ArthroLab Inc. and consultant for AbbVie, Bioiberica, Elanco, Endocyte, Ferring, Merck & Co., Pfizer, Servier, TRB Chemedica.

SE10

CAN WE IDENTIFY PATIENTS TO BE TREATED IN OSTEOARTHRITIS?

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Objective: Osteoarthritis (OA), a disease affecting different patient phenotypes, appears as an optimal candidate for personalized health care. The aim of the discussions of the European Society on Clinical and Economic aspects of Osteoporosis and Osteoarthritis (ESCEO) working group was to explore the value of markers of different sources in defining different phenotypes of patients with OA.

Material and Methods: The ESCEO organised a series of meetings to explore the possibility of identifying patients who would most benefit from treatment for OA, on the basis of recent data and expert opinion. In a first meeting, patient phenotypes were identified according to the number of affected joints, biomechanical factors and the presence of lesions in the subchondral bone. In a second meeting summarised in the present article, the working group explored other markers involved in OA.

Results: Profiles of patients may be defined according to their level of pain, functional limitation and presence of coexistent chronic conditions including frailty status. A number of data suggest that magnetic resonance imaging may also assist in delineating different phenotypes of patients with OA. Among multiple biochemical biomarkers identified, none is sufficiently validated and recognised to identify patients who should be treated. Considerable efforts are also being made to identify genetic and epigenetic factors involved in OA, but results are still limited.

Conclusion: The many potential markers that could be used as potential stratifiers are promising, but more research is needed to characterize and qualify the existing biomarkers and in identifying new candidates.

SE11

RECOMMENDATIONS FOR THE REGISTRATION OF DRUGS TO TREAT SARCOPENIA

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Purpose: Sarcopenia is an age-related muscle condition which is frequently a precursor of frailty, mobility disability and premature death. It has a high prevalence in older populations and therefore presents a considerable social and economic burden. Potential treatments are under development but, as yet, there are no guidelines to support regulatory studies for new drugs developed to manage sarcopenia. The objective of this position paper is therefore to suggest a set of potential endpoints and target population definitions to stimulate debate and progress within the medicoscientific and regulatory communities.

Methods: A multidisciplinary expert working group was hosted by the European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (ESCEO), which reviewed and discussed the recent literature from a perspective of clinical experience and regulatory guideline development. Relevant parallels were drawn from the development of definition osteoporosis as a disease and clinical assessment of pharmaceutical treatments for that indication.

Results: A case-finding decision tree is briefly reviewed with a discussion of recent prevalence estimations of different relevant threshold values. The selection criteria for patients in regulatory studies are discussed according to the aims of the investigation (sarcopenia prevention or treatment) and the stage of project development. The possible endpoints of such studies are reviewed and a plea is made for the establishment of a core outcome set to be used in all clinical trials of sarcopenia.

Conclusions: The current lack of guidelines for the assessment of new therapeutic treatments for sarcopenia could potentially hinder the delivery of effective medicines to patients at risk.

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IOF1

PATHOPHYSIOLOGY OF DIABETOPOROSIS

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Both type 1 and 2 diabetes are associated with an increased fracture risk. Whereas in type 1 bone fragility is mostly explained by a lower peak bone mass and low bone turnover state, which is a common feature of several chronic and/or inflammatory diseases starting during growth, in type 2 diabetes there is not necessarily low bone mass, rather a higher aBMD related to overweight/obesity in these subjects. To explain the increased propensity to fractures in this case, a higher risk of falls and decreased bone quality have both been advocated. The latter includes alterations in collagen crosslinks by advanced glycation endproducts (AGEs) such as pentosidine; higher sclerostin levels associated with low bone formation; and microstructural alterations, particularly an increased cortical porosity. The molecular mechanisms relating glucose, fat and bone metabolism appear increasingly complex. They involve the transcription factor Ppar gamma, which promotes fat accumulation at the expenses of bone forming cells; Wnt- β -catenin signaling; inflammatory factors, -i.e., interleukins-, and adipokines, -such as leptin and adiponectin-, that influence both insulin resistance and bone loss; and bone-derived molecules, including (undecarboxylated) osteocalcin and RANKL, both recently found to regulate glucose metabolism. Moreover, genomewide association studies (GWAS) have started to unveil common genes that exert pleiotropic effects on the susceptibility to both diabetes and osteoporosis.

IOF2

MENOPAUSAL HORMONE THERAPY REVISITED

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Loss of ovarian hormones at the menopause leads to the development of menopausal vasomotor and psychological symptoms and deleterious effects on the skeleton, cardiovascular, genito-urinary and central nervous systems. Loss of estrogen results in an increase in bone turnover, with resorption exceeding formation. This leads to loss of bone density, destruction of bone microarchitecture, and the development of postmenopausal osteoporosis with its attendant fractures. Menopausal hormone therapy (MHT) is the most effective medication available for the treatment of menopause related symptoms, as well as the prevention of menopause related bone loss and fractures. The use of MHT became unpopular because of safety concerns. It is now clear that MHT can be safely used by taking into consideration age and time since menopause, the appropriate dose and method of delivery. MHT for prevention of fracture is presently poorly appreciated. The workshop aims to change this perspective by critically looking at the strengths and weaknesses of MHT and other drugs available. Selective estrogen receptor modulators (SERMs) are a class of molecules that have either agonist or antagonist effects on the estrogen receptor depending on tissue type. Raloxifene and Bazedoxifene (BZA) are available for the treatment of postmenopausal osteoporosis. Both SERMs have been shown to be effective in the prevention of vertebral fractures as well as nonvertebral fractures in selected populations. Unlike MHT, SERMs do not alleviate vasomotor

symptoms, but the use of SERMs is associated with a significant reduction in risk of breast cancer. Currently, a combination of conjugated estrogens with BZA has been approved in the USA and EU for the treatment of menopausal symptoms as well as prevention of osteoporosis. This combination does not stimulate the endometrium and has a neutral effect on the breast, without increasing the risk for venous thrombosis above that of the drugs used alone.

IOF3

LATEST TRENDS ON SECONDARY FRACTURE PREVENTION

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The major clinical consequence of osteoporosis is fragility fractures, which affect a wide proportion of the population: one in two women and one in five men aged over 50 years will suffer a fragility fracture. Furthermore, fracture begets fracture; a first fracture doubles the risk of suffering a subsequent fracture compared to peers. Epidemiological data suggest that 16 % of patients sustain a fragility fracture over the age of 50, but few receive osteoporosis treatment. Despite evidence for the clinical effectiveness of secondary fracture prevention,

translation to the real world setting remains disappointing. The majority of patients presenting to urgent care services with fragility fractures do not receive the osteoporosis assessment and/or treatment that are needed to prevent subsequent fractures. Fracture Liaison Service (FLS), a coordinator-based model of care, has been shown to be the best model to close the care gap and prevent secondary fractures. Clinical and cost-effectiveness of FLS has been proven in a growing number of countries, and FLS has been shown to ensure identification of fracture patients for secondary preventive assessment, the undertaking of appropriate investigations and the initiation of osteoporosis treatment when appropriate. To support use of effective models of care across the globe, the International Osteoporosis Foundation's Capture the Fracture[®] campaign has developed a Best Practice Framework of criteria and standards to provide a quality benchmark. Capture the Fracture brings healthcare professionals a thorough review of the rationale for FLS, practical support for setting up FLS and the experiences and achieved outcomes from well-established FLS. FLS provide the anchor between all stakeholders—including patients, health-care professionals, policymakers, payers and the private sector—to establish a new standard of care for fragility fracture sufferers worldwide. This session will summarize the latest data from the Capture the Fracture campaign. Novel diagnostic technologies and laboratory results after fracture repair will also be presented. All these parameters could well become valuable clinical tools in the diagnosis of osteoporosis, fracture risk assessment and help close the current post-fracture care gap.

World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2015): Meet-the-Expert Sessions

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MTE1 SEQUENTIAL/COMBINED THERAPIES IN OSTEOPOROSIS

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The ability of any single osteoporosis drug to fully restore bone mass and microstructure in both trabecular and cortical compartments and to prevent fragility fractures throughout the skeleton is limited. Moreover in high-risk patients at immediate risk of fracture, the antifracture efficacy of these drugs, particularly on nonvertebral fractures, may be delayed. Eventually, the benefits-risk ratio of antiresorptive therapy declines with long-term exposure, particularly with bisphosphonates (BPs). Because of these limitations and by analogy with the approaches undertaken in other chronic disorders, such as hypertension and diabetes, sequential and even combined therapy approaches for osteoporosis need to be (re)considered. For instance several studies have now demonstrated that transitioning from a BP to denosumab increases aBMD further compared to another BP. Although some early trials with alendronate and PTH(1–84) or teriparatide had shown “no additive effects”, most animal models and recent new combinations of teriparatide and zoledronate, as well as teriparatide and denosumab, have shown clear additive effects on aBMD, particularly at the hip. Interestingly, these trials revealed that the profile of bone turnover markers with these combinations may be quite different, but in any case consistent with a more positive bone mineral balance than each single agent alone. In this session we will therefore discuss the opportunities and limitations of Sequential/combined therapies in osteoporosis.

MTE2 MONITORING OF OSTEOPOROSIS TREATMENTS

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Objective: In an ideal world all therapies would be highly effective without side effects and all patients would be adherent to their medication. Unfortunately pharmacologic therapies are less than perfect and patients do forget to take their medications or forget to take them correctly. As a result it is important to monitor individuals to make sure that there is a positive response and not a lack of response to treatment

Material and Methods: A history of falls or fractures is important. Ongoing fractures after a year of therapy would be considered treatment failure. Loss of height is one of the earliest signs of spine fractures. Occiput wall distance increases and rib-pelvis distance decreases with thoracic and lumbar spine fractures. Biochemical markers of bone turnover are particularly helpful when performed in a qualified lab. Early reductions in serum CTX and PINP represent a reduction in bone turnover and suggest response to antiresorptive treatment. Increases in both with teriparatide, suggest treatment response. BMD may be followed from 1 to 3 years from baseline depending upon the expected change in BMD. For treatment where large changes in BMD are expected, a repeat BMD at 1 year may be performed. Where small changes are expected, a repeat BMD may be better done at 2–3 years. Stable or increases in BMD both are associated with reductions in fracture risk, while declines are associated with an increase in fracture risk. X-rays are still useful in detecting fractures in the presence of back pain and height loss.

Results: Bone markers and BMD have been considered in determining treatment failure. Others have looked at monitoring FRAX scores. These are all open to debate and much of it based on expert opinion rather than science. There is

increasing talk of treating-to-target. Just what that target is, is open to debate.

Conclusion: Monitoring therapy is important in optimizing patient outcomes. Further guidance will be forthcoming as we learn more about what constitutes treatment success.

MTE3

EXERCISE, NUTRITION, BONE AND MUSCLES

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Throughout life bone and muscle mass are tightly coupled. Both organs respond similarly to exercise by increasing their mass and both organs lose mass with disuse. Muscle has been thought to be the primary stimulus for bone tissue since 1977 when Harold Frost put forward, the ‘mechanostat’ theory. The mechanisms by which muscle promotes influences bone mass are less well understood, but they are thought to include exercise induced production in muscle of cytokines that stimulate bone. Other potential mechanisms include growth factor/IGF-1, FGF-23, and myostatin axes which involve bone as well as muscle. Less is known about the anabolic effect of bone on muscle and this is an area of active investigation. Factors known to increase risk of sarcopenia include decreased physical activity, increased catabolic cytokine activity, decreased circulating anabolic hormone levels, and genetic factors. Nutrition and exercise are important approaches to preventing muscle and bone wasting. Vitamin D insufficiency has been associated with decreased muscle performance and increased risk of falling and also with increased rates of bone loss and fractures. Supplementation has been shown to increase myocyte cross-sectional area, through activation of vitamin D receptors in muscle tissue. Supplementation with vitamin D in amounts of 800 IU per day appears to provide protection from falls. This is also the intake recommended by the IOM for older adults to reduce fracture risk. Dietary protein intake is important for bone and muscle and protein intake has been positively associated with both muscle mass and BMD in older adults. The favorable effect of dietary protein appears to be amplified by the concurrent ingestion of foods that are metabolized to alkali, such as fruits and vegetables. Weight bearing exercise is important for bone and strength and balance training are important strategies to reduce risk of falling. Exercise for 30 min or more per day is recommended for older adults.

References: Bonewald LF et al. JBMR 2013;28:1857.

MTE4

EPIDEMIOLOGY AND MANAGEMENT OF POSTMENOPAUSAL OSTEOPOROSIS IN LATIN AMERICA

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The Latin American Region (LatAm) includes 20 countries and 20 Caribbean Islands, with a total population over 600 million. The people over 70 years old in the region shows the largest increases, many countries will be incrementing their eldest population in as much as 300 % by the year 2050, therefore chronic diseases as OP are anticipated to increase in the near future. Three countries within the region (Brazil, Cuba and Mexico) have taken the dimension of osteoporosis at the national level. Regarding the epidemiology of fractures, available Information indicates that the incidence of hip fractures varies from intermediate to low incidence with rates that goes from the highest in Argentina to the lowest in Ecuador (264 and 55 per/100 000, respectively). Projections for hip fractures reported for Mexico will increase from 85 thousand in 2010 to over 110 thousand by the year 2050 (431 %).

Less variability is found in the epidemiology of vertebral fractures. The prevalence of vertebral fractures within the LatAm region reported from the LAVOS study was similar in all five countries, increasing from 6.9 % in women aged 50–59 years to 27.8 % in those 80 years and older.

The risk factors for fractures are common to all groups were older age, positive history of prior fractures and self-reported height loss for vertebral fractures; for hip fractures older age, positive story of prior fractures and positive history of falls.

Guidelines for management and treatment for postmenopausal OP have been published in 10 countries by national societies; their governments have endorsed some of them. All of them include a compressive review of OP and the guidelines for treatment. Information gather from the LatAm audit indicate that bisphosphonates are available in every audited country with reimbursement policy differing in each country. Access to other osteoporosis medications (SERMs, strontium ranelate, hormone replacement therapy, PTH) is variable among the Audit countries. Vitamin D studies are also limited in this region, but the available evidence reveals an abundance of hypovitaminosis D throughout Latin America with no clear guidelines regarding supplementation of vitamin D.

MTE5 GENETIC MARKERS FOR THE PREDICTION OF FRAGILITY FRACTURES

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With the advent of genomewide association studies (GWAS) the number of genetic discoveries has increased dramatically for all complex diseases, and such is the case for osteoporosis. To date ~100 BMD loci have been identified by GWAS as robustly associated with BMD and several other osteoporosis-related traits. Many of the identified variants map in the vicinity of genes of unknown function (representing cutting-edge new biology), while several other factors cluster within critical biological pathways relevant for bone biology, like Wnt signaling, OPG-RANK-RANKL and mesenchymal cell differentiation, among others. These variants identified by GWAS together explain about 5–6 % of the variation in BMD and less for fracture susceptibility, limiting thus far the application for meaningful clinical risk prediction. On the other hand, these discoveries have allowed us to advanced our understanding of the underlying molecular mechanisms leading to fracture. Further, there is large potential for translating GWAS discoveries into novel therapeutic applications for the treatment of osteoporosis, as most (if not all) current medications, target factors in known pathways, which have been re-identified with the GWAS approach. The main question is - what comes next?—after this recent successful streak of GWAS discoveries; particularly, which techniques and methodological approaches are expected to yield the most efficient leaps towards clinical translation, particularly at the level of fragility fracture risk prediction, risk stratification and personalized medicine approaches. During this session, a glimpse will be taken into the future of new GWAS and next generation sequencing approaches for the identification of genetic determinants of fragility fracture.

MTE6 ROLE OF NUTRACEUTICALS IN THE MANAGEMENT OF OSTEOARTHRITIS

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Osteoarthritis (OA) is the most common rheumatic disease, characterized by progressive cartilage degradation, loss of joint architecture, and, finally, joint failure leading to significant pain and disability. The guidelines for the treatment of knee OA include losing weight, muscle strengthening and analgesics. However, real-life data suggest that NSAIDs,

paracetamol, and opioids are mostly used in daily clinical practice. Chronic use of NSAIDs is associated with gastrointestinal complications, myocardial infarction and acute kidney failure. The side effects of NSAIDs counter-indicate their use in some patients, who turn out to be regular users of opioids with a large amount of side effects including increased functional limitations and poor self-reported health outcomes. In turn, compounds of the symptomatic slow-acting drugs for OA (SYSADOA) class include nutraceuticals such as glucosamine-containing compounds, chondroitin sulphate, and others. Despite strong controversies about their use, these agents are commonly used for the control of OA symptoms in all European countries as well as in America. We will discuss the updated evidence of nutraceuticals compounds for OA treatment. Most practice guidelines analyze the evidence behind each proposed treatment, but do not prioritize the interventions. Furthermore, few clinical trials have been designed to study the effect of a given treatment in patients with history of previous therapeutic failure, and/or how new treatments should be introduced. In this sense, the algorithm recommendation of ESCEO for the management of knee OA puts all proposed treatments in logical sequence suggested by the available evidence, including the SYSADOAs. In the near future, and due to few current pharmacologic alternatives in OA treatment, other therapeutic targets should be considered. In this regard, innate immune responses have been suggested to play a key role in OA development; therefore, it is necessary to fully discern it and particularly to explore the role of toll like receptors in this process. In fact, several factors associated with TLR4 activation may be relevant biomolecules in cartilage inflammatory responses and in the development and progression of cartilage degradation. The most active ginger derivative, 6-shogaol, shows a potent anti-inflammatory and antidegradative effects in human OA chondrocytes, by blocking TLR4 signaling. New molecules of the SYSADOA group may come to the OA field.

MTE7 DIAGNOSIS AND TREATMENT OF SARCOPENIA

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Sarcopenia is an aging concept that receives increasing attention in the geriatric world. The concept was launched in 1998 by Dr. Rosenberg and was originally defined as the age-related loss of muscle mass. The operationalization of sarcopenia has changed and broadened over time. First, persons with a low muscle index (appendicular muscle mass (kg) divided by height (m) squared) were considered sarcopenic.

Later, poor muscle strength was also included in the definition, although some researchers prefer to call this dynapenia and treat it as a separate aging phenomenon. More recently, according to several consensus definitions, measures of physical functioning such as gait speed have also been included. Advantages and disadvantages of the different operationalizations will be discussed during this session. Also, consequences of the different operationalizations for diagnosis and prognostic value will be discussed. Finally, the preferred methodology to assess the different components of sarcopenia will be reviewed.

MTE8

PHYSICAL REHABILITATION IN MUSCULOSKELETAL CONDITIONS: WHICH METHOD?

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Disability is strongly associated with musculoskeletal conditions, such as low back pain, osteoporosis-related fracture, osteoarthritis and sarcopenia. These conditions can have long-term impacts on patients' quality of life. Rehabilitation (i.e. the process of managing the consequences of disease) aims to maximize physical, functional, psychological, social and role status. The burden of these musculoskeletal conditions may become exponentially high in the absence of rehabilitation. Indeed, musculoskeletal-related disability is amenable to rehabilitation and there is evidence to suggest that multidisciplinary forms of rehabilitation programs are effective in improving clinical and quality of life outcomes. Community-based programs, as an extension of rehabilitation, have also shown clinical effects in people with musculoskeletal conditions. Interestingly, some recent studies have suggested that home-based rehabilitation may be an effective alternative and that the Internet may be successfully used as a medium for providing community based self-management and rehabilitation interventions. However, the exact modalities of rehabilitation need to be defined as they depend on the disease and on the stage of its management (primary, secondary or tertiary prevention).

MTE9

USE OF FRAX WORLDWIDE: CURRENT CHALLENGES AND SOLUTIONS

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FRAX is a computer based algorithm (<http://www.shef.ac.uk/FRAX>) that calculates the 10-year probability of a major fracture (hip, clinical spine, humerus or wrist fracture) and

the 10-year probability of hip. Fracture risk is calculated from age, BMI and well validated dichotomized risk factors. Femoral neck BMD can be optionally input to enhance fracture risk prediction. Fracture probability differs markedly in different regions of the world so that FRAX is calibrated to those countries where the epidemiology of fracture and death is known (currently more than 50 countries). In addition to the web site, FRAX has been incorporated into the software of densitometers and is available as an application for the iPhone/iPod.

The major clinical application of FRAX is to enhance the assessment of fracture risk to better target interventions, particularly in primary care. However, the utility of FRAX depends importantly on the development of guidance on the fracture probability at which treatment should be recommended (i.e. the intervention threshold). In Europe, risk assessment models are available in 21 of the 27 member states but a small majority (12/21) provide guidance on its application to clinical practice. The intervention thresholds that are selected vary from country to country, since they depend on the importance of osteoporosis, the health care budget allocated, current practice guidelines, reimbursement and health economic considerations. This year, European guidelines have been published that incorporate FRAX which may stimulate a more cohesive approach to risk assessment and the targeting of treatment.

The targeting of treatment by fracture probability has stimulated the evaluation of treatment responses as a function of FRAX. Treatment with teriparatide, raloxifene and strontium ranelate appears to be equally effective over a wide range of fracture probabilities. By contrast, treatment efficacy (relative risk reduction) is enhanced in patients at high fracture probability with clodronate, bazedoxifene and denosumab. Such treatment interactions need to be explored with all therapeutic interventions because of important implications for meta-analysis, effective targeting of treatment and health economic consequences.

MTE10

EPIDEMIOLOGY AND MANAGEMENT OF POSTMENOPAUSAL OSTEOPOROSIS IN THE MIDDLE EAST AND AFRICA

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Postmenopausal osteoporosis (PMO) is an under recognized disease and its characteristics vary among regions. Genetic and environmental factors play a major role.

Objective: To gather data on epidemiology of PMO and fragility fractures (fx) and to study their management in countries in the Middle East and Africa (ME&A) as well

as to study the particularities of this disease in this region in order to deliver policy for health care improvement.

Methods: The resources of our research included Personal communication and a review of PubMed electronic database using the following terms: “Fractures, postmenopausal Osteoporosis, BMD, Middle East and Africa” up to September 2014.

Results: The prevalence of PMO based on BMD is quite comparable across ME&A countries, and was close to 30 % in several studies. Hip fx incidence ranged between 100 and 295 per 100,000 person/year. Radiographic vertebral fractures VF were detected in 1/4 of asymptomatic women with low BMD. A large number of women are unaware of osteoporosis (OP) risk factors: Sixty percent of women identified low calcium intake, 39 % lack of exercise and 22 % a family history of OP as risk factors of OP. The prevalence of hypovitaminosis D in the ME&A has been estimated to range between 50 and 90 %. The availability of DXA machines is estimated to

be less than 5/million population. National OP guidelines are available in five countries. Only 4 countries in ME&A have an online FRAX® calculator. Most approved antiresorptive drugs were available in the majority of countries, whereas PTH analogs were in only half. Reimbursement for diagnostics and therapeutics varied widely. Information on social costs and quality of life are rare. Discussion: The health burden of PMO in the ME&A is significant. The prevalence of PMO, fragility fx incidence and risk factors should be more widely and rigorously evaluated. Multiparity, skin pigmentation, clothing style are possible predictors of hypovitaminosis D. Access to care and the availability of equipment are variable depending on economic conditions.

Conclusion: Considerable support for research is required to face the explosive growth in osteoporotic fracture due to the steady growth of the ageing population in the ME&A.

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P101

DEGENERATIVE MENISCEAL TEARS AND POSTURAL CONTROL IN OLDER FALLERS: A CASE-CONTROL EVALUATION

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Objective: Menisceal tears can occur as a result of the cartilage degenerative process in osteoarthritis (OA) and are associated with impaired balance and mobility. The relationship between degenerative menisceal tears and subsequent falls, however, have not been adequately studied. We therefore conducted a case-control study to determine the influence of menisceal tears on postural control in older fallers.

Material and Methods: Cases consisted of individuals aged ≥ 65 years with a history of two falls or one injurious fall over the past 12 months while controls aged ≥ 65 years with no falls in the previous year were recruited through word-of-mouth and media advertising. The presence of menisceal tears were determined with 3 T magnetic resonance image (MRI). Postural control was evaluated with a balance platform (Balance master, Neurocom, USA) using the limits of stability (LOS), sit-to-stand (STS) and a modified clinical test of sensory interaction on balance (mCTSIB) assessments.

Results: 32 subjects (12 fallers, 20 non-fallers), mean age(SD)=70.97(4.771), 75 % women, were recruited. 21 subjects had a menisceal tear by MRI with 20 of them had on medial side only, 1 on lateral, and 3 on both compartments. No significant difference was found in the presence of menisceal tears among fallers and non-fallers (75 vs. 60 %, $p=0.465$). Subjects with menisceal tears were more likely to have worse percentage of rising index during STS test compared to the subjects without tears (19.90 ± 7.18 vs. 34.81 ± 20.21 , $p=0.005$). While fallers with menisceal tears were found significantly worse score in the percentage of symmetrical weight distribution in STS (15.78 ± 8.38 vs. 6.75 ± 5.64 , $p=0.008$), further end point (59.89 ± 9.53 vs. 47.92 ± 11.04 , $p=0.017$)

and further maximal excursion (84.22 ± 3.78 vs. 68.58 ± 13.87 , $p=0.006$) to the left, right and backwards compared to the non-fallers with menisceal tears. In a regression analyses, presence of menisceal tears remained associated with poor rising index even after controlling for age and history of falls ($p=0.027$).

Conclusion: This study discovered that presence of menisceal tears among the older adults was found strongly associated with impaired rising index in STS test and was not mediated by history of falls. In addition, despite having menisceal tears in knee, the non-fallers showed better percentage of left/right symmetry weight distribution in STS test compared to fallers. While better score found in LOS among fallers with menisceal tears when compared to the non-fallers with menisceal tears can be postulated that, the non-fallers with high risk of fall might have restricted their movement which simultaneously reduce their possibility to get fall. This findings suggested that, aiming to improve STS scores can become the main objective in any intervention involving elderly fallers with meniscus tears in knee OA in order to improve their functional status for daily living.

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P102

ELEMENT STATUS OF TOXIC ELEMENTS IN THE BLOOD AND HAIR SAMPLES FROM THE NORTH

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Objective: Bone belongs to the most mineralized tissues. Among the essential elements affecting mineral metabolism of bone tissue, leading role to ensure the body takes calcium, magnesium, phosphorus, copper, zinc and manganese.

Accumulation of toxic elements in the body can lead to the development/disruption of bone mineral metabolism.

Material and Methods: A total of 100 people under the age of 50 years. There were included 64 people living in the north in the group I. Group II—36 living in the northwest. Mass spectrometry with inductively coupled plasma was measured content of 10 toxic elements (Al, Cd, Ni, Hg, Rb, Pb, Ag, Sr, Tl, Ce) and 13 essential elements (Na, Mg, P, Ca, V, Cr, Mn, Co, Cu, Zn, As, Se, I) in serum, as well as 12 toxic elements (Al, Cd, Ni, Hg, Rb, Pb, Ag, Sr, Tl, Ce, Ba, Be), and 19 essential elements (Na, Mg, P, Ca, V, Cr, Mn, Co, Cu, Zn, As, Cd, Se, I, B, K, Ba, Li, Fe) in hair samples.

Results: Group I samples revealed increasing hair: Ba(95 %), Ni (22 %), Al(9 %), Cd(4 %) and Sr(4 %). Serum observed an increase of Rb(18 %), Cd(9 %) and Hg(4 %). In Group II, we observed a high Ni content (3 %) in hair samples. More pronounced changes are observed among the essential elements in a sample of hair, where deficiency of Se was detected (100 %), I(90 %), Co(90 %), identified as a significant reduction in Mg(55 %), Cu(20 %), Zn 35 %). Serum also revealed deficiency of Se(90 %) and I(38 %). Despite the fact that the median calcium content in hair samples from northern residents are within the boundaries of the reference range, a number of surveyed found their reduced levels compared with the control group.

Conclusion: Thus in the inhabitants of the north, we are seeing a significant violation of the element status, characterized by a high content of Ba, Ni, Al, Cd, Sr, Hg, Rb, Pb. Against the background of the excess of toxic elements observed, reduced levels of essential elements are necessary for the formation and bone metabolism.

P103

TRUNK FLEXION AND TRUNK EXTENSION: RELATIONSHIP OF JOINT MOVEMENTS AND INFLUENCE ON ANTHROPOMETRIC MEASUREMENTS

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Objective: To know if measurement of one flexibility exercise can be a cumulative of the total flexibility and how the sit and reach performance has impact on the anthropometric measurements.

Material and Methods: 30 male students 18–24 years. were subjects and variables of study were right planter and dorsi flexion, left planter and dorsi flexion, right and left wrist flexion and extension, trunk flexion and extension, body mass, standing height, leg length, weight-height ratio and reach to leg ratio. Partial correlation was used for analysis.

Results: Comparison of zero order correlation with partial correlation variables was computed by keeping other variables

constant and the observations were: Trunk flexion with trunk extension ($r=0.39$) by keeping reach to leg ratio constant (0.40), the difference was 0.01, not a marked one. Trunk flexion with reach to leg ratio (0.016) by keeping trunk extension constant (-0.09), the difference was 0.07, a marked one. Trunk flexion and trunk extension (0.39) by keeping leg length constant (0.43) the difference was 0.04 not much changed. Trunk flexion and leg length (0.309) by keeping flexibility (0.356) constant, the difference was 0.05, not markedly changed. Trunk flexion and trunk extension (0.39) by keeping weight-height ratio (0.39) constant, no difference. Trunk flexion and weight to height ratio (0.0023) by keeping trunk extension (-0.03025), the difference was -0.03 , no marked difference. Correlation between trunk flexion and trunk extension did not change mutually when other three variables were held constant.

Conclusion: Significant association between right plantar flexion and left plantar flexion, right dorsi flexion and left dorsi flexion of ankle joint. Significant association was found between right and left wrist flexion and extension. No relationship noticed between trunk flexion and trunk extension. Flexion and extension are two different characteristics and measuring one or two movement of a joint cannot be taken as total flexibility of an individual.

P104

SARCOPENIA IN THE ELDERLY: HISTOLOGICAL AND IMMUNOHISTOCHEMICAL INVESTIGATION OF AGE-RELATED MUSCULAR DEGENERATION

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Objective: Sarcopenia is a pathological condition which causes problems in the balance and gait, falls and subsequent fractures. Muscle fibers atrophy is quite characteristic, of this condition. Our study aims to clarify the histological and immunohistochemical side of the problem.

Material and Methods: We selected 102 patients who underwent a total hip arthroplasty (THA), 54 with hip fracture due to osteoporosis (OP), 48 with osteoarthritis (OA). On each one, we performed vastus lateralis biopsy. We collected personal history of the patients, we performed DXA, we assessed OA using Kellgren-Lawrence scale and Harris Hip Score. Morphometric analysis was performed on serial transverse cryostat sections and the muscle fibers were counted and measured. We quantified cytokines (TGF- β , BMP, myostatin) and cell markers (CD 56). By statistical analysis we correlated the

fiber atrophy with BMD in the OP group and Harris Hip Score in the OA group.

Results: Our study revealed a greater degree of atrophy in the OP group, especially in type II fibers, which correlates with lower values of BMD. In the OA group instead, atrophy was lower, homogeneous between the fibers and uninfluenced by the values of Harris Hip Score. There is a positive correlation between concentration of BMP-2 and BMD in OP group and also with the degree of osteoarthritis in the OA group. For TGF- β and myostatin, we obtained high levels associated with a greater degree of muscle atrophy.

Conclusion: We can assume that there is a mutual influence between sarcopenia and degree of OP, which could be an opening to therapeutic perspectives. With respect to the data of the OA group, despite muscle atrophy was present, its level was low and it did not show correlation with the Harris Hip Score. A hypothetical use of inhibitors of myostatin and TGF- β could improve sarcopenic and, indirectly, OA and OP frameworks. Finally, the use of BMP-2 may promote bone and cartilage repair mechanisms, improving the values of BMD, OP and OA.

P105

BONE MINERAL DENSITY AND MEASURES OF ADIPOSITY IN SAUDI POSTMENOPAUSAL WOMEN

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Objective: To investigate the relationship between BMD values at 3 skeletal sites and different measures of adiposity and body fat in Saudi postmenopausal women.

Material and Methods: 237 postmenopausal female subjects were randomly recruited from the Department of Internal Medicine at King Abdulaziz University Hospital (KAUH). The study was approved by the KAUH Ethics Committee. Different adiposity measures including body weight, BMI, waist circumference, hip circumference, and waist hip ratio (WHR). Body fat was evaluated by triceps skinfold thickness, mid arm circumference, mid arm muscle circumference, and mid-upper arm muscle area. BMD determined at the lumbar spine (L1-L4), mean of right and left femoral neck and total hip were assessed. Continuous and categorical data are presented as means \pm SE and number (percentages), respectively. The level of significance was set at two-sided p values $<$ 0.05. The data were analyzed using SPSS version 20.

Results: The age of study participants ranged from 46 to 88 years and they ranged in BMI from 25 to 54.3 kg/m². Among the 237 subjects, 32 % were overweight and 68 % were obese according to BMI values. The whole population is considered obese both in terms of WHR and waist

circumference values. The prevalence of osteoporosis was 29, 69 and 53 % according to BMD values at the lumbar spine, femoral neck, and total hip, respectively. The prevalence of osteopenia was 38, 29, and 41 % according to BMD values at the lumbar spine, femoral neck, and total hip, respectively. Correlation analysis revealed that BMD values at the 3 skeletal sites were significantly and positively related to all body composition except for WHR.

Conclusion: Our data indicate that all adiposity measures except for WHR and body fat are positively related to BMD. Whether these indices of adiposity are also protective factors against the risk of vertebral fractures will require longitudinal follow-up.

P106

THE QUANTIFICATION AND TRACKING OF OSTEOARTHRITIS

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Objective: Osteoarthritis is a debilitating and economically devastating syndrome that can be evaluated in subclinical manifestation using an injury based Health Risk Assessment, which quantifies the risk of osteoarthritis by 4 regions of the body. A physician can formulate for the patient a preventive treatment plan that may forestall or even prevent osteoarthritis. Using a quantitative scale (low-medium-high by points), we evaluated a number of factors and accommodates other factors known to affect osteoarthritis, such as posture, repetitive activities of daily living, hypoflexibility, and BMI, among others.

Material and Methods: Spinal analysis is performed for each spinal region then correlated with the inter-regional relationships. Sensory and possibly systemic findings are superimposed on biomechanical analyses and compound region of involvement impact. Lastly, a final region score is given after medical relative algorithms are referenced against pertinent medical history and activities-of-daily-living function.

Results: binary logistic regression function in SPSS 12.0 values from multiple patients ($n=279$) were used in this investigation. The sensitivity of the predicted results was 69.6 % (16/23), and the specificity of the predicted results was 98.4 % (252/256), resulting in an overall success rate of 96.1 %.

Conclusion: This process presents a systematic approach to assess patients for microinjuries and develop a comprehensive plan to help minimize or avoid risk factors in such a way that osteoarthritis can be prevented or postponed.

Disclosures: Dr. Groteke is the cofounder injury based health risk assessment. This article was prepared with Joseph Pergolizzi, MD and editorial assistance from Jo Ann LeQuang

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P107

RELAXATION METHOD AND OSTEOARTHRITIS IMPROVEMENT

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The research focuses on the harmful effect of free radicals on the vasculature. It indicates the benefit of relaxation, and exposes a new method to improve stretching and relaxation by mastering the breath. This method improves the range of motion, the flexibility of tendons and ligaments, and the vascularization around the joint.

Daily practice of the method raises the performance of joint suffering from degenerative lesion and strengthens the range of motion. Also, the study reveals the importance of antioxidants in order to avoid advanced lesions.

Material and Methods: Ten men aged between 30 and 65 practicing this method two times a week. Three of them have advanced osteoarthritis, one has diabetes neuropathy and high blood pressure, and the others are healthy. This method based on relaxing, stretching and breathing (inhaling and exhaling) improves a person's well-being including the improvement of the range of motion, pain joint and the articular inflammation. From a physiopathological point of view, injury and free radicals lead to endothelium dysfunction, and the genesis of the disease. the induced inflammation can progress to chronicity. We emphasize the harmful effect of the oxidative stress, its negative action on articular endothelial cells, and the beginning of osteocartilaginous degeneration.

The interest of a diet rich in antioxidants associated with the proposed exercises.

Results: After 6 weeks of training, all cases of osteoarthritis are painless. They have better range of motion, disappearance of local inflammation, an improvement of pain in neuropathic diabetes, and reduction of systolic pressure.

The healthy group became more flexible and appreciated the method.

P108

HYPOVITAMINOSIS D AS THE POSSIBLE MAIN RISK FACTOR FOR OSTEOPOROSIS: A DESCRIPTIVE EPIDEMIOLOGY IN A MIDDLE EASTERN POPULATION

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Objective: To determine the prevalence of hypovitaminosis D as the possible main risk factor for inducing osteoporosis in an attempt to differentiate between the association of the two conditions and the direct causal relationship.

Material and Methods: Retrospectively, we reviewed the records of 131 adult patients with hypovitaminosis D who underwent DXA scanning. Results of the scan were interpreted according to the T- or the Z-scores. A score of -2.5 or less in one or more of the examined sites indicated the presence of osteoporosis. Other data were age, nationality, 25(OH)D3, PTH (assayed by CMIA, Abbot) and serum calcium.

Results: 28(21.5 %) were deficient (<12 ng/ml) vs. 103 insufficient ($12-30$ ng/ml) for the vitamin. 60 individuals had normal outcome of DXA (46 %), 47 with osteopenia (36 %) and 24 (18.5 %) had osteoporosis. Osteoporosis in males was determined in 5/63(8 %) vs. 19/68(28 %) in females, $p=0.005$, whereas more males expressed normal outcome on DXA compared to females (60.5 vs. 32.5 %, $p=0.001$). However, the mean age of patients with osteoporosis was comparable in males and females respectively (43.4 ± 23.4 vs. 53.3 ± 15.8 years, $p=0.27$). The mean values of 25(OH)D3, serum calcium and PTH were not different in patients with osteoporosis and others with normal outcome (17.8 ± 5.47 vs. 18.3 ± 5.95 ng/ml for 25(OH)D3, 9.41 ± 0.44 vs. 9.38 ± 0.372 mg for calcium and 105 ± 65.1 vs. 94.3 ± 53.7 pg/ml for PTH) respectively, $P=NS$. Secondary hyperparathyroidism occurred in 12/19(63 %) vs. 36/51(70.5 %), in those with normal outcome, $p=0.57$. Four in the deficient group (14 %) and 20(19.5 %) among the insufficient had osteoporosis, $p=0.78$.

Conclusion: Osteoporosis tends to occur in the minority of patients with hypovitaminosis D irrespective to the degree of the inadequacy of the vitamin. In those patients, osteoporosis appears to be gender-related and associated with low BMI. Future work should compare these findings to others in patients with osteoporosis but with normal vitamin D status.

P109

STATUS OF SERUM CALCIUM AND PTH LEVEL IN PATIENTS UNDERWENT 99-MTC- SESTAMIBI SCAN FOR HYPERPARATHYROIDISM

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Objective: To review the outcome of parathyroid scan results in a cohort of patients with hyperparathyroidism with special attention paid to the associated serum calcium.

Material and Methods: Results of 129 patients with the diagnosis of hyperparathyroidism were reviewed. The scan was performed using 99-mTc-sestamibi (2-methoxyisobutylisonitrile) injected IV. PTH was assayed by chemiluminescent microparticle immunoassay (CMIA, Abbot) ($N=15-68$ pg/ml) and serum calcium estimation by cresolphalein complex method ($N=8.4-10.2$ mg/dl). Diagnosis of hyperparathyroidism was based on PTH levels of >70 pg/ml.

Results: The age of patients ranged between 14 and 81 years. Female predominance was evident 77 vs. 52. The PTH level ranged between 77.1 and 503 pg/ml in the whole group (mean of 152 ± 74.9) and serum calcium between 8.02 and 12.5 mg/dl (mean of 10 ± 0.88). 35 patients had parathyroid (single) adenoma (27 %), 52 had parathyroid hyperplasia (40 %), and 42 (32.5 %) expressed negative results. The mean level of PTH was not different in the three subgroups (147 ± 79.8 , 145 ± 54.4 and 163 ± 92.4 pg/ml respectively, $p=NS$). Likewise was the mean of serum calcium (9.95 ± 0.82 , 10.1 ± 0.84 & 10.1 ± 1.00 mg/dl) respectively, $p=NS$. Nonetheless, the frequency of eucalcemia was higher than hypercalcemia in the entire group. The same pattern of frequency was also observed in the subgroups respectively (22 (64 %) vs. 13 (36 %) in the adenoma group, $p=0.05$, 28 (54 %) vs. 24 (46 %) in the hyperplasia group, $p=0.55$ & 25 (59.5 %) vs. 17 (40.5 %) in the negative group, $p=0.12$).

Conclusion: The profile of serum calcium and raised serum PTH have failed to differentiate between the patients with hyperparathyroidism of various outcome of 99-mTc-sestamibi scan. Moreover, the emergence of eucalcemia as the most frequent biological marker in these patients poses a challenge to the customarily hypercalcemia in functioning parathyroid adenoma. Further studies to substantiate the above findings however, are warranted.

P110

OCCURRENCE OF VERTEBRAL FRACTURES IN GLUCOCORTICOID-INDUCED OSTEOPOROSIS

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Objective: To establish effect of glucocorticoids on BMD and occurrence of vertebral osteoporotic fractures.

Material and Methods: This paper presents the retrospective analysis of data taken from the National Register for Osteoporosis in Serbia. Total of 217 menopausal women with osteoporosis was analyzed, divided into 2 groups. One group

(110) comprised of patients with vertebral fractures, and other group consisted of 107 patients without vertebral fractures. Both groups were comparable according to their age. Effect of glucocorticoids as a risk factor for lower BMD was analyzed, as well as the occurrence of vertebral fractures. For statistical analysis, F test, Fisher test and multiple regression analysis were used.

Results: The average age of subjects was 69.96 ± 8.612 years. Patients from both groups who are taking glucocorticoids (27.2 %) had statistically significant lower BMD ($X=0.74395\pm 0.1065$) in comparison to patients who were not taking glucocorticoids ($X=0.81662\pm 0.0861$), $t=5.174$; $p<0.01$; they also had 87 times more chance for occurrence of vertebral fracture (OR 87.618; 95 %CI 9.175–838.707). Analysis of glucocorticoids effect between groups had showed that in vertebral fractures group 43.6 % patients took glucocorticoids statistically more often (Fisher test: $p<0.01$) than in control group (10.3 %).

Conclusion: Use of glucocorticoids is the major predictor for occurrence of vertebral osteoporotic fractures. Therefore, in patients with GIOP constant monitoring is needed, with preventive measures, removal of other risk factors, vitamin D and calcium supplements, and of course the adequate therapy.

References: Zvekic-Svorcan J et al., Osteoporos Int 2014;25:92. Jankovic T, Zvekic-Svorcan J, MD- Medical Data 2013;5:425.

P111

HYPOVITAMINOSIS D VERSUS HYPOVITAMINOSIS D: THE PTH CONNECTION

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Objective: There is a high prevalence of hypovitaminosis D (HD) in the UAE population and this may be complicated by secondary hyperparathyroidism (HD-SHPT). The latter has a pivotal role in the pathogenesis of low bone mineral disease. To investigate the relationship between these conditions and the BMD among residents of Abu Dhabi (UAE).

Material and Methods: 117 adults, predominately (80.5 %) Arab individuals (age 15–76 years) with hypovitaminosis D were selected for the study, of whom 25 (21.5 %) were deficient (HD), and 78 (66.5 %) also had HD-SHPT. Both T- and Z-scores were used in the evaluation of DXA findings. Data of patients with CRF and autoimmune disorders were excluded.

Results: The mean age, gender distribution, BMI, mean of 25-OH D and the mean of alkaline phosphatase, in patients with HD-SHPT were not significantly different to others with normal PTH. Both T- and Z-scores also failed to show any significant differences in normal outcome, osteopenia and osteoporosis (47.5 vs. 41 % $p=0.55$, 33.5 vs. 43.5 % $p=0.10$ and 19 vs. 15 % $p=0.79$) in the two groups respectively. However, a

lower mean of serum calcium yet within eucalcemia was observed in HD-STHP (9.39 ± 0.395 vs. 9.59 ± 0.355 mg/dl, $p = 0.025$). The range in these two groups was 8.58–10.6 and 8.89–10.4 mg/dl, respectively. The mean of each, age, 25OH D, calcium and alkaline phosphatase in osteoporotic patients of both groups were not different also, $P = NS$.

Conclusion: HD-SHPT is not always a prerequisite for the development of low BMD in patients with HD. The low BMD in the others with normal or low PTH invites further investigations and understanding.

P112

SPECT CT IMAGING IN OSTEOPOROSIS RELATED BACK PAIN

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Objective: Severe difficult to manage back pain is common in hospital based osteoporosis practice. This particularly applies to patients who have already sustained vertebral fractures where investigation to determine cause of pain as well as management can be challenging. We investigated the potential value of isotope bone scanning with hybrid SPECT CT in this clinical setting. This technique, widely available in modern Nuclear Medicine departments, combines the whole body capability and high sensitivity of bone scans with the anatomical skeletal detail of CT and enables mapping of the bone scan activity onto the CT abnormality.

Material and Methods: Patients were of average age 69 years, 29 female, 4 male with known osteoporosis and back pain not controlled by medical therapy. They were investigated with whole body isotope bone scans followed by SPECT CT of the relevant area of the spine (thoracic or lumbar).

Results: Studies were significantly abnormal in 32. High uptake was noted in vertebral fractures in 26 (17 multiple), non active vertebral fractures were seen in 15, facet or costovertebral uptake adjacent to fractures were noted in 11 and spondylosis adjacent to fracture in 6. Facet uptake or spondylosis distant from fracture in 11, other fractures noted (rib, sacral, spinous process) 7, discitis 1, screw loosening 1, Baastraps disease 1, scoliosis 1. 2 patients were referred for kyphoplasty. The overall average number of significant bone scan abnormalities was 3 (range 0–5) and where active vertebral fractures were present the average was 2 (range 1–6).

Conclusion: A large number of abnormalities were detected mostly in the area of pain which contributed to the diagnosis and management of patients. The ability to age fractures when multiple and the detection of fracture related facet or costovertebral abnormalities was particularly valuable. Whole body bone scan with SPECT CT is a useful technique which deserves further evaluation as an adjunct to MRI in investigating osteoporosis related back pain.

P113

QUANTITATIVE ULTRASOUND MEASUREMENTS OF STIFFNESS INDEX IN YOUNG ADULT FEMALES

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Objective: The aim of the study was to investigate the use of quantitative ultrasound (QUS) in the young (20–25 years) Saudi females to obtain stiffness index values related to bone quality.

Material and Methods: In 101 young females recruited, QUS measurements were performed in the calcaneus region. Measurements were made using Lunar Achilles Insight™–GE Healthcare which is a heel waterbath ultrasound system. Stiffness index (automatically calculated from broadband ultrasound attenuation and the speed of sound), T-score and Z-score were recorded using a standard protocol supplied by the manufacturer.

Results: 33 and 3 % had osteopenia and osteoporosis in the calcaneus, respectively; stiffness index values = 81.52 and 54.33 respectively. Of the 101 subjects, 65 young females did not suffer from osteopenia in that region with a mean stiffness index = 100.95. A strong association between stiffness index with weight was found but not with height.

Conclusion: We found that more than a third of the young Saudi females sampled suffered from osteopenia in the calcaneus region; body weight had a positive relationship with stiffness index.

P114

COMPLEX THERAPY FOR ALGODYSTROPHY

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Objective: In this report we present a collaborative study between the Physical and Rehabilitation Clinic and the Rheumatology Clinic at the University Hospital in Pleven, Bulgaria, regarding treatment of patients with algodystrophy syndrome after a distal radius fracture.

Material and Methods: 48 patients with algodystrophy syndrome after a distal radius fracture participated in the study. The complex therapy includes a drug treatment with Calcitonin and a physiotherapeutic program: underwater gymnastics, kinesitherapy, and electrotherapy with Magnetic Field and Interferential Current.

Results: A positive effect from the complex drug and physiotherapeutic treatment has been achieved in all the observed indicators, regardless of the patients' age and sex.

Conclusion: Complex interdisciplinary approach in the treatment of algodystrophy after distal radius fracture is a successful approach to the treatment of this disease.

P115**COMPLEX TREATMENT FOR PATIENTS WITH TOTAL HIP ARTHROPLASTY AFTER A HIP JOINT FRACTURE AS A RESULT OF A GENERAL OSTEOPOROSIS**D. Vacheva¹, M. Krastanova¹¹Medival University Pleven, UMHAT, Pleven, Bulgaria

Objective: We present a collaborative study of the Rheumatology Clinic and the Physical and Rehabilitation Clinic at the University Hospital, Pleven, Bulgaria regarding treatment of patients with hip joint endoprosthesis after a hip joint fracture as a result of general osteoporosis.

Material and Methods: 41 patients who had endoprosthesis after a hip joint fracture and were diagnosed with a general osteoporosis with DXA participated in the study. The complex therapy includes drug treatment with Alendronate, combined with a physiotherapeutic program: kinesiotherapy, ergotherapy, electrotherapy with magnetic field and interferential current and electrostimulation of the abductor muscles of the joint hip.

Results: A positive effect from the complex drug and physiotherapeutic treatment has been achieved in all the observed indicators over the course of 1 year, regardless of the patients' age and sex.

Conclusion: Interaction between doctors and physiotherapists rheumatologists provide better control and results in the treatment of patients with hip endoprosthesis on the occasion of femoral neck fracture due to generalized osteoporosis.

P116**FLACCID PARAPARESIS POST-POLIOMYELITIS: CASE REPORT**D. M. Dimulescu¹, G. Chiriti¹, G. Mologhianu¹¹Medical Rehabilitation, University of Medicine and Pharmacy, Bucharest, Romania

Objective: The purpose of this case report was to assess the role of a complex program which include physical and kinetics rehabilitation treatment for a patient with flaccid paraparesis post-poliomyelitis.

Material and Methods: We present the case of a 78 year old patient, who was hospitalized for mixed, predominant mechanical pain at the hips, knees and ankles level, thoracolumbar spine, marked functional impotence—difficult gait, with support on two crutches. In 1942 the patient had poliomyelitis, after which the motor deficit of the lower limbs appeared. On local examination are found: predominantly right paresis in lower limbs, osteotendinous areflexia; right lower limb: hip flexum of 20°, genu recurvatum, foot in varus equinus, hammer fingers; hypotrophy and hypotony of right hip muscle, right knee, right calf. Exam of the spine showed: increased thoracic kyphosis, lumbar hyperlordosis,

rightconvex thoracolumbar scoliosis, paravertebral contracture of the cervicodorsolumbar spine, Schober=2.5 cm. Difficult gait, with support in two crutches, with orthopedic boot and plantar support. The complex program of rehabilitation utilised: pharmacological treatment; electrotherapy with antalgic and myorelaxant effect; electrostimulation with exponential currents, thermotherapy, sedative massage of the spine; kinesiotherapy with postural therapy exercises; exercise of walking, coordination, with support in two crutches.

Results: After the treatment was applied, clinical-functional indices improved (pain, disability), without a significant influence on muscular testing. VAS score was reduced from 16 points to 12 points. Muscular paravertebral contracture was reduced, inducing an increase of Schober index to +3.5 cm and a decline of finger-ground index to 10 cm. Moving capacity has increased, making possible walk out of the house, with assistive devices.

Conclusion: The rehabilitation program improved clinical and functional indices (pain, disability), without a significant influence on myo-articular testing.

P117**TOTAL KNEE ARTHROPLASTY IN RHEUMATOID ARTHRITIS WITH SECONDARY KNEE OSTEOARTHRITIS: CASE REPORT**G. Chiriti¹, D. M. Dimulescu¹, G. Mologhianu¹¹Medical Rehabilitation, University of Medicine and Pharmacy, Bucharest, Romania

Objective: The purpose of this case report was to assess the role of a complex program which include physical and kinetics rehabilitation treatment for a patient with left knee arthroplasty in rheumatoid arthritis with secondary knee osteoarthritis.

Material and Methods: We present the case of a 76 year old patient, who was hospitalized for mixed, predominant inflammatory pain, tumefaction of the small joints of the hands and ankles, morning stiffness for over 1 h; mixed pain at the hips and knees level, marked functional impotence—difficult gait, with support on crutches. We found that in 2000, the patient had rheumatoid arthritis, with secondary knee osteoarthritis, where it has been practiced total left knee replacement in 2010. A year later, it was noted decementation of tibial piece, making the necessary surgical intervention. On local examination were found: increased thoracic kyphosis, lumbar hyperlordosis, rightconvex thoracolumbar scoliosis, paravertebral contracture of the cervicodorsolumbar spine, Schober=2.5 cm. The knee joint exam showed: spontaneous pain upon internal palpation, loading, mobilization; left knee was swollen, red and warm, with postoperative scar and limitation of mobility on all the axes of motion. Difficult gait,

with support in two crutches. The complex program of rehabilitation utilised: pharmacological treatment; electrotherapy with antalgic and myorelaxant effect; cryotherapy, diapulse, sedative massage; kineotherapy with postural therapy; exercise of walking, coordination.

Results: After the treatment was applied, it was noted: VAS score reduced from 9 points to 6 points; relief of the inflammatory syndrome from small hands joints (with 60 %) and left knee (with 40 %), increasing active flexion angle to 50° and passive flexion angle to 60°, improvement pattern of the gait.

Conclusion: The rehabilitation program improved algodysfunctional syndrome from small hands joints and left knee, increasing active and passive flexion in left knee.

P118

ATYPICAL FEMORAL FRACTURES: ONGOING AND HISTORY OF BONE SPECIFIC THERAPY, CONCOMITANT DISEASES, MEDICATIONS AND SURVIVAL

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Objective: Although atypical femoral fractures (AFF) are generally rare events, several studies indicated a potential link between AFF and long-term bone specific therapies (BST). The aim of the study was to analyze the frequency of AFF and potential associations with prior or ongoing BST.

Material and Methods: All Caucasian female and male patients with low-traumatic subtrochanteric/shaft fractures treated in the largest Austrian level 1 trauma center from 2000 to 2013 were selected. Of these patients, concomitant diseases, medication, previous fractures and survival were retrieved and analyzed.

Results: 194 patients with a de novo low-traumatic subtrochanteric/shaft fractures were identified: 35 atypical and 159 typical fractures. Female patients in both groups were significantly older. The median survival was significantly

shorter in patients with AFF (9 vs. 18 months; $p < 0.0001$). Cardiovascular disease, sarcopenia, chronic kidney disease, type 2 diabetes, smoking (past or current history) and prevalent fragility fractures were more frequent in AFF patients, as well as the concomitant use of phenprocoumon, furosemide, and sulfonylurea. Though the number of patients with current BST was low in both groups, more patients in the AFF group were pretreated with BST (71 vs. 49 %; $p = 0.016$), and they received these therapies for a longer time period.

Conclusion: A combination of severe comorbidities, long-term pharmaceutical therapies and a history of previous or ongoing BST could increase the individual risk for AFF.

P119

THE RELATION BETWEEN SERUM ADIPOKINES LEVELS AND THE SEVERITY OF KNEE OSTEOARTHRITIS

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Objective: To determine the relation between serum adipokines levels and the severity of knee osteoarthritis.

Material and Methods: 40 patients were collected according to the ACR criteria for diagnosis of primary knee OA. Local knee examination was performed. Pain, stiffness and physical function was assessed using WOMAC index, the KL scale was used for assessing severity of OA radiologically, and serum levels of leptin, adiponectin and resistin were detected by ELISA technique.

Results: There was a statistically significant correlation between serum levels of leptin and the BMI of studied patients. Whereas there was no statistically significant correlation between serum leptin levels and age, clinical results, KL scale and WOMAC scale. There was a statistically significant correlation between serum level of adiponectin and KL scale whereas there was no statistically significant correlation between serum level of adiponectin and age, BMI, clinical results, and WOMAC scale of studied patients. There was no statistically significant correlation between serum level of resistin and the age, BMI, clinical results, KL scale and WOMAC scale of studied patients.

Conclusion: Serum leptin could be a nonmechanical factor in the development of OA in obese patients. Serum adiponectin plays an important role in progression of knee OA.

P120**OSTEOMED FORTE: NEW WAY OF TREATMENT OF PRESENILE AND SENILE OSTEOPOROSIS**

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Objective: Study of the effect of Osteomed Forte on the human hormonal status and osteoporosis in older woman with deficiency of androgens.

Material and Methods: We investigated 81 women with postmenopausal osteoporosis. Diagnostics was carried out on the basis of clinical, biochemical, radiological (TBS values and bone density) methods of research. Hormonal profile was determined on the base of ELISA method. All women were divided into two comparison groups according to the method of treatment. The first group (39 women) was administered Osteomed Forte—with calcium citrate (250 mg), vitamin D3 (150 IU) and drone brood (50 mg)—2 tablets in the morning and 2 tablets in the evening during 10 months. The second (control) group (42 women) was administered with the same medicine on the same scheme and dosage but without drone brood. All the patients were investigated before and after 10 months course of treatment.

Results: After treatment the concentration of available testosterone in blood serum among the women of first group increased from 1.1 ± 0.4 nM/l to 2.5 ± 0.6 nM/l ($p < 0.05$). The X-ray absorption osteometry picture showed positive changes among 29 patients (74±8 %), reduction of cavities among 19 (49.4±7 %) and closing of cavities among 10 women (25.6±7 %). In the second group, positive tendencies were recorded among 20 women (47.6±8 %) in comparison with 74±8 % in 1st group ($p < 0.05$). Closing of cavities occurred 3 times more rarely—among 7 women (18±6 %, $p < 0.05$).

Conclusion: The combination of calcium citrate, vitamin D3, and drone brood allows achieving of better effect in the treatment of osteoporosis. Osteomed Forte provides pronounced gonadotropic effect and so helps to normalize the testosterone level in serum. Osteomed Forte is an effective therapeutic remedy for treatment of osteoporosis in women of menopausal age.

P121**THE PERFORMANCE OF SYNOVITIS IN TIME AT PATIENTS WITH OSTEOARTHRITIS (OA)**

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Objective: The timely assessment of the synovitis performance in patients with OA.

Material and Methods: In the study were taken 63 patients with knee articulation osteoarthrosis. All patients were assessed with x-rays to determine the extent of gonarthrosis, ECHO or MRI for the evaluation of synovitis, and were tested for the presence of FR, PCR, anti-CCP, uricemia, ESR every 6 months for 3 years.

Results: The age of the study group was 39 years old (±4 years). All patients at the time of the study exposed in the radiography elements of st gonarthrosis I–III, as well as in the ECHO or MRI of the knee articulation showed presence of synovitis or articular effusion from small to moderate quantities; they did not show arthritis elements or synovitis in the other articulations. The presence of the FR was found positive in 12 patients (19.4 %), PCR was found increased in 58 patients (92.06 %), anti-CCP resulted negative in all patients, uricemia was in normal values, ERS resulted increased in 45 patients (71.42 %). At the moment when the study was carried, the patients did not meet criteria for rheumatoid arthritis according to ACR/Eular 2010 or for synovitis within another pathology. As the time passed, in 9 patients (14.28 %) there were exposed sinovite arthritis in the small joints of the hands, anti-CCP resulted positive with >7 UI/ml (<7 UI/ml) in 6 patients (9.5 %). Uricemia resulted in increase $>10 \pm 2.6$ mg/dl (<7.2 mg/dl) in 3 patients (4.7 %) PCR resulted positive in 9 ± 3.4 (<8 UI/ml) in 21 patients (33.3 %) and ESR resulted with an average and increased titer 33 ± 9.3 mm/ore in 34 patients (35.9 %). At the end of 3-year study, 9 patients (14:28 %) met the ACR/Eular 2010 criteria for AR, 3 patients (4.7 %) had synovitis of Goutoz arthritis and the remaining 51 patients presented synovitis that was not ranked due to any other pathology.

Conclusion: A synovitis in a patient with OA that persists in time and is associated with increased inflammatory tests must be assessed in terms of an inflammatory pathology or a metabolic disorder.

P122**THE INCIDENCE OF OSTEOPOROSIS IN PATIENTS WITH BONE FORM OF PRIMARY HYPERPARATHYROIDISM**

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Objective: Assessment of BMD in patients with bone form of primary hyperparathyroidism (PHPT).

Material and Methods: The study involved 77 patients with bone PHPT who had surgery in the period from 2005 to 2013 at the Department of Endocrine Surgery of the RSPMCE MoH of Uzbekistan. The disease duration was 3.31 ± 2.25 years (Me 3.0 years; IQR 2.0; 5.0). In majority of

patients it ranged from 1 to 5 years (80.5 vs. 19.5 %, OR 17.1, 95 %CI 7.70–37.9; $P < 0.0001$). BMD of lumbar vertebrae and proximal femur was measured by DXA with bone densitometer Prodigy of GE Lunar Corporation, USA.

Results: BMD in the spine (L1-L4) was average 0.700 ± 0.09 g/cm². Z-score -2.98 ± 1.83 . BMD and Z-score at the femoral neck in patients with bone PHPT were not statistically significant, but 3.3–5.9 % lower than in lumbar spine. In patients with bone form of PHPT, osteoporosis at the lumbar spine was found in 12 (63.2 %), osteopenia in 6 (31.1 %), decrease in BMD occurred in 94.7 % of patients. In the femoral neck, osteoporosis was diagnosed in a fewer patients; normal bone density had 18 % of patients, and decreased BMD 82 % (osteopenia at 47 %). 13 (16.9 %) had normo-, 83.1 % hypercalcaemia. The activity of alkaline phosphatase (ALP) was increased in 48.1 % of patients. In 80.5 % PTH level exceeded the control values 5–7 times. There was a negative correlation between PTH and BMD: at the segment L1-L4 ($r = -0.59$; $p = 0.001$), in the right ($r = -0.41$; $p = 0.005$) and left ($r = -0.30$; $P = 0.03$) femoral neck. A negative correlation between BMD at the segment L1-L4 and the activity of ALP ($r = -0.57$; $p = 0.03$) was found. Statistically insignificant inverse relationship between the activity of ALP and BMD of the right ($r = -0.22$; $p = 0.44$) and left ($r = -0.24$; $p = 0.32$) femoral neck was revealed.

Conclusion: 63.2 % of patients diagnosed with osteoporosis at the lumbar spine, 47.3 and 36.8 % of cases, respectively, in the left and right femoral bones.

P123

INVESTIGATION OF PREDICTING FACTORS FOR NONUNION AFTER SPINAL FUSION SURGERY

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Objective: Presently, spinal fusion surgery is commonly performed on patients with abnormal motion of vertebrae such as degenerative spondylolisthesis. However, successful bony fusion has not always been achieved. Spinal bony union is thought to occur through endochondral bone formation, thus we reached the hypothesis that bone remodeling should affect the process of bone union after spinal surgery. The purpose of this study is to investigate whether bone remodeling ratio (BRR), which we defined here could be a useful indicator for the prediction of non-union after spinal fusion.

Material and Methods: BRR was defined as a value that equals serum TRACP-5b concentration divided by serum PINP concentration. The subjects consisted of 31 patients that underwent spinal fusion surgery, and who's BRR were measured preoperatively. Bony union/non-union determination

was made based on plain radiograph and CT images. We also measured BRR in patients without spinal fusion to investigate the mean BRR, and investigated the relationship between bone union and other factors such as age, nutritional status, etc.

Results: The mean BRR of all patients was 11.33 (female), 9.39 (male). As TRACP-5b is a marker for bone resorption and PINP is a marker for bone formation, thus according to theory, if the patient has a higher BRR than average, they have an increased tendency for bone resorption. On the other hand, if the patient has lower BRR than average, they have an increased tendency for bone formation. Non-union was observed in five patients. The mean BRR of these patients was 19.81. While the mean BRR of patients with successful spinal fusion was 10.57. BRR of non-union patients were significantly higher than that of bony union patients. In addition, older age is a significant risk factor for non-union.

Conclusion: Although our data is preliminary, BRR of non-union patients were significantly higher than that of bony union patients. As a result, BRR appears to be a useful predicting factor for non-union after spinal fusion.

P124

MODERN ANTHROPOLOGY: SOMATOTYPICAL STRUCTURE OF RUSSIAN, INDIAN AND AFRICAN TEENAGERS

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Objective: To reveal the somatotypical structure of different racial groups.

Material and Methods: Healthy young male participants: Russians ($n = 255$), Indians ($n = 241$) and Africans ($n = 234$) aged between 17 and 21 years had undergone the general anthropometric measurement. Individual somatotypes were estimated by the Bashkyrov's index: < 21.5 exposes the dolychomorphic somatotype, 23 mesomorphic, > 24.5 brachymorphic. Descriptive statistics were calculated for somatometric data using means and standard deviations ($M \pm SD$).

Results: Among the Russian teenagers the majority were brachymorphic, B-, (40.63 %), the remaining were in 30.00 % meso-, M- and in 27.73 % dolychomorphic, D-. Indian boys were mostly dolychomorphic (69.77 %), more rare were brachymorphs (16.25 %), and the least amount of the boys were mesomorphic (13.75 %). African boys were, as well as the Russians, mostly dolychomorphic (49.38 %), very rare in population (10.00 %) were seen mesomorphs, and moderate amount were brachymorphs (39.50 %). The body

weight of the Russians were from 69.56 ± 1.00 in D- and M-somatotype cases and the lightest body weight in B-boys (67.67 ± 0.69 kg). The heaviest over the all observed were Africans: D- (71.96 ± 1.37 kg) and B- (76.13 ± 1.75 kg) boys. The lightest body weight over the all 3 racial groups is the feature of the Indians (64.56 ± 1.22 kg in average). In Russian racial group boys were in average taller than their counterparts (178.00 ± 0.22 cm) independently from the somatotype; the shortest were B-Indians and B- Africans. (169.77 ± 1.00 cm). Russian boys of the all somatotypes have the widest chests < Africans and Indians have the approximately with the same chest size in D- and M-somatotypes. In all racial groups the common tendency is that the chest width is the widest in B-somatotype cases.

Conclusion: The chest width is the only body parameter that has no dependency on the race in male teenagers but determined by the somatotype: the widest chest is the feature for brachymorphic individuals.

P125

STRATEGIES TO PROMOTE BONE AND CARDIOVASCULAR HEALTH FROM CHILDHOOD THROUGH DIET AND PHYSICAL ACTIVITY: A CROSS-SECTIONAL AND LONGITUDINAL STUDY

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Objective: Osteoporosis and atherosclerosis are two major public health problems associated with lifestyle and aging. Preventive strategies have been investigated independently, but strategies to reduce osteoporosis may also benefit cardiovascular health. This study examines cost-effective methods to simultaneously prevent osteoporosis and atherosclerosis by improving diet and other lifestyle factors from an early age.

Material and Methods: 128 healthy female students aged 18–22 years were recruited. The BMD of the os calcis was measured by quantitative ultrasound. The cardio-ankle vascular index (CAVI) was also measured to assess arterial stiffness as an atherosclerosis-related index, which lineally increases with aging. Two years later, CAVI was measured again in 88 subjects aged 20–21 years as a longitudinal study. Associations between diet, physical activities and other lifestyle factors, and BMD or CAVI were studied.

Results: BMD was consistent with Japanese peak bone mass (the 'stiffness' index was 96 ± 16 vs. 100 % for the American value) and the CAVI value was 5.44 ± 0.66 (9.0 is the indicator value for atherosclerosis). The BMD was associated with dairy intake from childhood, and with sporting activity from high school to the present. Their CAVI values were associated with dairy intake from childhood to the present, intakes of

fruit, soybean, and present physical activities such as walking. Intake of oily sweetened snacks was associated with lower BMD and higher CAVI values. The increase of CAVI values after 2 years was suppressed by high dairy intake and long duration of exposure to sun.

Conclusion: Higher dairy intake from childhood, a lower intake of oily sweets, and more frequent outdoor physical activity can be assumed to be effective for the prevention of both osteoporosis and cardiovascular disease in later life. Early education for children on appropriate diet and physical activity is necessary for future health and lower medical expenses.

P126

BONE MINERAL DENSITY IN CUSHING'S DISEASE

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Objective: Assessment of BMD in Cushing's disease (CD).

Material and Methods: The study included 45 patients with CD. The average age of the patients was 27.8 ± 10.7 years (Me 25.0 years; IQR 20.0–38.0). The average age of men was 24.1 ± 12.5 years (Me 19.0; IQR 17.0–30.0), and women 29.3 ± 9.82 (Me 27.0; IQR 22.0–38.3). Lumbar spine and proximal femur BMD was measured by DXA with bone densitometer Prodigy of GE Lunar Corporation, USA.

Results: According to the DXA, osteopenia of the lumbar spine segment L1-L4 was diagnosed in 21 (46.7 %), osteoporosis in 20 (44.4 %). BMD and Z-score of the lumbar spine were 0.887 ± 0.16 g/cm² and -2.47 ± 1.20 , respectively. The analysis of results of DXA of the proximal femur (femoral neck, trochanter and Ward's triangle) identified that almost every second (46.7 %) patient with CD had osteopenia. Osteoporosis was significantly more frequently revealed in the Ward's triangle in the left (OR 4.33 95%CI 1.52–12.3, $P=0.009$), and right (OR 4.0, 95%CI 1,31–12,2; $P=0.02$) lower extre and mity. Prevalence of osteoporosis in L1-L4 was significantly higher comparing to the femoral neck (OR 5.20, 95%CI 1.84–14.7, $P=0.003$) and trochanter (OR 6.40, 95%CI 2.13–19.2, $P=0.001$) in patients with CD. We have found a positive correlation between age and Z-score of the lumbar spine segment L1-L4 ($r=0.35$). Z-score of the femoral neck was -1.96 ± 0.55 (Me -1.80 ; IQR -2.30 to -1.60 ; $P=0.03$) which is significantly higher than those for the lumbar spine. Analysis of bone metabolism markers level showed that osteocalcin and β -crosslaps levels were increased in 84.6 and 92.3 % of patients compared to the control levels.

Conclusion: Almost half of patients with CD were diagnosed osteopenia (46.7 %) and osteoporosis (44.4 %) of the lumbar spine. 46.7 % of patients with CD had osteopenia of the proximal femur.

P127

SURGICAL MANAGEMENT OF OSTEOPOROTIC 3–4 PARTS PROXIMAL HUMERAL FRACTURES: FUNCTIONAL OUTCOME AFTER TREATMENT WITH P.H.I.L.O.S. PLATE

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Objective: The aim of the study was to assess the functional and clinical outcome of 3–4 parts proximal humeral fractures in osteoporotic patients after treatment with P.H.I.L.O.S. plate.

Material and Methods: Standard deltopectoral approach was used; temporarily fixing tuberosities with sutures or Kirschner wires. Function and pain were compared according to the Constant-Murley scale 6 months after surgery. Inclusion criteria: Patients over 65 years. Known osteoporosis or diagnosed by X-ray at the time of the fracture. 3–4 parts proximal humeral fractures due to occasional fall. Patients operated in 1-year period at the Miguel Servet Hospital (64 patients).

Results: The mean score in Constant-Murley score was 72 (68–85). As complications, eight patients were reoperated: Plate extraction due to cephalic screws protrusion (6 patients). Substitution by a hemiarthroplasty due to avascular necrosis (2 patients). No infection or vascular injury were reported.

Conclusion: P.H.I.L.O.S. plate seems to be a good option in treatment of osteoporotic proximal humeral fractures showing a good range of motion and activity with low pain levels and few complications.

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VITAMIN D STATUS AND ITS RELATIONSHIP WITH HEALTH-RELATED QUALITY OF LIFE IN POST-MENOPAUSAL OSTEOPOROTIC WOMEN WITH AND WITHOUT (NON)VERTEBRAL FRACTURES

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Objective: The purpose of our study was assess health related quality of life (HRQoL) of osteoporotic patients without fracture, with vertebral and with nonvertebral (hip) fracture, as well as to find correlations between osteodensitometric parameters (BMD) and biochemical parameters (serum levels of vitamin D) and QUALEFFO-41 domains (general health perception, pain, physical, social and mental function).

Material and Methods: 100 osteoporotic and 30 hypothyreotic patients as controls were included in the study. BMD of the lumbar spine and femoral neck was assessed by

DXA. Subjects were taken venous blood for biochemical analysis, and HRQoL was assessed using QUALEFFO-41 questionnaire.

Results: Osteoporotic and hypothyreotic patients differed significantly in all osteodensitometric parameters, all QUALEFFO-41 domains and biochemical parameter—vitamin D. All osteodensitometric parameters, as well as vitamin D, correlated with some or all QUALEFFO-41 domains. We found that BMD and T-score of the lumbar spine significantly correlated with all QUALEFFO-41 domains, and that those correlations were the higher ones found. All in all, general health perception, social and mental function correlated (with higher or lower significance and correlation coefficient) with all QUALEFFO-41 domains, while pain was not in a relationship with BMD and T-score of the femoral neck, neither physical function correlated with BMD FN. Finally, levels of vitamin D correlated significantly with 3 QUALEFFO-41 domains: general health perception, social and mental function.

Conclusion: Our study showed that osteoporosis negatively affect HRQoL. We found that BMD of the lumbar spine significantly correlates with HRQoL. Vitamin D also affects HRQoL.

P129

THE EPIGENETICALLY ACTIVE SMALL CHEMICAL N-METHYL PYRROLIDONE (NMP) PREVENTS OVARIECTOMY-INDUCED OSTEOPOROSIS IN RATS

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Objective: Osteoporosis is a chronic skeletal disorder, prevalent in postmenopausal women influenced by hormonal factors causing a huge economic burden on our aging society. Currently, there are several treatments for osteoporosis; however, they all display some sort of limitation and/or side effects making the need for new treatments imperative. We have previously demonstrated that NMP is a bioactive drug which enhances bone regeneration in vivo and acts as an enhancer of bone morphogenetic protein (BMP) in vitro. NMP also inhibits osteoclast differentiation and attenuates bone resorption.

Material and Methods: In the present study, we tested NMP as a bromodomain inhibitor and for osteoporosis prevention on ovariectomized (OVX) induced rats while treated systemically with NMP. Female Sprague Dawley rats were ovariectomized and weekly NMP treatment was administrated 1 week after surgery for 15 weeks. Bone parameters and related serum biomarkers were analyzed.

Results: 15 weeks of NMP treatment slowed down body weight gain and prevented bone loss of the treated group compared to the control. In the same time both deterioration of

overall bone loss and trabecular microstructure were preserved. Moreover, mineral apposition rate and bone biomarkers of bone turnover in the treatment group were at similar levels with those of the Sham group.

Conclusion: Due to the function of NMP as a low affinity bromodomain inhibitor and its mechanism of action involving osteoblasts/osteoclasts balance and inhibitory effect on inflammatory cytokines, NMP is a promising therapeutic compound for the prevention of osteoporosis.

P130 KINETOTHERAPY IN SCAPULO-HUMERAL PERIARTHRITIS IN TYPE 2 DM PATIENTS

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Objective: Scapulo-humeral periartthritis (SHP) is a frequent complication of diabetes mellitus (DM) associated with stiffness and restricted range of movement following to injury of periarticular structures. It may be exacerbated by some factors such as trauma and overuse, or exposure to low temperature leading to significant disability. Our study aimed to assess efficacy of kinetotherapy and hydrokinetotherapy in a group of patients with type 2 DM with SHP.

Material and Methods: Our study included 39 patients with type 2 DM. The average age was 53.2±0.2 years. Exclusion criteria were thyroid gland involvement, viral hepatitis and cirrhosis, CKD IV-V K/DOQI, glucocorticosteroid therapy, any systemic condition before onset of DM, malignancies, decompensated heart and lung diseases. All patients presented with clinically scapulo-humeral periartthritis confirmed by joint ultrasound. Subsequently the patients were divided into 2 treatment groups. Group I (19 patients–49 %) administered systemic nonsteroidal anti-inflammatory therapy (NSAIDs) and group II (20 patients–51 %) on NSAIDs+kinetotherapy and hydrokinetotherapy.

Results: Pain relief was reported by 16 (84 %) patients in group I with an average decrease in pain VAS by 12 mm and 19 (95 %) patients in group II with an average decrease in VAS by 19.4 mm ($p<0.05$). Range of motion improved in 11 (58 %) patients in group I, and 18 (90 %, $p<0,01$) patients in group II. Inflammation decrease was noticed in both groups with a reduction of high-sensitive CRP, ESR and fibrinogen in 16 patients (84 %) in group I and 19 (95 %) patients in group II ($p<0.05$) accordingly. Muscle force increased in 6 patients

(32 %) in group I and 19 patients (95 %) in group II ($p<0.001$).

Conclusion: Although in both groups there was a similar reduction in inflammation indices (CRP, ESR, fibrinogen), and pain relief, the functional recovery of patients with combined therapy was significantly superior to that of only drug therapy leading to important improvement in disability and consequently quality of life.

P131 OSTEONECROSIS OF THE JAW IN A PATIENT WITH OSTEOPOROSIS TREATED WITH DENOSUMAB

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Objective: To analyze a case of osteonecrosis in patient with osteoporosis who was switched from bisphosphonates therapy to denosumab.

Material and Methods: 63 year old osteoporotic woman with osteonecrosis of the jaw presented to the center for osteoporosis and skeleton metabolic diseases by dentist.

Results: 63 year old woman was presented to the center for osteoporosis and skeleton metabolic diseases by dentist. The patient had moderate pain in projection of the central alveolar processes and nasal notch of the maxilla. The patient had a long term history of treatment for osteoporosis: alendronic acid 70 mg weekly orally for 2 years, then, due to gastritis, the therapy was continued for 3 years with quarterly intravenous injections of 3 mg ibandronic acid in combination with calcium and vitamin D. Two years before the event the therapy of osteoporosis was changed again, and continued with subcutaneous injections of denosumab 60 mg every 6 months. During that therapy in February 2014, two central incisors were extracted due to severe caries. In spite of precautions the treatment of osteoporosis with denosumab was not stopped. The patients returned in several days with complaints for persisted pain and delayed healing of the wound. The wound was inspected and cleaned. No signs of infection were revealed. Exposed bone was removed. However, due to delayed healing of the wound the surgical cleaning was repeated twice. The diagnosis of osteonecrosis of the jaw was ascertained. Laboratory tests for bone markers confirmed the severe suppression of bone metabolisms. Serum intact PTH was normal. Serum 25(OH)vitamin D was in the lower range of recommended values.

Conclusion: The long term treatment of osteoporosis with bisphosphonates, followed by denosumab subcutaneous injections lead to severe suppression of bone

metabolism. The treatment was not stopped before surgical procedure, as result teeth extraction was complicated by osteonecrosis of maxilla.

P132

INCREASED BONE MINERAL DENSITY (BMD) IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS (OP) RECEIVING TWO DENOSUMAB INJECTIONS IN ROUTINE CLINICAL PRACTICE IN BULGARIA

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Objective: To describe baseline characteristics and changes in BMD T-scores at 1 year, in postmenopausal women with OP receiving 2 denosumab injections in routine clinical practice in Bulgaria.

Material and Methods: This retrospective observational study, conducted in 11 specialist (endocrinology or rheumatology) practices scattered geographically across Bulgaria, included postmenopausal women ≥ 50 years old with a clinical diagnosis of OP, who initiated denosumab 60 mg Q6M on or after Oct 2011 (regulatory approval of denosumab in Bulgaria) and received a follow-up injection within 7 months after the first injection (until Aug 2013). All study outcomes were recorded as per routine clinical practice and reimbursement requirements, the latter require BMD T-scores to be recorded (at ≥ 1 anatomical site) prior to first injection (baseline) and yearly thereafter. Descriptive statistics were conducted.

Results: 222 women met the inclusion criteria with a mean (SD) age of 64.2 (8.54) years; approximately half (49.5 %) were < 65 years old and 13.1 % ≥ 75 years old. Mean (SD) age at menopause was 48.1 (3.98) years. 26.6 % reported a prior fragility fracture, with vertebral the most common site (71.2 %) followed by hip (6.8 %) and other sites (32.2 %, excluding hip). At baseline, 2.7 % were receiving vitamin D only, 5.9 % calcium supplements only and 35.1 % both; 31.5 % had received prior OP therapy. At baseline, mean (SD) BMD T-score was -3.2 (0.63) at the lumbar spine (LS; $n=189$), -2.3 (0.81) at the total hip (TH; $n=75$) and -2.7 (0.71) at the femoral neck (FN; $n=137$). At 1-year follow-up, all women had BMD assessed at ≥ 1 site; T-scores increased to -2.7 (± 0.57) at the LS ($n=187$), -2.1 (± 0.91) at the TH ($n=65$) and -2.4 (± 0.68) at the FN ($n=123$).

Conclusion: Postmenopausal women with OP receiving 2 denosumab injections in Bulgarian clinical practice had a

mean age of 64.2 years and experienced improved mean BMD T-scores at the LS, TH, and FN after 1 year.

Disclosures: Study funded by Amgen.

P133

TRABECULAR BONE SCORE IN PATIENTS WITH CHRONIC GLUCOCORTICOID OSTEOPOROSIS TREATED WITH ALENDRONATE OR TERIPARATIDE

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Objective: Trabecular bone score (TBS) is a gray-level textural metric that can be extracted from 2 dimensional lumbar spine (LS) DXA images. TBS has been shown to correlate to 3D characteristics of bone microarchitecture and to be a predictor of fracture in patients with osteoporosis independent of BMD and clinical risk factors. We determined TBS from historical DXA data from a 36-month glucocorticoid osteoporosis (GIO) clinical trial comparing alendronate (ALN) with teriparatide (TPTD).

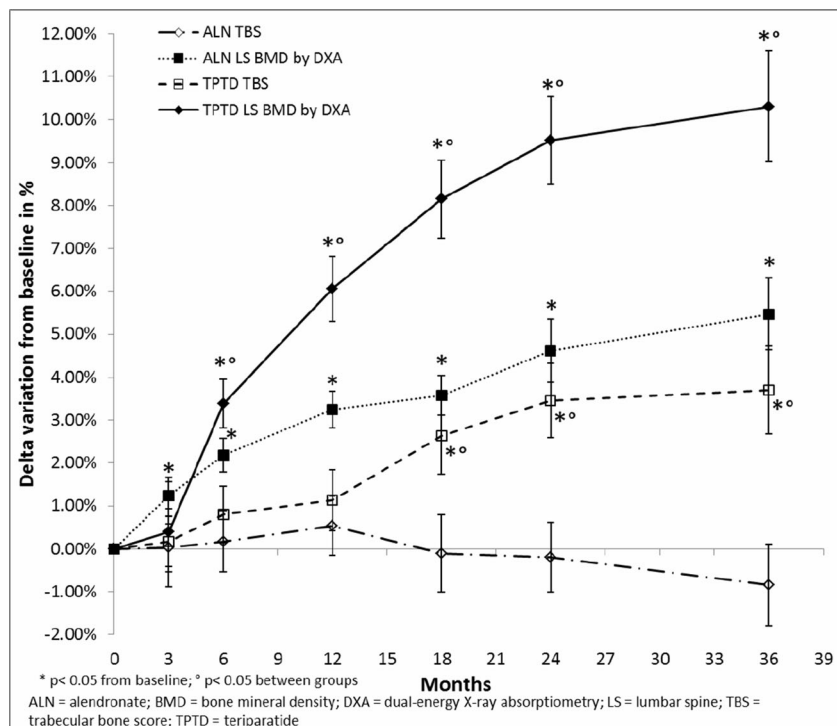
Material and Methods: Patients with chronic GIO (median of 7.5 mg/d prednisone for > 90 days) were randomized to ALN 10 mg/day (214 patients) or TPTD 20 μ g/day (214 patients) for 36 months; 123 patients completed treatment with TPTD and 118 completed treatment with ALN. DXA results of 53 ALN patients and 56 TPTD patients who had DXA scans from machines with adequate resolution to perform TBS analysis and completed 36 months of therapy were blindly analyzed for TBS at baseline and at 3, 6, 12, 18, 24, and 36 months.

Results: In patients treated with TPTD, TBS significantly increased from baseline at month 18, and by month 36, had increased 3.7 % ($p < 0.05$). Patients treated with ALN did not have a significant change in TBS compared to baseline at any time period. Changes in LS BMD by DXA in the subgroup of patients with TBS data were similar to BMD results of the overall study population. At 36 months, increases in LS

BMD were 5.5 and 10.3 % in patients treated with ALN and TPTD, respectively.

Conclusion: In patients with chronic GIO, both ALN and TPTD increased LS BMD. However, TBS significantly increased with TPTD, but did not significantly

change with ALN. The pathogenesis of chronic GIO is predominantly reduced bone formation. TBS may represent a sensitive measure to discriminate treatment effects of an anabolic versus an antiresorptive drug in this condition.



Disclosures: This work was sponsored by Eli Lilly and Company. Drs Donato Agnusdei, Kelly D. Krohn, Kyoungah See, and Kathleen A. Taylor are employees of Eli Lilly and Company and own stock in Eli Lilly and Company. Dr Kenneth G. Saag has received grant/research support from Merck and Amgen, and has served as a consultant for Eli Lilly and Company, Merck, and Amgen. Prof Didier Hans is on the Board of Directors of the Medimaps Group, is co-owner of the TBS patent, and has corresponding ownership shares and position at the Medimaps Group. Dr Lynn A. Kohlmeier has received grant/research support from Eli Lilly and Company, has served as a consultant for Eli Lilly and Company and Amgen, and is on the speaker's bureaus of Pfizer, and Abbvie. Dr Robert Marcus is a member of the data safety monitoring boards for Amgen and Ultra-Genyx and has given promotional talks for Eli Lilly and Company. Dr Christine Simonelli has received grant/research support from Amgen, has performed consultant, speaker's bureau, and advisory activities for Eli Lilly and Company and Amgen, and is on the board of the National Bone Health Alliance.

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LOW DOSE CORTICOSTEROIDS AND DURATION OF STEROID THERAPY—FACTORS AFFECTING THE BONE MINERAL DENSITY OF RHEUMATOID ARTHRITIS PATIENTS

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Objective: The aim of this study was to investigate the effects of low dose corticosteroids (Cs) and the duration of Cs therapy on the BMD of rheumatoid arthritis (RA) patients.

Material and Methods: A group of 352 female RA patients were categorized in premenopausal (preMP) and postmenopausal (PM) group. Each group was subdivided in two subgroups according to the dose of Cs therapy (on 5 mg and 6–10 ± 1 mg/day) and according to the duration of Cs therapy (1; 2–5; 7–1; and over 11 years). BMD was measured by DXA densitometer in the beginning of the trial, 6 months and 1 year after. Healthy individuals categorized by age, and preMP and PM RA patients on NSAID were used as a control groups.

Results: BMD of Cs (5 mg/day) and NSAID treated preMP RA patients was significantly lower ($p < 0.050$) when compared to adequate age matched control group, with no difference between Cs and NSAID treated group after 1 year follow-up. However BMD of Cs treated ($6-10 \pm 1$ mg/day) RA preMP patients was lower than in NSAID treated group ($p < 0.01$). BMD analysis in RA PM patients on Cs (5 mg/day) obtained similar results, there was no difference between Cs and NSAID treated group, but the difference was significant when compared with control group (0.994 compared to 1.106 g/cm², $p < 0.01$). BMD of RA PM patients treated with $6-10$ mg \pm 1 mg/day was significantly lower compared to NSAID treated RA PM and the control (0.992 compared to 1.058 and 1.106 g/cm²). RA PM patients on Cs in duration of 1, 2–6 and 7–11 years did not have significantly lower BMD compared to NSAID treated RA PM patients, but the difference was significant when Cs therapy last over 11 years (0.847 compared to 0.980 cm², $p < 0.01$).

Conclusion: Despite the multifactorial etiology of generalised osteoporosis, we suggest that Cs therapy with over 11 years duration, combined with Cs dose over 10 mg, daily makes this group of RA PM at highest risk of developing significant generalised osteoporosis.

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BONE MINERAL DENSITY DISORDERS IN POST-MENOPAUSAL OSTEOPOROSIS

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Objective: To assess the BMD disorders in postmenopausal women using DXA.

Material and Methods: The study involved 48 women with postmenopausal osteoporosis (PMO) aged 54–73 years (average age 62.2 ± 1.46 , Me 61.0 years, 95%CI 58.0–64.3), in a period of physiological menopause not less than 1 year. BMD of lumbar vertebrae and proximal femur was measured by DXA with bone densitometer Prodigy of GE Lunar Corporation, USA. The measurement results were expressed in absolute values of BMD (g/cm²) and T-score, according to generally accepted criteria of WHO for the diagnosis of osteoporosis.

Results: We have found that BMD and T-score of the lumbar spine segment L1-L4 in women with PMO were, respectively, 0.687 ± 0.04 g/cm² (Me 0.698; IQR 0.650; 0.711) and 3.29 ± 0.12 g/cm² (Me -3.26; IQR -3.33 to -3.22). BMD and T-score of the femoral neck were, respectively, 0.753 ± 0.03 g/cm² (Me 0.753; IQR 0.743; 0.7772) and 3.29 ± 0.12 g/cm² (Me -3.26; IQR -3.33 to -3.22). Correlation analysis showed

the presence of reliable negative correlation between T-score of the lumbar spine segment L1-L4 and age ($r = -0.31$; $P = 0.03$), as well as the duration of menopause ($r = -0.35$; $P = 0.02$). T-score of the femoral neck correlated with BMI ($r = -0.39$; $P = 0.01$). There was a negative correlation between T-score and age at menopause ($r = -0.34$; $P = 0.01$). Statistically significant inverse correlation between BMD in the lumbar spine and age of patients ($r = -0.35$; $P = 0.04$) is revealed. In its turn, the femoral neck BMD correlated with BMI ($r = -0.31$; $P = 0.03$), physical activity ($r = -0.28$; $P = 0.05$) and the use of Ca ($r = -0.29$; $P = 0.04$).

Conclusion: A negative correlation between age and BMD, as well as the T-score of the lumbar spine is found. BMD of the femoral neck was in negative correlation with BMI, physical activity and use of Ca.

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IL-18BP PREVENTS OVARECTOMY INDUCED BONE LOSS: INHIBITS IL-18 DRIVEN IL-17 PRODUCTION WITH CONCOMITANT INCREASE IN T REGULATORY CELLS

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Objective: Crosstalk between immune system and bone has led to a new area of research called osteoimmunology. Functional block of pro-inflammatory cytokines like IL-17 and TNF α by neutralizing antibody prevents bone loss in ovariectomized mice. IL-18 promotes IL-17 production and plays important role in pathogenesis of autoimmune diseases like rheumatoid arthritis. However, its role in estrogen deficiency induced bone loss is unknown. IL-18 binding protein is a natural antagonist of IL-18 and reduces the severity of collagen induced arthritis. In this study, we have investigated the effect of mIL-18BP administration to estrogen-deficient mice on T and B cells, Th17/Treg balance and finally its impact on skeletal parameters.

Material and Methods: Adult female Balb/c mice were taken for the study. The groups were: sham, Ovx, Ovx+mIL-18BP (0.5 mg/kg body weight). Treatment was continued for a period of 4 week with s.c. injection twice weekly. After 1 month, animals were sacrificed; long bones were collected for static and dynamic histomorphometry. Bone marrow was flushed out for peripheral blood mononuclear cell isolation. Cells were labelled with antibodies for FACS analysis. Serum was collected for ELISA.

Results: mIL-18BP administration effectively inhibited Ovx induced CD28 loss on T cells and B lymphopoiesis. mIL-18BP robustly inhibited the proliferation of IL-17 secreting Th17 cells with concomitant increase in CD4 + CD25 +

FoxP3 T regulatory cells. mIL-18BP treatment restored trabecular microarchitecture, preserved cortical bone parameters likely attributable to increased number of bone lining cells and reduced osteoclast activity. mIL-18BP treatment restored the levels of proinflammatory and anti-inflammatory cytokine to sham level which were altered due to ovariectomy in Balb/c mice.

Conclusion: Exogenous mIL-18BP administration provides protection against estrogen deficiency induced bone loss and has the potential as a therapy for postmenopausal osteoporosis.

P137

USE OF ALPHACALCIDOLUM IN COMBINATION WITH BISPHOSPHONATE PREVENTS THE HYPOCALCEMIA AND SECONDARY HYPERPARATHYROIDISM IN PATIENTS AFTER TOTAL HIP ARTHROPLASTY

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Objective: Bisphosphonates (BP) are the most widely used drug for the prevention of aseptic loosening after hip arthroplasty in patients with osteoporosis. BP have a high affinity for bone. However, their ability to bind divalent metal ions can cause a decrease in serum calcium, even in short-term circulation in the bloodstream, which is manifested hypocalcemia. Development secondary hyperparathyroidism against the background of hypocalcemia reduces the effectiveness of their application and can cause unwanted complications. The aim of study was to evaluate the possibility of alphacalcidolum prevent the development of hypocalcemia and secondary hyperparathyroidism in patients with osteoporosis after total hip arthroplasty.

Material and Methods: The study included 28 women (median age was 59.6 years) after hip arthroplasty with duration of menopause >1 year, the level of 25OHD3 < 20 ng/ml, normal level PTH and normocalcaemia, with high levels markers of resorption. All patients received alphacalcidolum from 0.75 to 1.5 µg/day and also zoledronic acid 5 mg/100 ml 1 time per year. The dose of alphacalcidolum was corrected on the basis of indicators of baseline blood and urine calcium. Additionally, osein hydroxyapatite was administered in a daily dose. PTH was evaluated in dynamics before treatment and after 12 months from the beginning.

Results: The treatment increased significantly urinary calcium excretion from 5.5±0.37 to 7.3±0.37 mmol/d, ($p < 0.001$). Levels of ionized and total calcium and also phosphorus and PTH blood on the background of the therapy did not change significantly.

Conclusion: Appointment of alphacalcidolum in combination with zoledronic acid in the early period after total hip arthroplasty hindered the development of hypocalcemia and secondary hyperparathyroidism.

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COMPARISON OF THE EFFECT OF 18 MONTHS DAILY TERIPARATIDE ADMINISTRATION BETWEEN RHEUMATOID ARTHRITIS AND POSTMENOPAUSAL OSTEOPOROSIS PATIENTS

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Objective: The aim of this study was to evaluate the effects of 18-month administration of daily teriparatide (TPTD) in osteoporosis patients with rheumatoid arthritis (RA) by comparing that of postmenopausal osteoporosis patients (Porosis).

Material and Methods: The effects of TPTD were examined between RA ($n=70$; age 68.4 years; disease activity score assessing 28 joints with CRP [DAS28-CRP] 2.8; rheumatoid factor [RF] positivity 75.5 %) with 77.1 % of prior bisphosphonate (BP), 84.3 % of oral prednisolone (PSL) (4.4 mg/day at baseline), 25.7 % of biologics, and Porosis ($n=62$; age 71.3 years) with 77.4 % of prior BP.

Results: Femoral neck (FN) BMD increase at 18 months was significantly greater in RA compared to Porosis (4.7 vs. 0.7 %, $P=0.038$), whereas it was 9.7 vs. 7.9 % ($P=0.736$) in the lumbar spine (LS). The increase of bone formation markers (bone alkaline phosphatase [bone ALP] and N-terminal type I procollagen propeptide [PINP]) at 1 month were all significantly greater in RA compared to Porosis. A multivariate logistic regression analysis revealed that the significant indicator of 18-month BMD increase in RA was a 3-month increase of under-carboxylated osteocalcin (ucOC) for LS ($\beta=0.446$, $P=0.005$) and baseline ucOC for FN ($\beta=0.554$, $P=0.001$), in which both showed significant negative correlation with baseline oral PSL dose stronger than other bone-turnover markers such as bone ALP, PINP, and TRACP-5b.

Conclusion: RA showed greater response to daily TPTD administration, especially in the increase of bone formation markers at 1 month and FN BMD increase at 18 months compared to Porosis. Monitoring ucOC may be useful in predicting BMD increase of daily TPTD treatment in RA, especially under oral glucocorticoid use.

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EFFECTIVENESS OF TOTAL HIP REPLACEMENT IN DYSPLASTIC COXARTHROSIS OF THE HIP JOINT

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Objective: To study results of total hip arthroplasty of hip joint in patients with a dysplastic coxarthrosis, to estimate optimum approaches at surgical treatment of this pathology and efficiency of various tactical options of total arthroplasty of hip joint.

Material and Methods: In the department of orthopedics and major joints in 2011–2013 we performed operations of primary hip arthroplasty at 49 patients, from them 12 (24,4 %) men, 37 (75,6 %) women. On age patients were distributed as follows: till 30 years–4 patients, 30–50 years–28 patients, 50–60 years–8 patients, 60–70 years–8 patients, >70 years–1. The youngest patient was 22 years old, the most elderly 72 years. Average age of surveyed patients: 43.2.

Results: The remote results of total arthroplasty of a coxofemoral joint at a dysplastic coxarthrosis of 3–4 stages are studied by us in period of the observation from 6 months till 3 years. Duration of supervision over patients was divided into 2 periods. The first period is a treatment in a hospital from 1 to 14 days from the moment of carrying out expeditious treatment. The second stage began with the moment of an extract of the patient from a hospital and was subdivided into some temporary intervals. The first control survey was performed during 1 month from the moment of operation. Further survey was carried out in time 1 month from the moment of operation and further was carried out each 3 months. The good result is stated at 47 patients, satisfactory at 2. Positive results (95.6 %). After 6 months after total hip arthroplasty, most patients did not note pain when walking, movements, or it had periodic character at movement on long distances, or after prolonged physical activity.

Conclusion: The results received by us total hip arthroplasty confirm the correct theoretical validity and high efficiency of expeditious treatment of a dysplastic coxarthrosis and positive results endoprosthesis replacement is observed in 95.6 % of cases.

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HIP ARTHROPLASTY IN PATIENTS WITH ASEPTIC NECROSIS OF THE FEMORAL HEAD

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Objective: Improve the results of surgical treatment of patients with aseptic necrosis of the femoral head by total hip arthroplasty with use of modern implants and methods of their fixation.

Material and Methods: In the department of orthopedics and major joints in 2011–2014 we performed operations of primary hip arthroplasty at 32 patients, from them 10 (31.3 %) men, 22 (68.7 %) women. On age patients were distributed as follows: till 30 years–6 patients, 30–50 years–18 patients, 50–60 years–3 patients, 60–70 years–5 patients. The youngest patient was 18 years old, the most elderly 68 years. Depending on the stage of the lesion of the hip in all patients had a lameness of varying severity. Patients suffering aseptic necrosis of the femoral head, usually used as an additional support in the form of a cane, crutches or their combination. The first group included 5 patients operated using minimally invasive access to Teak Rim Yoong, second group 27 patients on who had used standard access of Harding.

Results: The remote results of total arthroplasty of a coxofemoral joint in an aseptic necrosis of the femoral head are studied by us in period of the observation from 6 months till 3 years. The good result is stated at 29 patients, satisfactory at 3. Positive results (90.6 %). In bilateral lesion of the hip joint second operation we carried out with an interval of 3–6 months. After the first operation patient was recommended walking with crutches for 6–8 weeks. During this time the bone adapted to the new conditions of operation, there was a growth of new bone around the implant, which was necessary to spare and do not expose it to high loads.

Conclusion: The results received by us total hip arthroplasty confirm the correct theoretical validity and high efficiency of expeditious treatment of an aseptic necrosis of the femoral head and positive results endoprosthesis replacement is observed in 90.6 % of cases.

P142

RESIDUAL LIFETIME RISKS AND COSTS OF FIRST OSTEOPOROTIC FRACTURES IN CHINESE WOMEN AND MEN

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Objective: To investigate the residual lifetime risks and costs of osteoporotic fractures in the Chinese population.

Material and Methods: A validated state-transition microsimulation model, including hip, clinical vertebral and wrist fractures, was used in this study. Microsimulation and second-order Monte-Carlo simulations with a 1-year cycle length were performed until all simulated subjects died. Only the first fracture was accounted for over patients' lifetimes. Model demographic and epidemiological parameter values were retrieved from published sources. Costs were calculated in

2013 US dollars and the analyses were performed from the Chinese healthcare perspective.

Results: The residual lifetime risks of osteoporotic hip, vertebral and wrist fractures in Chinese women aged 50 years were estimated at 6.4 % (95 %CI: 5.8 %, 7.0 %), 19.1 % (95 %CI: 18.0 %, 20.5 %) and 15.4 % (95 %CI: 14.5 %, 16.5 %), respectively. For men aged 50 years, the respective residual lifetime risks were estimated at 2.9 % (95 %CI: 2.5 %, 3.3 %), 4.2 % (95 %CI: 3.7 %, 4.6 %) and 1.6 % (95 %CI: 1.3 %, 1.9 %). The lifetime risk of having any major osteoporotic fractures at 50 years was estimated to be 36.3 % (95 %CI: 34.2 %, 38.2 %) for women and 7.0 % (95 %CI: 6.0 %, 7.7 %) for men. While the annual fracture rates increased, the lifetime risks of any osteoporotic fractures were estimated to decrease in both women and men with increasing age: the lifetime fracture risks at age 85 years were 12.6 % for women and 3.7 % for men. Average lifetime costs of fractures for Chinese women and men at age 50 years were estimated at \$1464 (95 %CI: 1,388, 1,580) and \$397 (95%CI: 356, 441), respectively.

Conclusion: This study sheds new light on the lifetime risks and costs of osteoporotic fractures in China. More than one third of the Chinese women aged 50 years are estimated to have an osteoporotic fracture in their remaining lifetime, whereas the lifetime fracture risks and costs are much lower in men.

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VALIDATION OF THE QUALEFFO-41 GREEK VERSION SPECIFIC OSTEOPOROSIS QUALITY OF LIFE QUESTIONNAIRE

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Objective: To validate the Greek version of the disease specific quality of life instrument Qualeffo-41 (Q-41) by measuring the quality of life in osteoporotic patients with prevalent vertebral fractures.

Material and Methods: The Q-41 English version questionnaire after being translated into Greek and culturally adapted for the Greek population, was distributed in patients diagnosed with osteoporosis according to WHO criteria with at least one low velocity vertebral fracture. 54 Caucasian osteoporotic patients included in this study completed voluntarily, anonymously and simultaneously the Q-41 and the Short Form-36 (SF-36) questionnaires. The statistical analysis used the Stata™ software (Version 10.1 MP, Stata Corporation, College Station, TX, USA), the Shapiro-Wilk, the Mann-Whitney U or T-tests and checked the Q-41 internal reliability, convergent validity and internal reliability consistency.

Statistical importance was set at p value < 0.05. The Q-41 total and domain scores were adapted so 100 represented the best quality of life.

Results: The Q-41 average total score was 63.67 and the average domain scores ranged from 44.135 to 78.472. Cronbach's alpha coefficient presented high values ranging 0.8969–0.9348. Spearman rho coefficient ranged from 0.454 to 0.782. P had values between 0.01 and 0.451. These results were similar with the ones obtained from the SF-36.

Conclusion: This study proves the validity, consistency and reliability of the Q-41 Greek version osteoporosis specific quality of life instrument based on the collected data and analysis. The patients' answers describe the osteoporosis' impact on their everyday quality of life and these results are comparable with the ones from similar studies. The validated Q-41 could be proved a useful tool in an attempt to evaluate the actual osteoporosis primary and secondary prevention programs applied in our country. Also, it could help in the cost-effectiveness assessment of the current treatment methods and in the development of new.

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HEALTH RELATED OPTIMISM AND ADHERENCE TO TREATMENT IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

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Objective: To find out association of optimistic beliefs about health and adherence towards the treatment in postmenopausal osteoporotic women. To determine the influence of health related optimism on adherence attitude towards the treatment in women suffering from postmenopausal osteoporosis. To find out the influence of demographic variables on adherence towards the treatment in postmenopausal osteoporotic women.

Material and Methods: Within group research design was used in the study. Sample consisted of 60 postmenopausal osteoporotic women taken from different hospitals of Lahore by using non probability sampling technique. Health related optimism was assessed using Life orientation Test Revised (Schizer & Carver, 1994) and adherence towards treatment in postmenopausal osteoporotic women was assessed by using Morisky Medication Adherence Scale Urdu version (Morisky, 2008).

Results: Results showed that health related optimism was not significantly related with adherence to treatment in postmenopausal osteoporotic women. Health related optimism was not a predictor of adherence to treatment in postmenopausal osteoporotic women. Family genetics and family system emerged as a predictor of adherence to treatment in postmenopausal osteoporotic women. There were differences in adherence to treatment on the basis of family genetics and family system.

Conclusion: The present research contributed towards understanding the association of health related optimism and adherence to treatment in women with postmenopausal osteoporosis. In the light of results it was found that both of these variables have no significant relationship among them. While identifying the prediction of adherence to treatment as a result of health related optimism, it was concluded that health related optimism is not predicting adherence in postmenopausal osteoporotic women. The influence of demographic variables revealed that family genetics and family system are significantly predicting adherence to treatment.

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LIFE AFTER PROXIMAL HUMERUS FRACTURE: SETTING PRIORITIES IN HEALTH RESEARCH USING A MODIFIED DELPHI CONSENSUS APPROACH

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Objective: It is estimated that more than US\$130 billion are invested globally into health research each year and the amount has been increasing steadily over the past decade. Still, proposals for health research funding are exceeding the available resources. Our purpose was to address the growing need to set priorities in health research on the proximal humerus.

Material and Methods: Results conducted through a modified Delphi process was distributed to OTA, IOF and SECEC. All responses were grouped into 4 main research avenues: 1) health policy and systems research, 2) research to improve existing interventions, 3) research to develop new interventions, and 4) epidemiological research. Participants in the working groups identified, defined, and ranked those results from round 2. In round 3, a final prioritized list was developed.

Results: In delphi round 1, 137 responders identified 213 research areas in the field. This list included 39 research items (5 surgical, 6 outcome, 7 post-rehabilitative, 8 treatment decision-making, 7 biomechanical and 6 additional areas) achieved through a survey and table discussions held by 19 responders. In delphi round 2, 78 out of 118 responders ranked 31 research items. Studying how surgeons and patients can more easily understand interventions and improve communication as well as identifying optimal treatment algorithms that consider age were amongst those prioritized in the list of research areas of high interest amongst those surveyed. Development of a fracture classification system, a registry, and defining the incidence of shoulder fracture in the elderly were also of priority.

Conclusion: Given the uncertainty and need for research that exists in the area of proximal humerus fractures, obtaining input from various stakeholders is essential to advancing agendas in a meaningful way. The use of robust methodology to identify these priorities will focus topics that will have more impact and be useful.

Acknowledgements: Members of the OTA, IOF, and SECEC.

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FRACTURE AND SURGICAL BURDEN IN PEDIATRIC AND ADULT PATIENTS WITH HYPOPHOSPHATASIA: RESULTS FROM PATIENT-REPORTED OUTCOME SURVEYS

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Objective: Hypophosphatasia (HPP) is a rare disease caused by loss-of-function mutation(s) in the tissue- nonspecific alkaline phosphatase gene. HPP is characterized by defective skeletal mineralization and diverse complications that may include proximal muscle weakness, pain, and pathological fractures (Fx). Here, we describe the fracture and surgical burden of HPP as assessed by 2 surveys specific to HPP symptomatology.

Material and Methods: The Hypophosphatasia Impact Patient Survey (HIPS, internet-based) and Hypophosphatasia Outcomes Study Telephone interview (HOST) were designed to assess the burden of disease in patients (pts) with HPP. Outreach from 2009 to 2011 by pt advocacy groups or physicians provided awareness of the surveys to pts or caregivers and invited participation. Data are expressed as the percentage of pts who responded to each item; questions common to both surveys were pooled.

Results: 184 pts responded to the surveys: 59 children (mean[SD] age 7.6[5.1] yrs); 125 adults (mean[SD] age 45.0[14.3] yrs). Fx (mean, min-max) were reported in 42 % of children (1, 0–8) and 86 % of adults (11.6, 0–100). 15 % of children had ≥ 2 Fx; 74 % of adults experienced multiple (≥ 2) Fx, with 47 % adults experiencing ≥ 6 Fx. Children in HIPS ($n=44$) reported pseudo- (7 %) and nonhealing (2 %) Fx. 36 % of children did require some surgery, most commonly skull (21 %) and osteotomy (11 %). Adults in HIPS ($n=89$) reported higher rates of pseudo- (44 %) and nonhealing (36 %) Fx, with 74 and 44 % of HIPS adults requiring surgery and Fx fixation, respectively; other common surgeries included osteotomy (15 %) and joint replacement (11 %).

Conclusion: As reported by patients/caregivers, HPP is associated with a high burden of disease. Fx and surgeries are common in both children and adults with HPP. The majority

of adults report pathological and/or multiple Fx, possibly reflecting greater time with disease. High lifetime incidence of fractures and surgeries in adults suggests progressive morbidity with age.

Disclosures: Scott Moseley, Eileen K Sawyer, and Tatjana Odrlijin are employees of Alexion Pharmaceuticals, Inc., which funded and analyzed the HIPS and HOST studies. Thomas J Weber has received consulting fees from Alexion. Priya S Kishnani has received honoraria from Alexion and is chair of the HPP registry board. Editorial support was provided by Fishawack Communications, GmbH, Basel, Switzerland, a member of the Fishawack Group of Companies, and was funded by Alexion.

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WRONG EVIDENCE-BASED MEDICINE, OSTEOPOROSIS AND BREAST CANCER

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Objective: Searching for new answers in the link between breast cancer, osteoporosis and targeted breast cancer drugs.

Material and Methods: We have performed a bibliography review in a worldwide basis and from our own experience.

Results: The lifetime risk of developing breast cancer is 1 in 8 for women. Risk factors associated with the disease could be viruses, environmental factors or others acting on breast cell. Women in developed countries are at increased risk of breast cancer compared with women from less developed countries. A large part of this variation can be explained by the fact that women in developed countries have fewer children on average and a limited duration of breastfeeding, it is said. But in reality reproductive factors that influence breast cancer risk do not explain it. Breast cancer is one of the few cancers where incidence rates are higher for more affluent women and there is a clear trend of decreasing rates from least to most deprived groups. Post-menopausal osteoporosis usually affects women over the age of 60. The leading cause of osteoporosis is a lack of estrogens in women and opposite drugs. Osteoporosis, affects 1 in 2 women, is now three times more common than breast cancer. Bisphosphonates may contribute to fewer breast cancers. The cell cycle consists of four phases. DNA and RNA viruses have been shown to be able to cause cancer and referred to as carcinogens.

Conclusion: The natural lack of estrogen does not decrease breast cancer incidence. Targeted breast cancer therapies are to be studied. Environmental factors could play any role but viruses can attack cells in different phases and that could explain the different breast cancer types. And there is the track to go up in this matter. Osteoporosis, affects 1 in 2

women, is now three times more common than breast cancer.

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INCIDENT CLINICAL FRACTURES WERE ASSOCIATED WITH INCREASED RISK OF DEATH AFTER ADJUSTMENT FOR FRAILTY INDICES IN COMMUNITY-DWELLING ELDERLY JAPANESE MEN: A COHORT STUDY

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Objective: Fractures have been documented to increase the risk of mortality. However, frailty may underlie the association between fracture and death resulting in a false result. To evaluate this association after allowing for frailty status represented by ADL, physical performance and laboratory tests for geriatric common diseases.

Material and Methods: We examined 2174 community-dwelling ambulatory men aged 65 years and older at baseline in the Fujiwara-kyo Osteoporosis Risk in Men (FORMEN) Study¹ for past and present illness, lifestyle, instrumental ADL (IADL), physical performance tests including hand-grip strength (GS), one-foot balance with eyes open (1FB) and 10-m gait speed (10 mGS), and laboratory tests of sera. The participants were followed for 5 years for incident fractures identified through in-person interviews or mail and telephone surveys, and for death through municipal resident registry inquiry. Effect of an incident fracture on death was determined by the Cox proportional hazards model with the first fracture during follow-up as a time-dependent predictor.

Results: We identified 102 events of fractures in 95 men (10.9/1000 person-year (PY)) and 138 deaths (15.8/1000 PY) during a median follow up of 4.5 years in 1999 men (total follow-up, 8707 PY). The deceased men showed no significant difference from the survivors in IADL and level of physical activity at baseline, but had significantly weaker GS, worse 1FB, slower 10mGS, and worse laboratory test results including serum albumin, total cholesterol, LDL-cholesterol, eGFR and high-sensitivity CRP. Men

who experienced fractures during follow-up showed a significantly higher cumulative death rate than those without fracture ($p=0.0025$). The age-adjusted hazard ratio (HR) of death for incident fracture was 3.85 (95 %CI: 2.21–6.72) which was attenuated to 2.98 (1.63–5.45) when adjusted for physical performance but remained significant. The HR was not significantly changed when adjusted for laboratory test results (4.06 (2.31–7.12)). These results did not alter when the deaths within the first year of follow-up were excluded from the analysis.

Conclusion: Incident clinical fracture was associated with elevated risk of death independently of various indices representing frailty in community-dwelling elderly men.

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RELATIONSHIPS BETWEEN BONE MASS AND BODY COMPOSITION IN BOYS WITH DUCHENNE MUSCULAR DYSTROPHY (DMD)

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Objective: In boys with DMD, skeletal muscles are progressively destructed and replaced by adipose and fibrous tissues. Boys with DMD often have fragile bones, but the underlying mechanism is still poorly understood and several factors such as a compromise of bone-muscle unit, loss of ambulation and glucocorticoid therapy are suspected as a cause. We conducted the study to investigate the relationships among bone mass (BM), lean tissue mass (LTM) and fat mass (FM) in boys with DMD and to explore the causes of bone fragility.

Material and Methods: We analyzed 20 boys with DMD who were in treatment of myogenic scoliosis. Mean age was 14.1 years, mean BMI was 17.9 and all were nonambulatory. Six boys (30 %) received glucocorticoids (Gc) therapy. DXA measurement was performed at lumbar spine and on total body, L2-4 BMD, subtotal BMD, total body mineral content (TBBMC), LTM, arm LTM, leg LTM and FM were analyzed.

Results: Mean lumbar BMD was 0.57 ± 0.10 g/cm² ($Z=-3.1$), mean subtotal BMD was 0.48 ± 0.05 g/cm², and mean TBBMC was 393 ± 132 g, and DMD boys showed osteoporosis. LTM and BMC correlated positively ($r=0.70$, $p<0.001$), and LTM and FM also correlated positively ($r=0.81$, $p<0.001$). There was a stronger positive correlation between arm LTM and BM. In the Gc treated group ($n=6$), BMI was significantly higher and BMC, LTM, FM were also significantly higher than in the Gc naive group ($n=14$). The Gc-treated group had a tendency to be a higher lumbar BMD (treated: $Z=-2.5 \pm 0.5$, native: $Z=-3.4 \pm 1.3$, $p=0.09$).

Conclusion: In this study, we showed the strong relationship between BM and arm LTM which are not affected by gait

inability. This result suggests that progressive destruction of muscles decrease not only LTM but also BM. In general, Gc therapy induce osteoporosis accompanying with a decrease in LTM and an increase in FM, but Gc therapy for boys with DMD induce an increase of LTM, FM and BM. This study suggest that osteoporosis observed in boys with DMD is mainly caused by the compromise of bone- muscle units.

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SERUM ADIPONECTIN IS NEGATIVE INDEPENDENT DETERMINANT OF BONE MINERAL DENSITY IN POSTMENOPAUSAL FEMALES WITH OSTEOPOROSIS DURING THE FIRST DECADE OF MENOPAUSE

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Objective: To examine the association between adiponectin and BMD in postmenopausal females with and without osteoporosis and to investigate whether different stages of menopause influence association between adiponectin and BMD.

Material and Methods: The study included 180 postmenopausal females who were based on the BMD values, divided into a group with osteoporosis (OG, $N=90$) and the group with preserved bone mass (CG, $N=90$). We determined serum levels of adiponectin, gonadotropins (FSH and LH) and β -estradiol. Subcutaneous (SFT), visceral fat tissue (VFT) diameter, total fat mass (TFM) and total lean mass (TLM) were determined indirectly by ultrasound in all participants included in the study.

Results: Serum adiponectin level was significantly higher in OG compared to CG (12.65 ± 0.4 vs. 10.45 ± 0.6 mg/mL; $p<0.05$). In the OG, adiponectin was inversely associated with total hip BMD ($r=0.23$, $p<0.05$) and remained independently associated with total hip BMD ($\beta=-0.22$; $p=0.04$) even after adjustment for age, years since menopause, BMI, visceral and subcutaneous fat diameter, TFM, log β - estradiol, FSH and LH. When we divided OG into subgroups by the decades of years since menopause, BMI ($\beta=0.37$; $p=0.04$) and adiponectin ($\beta=-0.37$; $p=0.04$) remained significantly independent determinants of total hip BMD in the OG during the first decade of menopause, while in the OG of females in their latter stages of menopause, TFM ($\beta=0.4$; $p=0.005$) and TLM ($\beta=0.37$; $p=0.01$) were positively independently associated with total hip BMD. In CG, a significant negative correlation between the adiponectin level with hip BMD was found but did not remain significant after

adjustment for body composition indices and gonadal hormones.

Conclusion: Our findings suggest that adiponectin is a negative determinant of BMD and that inhibiting its negative effect on bone remodeling might prevent accelerated bone loss associated with the early stages of menopause.

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WRITING A GRANT

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Objective: Writing a grant proposal is similar to writing a manuscript in several ways; getting started is no fun, in fact, its agony. As Harold Frost told Pierre Meunier, and Pierre told me many years ago, “Trust your brain”. The same is expressed in ‘Finding Forrester’, a film about a famous writer in the last years of his life who takes on an insecure young student from the Bronx—just sit down and start, write something, anything, just write!! (1)

Life was not meant to be easy (2). The struggle from chaos to order, from confusion to clarity takes time. There is a delightful music within, but to write it, to enable others hear it distinctly, takes time and an “all too ready self approval” must be avoided because “no one, not your own self even, will ever know the tune that beset you....” (3).

Page 1 is particularly difficult. The reviewers, the committee and chairman are unlikely to work in your specialized field. To convince this judge and jury of your peers of the worth of your application, the content of this page—the Title, Aim, Hypothesis, Rationale and Significance must be simple, clear, comprehensible and impactful in a single reading (4).

The first step is to prepare early, a year or more before the application is due! Does anyone do that? Of course! Do most investigators do it? Of course not! Early preparation is critical for many reasons. Success requires pilot data. Without it, why should the reviewer believe you can do what you confidently claim you will do. Success requires collaboration and when ever possible, evidence that you and your collaborators have published previously. Surround yourself with investigators better than yourself: two heads are better than one. A biologist needs a statistician, a biomechanical engineer needs a clinician. None realize greatness without the courage to recognize their limitations. Collaborate—don’t worry, the person deserving of first authorship will become clear.

Title: Don’t worry about this for now. It will come when the rest is right.

Aim: This is a general statement of purpose to bring the reviewer to the area to be explored.

Hypothesis: What is the question? Ensure you have an answerable question by writing the proposed answer. This ‘postulate’ is the ‘hypothesis’. It is written in unambiguous quantifiable terms. With this you have the framework around which to assemble the application. Without it, you have nothing. We hypothesize that the sky is level 12 (baby) blue. The question then is, what is the color of the sky? The Aim of the study is to study the color of the sky. At this stage, we don’t know why you want to study the color of the sky. Nor do we know if it is an important question.

Rationale: For every question there is a second question—why are you asking? This is the ‘Rationale’ or ‘Background’; it forms the ‘Introduction’ of the manuscript that will follow, and of course, it will be published in Nature or the New England J of Medicine! The Rationale is not a literature review. It is an explanation of why you have decided to spend the next few years of this one life measuring the color of the sky. What is the problem? Why is it important? Does the color of the sky tell us something about the weather, if so, so what? What if it tells us about the seasons, temperature levels at different times, and suitability of soil for planting and the growth of food? From this information the reviewer can start to understand your project, and so will you! Yes, through the labor you will also start to understand your own project better than when you started developing the Rationale. The same occurs in preparing a manuscript, or a lecture—you learn yourself. What is known about the color of the sky—some say its baby blue, others say its navy blue while other investigators say its black and twinkles. Some say its lots of colors while others say it’s all of the above. You must be fully conversant with all of the literature on the topic and you can only achieve this by early preparation because the reading must be critical reading. You cannot possibly cite all of the literature but by critical reading you can formulate what is not known, what methodological differences may be explaining or reconciling the different colors reported; some investigators measured the color only at midday, others only at night, others only in the morning or evening or only from the North or South Pole. A critical reading requires you to have disassembled and then reassembled this literature to critically develop this rationale. It should take the reader easily to the question even before reading it. The reading teaches you the right question, leads you to the right hypothesis, the significance and finally the title. This process of critical reading, reorganization in your own mind, and then writing it, is what enables you to know what is known, and, most importantly, to know precisely what is not known. You have labored and now are now

able to design a study taking into account the factors that contribute to the colors of the sky from which you can help the scientific community understand the rotation of the earth, the seasons, and determinants of the best time to plant seeds and harvest wheat.

Material and Methods: The content and organization of the Methods section must precisely follow the order of the Hypotheses—the most important first, then secondary hypotheses follow. Each hypothesis is addressed by a given method—the appropriate sample size based on power calculations derived using the pilot data, appropriate inclusion, exclusion criteria ensuring the only difference between cases and controls is the intervention or the effect of exposure to a risk factor you are testing. No measurement (blood test, imaging) should be included that is not justified and relevant to testing the hypothesis you have stated.

Conclusion: This should be written in clear terms that convey how the results influence longevity, or **Results:** clinical applications to help individuals or the society. This is the translational aspect that demonstrates ‘importance’; there is no point in defining the colors of the sky if all you find out is the colors of the sky. Your point is that these colors explain the spin of the planets, the behavior of the weather and provide information concerning the best time to plant seeds, grow crops and harvest the fruit and thereby your work will increase exports and provide a solution to world poverty and starvation. Finally, you you’re your title; The Color of the Sky as a Predictor of Crop Yield. That’s ‘important’. Good luck is earned.

References: 1. Finding Forrester. 2000 Author Mike Rich, director Gus Van Sant. 2. Attributed to M Fraser, 22nd Prime Minister of Australia who misquoted it from George Bernard Shaw’s play Back to Methuselah: “Life is not meant to be easy, my child; but take courage: it can be delightful.” 3. Marcel Proust. On Art and Literature. Publishers Carroll & Graf NY. Ontra Saint-beuve p 276. 4. “I didn’t have time to write a short letter, so I wrote a long one instead.” Mark Twain

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EFFECTS OF EXERCISE INTERVENTIONS TO IMPROVE SARCOPENIC INDICES AMONG COMMUNITY-DWELLING OLDER ADULTS WITH HIGH OSTEOPOROTIC FRACTURE RISKS

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Objective: To determine the effects of 3 exercise interventions on sarcopenic indices among community-dwelling older adults with high osteoporotic fracture risks.

Material and Methods: The current study enrolled subjects who screened high risk of fall, osteoporosis/fracture by standardized questionnaires or FRAX. Subjects at the National Taiwan University Hospital Bei-Hu Branch (NTUHBB) were randomized into integrated care group (ICG, $n=55$) and lower extremity exercise group (LEEG, $n=55$). Subjects from Lingko Chang Gung Memorial Hospital (LCGMH) were all assigned into home exercise group (HEG, $n=41$). All participants received a CD-ROM and a 2-h education with professional led home/community exercise program. HEG subjects were encouraged to do the designed exercise 3 times/week. ICG subjects received once weekly group exercise while LEEG subjects received twice weekly machine-based lower extremity exercise. Major outcomes were muscle mass (measured by bio-impedance analysis), grip strength, walking speed, and lower leg extension power at baseline and after 12-weeks of intervention.

Results: Mean age was 72.3 ± 7.3 years and 72.2 % were women. At baseline mean appendicular skeletal muscle index (ASMI) was 7.3 ± 1.1 kg/m², mean hand grip strength was 17.3 ± 8.2 kg, mean walking speed was 1.2 ± 0.3 m/s, and mean leg extension power was 21.7 ± 4.8 kg. At 3-month follow up, ASMI stayed stable at 7.3 ± 1.1 kg/m². However, there were significant improvements of the other three indices at 18.8 ± 6.8 kg, 1.3 ± 0.3 m/s, and 27.1 ± 5.9 kg, respectively (all paired t -tests $p < 0.001$). Improvements at 3 groups were similar.

Conclusion: Among participants with high fall and osteoporotic fracture risks, 3 types of exercise interventions resulted in significant and similar improvements in most sarcopenic indices.

Acknowledgements: The authors thank Wang Jhan-Yang Charitable Trust Fund (WJYCTF) for sponsoring the study. We also thank the research coordinators WL Liu, MY Lin, DM Yeh, J Chiou, and JY Lin for conducting the study.

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THE LEVELS OF THE ADIPOKINES LEPTIN, ADIPSIN AND ADIPONECTIN PREDICT KNEE OSTEOARTHRITIS PROGRESSION AS ASSESSED BY MRI AND TOTAL KNEE REPLACEMENT OCCURRENCE IN SYMPTOMATIC PATIENTS

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Objective: Few studies have looked at the association of adipokines with, and prediction of, structural progression of knee OA using qMRI. This study contrasted serum levels of 5 adipokines to cartilage volume loss and examined if they predict total knee replacement (TKR).

Material and Methods: The study was performed on the ATP population ($n=138$) of a knee OA trial^{1,2}. The serum levels of the Adipsin Factor D (CFD), Leptin (LEP), Adiponectin (ADIPOQ), Resistin (RETN), and Serpin E1 (SERPINE1) as well as cartilage volume were determined at baseline and 24 months. TKR incidence of the study knee up to 4 years post-trial was also evaluated.

Results: Greater baseline values of LEP correlated with more cartilage volume loss in the global knee and medial femur ($p \leq 0.033$), and CFD in the lateral compartment and femur ($p \leq 0.028$). ADIPOQ showed the inverse in the medial compartment and femur ($p \leq 0.027$). RETN and SERPINE1 were not associated with cartilage volume loss. Multivariate analyses revealed for CFD and LEP that patients belonging to the highest tertile at baseline had an additional 2.2 and 1.7 %, respectively, cartilage volume loss in the lateral (CFD; $p = 0.003$) and global (LEP; $p = 0.040$) femur, and a trend of 2.3 % in the medial compartment (LEP; $p = 0.067$). The changes at 24 months in CFD and LEP levels were also predictive of greater cartilage volume loss in the lateral femur (CFD; $p = 0.003$) and medial compartment (LEP; $p = 0.038$). Importantly, patients belonging to any of the “at risk” tertiles of CFD or LEP (highest) or ADIPOQ (lowest) at baseline had a trend toward a greater occurrence of TKR ($p = 0.136$, survival analysis).

Conclusion: Data demonstrate that both CFD and LEP predict greater cartilage volume loss over time in the lateral femur and medial compartment, respectively. Baseline “at risk” levels of LEP, CFD and ADIPOQ are associated with a greater occurrence of TKR.

References: 1. Raynauld JP et al. *Ann Rheum Dis*. 2009;68:938. 2. Raynauld JP et al. *Ann Rheum Dis*. 2011;70:1382.

*Equal participation

Disclosures: JMP and JPP are shareholders in ArthroLab Inc. JPR and MD are consultants for ArthroLab. FA is an employee of ArthroLab.

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THE INFLUENCE OF FEEDBACK ON BONE DENSITOMETRY RESULTS ON HABITUAL CALCIUM INTAKE IN COMMUNITY DWELLING POSTMENOPAUSAL WOMEN

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Objective: Published studies demonstrate that bone density (DXA) screening and feedback of fracture risk have a significant influence on voluntary changes in lifestyle (1). The current study aims to investigate the influence of DXA results on the self-reported calcium intake in community dwelling postmenopausal women in South Australia.

Material and Methods: Baseline, 1 and 2 years calcium intakes were estimated using a validated food frequency questionnaire (FFQ). DXA screening was performed at the lumbar spine, hip and forearm at baseline, and results explained to the subject.

Results: Out of the 175 women eligible, 129 underwent DXA, and 112 of these completed the second FFQ. The mean age, BMI and years since menopause were 61 years, 25 and 10 years respectively. The baseline total Ca intake was 1193 mg/day and 40 % were on Ca supplements. Only 45 % met their daily recommended Ca intake of 1300 mg. The prevalence of osteoporosis (11.6 %) and osteopenia (46.5 %) in this group was comparable to that reported in our community. Overall there was no significant difference between the baseline and 12 month total Ca intake. Total Ca intake increased by at least 50 mg a day in 46 and 35 % of women diagnosed with osteoporosis and osteopenia, respectively. However 23 and 40 % diagnosed with osteoporosis and osteopenia decreased Ca intake.

Conclusion: The majority of women with osteoporosis increased their habitual Ca intake which may have been due to the feedback on their DXA result. Feedback on DXA result is a potential tool in educating women in prevention and management of osteoporosis.

1. Winzenberg References: T, et al. *Nutrients* 2010;2:985.

References: 1. Winzenberg T, Oldenburg B, Jones Graeme. Bone density testing: An under-utilised and uner-researched health education tool for osteoporosis prevention? *Nutrients* 2010;2:985–996.

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COMMUNITY OSTEOPOROSIS, SARCOPENIA, FALL RELATED SCREENING, EDUCATION, AND INTERVENTION PROGRAMS IN TAIWAN

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Objective: To determine the effects of 4 independent but integrated osteoporosis, sarcopenia, fall related screening, education, and intervention programs in Taiwan.

Material and Methods: Sponsored by the Wang Jhan-Yang Charitable Trust Fund (WJYCTF), and the Taiwanese Osteoporosis Association (TOA), the current study included 4 major programs with 8 subprograms targeting community adults with high risks for fall/osteoporosis/fracture/sarcopenia. Core assessments included demographics, osteoporosis/fracture/fall risks, sarcopenia indices, and nutrition. Interventions included combinations of educations to improve awareness, screening and referral, exercise programs, nutrition evaluation and consultation, and postfracture care management.

Results: In total, 3911 subjects were enrolled. Program 1 found that 70 % of subjects had low BMD which were associated with lower exercise level and lower muscle mass. There was a need to increase willingness to participate into the study exercise program. Program 2 found that all 3 types of exercise interventions conducted for 3 months significantly and similarly improved in most sarcopenic indices including walking speed, grip strength, and lower extremity extension powers. Program 3 found that care management improved medication adherence rate to >80 %. Also, study core body muscle exercise significantly improved muscle strength with high satisfaction. Another intervention in the same program using commercially available X-box exercise program found that physical performance improved significantly and the program was very joyful. Program 4 found that exercise specialist directed individualized program fit personal needs with significant improvements on most sarcopenia indices. Baseline data of the Fracture Liaison Service

from the program also showed significant improvements on osteoporosis and medication knowledge.

Conclusion: Four programs with different design worked toward improving overall musculoskeletal system health of Taiwanese high risk adults.

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QUANTITATIVE ULTRASOUND OF THE FOREARM USING THE SUNLIGHT OMNISENSE AND BONE MINERAL DENSITY: A META-ANALYSIS

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Objective: Quantitative ultrasound (QUS) of the heel is an independent risk factor for fracture risk, in selected individuals. Our objective was to further consolidate the evidence base for non-heel peripheral QUS in identifying DXA proven osteoporosis by conducting a meta-analysis of forearm QUS parameters correlated with BMD of a popular multisite QUS machine (Sunlight Omnisense).

Material and Methods: Criteria for eligibility were studies that included a measurement of speed of sound (SOS) at the forearm using the Sunlight Omnisense and corresponding measurement of BMD with a quoted correlation coefficient. A search was performed on PubMed, MEDLINE and EMBASE. The principle summary measure was the site-matched correlation coefficient between radial SOS t-score and radial BMD t-score. Secondary summary measures included non site-matched correlation coefficient between radial SOS t-score and central (axial spine, neck of femur and hip) t-score. A medical statistician performed a meta-analysis of correlation coefficient and a measure of study heterogeneity (I²).

Results: 12 studies totalling 4491 participants were identified. Data for radial SOS and hip DXA t-score correlation were the largest comprising 2252 patients. Data for site-matched radial SOS and BMD t-score were the least comprising 1195 patients. Meta-analysis of published correlation coefficients yielded a site-matched correlation of radial SOS and BMD of 0.41 (I²=24 %) from 1195 patients. Non site-matched correlations were lower at 0.25, 0.22 and 0.20 for spine, hip and NOF respectively (I²=30, 66 and 0.1 % respectively).

Conclusion: The main finding was predictably poor radial SOS and BMD t-score correlation, with site-matched correlation slightly better than non site-matched. This supports existing data from other peripheral sites (heel) that QUS is of little value in diagnosing “DXA proven” osteoporosis. This agrees with what is already known for the agreement of QUS parameters with BMD of the heel, and extends it to the forearm.

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GLUCOSAMINE-CONTAINING SUPPLEMENT IMPROVES LOCOMOTOR FUNCTIONS IN SUBJECTS WITH KNEE PAIN: A PILOT STUDY OF GAIT ANALYSIS

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Objective: Oral glucosamine have been used worldwide for the treatment of knee pain associated with osteoarthritis. Previously, we demonstrated that an orally administered glucosamine-containing supplement was effective for improving locomotor functions, especially walking speed, in a placebo-controlled study, however the biomechanical mechanism for the efficacy has not been elucidated. This study was aimed to investigate the mechanism for improving effects of the glucosamine-containing supplement on walking speed in subjects with knee pain by using motion capture technology.

Material and Methods: An open labeled study was conducted in 30 Japanese subjects with knee pain. The subjects were administered supplement containing a daily dose of 1200 mg of glucosamine hydrochloride, 60 mg of chondroitin sulfate, 90 mg of quercetin glycosides, 45 mg of type II collagen, 10 mg of imidazole peptides, 5 µg of vitamin D and 1000 µg of proteoglycan (GCQID supplement), and the intervention was continued for 16 weeks. Efficacy for knee symptoms mainly including knee pain was evaluated using Japanese Knee Osteoarthritis Measure (JKOM) and 5-question Geriatric Locomotive Function Scale (GLFS-5). To examine the biomechanical mechanism of efficacy for locomotor functions, motions of subjects in normal walking state were captured. Gait analysis was conducted and efficacy for gait parameters (normal walking speed, length of stride, pitch, time during stance phase, time during swing phase, angle of foot etc.) was evaluated.

Results: VAS Score for knee pain and total score in JKOM and score for GLFS-5 were significantly improved by intervention. In gait analysis, normal walking speed and length of stride was significantly increased, but pitch was not significantly changed during intervention period. Time during stance phase and angle of foot at the beginning of stance phase were significantly decreased. Angle of the bottom of foot at the end of stance phase was significantly increased by intervention.

Conclusion: GCQID supplement might increase walking speed partly through increasing length of stride and angle of kicking out the ground during step, which might be associated with alleviated knee pain.

Disclosures: This study was funded by Suntory Wellness Ltd.

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ASSOCIATION BETWEEN BONE MINERAL DENSITY AND BALANCE CONTROL IN ELDERLY POPULATION

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Objective: To identify the effect of BMD on balance control ability in older population.

Material and Methods: 729 subjects on the first visit to our osteoporosis center were enrolled in our study, aged from 45 to 85 years old. The information of age, gender, height, and weight were obtained while the DXA exam and IBS test were performed on the subjects.

Results: There were 557 males and 172 females in this study. In the female group, the mean age was 65.58±9.7 years old. The mean BMD value of total hip, femoral neck and L1-4 The mean value of total hip BMD, femoral BMD and L1-L4 BMD was 0.81±0.14 g/m², 0.77±0.13 g/m² and 0.86±0.17 g/m², respectively. In the male group, the mean age was 66.29±10.7 years old. The mean BMD value of total hip, femoral neck and L1-4 The mean value of total hip BMD, femoral BMD and L1-L4 BMD was 0.88±0.16 g/m², 0.83±0.15 g/m² and 1.02±0.21 g/m², respectively. The linear regression analysis revealed that falling in previous 12 months, gender, age, BMI and BMD of L1-4 made a significant contribution to the FI (fall index), with coefficients counted as 0.225, 0.089, 0.121, 0.096 and 0.130 respectively. BMD of area from total hip and femur had no significant influence on FI. There are significant differences between male and female groups in postural characteristics of F2-4 in NO and PO position. By means of ANCOVA, in HB position, ST (general stability) was found to be moderately correlated with BMD of L1-4 ($F=1.332$, $p=0.004$); Fourier Transformation in frequency (F2–F6) was associated with BMD of L1-4.

Conclusion: The increased age, higher BMI, and the history of previous falls have a significantly inverse effect on the balance control in elder population. Males have a higher risk of falls than females. In addition, BMD of hip has no specific effect on the balance control ability, and the abnormal increased BMD of lumbar

indicates a compensation mechanism of inadequate balance control.

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EFFECTS OF WEEKLY RISEDRONATE WITH CHOLECALCIFEROL ON 25-HYDROXYVITAMIN D LEVEL AND BONE MINERAL DENSITY IN KOREAN PATIENTS WITH OSTEOPOROSIS

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Objective: We have previously reported that a single pill of risedronate combined with cholecalciferol demonstrated efficacy in correction of 25-hydroxyvitamin D(25OHD) and reducing bone markers. However, the short duration of previous study prevented meaningful evaluation of BMD. Therefore, we performed a phase 4, randomized, open, prospective, 12-month clinical trial to evaluate the efficacy and safety of weekly risedronate with and without cholecalciferol on 25OHD levels and BMD in Korean patients with osteoporosis.

Material and Methods: We randomly assigned 1076 adults with osteoporosis to one of two treatment groups: RSD+ (weekly risedronate 35 mg and cholecalciferol 5600 IU combined in a single pill, $n=820$) or RSD (weekly risedronate 35 mg alone, $n=256$). We measured serum levels of 25(OH)D, PTH, and BMD at baseline and after 12 months of treatment.

Results: After 12 months of treatment, mean serum 25(OH)D increased significantly from 18.3 to 30.4 ng/mL in the RSD+ group and increased from 17.8 to 18.6 ng/mL in the RSD group. The RSD+ groups had decreases in serum PTH from 40.6 to 39.4 pg/mL during the study, but the RSD group showed significant increase of PTH from 38.7 to 44.6 pg/mL. At 12-months, BMD at lumbar spine, femoral neck and femur total increased by 4.9, 2.5, 1.9 % in the RSD+ group and 4, 2.1, 2.1 % in the RSD group, respectively. The overall incidence of clinical adverse events was not significantly different between groups.

Conclusion: In patients with osteoporosis, a once-weekly pill of risedronate and cholecalciferol significantly increased BMD and efficiently improved 25(OH)D level over a 12-month treatment period without significant adverse events.

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HEALTH RESOURCE USE AND COST OF HIP FRACTURE IN SPAIN: RESULTS FROM A PROSPECTIVE, OBSERVATIONAL STUDY ON BURDEN OF HIP FRACTURE IN SPAIN (PROA)

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Objective: Osteoporotic (OP) hip fractures are associated with a high socio-economic burden, which is systematically underestimated since only the admission period is considered. PROA study was conducted to estimate health resource utilization (HRU) and related costs during the entire first year following a first hip fracture, and to describe patients' (pts) characteristics and associated mortality.

Material and Methods: This prospective, observational study included pts aged ≥ 65 years admitted to hospital due to an acute, low-trauma first hip fracture, in 28 representative centers in Spain. Fracture-related HRU was collected for up to 12 months (m) and total costs calculated using unit costs from the eSalud database (<http://www.oblikue.com/bddcostes>) updated to 2012.

Results: A total of 487 pts (77 % women) were included. Mean (\pm SD) age was 83 ± 7 years (no difference between genders; 90 % of pts ≥ 75 years). 37 % of pts reported a prior non-hip fracture (60 % of them by low impact trauma), 16 % had received OP treatment and only 3 % had been submitted to a densitometry tests (1.8 % had T-score ≤ -2.5). HRU was similar across genders, except for more re-hospitalizations among women vs. men (6.4 % vs. 3.6 %). Mean length of hospital stay was 11.8 days. Mean total cost was €9,690 (95 %CI: 9184–10,197) in women and €9,019 (8079–9958) in men, with no significant differences between genders except for the cost of rehospitalizations (women, €395; men, €59). The main cost-determinant was first hospitalization (€7067 [73 %] and €7196 [80 %] in women and men, respectively), followed by outpatient visits (€1323 [14 %] and €997 [11 %]) and home care (€905 [9 %] and €767 [9 %]). During the 12 m follow-up, 16 % of pts (women, 14 %; men, 25 %) died, (50 % within the first 3 m).

Conclusion: In a Spanish setting, osteoporotic hip fractures incur a high cost, mainly due to the healthcare resources used during the first hospitalization, but also due to subsequent outpatient visits. Prior to the first OP hip fracture, approximately 1 out of every 4 patients suffered from a previous OP fracture, and only 16 % received some form of OP treatment.

Acknowledgements: Financially supported by Amgen S.A.

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ASSESSMENT OF BONE GEOMETRY, VOLUMETRIC BONE MINERAL DENSITY AND BONE MICROARCHITECTURE IN BOTH WOMEN AND MEN WITH DIABETES MELLITUS

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Objective: HR-pQCT captures novel aspects of bone geometry, volumetric BMD and offers the ability to measure bone microarchitecture, but data relating measures obtained from this technique in patients with diabetes mellitus (DM) are inconsistent in women and lacking in men.

Material and Methods: Here we report an analysis from the Hertfordshire Cohort Study, where we were able to study associations between measures obtained from HR-pQCT of distal radius and distal tibia in 350 participants (184 men and 166 women) aged 71.5–80.5 years with or without DM; $n=47$ and $n=303$ respectively. Statistical analyses were performed separately for women and men.

Results: The mean (SD) age of participants was 75.6 (2.3) and 75.4 (2.4) years in women and men, respectively. Analyses in women revealed that cortical porosity (Ct.Po,%) and cortical pore volume (Ct.Po.V, mm³) were higher in participants with DM ($\beta=0.73$ [0.11, 1.34], $p=0.021$ and $\beta=3.79$ [0.89, 6.69], $p=0.011$, respectively) at the distal radius. Adjustment for weight did not materially affect the relationship described for Ct.Po.V ($\beta=3.49$ [0.54, 6.45], $p=0.021$) and Ct.Po ($\beta=0.72$ [0.09, 1.35], $p=0.025$) and revealed a significantly lower total area ($\beta=-53.66$ [-101.5, -5.85], $p=0.028$) at the distal tibia. Analyses in men revealed that Ct.Po and Ct.Po.V were higher in participants with DM ($\beta=1.58$ [0.40, 2.75], $p=0.009$ and $\beta=31.93$ [13.08, 50.78], $p=0.001$, respectively) at the distal tibia. Adjustment for weight did not materially affect the relationship described for Ct.Po.V ($\beta=19.29$ [1.54, 37.03], $p=0.033$) but differences in Ct.Po were attenuated ($\beta=1.14$ [-0.44, 2.33], $p=0.057$).

Conclusion: Our results confirm previous studies demonstrating higher cortical porosity at the distal radius in women with DM and highlight similar abnormalities at the distal tibia in men.

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THE RELATIONSHIP OF BONE PROPERTIES USING HIGH RESOLUTION PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY TO RADIOGRAPHIC COMPONENTS OF HIP OSTEOARTHRITIS

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Objective: Positive associations between radiographic osteoarthritis (OA) and areal BMD have been demonstrated and appear strongest when bony features of OA are considered. To date, these associations have not been assessed using HR-pQCT.

Material and Methods: A total of 318 participants (170 men and 148 women), aged 71.5–80.5 years, underwent HR-pQCT of the distal radius and tibia along with hip radiography. Differences in bone microarchitecture were assessed between those with and without osteophytes, sclerosis or joint space narrowing (JSN) in either hip.

Results: After adjustment for age and BMI, men with osteophytes had significantly higher trabecular volumetric BMD (Tb.vBMD) ($p=0.023$) at the distal radius. This was associated with a correspondingly higher trabecular thickness (Tb.Th) at both skeletal sites ($p=0.046$, distal radius; $p=0.009$, distal tibia). Men with sclerosis had significantly higher cortical volumetric BMD (Ct.vBMD) ($p=0.020$) and lower cortical porosity (Ct.Po) ($p=0.020$) at the distal tibia after similar adjustment. These differences were not replicated in women. Interestingly, bone microarchitecture did not differ significantly in those with JSN from those without it in men or women.

Conclusion: We have demonstrated higher Tb.Th in men with osteophytosis but higher Ct.vBMD and lower Ct.Po in men with hip joint sclerosis at the distal tibia.

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BONE QUALITY AFTER MAXILLARY FILLING WITH A BIOACTIVE GLASS

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Objective: To assess bone quality in patients after maxillary filling with a bioactive glass (GlassBONE®, Noraker, Villeurbanne, France).

Material and Methods: Nine patients (4 women, 5 men, mean age 57±10 years) were included for a total of 17 bone samples taken 6 months after bone filling. Bone quality was assessed by histomorphometry (measurement bone volume and bone remodeling), microindentation (1) to calculate Vickers microhardness, and quantitative microradiography (1) to measure the degree of

mineralization of bone (DMB) and the heterogeneity index of mineralization (HI).

Results: Histology showed bone structures composed of cortical and cancellous bone, a well vascularized marrow rich in bone cells. The residual bone was identified by its lamellar texture and the presence of bone marrow adipocytes. The newly-formed bone was characterized by a woven texture and the persistence in medullary cavity of biomaterial partially degraded. Bioactive glass was well tolerated and caused no foreign-body reaction. New bone volume varied between 4.4 and 54.4 % and the volume of residual bone was between 4.3 and 27.6 %. Bioactive glass increased bone formation stimulating osteoblast proliferation. Microhardness of new bone (38.96 ± 4.47 kg/mm²) was closed to that of residual bone (42.54 ± 5.60 kg/mm²). DMB were similar in newly-formed (1.02 ± 0.13 g/cm³) and residual bone (0.91 ± 0.20 g/cm³). HI was more heterogeneous in new bone (0.32 ± 0.16 g/cm³) than in residual bone (0.27 ± 0.20 g/cm³).

Conclusion: Bioactive glass was well osteointegrated and degraded with the formation of new bone. This biomaterial guided bone remodeling from the residual bone and promoted formation and mineralization of bone. Mineralization and microhardness of new bone were physiologically normal. Our data suggest the formation of bone tissue of good quality to secure the placement of the implant. Our results demonstrated the efficiency of the bioactive glass 45S5 to fill at least small cavities in bone tissue.

References: ¹Boivin et al. Bone 2008;43:532.

Disclosures: Study funded by the Noraker Company. EF is employee of Noraker.

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COMPARISON OF RISK FACTORS FOR OSTEOPOROSIS IN HIP FRACTURE AND MATCHED CONTROL SUBJECTS IN THE ETHEKWINI MUNICIPALITY, KWA ZULU-NATAL, SOUTH AFRICA (SA)

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Objective: To determine the risk factors for hip fractures in SA.

Material and Methods: In a case control study 200 subjects aged ≥ 60 years presenting with hip fractures and 200 age, gender and ethnic matched controls were enrolled. A questionnaire for risk factors was administered and BMD was measured. Matched conditional logistic regression was used to determine association between outcome and risk factors.

Significant variables were entered into a multiple regression model.

Results: The mean age of hip fracture and control subjects was 74.3 ± 8.8 years and 73.0 ± 8.1 years, respectively. Hip fracture subjects compared to controls, were less likely to have had formal education (12.5 vs. 37 %; $p < 0.0001$), had a lower body weight (54.7 ± 13.7 kg vs. 72 ± 16.2 kg; $p < 0.0001$), a higher frequency of prior fragility fractures (27.5 vs. 8.5 %; $p < 0.0001$), were more likely to be smokers ($p = 0.04$), use alcohol ($p < 0.0001$) and reported a significantly greater difficulty with physical self-maintenance, instrumental activities of daily living (IADL) and had a poorer quality of life (QoL) prior to the fracture. The mean vitamin D level was lower in hip fracture subjects ($p < 0.0001$) as was the BMD at the femoral neck and spine ($p > 0.001$). There was no difference in number of falls, caffeine use, sunlight exposure, dietary calcium intake and age of menarche or menopause. Hormone replacement therapy however was a significant protective factor in control subjects ($p = 0.001$). In the multiple regression model, a low BMI ($p < 0.0001$), lower educational level ($p < 0.0001$), history of a prior fracture ($p = 0.001$), higher activity level ($p = 0.002$), impaired IADL ($p = 0.002$) and QoL score ($p = 0.038$) remained significant.

Conclusion: This study demonstrates that risk factors for osteoporotic hip fractures in the Indian and African population in SA are similar to that described in developed countries.

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VALIDATION OF A SELF-ADMINISTERED SHORT QUESTIONNAIRE TO ESTIMATE USUAL CALCIUM INTAKE IN POSTMENOPAUSAL WOMEN

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Objective: Self-administered food frequency questionnaires (FFQ) are useful tools in estimating dietary intake of multiple nutrients. However, for a single nutrient, the use of FFQs can be cumbersome and lengthy and may be less accurate (1). We aim to validate a short questionnaire estimating calcium intake in Australian postmenopausal women.

Material and Methods: Postmenopausal women recruited for an observational non-interventional study were invited to participate. They completed a short (2 page)

questionnaire on the frequency of food items providing calcium, mainly dairy (including beverages), fish and desserts. Calcium from nondairy items not included in the questionnaire was estimated to be 300 mg/day based on a 7500 kJ/day diet. A 3 day weighed in food record (WFR) using electronic kitchen scales was completed by each subject, after receiving verbal instructions and a demonstration. Dietary data was analysed using a database of Australian foods (Foodworks, Xyris Software, Australia).

Results: The mean age of the 26 women was 62 (SD 4) years. The mean (SD) Ca intake was 1080 (488) mg/day (questionnaire) and 1033 (517) mg/day (WFR). A strong correlation was observed between the questionnaire and WFR (Pearson $r=0.63$; $P<0.001$ 2-tailed). A Bland-Altman analysis showed that the questionnaire overestimated the intake by 46 mg (95 %CI, -783 to 875 mg/day). The questionnaire and the WFR indicated that 65 and 69 % of women had an intake below RDI of 1300 mg/day, respectively.

Conclusion: There was strong agreement between the questionnaire and WFR. The positive bias in the questionnaire may not be significant but the questionnaire may misclassify some women as taking adequate calcium when they are not. Further modification of this questionnaire may be required for use as a clinical and research screening tool.

References: Sebring NG et al. *J Am Diet Assoc* 2007;107:752.

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THE ACUTE SUPPRESSION OF BONE RESORPTION FOLLOWING DIETARY CALCIUM IS MODIFIED BY METABOLIC SYNDROME

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Objective: Animal models demonstrate that bone and energy metabolism are inter-related, and are regulated by endocrine activities. Leptin derived from adipocytes acts on osteoblasts to regulate bone mass while osteoblast-derived osteocalcin is a regulator of glucose metabolism. The present study aims to assess the influence of metabolic syndrome on acute effects of dietary calcium on bone resorption.

Material and Methods: Calcium fortified milk with MiloTM (250 ml; total Ca 510 mg; 20 g glucose) was given to 27 postmenopausal women at 9 p.m. On the morning of the drink and 12 h after, fasting blood was collected for

biochemistry (PTH, CTX, vitamin D, glucose, Ca, PO₄). Weight, height, waist circumference (WC), lumbar spine bone density (BMD) and content (BMC), lean and fat mass in the lumbar region using DXA were measured. A WC >88 cm was considered a sign of metabolic syndrome (MetS).

Results: There was no significant difference between age, BMD, BMC, lean mass or height between Lean [WC <88 cm ($n=17$)] and MetS (WC >88 cm) ($n=10$) women. The BMC, visceral fat mass, weight and BMI were significantly higher in MetS ($P<0.05$). Fasting glucose post intervention was higher in the MetS ($P<0.05$) subjects. CTX suppression following the drink was significant in MetS ($P<0.01$) while no change was evident in Lean. Changes in PTH were similar in the 2 groups and were not significant.

Conclusion: The acute suppressive effects of bone resorption following dietary calcium may influenced by visceral adiposity. Despite similar baseline levels of CTX, those with higher visceral fat and WC demonstrated a significant suppression of bone resorption as a response to a single dose of dietary calcium. These data support the concept that bone metabolism is influenced by adiposity. This may be explained by lower baseline GLP-1 levels and greater responses of postprandial GLP-2 in metabolic syndrome. A higher serum glucose post intervention in MetS suggests glucose intolerance in this group.

#Prof BEC Nordin—Deceased 27th October 2014

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THE CHANGE OF BONE MINERAL DENSITY AND HIP STRUCTURAL STRENGTH IN THE FEMALES WITH OSTEOPOROTIC HIP FRACTURE

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Objective: To study the change of BMD and hip structural strength in the females with osteoporotic hip fracture.

Material and Methods: The BMD and hip structure analysis was performed with DXA for 95 female patients with osteoporotic hip fracture. The patients' age was 76.60 ± 9.36 years and the patients' BMI was 20.88 ± 3.72 kg/m². 63 females aged ≥ 50 years with normal BMD were included in the control group. The females' age was 57.24 ± 5.65 years and the females' BMI was 26.56 ± 4.82 kg/m² in the control group. The BMD and

structural strength variables including cross surface area(CSA), cortical thickness(CT) and buckling ratio(BR) in the females with osteoporotic hip fracture were compared with the females with normal BMD.

Results: Hip fracture group: femoral neck BMD was 0.46 ± 0.10 g/cm² with T -3.46 ± 1.13 and there were 81 patients in osteoporosis and 14 in the osteopenia. At femoral neck, CSA was 1.83 ± 0.38 cm², CT 0.11 ± 0.02 cm and BR 18.49 ± 4.89 . At intertrochanteric region, CSA was 3.11 ± 0.87 cm², CT 0.25 ± 0.07 cm and BR 14.42 ± 4.62 . Control group: femoral neck BMD was 0.83 ± 0.06 g/cm² with T -0.21 ± 0.57 . At femoral neck, CSA was 3.09 ± 0.31 cm², CT 0.20 ± 0.02 cm and BR 8.55 ± 1.52 . At intertrochanteric region, CSA was 5.58 ± 0.60 cm², CT 0.46 ± 0.05 cm and BR 6.89 ± 0.86 . The females with hip fracture had significantly lower femoral neck BMD, CSA and CT, and had higher buckling ratio than the control group. 87.4 % of the females with hip fracture had BR >10 and 84.1 % of the females with normal BMD had BR ≤10 at femoral neck and intertrochanter.

Conclusion: The significant change of femoral neck BMD and of hip structural strength was present in the females with osteoporotic hip fracture. Femoral neck BMD is a strong predictor of hip fracture. But majority of fractures occur in women with BMD in the osteopenic range. The change of hip structure explains the hip fracture risk in the patients with different BMD levels. The hip structural analysis is helpful to predicting the risk of hip fracture.

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ATOMIC FORCE MICROSCOPY (AFM) OF BONE PREDICTING TREATMENT OUTCOMES AFTER SURGICAL NECK FRACTURES OF THE HUMERUS IN PATIENTS WITH OSTEOPOROSIS

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Objective: To develop criteria for the assessment of bone structure and collagen state in patients with osteoporosis using the AFM data. To assess the value of AFM data in predicting osteosynthesis outcome in patients with fracture of the surgical neck of the humerus.

Material and Methods: 10 women and 2 men (osteoporotic or osteopenic) aged 63–84 years with the fracture of surgical neck of the humerus were enrolled in the study. Prior and after the surgery, all patients underwent osteodensitometry using «Lunar» device. Bone biopsies were taken during osteosynthesis and at removal of metal ware using a biopsy cutter. After treatment of

samples, the light microscopy and AFM in contact mode using FemtoScan device in high regimen.

Results: Comparative assessment revealed a correlation between light microscopy data, showing a marked trabecular rarefaction of bone, and AFM data in patients with osteoporosis. The comparisons of AFM results with osteodensitometry results have shown that in patients with T-score of -1.0 to -2.5 , the fixed and contrasted collagen fibrils appear striated, with a period of 20 nm, consisting of one dark and one light strip with a diameter of an average of 70 nm, arranged in different directions. In patient with lower T- scores (≤ -2.5), up to 20 % of type I collagen fibrils were packed lengthwise and had a larger diameter. In addition, patients with osteoporosis showed a significant variation in the length and diameter of collagen fibers, with an increase in the transverse dimension of fibers.

Conclusion: The atomic force microscopy revealed patterns in the bone nanostructure, especially in the spatial organization of packaging of the bundles of collagen fibers, resulting in their structural changes with the development of osteoporosis. In osteoporotic patients with the fracture of surgical neck of the humerus, the AFM data on the bone morphology makes it possible to predict outcomes of the surgical treatment.

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“BRITTLE BONES AND STIFF ARTERIES”—IS THE ATHEROSCLEROSIS RISK FACTOR FOR OSTEOPOROSIS

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Objective: The majority of scientific researches promote the idea that OP and atherosclerosis are interconnected via OPG system. Scientists have speculation that OPG is the molecular bond between artery hardening and bone resorption. Thus the mechanism explained above makes obvious the coexistence of two: artery hardening and osteoporosis.

Material and Methods: 1675 men, age range 38–78 years, mean age 59 ± 4.3 . Disease duration 6.4 ± 1.75 with the diagnosis of Atherosclerosis (revealed on coronarography, assessed lipid profile). Bone mass was assessed by DXA (Hologic 1000) using T- and Z-Scores. As a control group, 680 healthy Georgian men 40–70 age range were assessed.

Results: Men having atherosclerosis are rather predisposed to osteoporosis than healthy individuals. In atherosclerosis subgroup normal bone mass was measured in 23 % (385.25

patients) of patients; Osteopenia was diagnosed in 19 % (315.25 patients), Osteoporosis was detected in 58 % (971.5 %) according to T-score SD.

Conclusion: 1. According to our research more than 50 % of men with verified atherosclerosis are diagnosed to have osteoporosis. 2. The lowest BMD values were observed in lumbar spine L1-L4, indicating that trabecular bone is more deteriorated than cortical. 3. Correlation between T-score values and clinical forms of Atherosclerosis were not observed. 4. The best understanding of interrelations of mechanisms could point out the right direction for the simultaneous therapy against both targets—osteoporosis and atherosclerosis. 5. Therefore the expectation of establishing novelty direction among other subtypes of the Medical Specialties as a Preventive Gerontology can be realistic.

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PROFILING OSTEOCYTES IN RENAL OSTEODYSTROPHY FOR IDENTIFICATION OF POTENTIAL NEW BIOMARKERS OF CHRONIC KIDNEY DISEASE-INDUCED BONE LESIONS

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Objective: Renal osteodystrophy (ROD) affects bone remodeling and mineralisation and underlies osteoporosis mechanisms in patients with chronic kidney disease (CKD). ROD includes 4 types of lesions: osteitis fibrosa (OF) adynamic osteopathy (OA) osteomalacia (OM) and mixed uremic lesions (MUO). ROD diagnosis is difficult because biomarkers such as serum PTH are too weak to predict bone lesions. Osteocytes (ocy) express extracellular matrix SIBLINGS family members, such as DMP-1, MEPE and the peptide ASARM, which all regulate bone mineralisation. Ocy also express sclerostin (SOST), a potent inhibitor of bone formation, whose serum levels increase as CKD worsens. SOST expression is inhibited by PTH and may be linked to ocy apoptosis. In this context, our aim was to characterize ocy protein expression and apoptotic profile in ROD by immunohistochemistry (IHC) as a first step to identify potential new ROD biomarkers.

Material and Methods: We selected 48 iliac bone biopsies: 36 from CKD patients including all 4 ROD types defined by histomorphometry data and 12 from nonuremic osteoporotic (OP) patients. Sections were decalcified and deplastified and IHC for ocy proteins was performed with anti-SOST, DMP1, MEPE and ASARM Antibodies. Nuclei were stained with DAPI. Quantitative (% of IHC or DAPI-stained ocy lacunae)

and qualitative analyses were carried out. DAPI-negative ocy lacunae characterized apoptotic ocy. We counted 500 ocy per biopsy.

Results: 61.8±13.2 % ocy were apoptotic in OA vs. 23.6±8.8 % in OF, 19.8±9.6 % in OM, 23±8.6 % in OMU ($p<0.05$) and 22.3±9.3 (NS) in OP. 38.8±14.2 % ocy were SOST+ in OA vs. <10 % in the other groups ($p<0.02$). DMP1 was highly expressed in OF. Strikingly, DMP1 and ASARM were distributed in the matrix while they were restricted to the ocy lacunae in OF, OA and OP. Bone formation rate negatively correlated with SOST+ Ocy number ($p<0.001$).

Conclusion: Our results identify sclerostin and SIBLINGS proteins, which are found in blood, as potential biomarkers for improvement of ROD diagnosis.

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CLINICAL EFFICACY OF MONTHLY ORAL IBANDRONATE 100 MG IN JAPANESE PATIENTS WITH PRIMARY OSTEOPOROSIS: THE PHASE III MOVEST STUDY

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Objective: We conducted a noninferiority study to evaluate the efficacy and safety of monthly oral ibandronate (IBN) in Japanese patients with osteoporosis, in comparison with monthly intravenous (iv) IBN 1 mg, which is approved for this patient population in Japan.

Material and Methods: The MOVEST (Monthly Oral VERSus intravenous ibandronate) study was a multicenter, randomized, phase III, double-blind (double-dummy), parallel group comparative study. Patients aged ≥55 years with primary osteoporosis were enrolled. Patients with secondary osteoporosis or with morphologic problems that may interfere with lumbar spine (L2-L4) BMD evaluation were excluded. Patients were randomized to receive monthly oral IBN 100 mg plus monthly iv placebo, or monthly iv IBN 1 mg plus monthly oral placebo. All patients received supplementary calcium 610 mg/day and vitamin D 400 IU/day throughout the

study. The primary endpoint was non-inferiority of oral IBN 100 mg vs. iv IBN 1 mg with respect to BMD changes at the lumbar spine after 12 months. Secondary endpoints were BMD changes at other sites and bone turnover marker (BTM) levels.

Results: 422 patients were randomized. 372 patients formed the per-protocol set: 183 and 189 in the oral and iv IBN groups, respectively. Relative change from baseline in lumbar spine BMD values for the IBN oral and iv groups, respectively, was 5.22 % (95 %CI 4.65–5.80) and 5.34 % (95 %CI 4.78–5.90). The least square mean difference between the two groups was -0.23 % (95 %CI -0.97 – 0.51), showing the noninferiority of oral IBN 100 mg to iv IBN 1 mg (noninferiority limit: -1.60). Changes in BMD values at other sites, and BTM levels of the oral group, were also comparable with those of the iv group. No new safety concerns were raised.

Conclusion: This study demonstrated the noninferiority of monthly oral IBN 100 mg to monthly iv IBN 1 mg in increasing lumbar spine BMD in Japanese patients with primary osteoporosis.

Disclosures: Supported by Chugai Pharmaceutical Co. Ltd.

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ASSESSMENT OF FRACTURE RISK IN PATIENTS WITH AXIAL SPONDYLOARTHRITIS: A CASE-CONTROL STUDY USING THE KOREA NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY V

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Objective: Axial spondyloarthritis (axSpA) is associated with low BMD and fractures, although true fracture risk is unknown. The present study examined BMD and 10-year fracture risk in axSpA patients and matched controls and identified factors associated with high fracture risk.

Material and Methods: A total of 240 axSpA patients and 1200 controls from Korean Health and Nutrition Examination Survey (KNHAES) V, matched using propensity scores, were included. Lumbar spine and right femur BMD were measured by DXA. Ten-year risks of major osteoporotic and hip fractures were calculated using the FRAX tool in subjects age ≥ 40 years. Multivariate linear regression models were used to explore factors associated with 10-year fracture risk in axSpA patients.

Results: Hip and lumbar spine BMDs were lower in axSpA patients than in matched controls. Osteoporosis was present in 17 % of axSpA patients and 3 % of controls ($p < 0.001$). Low BMD was present in 22 % of axSpA patients and 4 % of controls under 50 years old ($p < 0.001$). 10-year major osteoporotic and hip fracture risks were significantly higher among axSpA patients. High 10-year fracture risk was observed in 10 % of axSpA patients and 1.7 % of controls ($p = 0.003$). Severity of sacroiliitis was independently associated with both osteoporotic and hip fracture risks ($p = 0.006$ and 0.026 , respectively).

Conclusion: Patients with axSpA presented more frequently with low BMD and increased 10-year fracture risk than did matched individuals from the general population. Severity of sacroiliitis was independently associated with high 10-year fracture risk in axSpA patients.

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POSITIVE CORRELATION OF URIC ACID AND BONE MINERAL DENSITY IN ANKYLOSING SPONDYLITIS

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Objective: Uric acid (UA) has anti-osteoporotic effects in postmenopausal women. This study investigated the association between serum UA levels and BMD in young male patients with ankylosing spondylitis (AS).

Material and Methods: 150 patients who fulfilled the modified New York criteria for the classification of AS were analyzed. All patients were male and under 50 years of age. BMD, serum UA concentrations, clinical parameters, and radiographic progression were assessed. The associations between UA and BMD at the lumbar spine and hip were evaluated using multiple linear regression analysis. Multivariate logistic regression analyses were performed to identify risk factors associated with low BMD.

Results: Mean serum UA concentration in the 150 patients with AS was 5.5 ± 1.3 mg/dl. BMD at the lumbar spine, but not at the total hip and femoral neck, increased with increasing serum UA tertiles ($p = 0.033$). The significant positive association between serum UA and BMD at the lumbar spine remained after adjustment for confounding factors ($\beta = 0.185$, $p = 0.014$, adjusted $R^2 = 0.310$). Multiple logistic regression analyses showed that lower UA concentrations (odds ratio: 4.02, 95 %CI: 1.34–12.3) and BMI and increased erythrocyte

sedimentation rate were independently associated with the risk of low BMD.

Conclusion: Lower serum UA levels are associated with lower BMD in young male patients with AS. UA may be a novel predictive marker or therapeutic target in patients with AS.

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ADULT HYPOPHOSPHATASIA: RELATIONSHIP WITH RHEUMATOID ARTHRITIS AND ANKYLOSING SPONDYLITIS

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Objective: Hypophosphatasia is a rare disorder, it is characterized by a low serum alkaline phosphatase activity (LAPA) and defective bone mineralization. Our aim was to establish the prevalence of hypophosphatasia in an adult community of patients attending a Rheumatology Clinics, and in patients with systemic inflammatory disorders such as rheumatoid arthritis (RA) and Ankylosing Spondylitis (AS).

Material and Methods: Clinical charts from 1138 patients seen in the Rheumatology outpatient clinics of Hospital Santa Creu i Sant Pau from January to November 2013 were reviewed. From them, 253 patients were diagnosed of having RA and 53 AS. We assessed all patients in order of having hypophosphatasia by blood and urine tests.

Results: Acquired hypophosphatasia was found in 17 cases. Nine women and nine men. The mean age was 56 years (range: 33–86). Of the 17 patients with acquired hypophosphatasia, 5 (29.4 %) had the diagnosis of RA and 3 the diagnosis of AS. Of the 253 patients with RA, 2 % have acquired hypophosphatasia (with 95 %CI: 0.6–4.6 %) Of the 53 patients with AS, 5, 7 % have acquired hypophosphatasia (95 %CI: 1.2–15.7 %). The most frequent clinical manifestation is joint pain in 94.1 % of the patients. None of the patients had chondrocalcinosis or dental abnormalities. 17.6 % had osteoporotic fractures and of those 17.6 % also received bisphosphonates.

Conclusion: In our experience, 2 % of patients with RA and 5.7 % with AS developed acquired hypophosphatasia. Although the prevalence is low, it has to be taken into account in front of patients with the suspicion of suffering it. It has been described that the inflammatory bone disorders are characterized by the bony resorption induced by inflammation and the

result of the abnormal activation of the innate immune system. It is our hypothesis that the relationship of acquired hypophosphatasia ought to be correlated with the metabolic bone activity in these patients.

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A SINGLE CT-GUIDED PERCUTANEOUS INTRAOSSEOUS INJECTION OF THERMOSENSITIVE SIMVASTATIN/POLOXAMER 407 HYDROGEL ENHANCES VERTEBRAL BONE FORMATION IN OVARIECTOMIZED MINIPIGS

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Objective: The greatest hazard associated with osteoporosis is local fragility fractures. An alternative, local treatment strategy targeting specific bone that is prone to fractures may help to decrease the incidence of osteoporotic fractures. Statins stimulate bone formation, but the primary target organ of statins is the liver, less than 5 % of orally administered statins reach systemic circulation. Intraosseous injected agents reach the circulation rapidly, similar to the intravenous injection. We constructed an injectable thermosensitive simvastatin/poloxamer 407 hydrogel, investigated its bone anabolic effects in ovariectomized minipig after minimally invasive CT-guided percutaneous vertebral injection.

Material and Methods: Scanning electron microscopy, rheological, and drug release analyses to study whether poloxamer 407 is an effective controlled-delivery system for intraosseous-injected simvastatin in vitro and vivo. Three months after a single CT-guided percutaneous intraosseous injection of thermosensitive simvastatin/poloxamer 407 hydrogel, DXA, μ CT, biomechanical test, histology was conducted to evaluate the effect on bone augmentation. Immunohistochemistry and western blots for VEGF, BMP2 and osteocalcin were also conducted to explore the possible mechanism.

Results: Thermosensitive poloxamer 407 hydrogel is an effective controlled-delivery system for intraosseous injection of simvastatin. A single injection of the simvastatin/poloxamer 407 hydrogel significantly increased BMD and bone microstructure. The bone volume fraction and trabecular thickness increased nearly 150 %, bone strength almost doubled compared with controls (all $P < 0.01$). The expression of VEGF, BMP2, and osteocalcin in the simvastatin-treated were higher than the control.

Conclusion: CT-guided percutaneous vertebral injection of a thermosensitive simvastatin/poloxamer 407 hydrogel can promote bone formation in ovariectomized minipigs, which provide a successful novel strategy for the prevention and treatment of osteoporotic fractures.

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THYMOQUINONE INHIBITS RANKL AND CANCER INDUCED OSTEOCLASTOGENESIS BY SUPPRESSING NF-KB AND MAPK SIGNALING

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Objective: Though, improvement in primary cancer site control is achieved with improved treatment, cancer induced bone loss still a major concern during cancer therapy. To find out better treatment strategies, we investigated the effect of thymoquinone (TQ) on RANKL and cancer osteoclastogenesis.

Material and Methods: RANKL induced osteoclastogenesis was performed in RAW 264.7 (macrophage) cells by treating with RANKL (100 ng/ml) and TQ for 5 days. For cancer induced osteoclastogenesis RAW 264.7 cells were cocultured with breast (MDA-MB-231) or multiple myeloma (U266) cancer cells and treated with TQ for 5 days. After 5 days, cells were stained for TRAP staining. In vivo osteolysis was developed in C57BL/6 J mice by injecting (i.p. route) lipopolysaccharide (LPS 5 µg/g body weight) on day 1 and day 4. TQ was orally administered at a dose of 5 mg/kg, 1 day prior to the injection of LPS and continued for 8 days. The effect of TQ on LPS induced bone resorption was determined by µCT analysis.

Results: TQ significantly inhibited RANKL and cancer induced osteoclastogenesis. Mechanistically, TQ blocked the RANKL triggered phosphorylation of mitogen activated protein kinases (MAPKs) and NF- KB. TQ also inhibited the RANKL induced gene expression of TRAP, NFATc1, c-FOS, DC-STAMP in macrophage cells and RANKL expression in MDA-MB-231 cells. Further, TQ also suppressed the oxidative stress in macrophage cells and osteoblast cells. Consistent with the in vitro results, micro-CT analysis in mice has shown that administration of TQ increased the bone mineral content, BMD, trabecular thickness and decreased trabecular space in LPS treated mice.

Conclusion: Taken together, our results demonstrated that TQ suppresses RANKL and cancer induced osteoclastogenesis via NF-KB, MAPK signaling pathways. Therefore, TQ may be considered as a novel therapeutic strategy against bone lytic diseases.

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PREDICTORS OF MORTALITY IN HIP FRACTURE SUBJECTS AGED 60 YEARS AND OVER WITH MINIMAL TRAUMA HIP FRACTURES IN THE ETHEKWINI MUNICIPALITY, KWAZULU-NATAL, SA

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Objective: To determine the predictors of mortality in hip fracture subjects.

Material and Methods: 200 hip fracture subjects participated in a 1 year longitudinal study. Predictors for mortality were determined by comparing survivors to subjects who had died, using logistic regression analysis. All significant variables were entered into a multiple regression analysis model to determine significance.

Results: The mean age of the subjects was 74.3±8.8 years with a female to male ratio of 2.2:1. The majority of subjects were treated surgically (86.5 %) and the mean length of hospital stay was 21.9 days with a mean delay before admission of 4.2 days. The mortality rate at 1 year was 33.5 % and was highest in the first month with 26 deaths (13 %) which accounted for 38.8 % of all mortality. At 3 and 6 months a further 9 (4.5 %) and 17 (8.5 %) subjects died respectively and from months seven to 12, a further 15 (7.5 %) had died. In the univariate analysis subjects who died were significantly older ($p=0.048$). There was no significant association between mortality and gender, chronic cardiovascular disease (hypertension and DM) or secondary causes for osteoporosis. In the multiple regression model predictors of mortality were African ethnicity ($p=0.031$), low body weight ($p=0.004$), low BMI ($p=0.023$), higher educational level ($p=0.003$), impaired mobility ($p=0.007$), inability to cook, ($p=0.004$) take medication ($p=0.006$), and manage finances ($p=0.006$) prior to the hip fracture, low serum albumin levels ($p=0.008$), high CRP ($p=0.003$) and a longer length of hospital stay ($p=0.012$).

Conclusion: The mortality rate and predictors of mortality in this cohort is comparable to developing and developed countries. The significant delay in admission and surgery is not within the current international and national management recommendations and needs urgent attention.

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PERCEIVED BARRIERS TO CONDUCTING A PHARMACIST-LED OSTEOPOROSIS SCREENING PROGRAM IN A PRIMARY CARE CLINIC IN MALAYSIA: A QUALITATIVE STUDY

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Objective: To explore the perceived barriers to conducting a pharmacist-led osteoporosis screening program in a primary care clinic in Malaysia.

Material and Methods: Nurses ($n=10$), pharmacists ($n=11$), doctors ($n=10$), policy makers ($n=5$) and patients ($n=20$) from an urban primary care clinic, Kuala Lumpur, Malaysia, were purposively sampled and individually interviewed using a semi-structured topic guide. Interviews were transcribed verbatim and analysed using thematic analysis informed by constant comparison, and the protocol for the investigation and analysis of clinical incidents.

Results: Seven main barriers to conducting a pharmacist-led osteoporosis screening program were identified: governmental, organizational and management, work environment, team, task, individual and patient factors. There is currently no mandate or policy to perform a population based osteoporosis screening program at the governmental, organizational and management levels. As a result, participants cited that the limitations of work environment factors such as insufficient training on osteoporosis, the lack of elderly friendly services (such as ramps), diagnostic equipments, medications, staff, time and space may have contributed to the lack of this service. The

lack of teamwork (i.e., communication) between departments, and the lack of suitable population based osteoporosis screening tools may be other factors. The lack of knowledge on osteoporosis leading to neglect in osteoporosis screening were the main patient and individual factors.

Conclusion: Pharmacist-led osteoporosis screening program in a primary care clinic in Malaysia faced barriers at various levels. A multi-level intervention approach is required for this program to be successful.

References: 1. Vincent C et al. (1999) University College London/Association of Litigation and Risk Management.

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P179

ANALYSIS OF BLOOD CIRCULATING MIRNAS PREDICT FRACTURE-RISK IN OSTEOPOROSIS

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Objective: MicroRNAs (miRNAs) regulate gene expression and are known to take part in the control of bone metabolism. As they are secreted by many cell types and can transfer “messages” to recipient cells, circulating miRNAs could be useful biomarkers for the diagnosis or prognosis of disease. The objective of this study was to identify and validate serum miRNAs in two cohorts of postmenopausal osteoporosis, and to evaluate their predictive power for fracture risk as well as their biological functions in the context of bone metabolism.

Material and Methods: Explorative analysis of 375 miRNAs was performed via quantitative PCR in serum from 19 postmenopausal women with prevalent fragility fractures (Fx) and 17 age matched fracture-free controls

(Co). Parametric univariate statistics were applied and top-ranked miRNAs were used to calculate multivariate prediction models including up to 4 miRNAs using a support vector machine as a base classifier and a 5-fold cross validation. MiRNA results were validated prospectively against 13 osteoporotic patients with novel incident fragility fractures (incFx) and 14 age-matched fracture-free controls (Co). In vitro experiments were performed by engineering miRNA expression in primary adipose- tissue derived mesenchymal stem cells.

Results: Explorative multivariate classification revealed a combination of 4 miRNAs that could clearly differentiate prevalent Fx from Co (AUC=0.978). When the same 4 miRNAs were applied to the prospective data, they could differentiate incFx vs controls with an AUC=0.808. Some of these 4 miRNAs had previously been described in the context of osteoclastogenic differentiation (miR-155-5p), or in animal models of osteoporosis (miR-136-3p). All other, so far uncharacterized miRNAs were further studied in vitro for their potential (anti)-osteogenic activity.

Conclusion: Our data provide first proof that specific circulating miRNA levels are indicative of fragility fractures in postmenopausal osteoporotic women and may be novel candidates for general fracture risk screenings. Future studies will show if this knowledge can be used to improve current diagnostic techniques to predict fracture risk and therapy response in elderly women.

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THE IMPACT OF BONE MINERAL DENSITY AND HIP GEOMETRY ON THE DIFFERENT TYPES OF HIP FRACTURE

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Objective: To study the impact of BMD and hip geometry on the fragility fracture of femoral neck and of intertrochanteric fracture.

Material and Methods: There were 95 menopausal females with fragility fracture of hip. 55 patients were divided into the group of femoral neck fracture and 40 divided into the group of intertrochanteric fracture. 63 non-fractured females with normal BMD were chosen as control group. BMD, hip axis length, neckshaft angle and

structural parameters including cross surface area, cortical thickness and buckling ratio were compared among three groups.

Results: Compared with control group, the patients with fragility fracture of femoral neck or of intertrochanteric fracture had significantly lower BMD of femoral neck, lower cross surface area and cortical thickness, and higher buckling ratio at femoral neck and intertrochanter. But there were not significant differences of BMD and structural parameters between fragility fracture of femoral neck with fragility fracture of intertrochanteric fracture. Hip axis length and neck-shaft angle were not significantly different among three groups.

Conclusion: The significant change of BMD and proximal femur geometry were present in the fragility fracture of femoral neck or of intertrochanteric fracture. The different types of hip fracture could not be explained with the changes of BMD and proximal femur geometry. The different types of hip fracture may be caused by the factors beyond the hip. The factors such as advanced age make the patients present different protective responses to falling, which causes differences in the degree and direction of the impact force on hip or the greater trochanter and lead to different types of hip fracture.

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EFFECTS OF VITAMIN D ON QUALITY OF LIFE IN FIBROMYALGIA PATIENTS: A RANDOMIZED CONTROLLED TRIAL

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Objective: Various studies have reported hypovitaminosis D in fibromyalgia patients. In the present study, we have evaluated the effect of vitamin D supplements on symptoms of fibromyalgia and patients' quality of life.

Material and Methods: The present study was done from October 2012 to March 2014 in Rheumatology clinic of Firoozgar Hospital, Tehran, Iran. 108 patients with fibromyalgia were assessed and 74 patients who diagnosed as fibromyalgia according to American College of Rheumatology (ACR 2010) criteria and had hypovitaminosis D entered the study. Patients were randomized to two groups. Group A received oral vitamin D 50000 IU weekly plus trazodone 25 mg at bedtime and group B received trazodone 25 mg at bedtime only. The patients were evaluated at baseline, at 4 and 8 weeks and 25(OH)D level was measured, patients were examined and Fibromyalgia Impact Questionnaire (FIQ), Short Form Health Survey (SF-36), Pittsburg sleep Quality Index(PSQI) were completed.

Results: Comparison between two groups showed a great improvement in different items of SF-36 and FIQ at the end of the treatment period. WPI score was decreased in both groups with a significant alteration in group A. There was a statistically significant reduction in PSQI score within each group. There was a marginally significant trend in favor of Group A in PSQI score at the end of study. ($p=0.06$).

Conclusion: Both regimens were considerably effective, also we relieved that treating hypovitaminosis D could improve physical and psychological symptoms of fibromyalgia significantly and according to high prevalence of hypovitaminosis D in FM patients, assessment of serum 25(OH)D level and optimization of its level should be recommended. (IRCT2012100610960N2)

P182

PERSISTENCE TO ANTIOSTEOPOROTIC DRUGS IN REAL CLINICAL PRACTICE IN RUSSIA

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Objective: Antiosteoporotic drugs have demonstrated fracture risk reduction in many RCTs, but in real clinical practice we cannot receive such results often due to poor adherence to therapy. Antiosteoporotic drugs are not in reimbursement list, so we do not have an insurance database pertaining to the use of antiosteoporotic medications in Russia. Aim: to evaluate patients' persistence to antiosteoporotic drug therapy during 1 year in real clinical practice.

Material and Methods: We conducted a retrospective study of 1178 patients 50 years or older (mean age 64 ± 7 years, male–204 and female–974), whom the diagnosis was done and treatment of osteoporosis was recommended in March–April 2013. In April–May 2014 they were asked what antiosteoporotic drug they received, about the number of months of treatment, and the number of medication packages they bought.

Results: 128(11 %) patients did not start the drug treatment at all (36(17.6 %) men and 92(9.4 %) women ($p<0.001$)) and 113 (9.6 %) received only calcium+vit D. Among 937 patients who started the treatment 685 (73 %) were treated with weekly bisphosphonates (BP), 69 (7.4 %) with monthly BP, 106 (11.3 %) with strontium ranelate daily, 31 (3.3 %) with denosumab twice a year, 46(4.9 %) with once a year BP. Overall persistence was 39.5 % (370/937). Persistence to oral treatment was 37.7 % (324/860): 35.1 % patients on weekly BP, 49.3 % on monthly BP and 37.7 % on strontium ranelate were still persistent at 1 year. Monthly regimen

was associated with higher persistence rates than weekly ($p=0.02$), but not than daily. Persistence to oral therapy was better among women than men ($p=0.0124$), especially on daily regimen (42.5 vs. 15.6 %, $p=0.029$).

Conclusion: 1/5 of patients didn't start the drug treatment during the year after diagnosis of osteoporosis. Among patients who started with antiosteoporotic drugs overall persistence at 1 year was low, but in women it was significantly higher. Better persistence to oral therapy was among patients who received treatment on a monthly basis.

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EFFICACY OF A NATURAL EXTRACT RICH IN HYALURONIC ACID FOR TREATMENT OF KNEE OSTEOARTHRITIS AND SYNOVIAL EFFUSION: DOSE-RESPONSE STUDY

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Objective: This is a retrospective study to evaluate the efficacy of a natural extract rich in hyaluronic acid, polysaccharides and collagen at different doses, in patients with moderate to severe knee OA presenting with persistent knee pain and synovial effusion.

Material and Methods: 103 patients with knee OA and synovial effusion taking one of the three treatments were included: Natural extract rich in hyaluronic acid at 80 mg/day ($n=35$); the same extract at 40 mg/day ($n=30$); acetaminophen 500 mg/day ($n=38$). All patients received the assigned treatment during 3 months. The clinical outcomes were the change in pain intensity measured on a visual analog scale and the evolution of the synovial effusion in the suprapatellar recess using ultrasonography.

Results: All three groups experienced a significant reduction in pain compared to baseline values. Patients taking 80 mg/day of the natural extract showed a faster pain reduction, reaching significantly lower values at 3 months as compared to patients taking acetaminophen. Patients taking 40 mg/day of the extract also presented lower pain values than acetaminophen at 3 months, but the difference did not reach statistical significance. All patients had synovial effusion at inclusion. The supplementation with 80 mg/day of the extract resulted in a significant decrease on the number of patients with synovial effusion from the first month of treatment until the end of the study, when only 1 subject in the group remained presenting synovitis. Acetaminophen and half dose extract had low effect in synovitis. The intake of the natural extract led to a dose-dependent reduction in

the need of rescue medication. No adverse events were reported during the study.

Conclusion: These results suggest that oral intake of a natural extract rich in hyaluronic acid is safe and effective in patients with knee OA. It relieves knee pain and reduces the consumption of analgesics, and at the higher dose it reduces the degree of synovial effusion.

Disclosures: PR and DMP are employed by Bioiberica S.A.

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EFFECTS OF ORAL NATIVE TYPE II COLLAGEN TREATMENT IN KNEE OSTEOARTHRITIS: A RANDOMIZED CONTROLLED TRIAL

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Objective: The aim of this randomized controlled study was to evaluate the efficacy of oral native type II collagen treatment on symptoms and biological markers of cartilage degradation, when given concomitantly with acetaminophen in patients with knee osteoarthritis.

Material and Methods: 39 patients diagnosed with knee osteoarthritis were included and randomly distributed into two groups: one treated with 1500 mg/day of acetaminophen (group AC; $n=19$) and the other treated with 1500 mg/day of acetaminophen plus 10 mg/day of avian native type II collagen (group AC+CII; $n=20$) for 3 months. Visual Analog Scale (VAS) at rest and during walking, (WOMAC pain, WOMAC function, and Short Form-36 (SF-36) scores, were recorded. Coll2-1, Coll2-1NO2 and fibulin-3 levels were quantified in urine as biomarkers of disease progression.

Results: After 3 months of treatment, significant improvements compared to baseline were reported in joint pain (VAS walking), function (WOMAC) and quality of life (SF-36) in the AC+CII group, while only improvements in some subscales of the SF-36 survey were detected in the AC group. Comparisons between groups revealed a significant difference in VAS walking score in favor of the AC+CII group as compared to AC group. Biochemical markers of cartilage degradation in urine didn't significantly improve in any of the groups.

Conclusion: These results suggest that native type II collagen treatment combined with acetaminophen is superior to only acetaminophen for symptomatic treatment of patients with knee osteoarthritis.

Disclosures: DMP is employed by Bioiberica S.A.

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EFFECTS OF RESISTANCE TRAINING PROGRAM ON BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN

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Objective: To verify the effects of resistance training program on BMD on the femur and lumbar spine in postmenopausal women.

Material and Methods: Eight women (age: 61.6 ± 5.2 years; BMI: 24.4 ± 3.2 ; menopausal age: 52.0 ± 3.8 years; menopausal time: 9.6 ± 3.7 years), with clinical diagnosis of osteopenia/osteoporosis, participated in a program with 10 resistance exercises, periodized, for 12 months, three times per week, with low intensity and progression of load according to the perceived exertion. BMD (g/cm^2) were assessed by DXA with equipment Hologic QDR Discovery A series before and after to the program. Femoral BMD was measured in the neck region and the density of the lumbar spine was obtained according to the average of densitometry L1-L4 vertebrae. Data were analyzed with t-test of repeated measures in SPSS 22.0 and the significance level maintained at 5 %.

Results: There was no significant effect on mean femoral BMD (pre: $0.639 \text{ g}/\text{cm}^2$; post $0.645 \text{ g}/\text{cm}^2$; $p=0.251$) and lumbar spine (pre: $0.797 \text{ g}/\text{cm}^2$; post $0.801 \text{ g}/\text{cm}^2$; $p=0.556$). However, the percentage change in femoral BMD (1.1 %) was higher as compared with the lumbar spine (0.5 %).

Conclusion: The resistance training program had no significant effect on BMD. However, provided an important increase in densitometric values in the femur. The results have implications for clinical practice, where resistance exercise provided a small increase in BMD.

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SYSTEMATIC REVIEW AND META-ANALYSIS OF PERSISTENCE WITH ORAL OSTEOPOROSIS THERAPIES IN ROUTINE CLINICAL PRACTICE

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Objective: To conduct a systematic review and meta-analysis of persistence with oral osteoporosis (OP) therapies at 1 year or longer in routine clinical practice.

Material and Methods: This systematic review included English language articles published between January 2004 and July 2014 in PubMed and/or EMBASE which presented at least 1 estimate of the proportion of patients persistent (i.e. time from initiation to discontinuation of treatment) to oral OP therapies at 1 year or longer. Oral OP therapies included oral bisphosphonates (BP), raloxifene, and strontium ranelate. Both retrospective observational studies and prospective observational studies without active patient enrollment were considered. A random effects model was used to calculate pooled persistence estimates over 1 to 5 years.

Results: Of the 1724 titles and abstracts reviewed, 39 articles were eligible and included in the meta-analysis. At 1 year, up to 40 % of patients remained persistent with oral OP therapies. Oral BP use was associated with higher pooled persistence at 1 year (40 %) compared with use of raloxifene (33 %) or strontium ranelate (18 %). Persistence declined over time, and only 14 % of patients remained persistent with oral BPs at 5 years (29 % at 2 years, 24 % at 3 years). The daily regimen was associated with lower pooled persistence compared with the weekly regimen for up to 3 years after treatment initiation (1-year: 30 vs. 46 %; 2-year: 18 vs. 28 %; 3-year: 10 vs. 22 %). No difference in persistence rates was observed between weekly and monthly regimens.

Conclusion: This study provides an up-to-date review of real world persistence with oral OP therapies. At 1 year after treatment initiation, less than half of patients remained persistent with therapy, and the rate declined over time to less than 15 % at 5 years. While weekly and monthly regimens were associated with higher persistence than a daily regimen, persistence rates remained suboptimal for oral OP therapies for all dosing regimens.

Disclosures: Funded by Amgen Inc., USA

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RARE CAUSES OF SECONDARY HYPERPARATHYROIDISM: CLINICAL CASES OF WERNER'S SYNDROME, GITELMAN'S SYNDROME AND OSTEOPETROSIS AMONG PATIENTS REFERRED FOR PRIMARY HYPERPARATHYROIDISM

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Objective: A reliable immunoassay for PTH makes hyperparathyroidism a widely diagnosed condition. We have reported rare causes of elevated PTH.

Material and Methods: Referral patients with initial diagnosis of primary hyperparathyroidism.

Results: 1) A 35 years old male with weakness, progressive weight lost, PTH 351.6 pg/ml (15.0–68.3), serum calcium (Ca) 2.68 mmol/l (2.10–2.55), total hip Z-score –3.24. At the time of admission: height of 153 cm, weight 31 kg, BMI 13.24 kg/m², signs of premature ageing, a history of bilateral cataract diagnosed and treated at 19 years old, vitamin D 22.5 ng/ml, PTH 72.9 pg/ml (15–65), Ca 2.61 mmol/l; PTH 36.01 pg/ml, measurements with the same assay, no signs of parathyroid adenoma. The condition was considered as functional hyperparathyroidism due to Werner's syndrome. 2) A 27 years old female with intense pain in bones, severe muscle weakness, hair loss, PTH 16.9 pmol/l (1.6–6.9), Ca²⁺ 1.35 mmol/l (1.0–1.3), P 0.68 mmol/l (0.87–1.45), creatinine 153.3 mmol/l, neck Z-score –2.9, kidney stones. At the time of admission: PTH 59.8 pg/ml; Ca²⁺ 0.99 mmol/l. Two days later the patient collapsed (BP 70/0), potassium 2.5 mmol/l (3.5–5.1), bilateral adrenal tumors. Gitelman's syndrome was finally confirmed and functional hyperparathyroidism was considered to be the consequence of transitory electrolyte disturbance. 3) A 47 years old female with intense pain in joints, PTH 246.5 pg/ml; Ca 2.47 mmol/l; low traumatic fracture of radius and coccyx. At the time of admission: PTH 40.9 pg/ml, Ca 2.48 mmol/l, Ca in 24 h urine sample 2.12 mmol/24 h (2.50–8.0), osteocalcin 8.73 ng/ml (11.0–43.0), no antiresorptive treatment, neck Z-score +2.5; L1-L4+2.5 thick, dense bone on X-Ray. Autosomal dominant osteopetrosis with altered bone resorption and following transitory hypocalcemia was considered as a cause of functional hyperparathyroidism.

Conclusion: Rare heredity disorders affecting calcium metabolism might be the cause of elevated PTH.

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EFFECT OF AGE ON INDEX BONE MICROARCHITECTURE (TBS), AND BONE MINERAL DENSITY (BMD) IN HEALTHY POSTMENOPAUSAL WOMEN

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Objective: To assess whether the age affects the value of TBS and BMD in healthy postmenopausal women.

Material and Methods: In a cross-sectional study including 257 healthy menopausal women, who underwent osteodensitometric (DXA) examination of the lumbar (L) spine and hip, with TBS score at the L spine measured. The survey excluded all subjects with risk factors that could affect bone microarchitecture (steroids, previous fractures, systemic disease, excessive use of alcohol

and cigarettes, as well as the use of drugs with a negative impact on bone metabolism). Statistical analysis was performed in SPSS system, appropriate statistical methods.

Results: The average age of patients was 64.3 ± 7.9 years. The average value of L spine BMD was 0.859 ± 0.153 g/cm², while average hip BMD was 0.795 ± 0.123 g/cm². The mean value of TBS was 1.223 ± 0.101 . There was a significant positive correlation between the TBS and L spine BMD ($r=0.487$, $p<0.001$) and between the TBS and the hip BMD ($r=0.292$, $p<0.001$). A significant negative correlation was observed between age and TBS ($\rho=-0.218$, $p<0.001$), as well as the age and the BMD of the hip ($\rho=-0.201$, $p<0.001$), while the age and L spine BMD were not significantly correlated ($\rho=-0.003$, $p=0.959$).

Conclusion: A reduction in the value of the index values of bone microarchitecture and BMD of the hip is connected with aging. There was no significant variation in BMD at L spine with age, which may indicate the progression of degenerative changes of the spine. TBS is an independent parameter, which has the potential diagnostic value itself, not taking into account the BMD.

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HOW WOULD SENIOR CHINESE ORTHOPAEDISTS MANAGE OSTEOPOROTIC FRACTURE? A NATIONWIDE SURVEY IN CHINA

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Objective: To know how senior Chinese orthopaedists from tertiary hospitals would manage osteoporotic fracture.

Material and Methods: A pretested questionnaire with multiple choice items based on local and various

international osteoporosis guidelines was drafted as standard flow and advice from orthopaedic specialists. The questionnaire files were saved in tablet computers which were distributed to 509 orthopaedists who are deputy directors and above in mainland China.

Results: Pretest revealed good internal consistency of the questionnaire (Cronbach's $\alpha>0.7$). Nine factors were extracted by factor analysis and explained 63.5 % of the cumulative variance. Overall, 484 effective questionnaires (95 %) were confirmed, of them, 83 % agreed osteoporosis can be diagnosed if a patient is over 50 years old and have fragility fracture, and 95 % accepted anti-osteoporosis medications are needed if a patient has a history of fragility fracture. For the primary target of anti-osteoporosis, 63 % chose to prevent fractures and re-fractures, 14 % chose to increase bone density, 7 % chose to improve the quality of life, 10 % chose to improve bone quality, and 5 % chose to relieve bone pain. The most recommended daily intakes for calcium and vitamin D was 600 mg (45 %) and 800 IU (50 %), respectively. For anti-osteoporosis therapy with bisphosphonates, 53 % would give a course of 1–3 years, 29 % would give a course of 3–5 years, and 13 % would give a course of 3–12 months. Nearly half (48 %) believed using bisphosphonates has an effect on fracture healing and 29 % disagreed. For perioperative medication, 76 % would prescribe antiosteoporosis medications for osteoporotic fracture; although 56 % would use bisphosphonates, 30 % chose not to use it, and 14 % were uncertain if it should be used.

Conclusion: The survey is reliable and valid. It shows that senior Chinese orthopaedists are more likely to manage osteoporotic fracture according to the Chinese guideline.

Disclosures: All the authors are employees of Beijing Novartis Pharma Co., Ltd. (China)

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INVESTIGATION OF THE ASSOCIATION BETWEEN FIBROBLAST GROWTH FACTOR 23 (FGF23) AND OSTEOPOROTIC FRACTURE IN POSTMENOPAUSAL WOMEN

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Objective: FGF23 is secreted by osteocytes and is involved in phosphate (P) metabolism. Increases in this factor are known to occur with decreased renal function. Moreover, it has been reported that the presence of high levels of FGF23 is a risk factor for osteoporotic fracture

in elderly men. The aim of the present study was to elucidate the association between FGF23 and osteoporotic fracture in postmenopausal women.

Material and Methods: A total of 190 postmenopausal women who underwent medical examinations for osteoporosis were examined. Serum levels of Ca, P, Cr, PTH, 25-hydroxyvitamin D [25(OH)D], and FGF23 were measured, as were the bone markers PINP and CTX. DXA scans were used to measure BMD of the lumbar vertebrae (L2-4) and femoral neck (FN), and the presence or absence of morphological vertebral fractures was determined. The presence or absence of existing osteoporotic nonvertebral fractures was determined through physician interviews.

Results: The mean age of subjects was 63.4 ± 7.5 years. The mean values of measured variables were Cr 0.58 ± 0.10 mg/dL, 25(OH)D 16.0 ± 4.2 ng/mL, FGF23 33.9 ± 9.1 pg/mL, PINP 53.9 ± 16.6 ng/mL, and CTX 0.401 ± 0.149 ng/mL. FGF23 was not significantly different between subjects with and without vertebral fractures and between subjects with and without nonvertebral fractures. Since FGF23 is linked to renal function, further analysis was conducted by the patients' chronic kidney disease (CKD) stage. In group of subjects with stage 2 CKD (eGFR: 60–89 mL/min/1.73 m²), FGF23 was significantly elevated in subjects with nonvertebral fractures ($p < 0.05$), but not in those with vertebral fractures. Logistic regression analysis identified FGF23 as a significant risk factor for nonvertebral fracture, even after adjusted for age, BMI, Ca, P, Cr, intact PTH, 25(OH)D, CTX and BMD [odds ratio: 1.93 (95 %CI:1.10–3.39), $p < 0.05$].

Conclusion: This study showed that FGF23 is a risk factor for nonvertebral fracture in postmenopausal women with mild renal dysfunction.

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EFFECT OF ADAPTED PHYSICAL ACTIVITY ON BONE MINERAL DENSITY AND LIFE QUALITY OF POSTMENOPAUSAL WOMEN WITH OSTEOPENIA OR OSTEOPOROSIS

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Objective: To analyze the impact of adapted physical activity on BMD and quality of life in postmenopausal women with reduced BMD.

Material and Methods: A total of 89 postmenopausal women with osteoporosis or osteopenia (mean DXA T-

score of the lumbar spine -2.24 ± 0.73), were included in this randomized prospective study. Subjects were divided into two groups: the study group (SG, $n=45$; 58.7 ± 6.3 years) and the control group (CG, $n=44$; 57.9 ± 5.5 years). In the study group a physical activity protocol (warm up and aerobic exercises, resistance and weight exercises, coordination and balance training) was applied during 12 months (2 months in outpatient hospital settings and 10 months at home). In the control group no exercise protocol was applied. BMD at the lumbar spine and hip was assessed at baseline and at the end of follow-up by DXA. Life quality was assessed by the Qualeffo-41 questionnaire devised by the International Osteoporosis Foundation at the beginning and at the end of the treatment.

Results: Patients in SG showed an increase in the lumbar spine BMD at the end of the treatment ($\Delta g/cm^2 = 0.008 \pm 0.031$) while CG patients had a decrease in lumbar spine BMD ($\Delta g/cm^2 = -0.023 \pm 0.036$), difference between SG and CG was highly significant $p < 0.001$. There was no significant difference between baseline life quality of SG and CG (SG 31.8 ± 8.9 vs. CG 30.5 ± 8.7 $p = 0.487$), while at the end of the follow up patients from the SG had significantly better life quality scores (SG 23.8 ± 7.0 vs. CG 28.3 ± 8.3 $p = 0.0069$).

Conclusion: This protocol of adapted physical activity did not significantly improve BMD in postmenopausal women, but in comparison to the control group, the results showed the importance of physical activity for maintenance of bone health. Furthermore women included in physical activity program had significantly improved life quality at the end of the treatment.

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MUSCULOSKELETAL DISEASES AND IN-PATIENT REHABILITATION

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Objective: To analyse hospital prevalence of musculoskeletal diseases among patients at stationary rehabilitation in 1 year period.

Material and Methods: Analytic, retrospective study included 172 patients with musculoskeletal diseases, selected from the total number of 534 patients who were rehabilitated stationary in the period from November 2013 to November 2014. There were four groups of patients. Entities of the first (I) group were: spondylosis/spondyloarthrosis, radiculopathy, herniated (not recently operated) intervertebral disc, and osteoporosis. Second group (II) was presented with coxarthrosis and

gonarthrosis, third (III) group was combination of the I and II, and fourth (IV) with just osteoporosis.

Results: Annual prevalence of musculoskeletal diseases at stationary rehabilitation was 32.2 %. The most presented was the I group, with 63.4 %, II group was presented with 5.8 %, III group with 30.2 % and IV group with 1.2 %. There were 70.3 % ($n=121$) females, and 29.7 % ($n=51$) males. Average age was 59.97 year. Chronic stage of disease have had 84.9 % ($n=126$) patients, and acute stage 15.1 % ($n=26$) patients. In the I group, the most presented entity was herniated intervertebral disc, 80 %, found more in males, 72.5 % ($n=51$), followed by radiculopathy, 73.4 %, also found more in males, 62.7 % ($n=48$). In the II group, females were more pronounced, and gonarthrosis was presented with 90 %. In the III and the IV group, females were also more presented.

Conclusion: Fairly high hospital prevalence was found in this study, meaning that there are a large number of patients with musculoskeletal diseases who require stationary physical treatment, either in the acute or chronic stage of disease.

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RISING TREND IN VITAMIN D STATUS IN IRELAND FROM 1993 TO 2013: CONCERNS FOR THE FUTURE

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Objective: The Institute of Medicine 2011 Report on Dietary Reference Intakes for Calcium and Vitamin D specified higher intakes for all age groups compared to the 1977 report, but also cautioned against spurious claims about an epidemic of vitamin D deficiency and against advocates of higher intake requirements. Over 40 years, we have noted marked improvement in vitamin D status but we are concerned about hypervitaminosis D. We sought to evaluate the 25OHD trend over 20 years.

Material and Methods: We retrieved all results of serum 25-hydroxyvitamin D (25OHD) from 1993 to 2013 ($n=69,012$) that was trimmed to one sample per person ($n=43,782$). We conducted a time series analysis of the monthly averages for 25OHD using a simple sequence chart and a running median smoothing function. We modelled the data using univariate auto-regressive integrated moving average (ARIMA) and forecast 25OHD levels up to 2016.

Results: The time series sequence chart and smoother function demonstrated a steady upward trend with seasonality.

The yearly average 25OHD increased from 36.1 nmol/L in 1993 to 57.3 nmol/L in 2013. The ARIMA model was a good fit for the 25OHD time series; it forecasted monthly average 25OHD up to the end of 2016 with a positive stationary R2 of 0.377.

Conclusion: Vitamin D status improved over the past 40 years, but there is a dual problem: groups at-risk of vitamin D deficiency, who need public health preventative measures; and, random members of the population who are taking unnecessarily high vitamin D intakes for unsubstantiated claims.

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A CLOSE CORRELATION BETWEEN RADIOLOGIC PROGRESSION SEVERITY AND TRABECULAR BONE LOSS IN MALE PATIENTS WITH ANKYLOSING SPONDYLITIS

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Objective: Ankylosing spondylitis (AS) is a chronic, progressive disease characterized by inflammation of entheses. Inflammation is associated with cortical new bone formation leading to progressive ankylosis of the spine and sacroiliac joints but also with trabecular bone loss leading to osteoporosis. The aim of this study is to investigate the association of spinal radiologic progression with BMD in male AS patients.

Material and Methods: Clinical and radiographic data were collected in 116 male AS patients. Spinal radiographs were scored using the modified Stoke AS Spinal Score (mSASSS) and spinal BMD of anteroposterior (AP) and lateral (Lat) views was measured by DXA.

Results: 73 (62.9 %) patients had syndesmophytes at their lumbar spine (L-spine) and 45 patients (38.8 %) were treated by tumor necrosis factor (TNF) inhibitors. mSASSS and BMD were significantly higher in patients with syndesmophyte(s) (all $P<0.05$). For the 2nd and 3rd lumbar vertebrae, BMD of AP view was significantly higher in vertebrae with syndesmophyte(s) ($P=0.001$) while BMD of Lat view was decreased and did not differ

between those with and without syndesmophyte(s). Moreover, L-spine mSASSS was positively correlated with BMD of AP view ($\gamma=0.239$, $P=0.010$) while negatively correlated with BMD of Lat view ($\gamma=-0.209$, $P=0.025$). These correlations were significant when adjusted for age, HLA-B27, smoking, treatment drugs (NSAIDs, TNF inhibitors, statins and bisphosphonate), BMI and C-reactive protein.

Conclusion: Trabecular BMD was decreased and correlated with severity of radiologic progression in L-spine of male AS patients, suggesting a parallel progression between cortical bone formation and trabecular osteoporosis.

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MEASUREMENT OF BONE MINERAL DENSITY IN TYPE 2 DIABETIC PATIENTS

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Objective: i. To find out the types and number of risk factors indicative of osteoporosis in type 2 diabetes mellitus patients and age-sex matched non-diabetic patients attending the outpatients' clinic of No. 2 Military Hospital. ii. To assess the diagnostic categories of osteoporosis in the diabetics and non-diabetics based upon the severity of the measured actual BMD values. iii. To determine the relationship between the types and number of risk factors indicative for osteoporosis and the severity of actual BMD measurement, in these patients. iv. To find out the relationship between the BMI and the severity of actual BMD measurement, in the type 2 diabetic patients and non-diabetics.

Material and Methods: This study is a hospital based, cross-sectional, descriptive study at the No. (2), Military Hospital- (500 bedded) Yangon, between October 2008 and August 2010. The aim of the study was to measure the BMD among (115) Type 2 Diabetes Mellitus patients and (115) age-sex matched nondiabetes individuals. BMD performed by using Sonost 3000 bone sonometer, software 3.03.06 in all the patients.

Results: The majority (68.7 %) of patients were in the age group 40–64 in both groups. Female population predominated in both groups (62.6 %). The frequency distribution of risk factors indicative of osteoporosis differed between the two groups, viz. postmenopausal women 62(86.1 %) and 57(79.1 %); early menopausal women before the age of 45 was 18(25 %) and 15(20.8 %); nulliparous women 28(38.9 %) and 17(28.6 %); drug history of taking steroid or phenytoin or anticancer in 10(8.7 %) and 5(4.3 %); BMI <18 kg/m² was 11(9.6 %) and 13(11.3 %) in the diabetic and non-diabetic

groups respectively. However, the frequency distribution of advanced age >65 years old was 34(29.6 %) and female distribution was 72(62.6 %) in both the groups. An association was drawn between eleven risk factors indicative for osteoporosis and BMD measurement (T-score). In the diabetic group, advanced-age ($p=0.016$), early menopause ($p=0.009$) and post-menopause ($p=0.004$) were significantly associated. In the non-diabetic group post-menopause (0.002), nulliparity ($p=0.03$) and low BMI ($p=0.01$) were significantly associated with T-score. The number of risk factors in each patient ranged from zero to two in 40.9 and 46.9 %; and three to five in 56.5 and 49.5 % of the diabetic and non-diabetic groups respectively. The risks were: being female, postmenopausal, advanced age with past history of fracture and nulliparity. There was statistically significant association between the number of risk factors and the severity of actual BMD in non-diabetes group but the association was not significant in T2DM group. According to BMD value by T-score, diabetes patients 41(35.7 %) had osteoporosis, 61(53.0 %) were found to have osteopenia and only 13(11.3 %) were normal BMD. Among non-diabetic patients 8(7.0 %) had osteoporosis, 70(60.9 %) were found to have osteopenia and 37(32.2 %) were normal BMD. Hence there was a higher percentage of osteoporosis among the diabetic patients and osteopenia among the non-diabetics. In the diabetic group, there was a statistically significant association between the three risk factors (of advanced age, early menopause, and post menopause) and the severity of actual BMD. The association between the other risk factors and the severity of BMD was not statistically significant. In the non-diabetic group, there was a statistically significant association between the risk factors (of early menopause, post-menopause, low body weight) and the severity of actual BMD. There was statistically significant association between the number of risk factors and the severity of actual BMD in non-diabetes group but the association was not significant in T2DM group. According to BMD value by Z score, among the diabetic patients, 78(67.9 %) had BMD lower than the average age, 13(11.3 %) had BMD of the average age and 34(29.9 %) had BMD higher than the average age. Among non-diabetic patients, 9(7.8 %) had BMD lower than the average age, 2(1.7 %) had BMD of the average age and 104(90.4 %) had BMD higher than the average age. Hence a higher percentage of T2DM patients had a BMD lower than the average age compared to the age-sex matched non-diabetic patients. The relationship between BMI and severity of actual bone density was statistically significant in non-diabetes group but not in the diabetes group. Relationship between the duration of diabetes and the severity of actual BMD measurement was statistically significant in the diabetic group. The majority (68.7 %) of patients were in the age group 40–64 in both groups. Female population predominated in both groups (62.6 %). The frequency distribution of risk

factors indicative of osteoporosis differed between the two groups, viz. postmenopausal women 62 (86.1 %) and 57(79.1 %); early menopausal women before the age of 45 was 18 (25 %) and 15 (20.8 %); nulliparous women 28 (38.9 %) and 17(28.6 %); drug history of taking steroid or phenytoin or anticancer in 10 (8.7 %) and 5 (4.3 %); BMI lower than 18 kg/m² was 11(9.6 %) and 13(11.3 %) in the diabetic and non diabetic groups respectively. However, the frequency distribution of advanced age above 65 years old was 34 (29.6 %) and female distribution was 72(62.6 %) in both the groups. An association was drawn between 11 risk factors indicative for osteoporosis and the BMD measurement (T-score). In the diabetic group, advanced age ($p=0.016$), early menopause ($p=0.009$) and post menopause ($p=0.004$) were significantly associated. In the non diabetic group post menopause (0.002), nulliparity ($p=0.03$) and low BMI ($p=0.01$) were significantly associated with the T-score. The number of risk factors in each patient ranged from zero to two in 40.9 and 46.9 %; and three to five in 56.5 and 49.5 % of the diabetic and non diabetic groups respectively. The risks were: being female, postmenopausal, advanced age with past history of fracture and nulliparity. There was statistically significant association between the number of risk factors and the severity of actual bone density in nondiabetes group but the association was not significant in the type 2 diabetes mellitus group. According to BMD value by T-score, the diabetes patients 41(35.7 %) had osteoporosis, 61 (53.0 %) were found to have osteopenia and only 13 (11.3 %) were normal bone density. Among nondiabetic patients 8(7.0 %) had osteoporosis, 70 (60.9 %) were found to have osteopenia and 37 (32.2 %) were normal bone density. Hence there was a higher percentage of osteoporosis among the diabetic patients and osteopenia among the non diabetics. In the diabetic group, there was a statistically significant association between the three risk factors (of advanced age, early menopause, and post menopause) and the severity of actual BMD. The association between the other risk factors and the severity of BMD was not statistically significant. In the non diabetic group, there was a statistically significant association between the risk factors (of early menopause, post menopause, low body weight) and the severity of actual BMD. There was statistically significant association between the number of risk factors and the severity of actual bone density in nondiabetes group but the association was not significant in the type 2 diabetes mellitus group. According to BMD value by Z score, among the diabetic patients, 78 (67.9 %) had BMD lower than the average age, 13(11.3 %) had BMD of the average age and 34 (20.9 %) had BMD higher than the average age. Among

nondiabetic patients, 9 (7.8 %) had BMD lower than the average age, 2(1.7 %) had BMD of the average age and 104 (90.4 %) had BMD higher than the average age. Hence a higher percentage of the type 2 diabetes mellitus patients had a BMD lower than the average age compared to the age-sex matched non diabetic patients. The relationship between BMI and severity of actual bone density was statistically significant in nondiabetes group but not in the diabetes group. Relationship between the duration of diabetes and the severity of actual BMD measurement was statistically significant in the diabetic group.

Conclusion: Care of patients with diabetes should include an assessment of bone health. It has become increasingly clear that patients with type 1 diabetes have lower BMD and higher risk of fractures.

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MAINTENANCE THERAPY WITH GLUCOSAMINE SULFATE AND PHYSIOTHERAPY ON OSTEOARTHRITIS PROGRESSION

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Objective: Osteoarthritis of the knee is a chronic progressive disease. It causes chronic pain and damage to the joint cartilage. The quality of life of the patients is reduced and they may become invalid. We assessed the effects of the specific drug glucosamine sulphate (GS) and physiotherapy on the Maintenance therapy and changes the symptoms.

Material and Methods: We did a randomised, placebo controlled trial, in which 191 patients with knee osteoarthritis were to receive oral GS 1500 mg once a day 4 months per year, or placebo and physiotherapy 30 day/year for 3 years. The patients are divided in two groups. The first group of 93 patients is treated with 1500 mg GS once a day 4 months per year and physiotherapy 30 day/year, and the second group of 98 patients is treated with placebo and physiotherapy 30 day/year. The pain was measured in the beginning of the first and in the end of the third year in compliance with the VAS and algofunctional index for the knee by Lequesne.

Results: At the end of the third year, the pain under VAS in the first group increased with 7.9 mm and for the second group, with 12.3 mm in comparison to the initial values. Algofunctional index at the end of the third year increased with 1.0 points for the first group and with 1.5 for the second group. Comparing the obtained values, a very significant statistical difference ($p>0.05$) was noticed.

Conclusion: Maintenance therapy with GS and physiotherapy retarded the progression of knee osteoarthritis.

The treatment with GS 1500 mg daily of patients with osteoarthritis of the knee 4 months per year and physiotherapy is more effective than the treatment only with physiotherapy 30 day/year.

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TEN-YEAR RISKS OF FIRST OSTEOPOROTIC FRACTURES IN CHINESE WOMEN AND MEN

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Objective: To estimate the 10-year risks of first osteoporotic fractures in the Chinese population.

Material and Methods: A validated state-transition microsimulation model, including hip, clinical vertebral and wrist fractures, was used in this study. Microsimulation and 2nd order Monte-Carlo simulations (10,000 trials×100 samples) were performed with a 10-year simulation time horizon or until the simulated subjects died. Only the first fracture was accounted for in the simulation. Model parameter values were retrieved from published sources.

Results: Overall, 10-year fracture risks increase with age in women and men until the short-time mortality outweighs the fracture risk (Fig. 1). The highest 10-year risk of any osteoporotic fracture (hip, vertebral or wrist fracture) occurs at age 75 years in women (14.8 %, 95 %CI: 13.7–15.9 %) and 80 years in men (4.6 %, 95 %CI: 4.0–5.2 %). Women are estimated to have substantially higher 10-year vertebral and wrist fracture risks than men, but not in hip fracture.

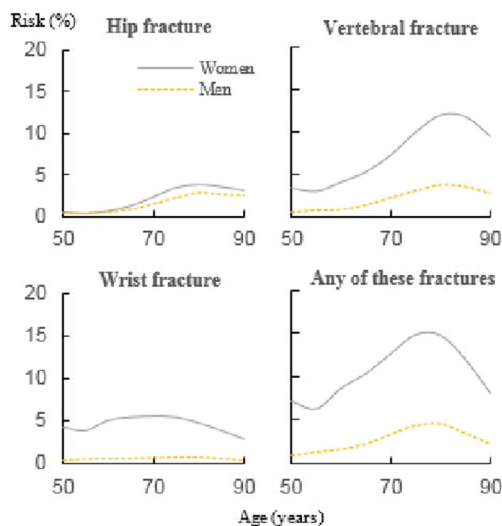


Figure 1. 10-year osteoporotic fracture risks in Chinese women and men

Conclusion: 10-year fracture risks are smaller in Chinese population comparing with Caucasians [1], but are higher than earlier estimations [2].

References: 1. Kanis et al., *Osteoporos Int* 2000;11:669. 2. Kanis et al., *J Bone Miner Res* 2002;17:1237.

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PREVALENCE OF VITAMIN D DEFICIENCY IN A SOUTHERN CHINESE POPULATION WITH LOW BONE MINERAL DENSITY

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Objective: To identify the prevalence of vitamin D deficiency in southern Chinese individuals with low BMD and evaluate the associating clinical and biochemical parameters.

Material and Methods: Patients referred for management of low bone mass underwent a standard systematic assessment protocol with comprehensive biochemical measurements, and BMD was measured by DXA scan. Patients assessed from 2011 to 2013 were recruited. Vitamin D status was defined as deficient if serum 25-hydroxyvitamin D <20 ng/mL and insufficient if the level was ≥20 ng/mL but <30 ng/mL. The characteristics of the vitamin D deficient subjects were compared to those with serum 25-hydroxyvitamin D ≥20 ng/mL using the independent T-test or chi-square test, whichever was appropriate.

Results: 125 subjects with complete anthropometric and biochemical data available were included in this report. 91.2 % were female. The mean age was 68.7±11.3 years, BMI was 21.4±3.5 kg/m². For the assessment of BMD, the T-score was -3.0±0.9 at neck of femur and -2.8±0.8 at spine. 55.2 % of the subjects had history of fragility fracture. Vitamin D insufficiency and deficiency was observed in 35.2 and 50.4 % of the subjects, respectively. Subjects with vitamin D deficiency had higher PTH level (6.7±3.5 vs. 5.3±2.9 pmol/L, *P*=0.01), higher alkaline phosphatase (ALP) (73.3±24.9 vs. 64.3±18.0 U/L, *P*=0.02). However, there was no difference in BMD, calcium and phosphate levels. In addition, only 37.9 and 4.8 % of the subjects had PTH and ALP levels higher than the reference range.

Conclusion: Vitamin D deficiency was remarkably common in Chinese subjects with low BMD. Such deficiency status was not effectively reflected by measurement of other biochemical parameters. As subjects with vitamin D deficiency require a larger dosage for replacement, measurement of serum vitamin D level followed

by appropriate supplementation is mandatory for the management of subjects with low BMD in the Chinese population.

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CLUSTER ANALYSIS OF HIGH RESOLUTION PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY PARAMETERS IDENTIFIES BONE PHENOTYPES ASSOCIATED WITH HIGH RATES OF PREVALENT FRACTURE

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Objective: To identify clusters of bone microarchitecture in older men and women and relate them to fracture prevalence and aBMD.

Material and Methods: We studied 177 men and 159 women, aged 72.1–80.9 years, with HR-pQCT (XtremeCT) images (voxel 82 μm) of the distal radius. Standard image analyses were performed for assessment of macrostructure, regional densitometry, cortical porosity and trabecular microarchitecture. K-means partitioning cluster analysis was used to identify 5 clusters in men and 5 in women. Prevalent fracture rates and femoral neck aBMD were determined for each cluster.

Results: 44 (24.9 %) men and 48 (30.2 %) women had fractures. Women with fractures were on average 1.7 years older and 3.1 years further from menopause than women who had not fractured ($p < 0.05$). Although analyses were carried out separately in each sex, two morphologically-similar, high risk clusters were identified in each sex. “Cluster A” contained 20 women (50.0 % fractured) and 14 men (35.7 % fractured) and showed a phenotype with mean trabecular density and trabecular number both more than 1 SD below the sex-specific cohort mean. “Cluster B” contained 26 women (50.0 % fractured) and 30 men (50.0 % fractured) and denoted a phenotype with mean cortical thickness and cortical volumetric BMD around 1SD below and, in men, mean total and trabecular area more than 1SD above, the sex-specific cohort mean. Logistic regression showed fracture rates in these clusters to be significantly higher than the lowest fracture risk cluster (E) ($p < 0.05$). Mean femoral neck aBMD was significantly lower than cluster E in women in cluster A and B ($p < 0.001$ for both), and in men, in cluster A ($p < 0.001$) but not B ($p = 0.220$).

Conclusion: We have identified a cluster (B) that describes a bone phenotype which differs from the conventional view of osteoporosis but with a high proportion of fractures. In men, this phenotype was not associated with lower aBMD

measured by DXA and therefore could be missed by current clinical assessments of osteoporosis.

P200

MAXIMAL OXYGEN CONSUMPTION AND BONE MINERAL DENSITY IN YOUNG LEBANESE MEN

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Objective: To investigate the relationship between maximal oxygen consumption ($\text{VO}_2 \text{ max}$) and BMD in a group of young Lebanese men.

Material and Methods: 50 adult men aged between 18 and 30 years participated in this study. Weight and height were measured, and BMI was calculated. BMD was measured by DXA at lumbar spine (L1-L4), total hip (TH) and femoral neck (FN). $\text{VO}_2 \text{ max}$ was determined by direct measurement while exercising on a bicycle ergometer (Siemens-Elema RE 820; Rodby Elektronik AB, Enhorna, Sweden). A progressive 2-min step protocol (20–30 W/step) was used as previously described [1].

Results: $\text{VO}_2 \text{ max}$ (l/mn) was positively correlated to L1-L4 BMD ($r = 0.54$; $P < 0.001$), TH BMD ($r = 0.45$; $P < 0.001$) and FN BMD ($r = 0.40$; $P < 0.01$).

Conclusion: This study suggests that $\text{VO}_2 \text{ max}$ (l/mn) is a positive determinant of BMD in young men. Maximizing $\text{VO}_2 \text{ max}$ (l/mn) during early adulthood may help to prevent osteopenia and osteoporosis later in life.

References: [1] El Hage R et al., J Clin Densitom 2014;17:320.

P201

FRAILTY PREVALENCE AND RELATED FACTORS IN THE ELDERLY- FRAILTURK PROJECT

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Objective: Frailty is one of the geriatric syndromes and has an important relationship to mortality and morbidity. The aim of this study is to present the characteristics,

prevalence and related factors of frailty in the elderly in our country.

Material and Methods: The study included 1126 individuals over 65 years from 13 centers. Frailty was evaluated by using Fried Frailty criteria and patients were grouped as “frail”, “pre-frail” and “non-frail”. Nutritional status was assessed by “mini nutritional test”; psychological status was assessed by “center for epidemiological studies depression scale-CESD”, and additional diseases were assessed by Charlson comorbidity index.

Results: 66.5 % of the participants were between 65 and 74 years of age and 65.7 % were women. 39.2 and 43.3 % of the participants were determined to be frail and non-frail, respectively. Multinomial logistic regression analysis was used to determine the factors associated with frailty. It was observed that age, female gender, low education level, being a housewife, living with the family, being sedentary, presence of an additional disease, using 4 or more drugs per day, avoiding to go outside, at least one visit to any emergency department within the past year, hospitalization within the past year, nonfunctional ambulation, and malnutrition increased the risk of frailty ($p < 0.05$).

Conclusion: Establishing the factors associated with frailty is highly important for both clinical practice and national economy. This is the first study on this subject in our country and will provide guidance in determining treatment strategies.

P202

MORPHOMETRIC STUDY OF ALGERIAN HIPS: AN ETIOLOGICAL STUDY TO EXPLAIN THE LOW PREVALENCE OF HIP OSTEOARTHRITIS IN ALGERIA

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Objective: In western countries, knee osteoarthritis (OA) is the third osteoarthritic location in terms of prevalence, with a ratio hip/knee OA of 1:2 to 1:3. However, in Asian/African countries, this ratio is much lower, of 1:27 in Algeria and 1:40 in China. We conducted this study to find out morphometric differences between Algerian and American hips that may explain such differences in hip OA prevalence.

Material and Methods: A morphometric study was performed on 200 hips of 100 Algerian healthy female subjects, aged ≥ 60 years and compared with values of 200 American hips of the Study of Osteoporotic Fractures (SOF). Were

measured and compared the following dysplasia and impingement parameters: lateral center-edge angle, impingement angle, acetabular slope, femoral head-to-femoral neck ratio and crossover sign. Comparisons were made using t-tests for continuous variables and z tests for proportions. Intra- and inter-observer intraclass correlation for Algerian measures were calculated.

Results: The intra- and inter-observer intraclass correlation were good to excellent (0.91–0.97 and 0.79–0.89, respectively). Different values are exposed on table 1.

Parameter	Algerian subjects <i>n</i> =100, 200 hips	American subjects <i>n</i> =100, 200 hips	<i>P</i> values
Age (mean±SD) (years)	66.6±6.4	71.0±4.8	<0.0001
BMI (mean±SD) (Kg/cm ²)	29.1±5.7	26.8±4.2	0.0014
Lateral center-edge angle (Wiberg) (°)	41.4	30.4	0.075
Impingement angle (°)	62.6	83.6	0.029
Femoral head-to-femoral neck ratio	0.91	0.89	0.505
Acetabular slope of Tönnis (°)	2.7	3.8	0.663
Wiberg >35° (%)	77.5	23.1	<0.0001
Wiberg <20° (%)	0.0	7.0	0.0001
Tönnis <0° (%)	16.5	13.0	0.323
Tönnis >15° (%)	0.0	1.0	0.156
Impingement angle <70° (%)	78.0	12.1	<0.0001
Femoral head-to-femoral neck ratio >1.35	0.5	4.0	0.018
Crossover sign (%)	3	81	< 0.0001

Conclusion: Compared with American women >60 years, Algerian women have distinct differences in their morphometric values, with lower mean impingement angles and more important Lateral center-edge angles. These data suggest a more common asphericity and impingement in Algerians, which theoretically predisposes to more hip OA lesions. We think that this abnormality is largely offset by the almost total lack of acetabular retroversion in Algerians (3 % in Algerians vs. 81 % in Americans), which may play a protective role against the anterior femoroacetabular impingement.

P203

SELF-RATED HEALTH AND BONE MINERAL DENSITY AMONG PARTICIPANTS FROM THE HERTFORDSHIRE COHORT STUDY

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Objective: Previous studies have suggested an association between self-rated health and BMD among American Caucasian males. We examined this question in a community dwelling cohort of UK men and women.

Material and Methods: 184 men and 166 women born 1931–39 in Hertfordshire UK participated in this study. Subjects completed a questionnaire that detailed self-rated health as very good; good; fair; bad; very bad. Information was also collected on past medical history, drug history, BMI, cigarette and alcohol consumption, dietary calcium intake and physical activity. BMD was measured using a Hologic QDR 4500 instrument.

Results: The mean age in this study was 76.1 (SD 2.5) years in men and 76.4 (SD 2.6) years in women. The mean BMI was 27.7 (SD 3.8) in men and 28.2 (SD 4.8) in women. Twenty two percent of men and 27 % women reported a prior fracture; 38 % men and 28 % women had at least one co-morbidity, with 8 % men and 10 % women reporting 4 or more comorbidities. Twenty nine percent of men and 23 % of women rated their health as very good; 54 % men and 57 % women as good; 14 % men and 20 % women as fair; 2 % men and 1 % women as bad and 1 % men and no women as very bad. There were no significant differences in self-report of health according to sex. There was an apparent, but non-significant trend toward lower total hip BMD among men with worse self-reported health. These relationships were strengthened by adjustment for age, BMI, social class, physical activity, cigarette and alcohol consumption, dietary calcium intake and prior fracture, but remained of borderline significance in this sample ($p=0.09$). No such relationships were observed in women.

Conclusion: While our analyses were limited by low numbers of men with poor self-rated health, our analyses do suggest that self-rated health in men may be a useful clinical indicator that further consideration of bone health is warranted. Further analyses in data sets of larger numbers of men with poor self-rated health are now warranted.

P204

SCREENING OF PRIMARY HYPERPARATHYROIDISM IN ECUADORIAN POPULATION

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Objective: To know the epidemiology of the primary hyperparathyroidism (PHP) through screening by means of simultaneous measurement of PTH and ionic calcium a sample of the Ecuadorian population.

Material and Methods: We performed measurement of PTH and ionic calcium in 13,860 people who attended routine control tests during the period from 1 January 2009 to 30 November 2014. It was confirmed the diagnosis of PHP if the PTH level remained high at least in two different occasions. We also measured serum creatinine, vitamin D, osteocalcin and pyrilinks-D. We excluded patients with elevation of the creatinine, or treatments that could alter the levels of PTH.

Results: 482 cases found high PTH. In 61 cases (14 men and 47 women) the elevation of PTH was confirmed at least on two occasions. The mean age in women 64.9 ±13.74 and men 63.5±14.11. In all cases the levels of ionic calcium were kept in the high limits of normality. Vitamin D levels were normal in all cases (Table 1). The prevalence of PHP corresponds to 12.6 %. The greatest increase in the prevalence of PHP was seen in women ≥60 years and in men ≥50 years.

Table 1: Characteristics of participants with a biochemical diagnosis confirmed of PHP.

	Hombres (n=14)	Mujeres (n=47)	Total (n=61)
Age	63,5±14,11	64,9±13,74	64,59±13,72
PTH (12 a 72 pg/mL)	102,22±18,45	123,26±51,04	118,43±46,37
Ionic calcium (4,5–5,6 mg/dl)	5,00±0,35	5,23±0,43	5,18±0,42
VD (32–70 ng/mL)	32,05±11,32	38,80±22,30	37,26±20,412
Creatinine S (mg/mL)	0,97±0,14	0,82±0,19	0,85±0,19
Osteocalcin (12–41 ng/mL)	nd	33,18±22,06	33,18±22,06
Pyrilinks-D (3–7,4 nM DPD/nM)	nd	6,84±1,65	6,84±1,65

Conclusion: The prevalence of PHP is high in this sample of Ecuadorian population (12.6 %). The biochemical presentation corresponds to normocalcemic form of the disease. The prevalence of PHP is greater at advanced ages and women.

P205**MAXIMAL OXYGEN CONSUMPTION AND TRABECULAR BONE SCORE IN YOUNG LEBANESE WOMEN**

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Objective: To investigate the relationship between maximal oxygen consumption (VO₂ max) and trabecular bone score (TBS) in a group of young Lebanese women.

Material and Methods: 29 adult women aged between 18 and 30 years participated in this study. Weight and height were measured, and BMI was calculated. BMD was measured by DXA at lumbar spine (L1-L4). Lumbar spine TBS was derived from DXA lumbar spine examinations. VO₂ max was determined by direct measurement while exercising on a bicycle ergometer (Siemens-Elema RE 820; Rodby Elektronik AB, Enhorna, Sweden). A progressive 2-min step protocol (20–30 W/step) was used as previously described [1].

Results: VO₂ max (l/mn) was positively correlated to L1-L4 TBS ($r=0.36$; $P<0.05$). VO₂ max (ml/mn/kg) was positively correlated to L1-L4 TBS ($r=0.39$; $P<0.05$). Weight, height and BMI were not correlated to TBS values.

Conclusion: This study suggests that VO₂ max is a positive determinant of TBS in young women. Maximizing VO₂ max during early adulthood may be associated with a better bone microarchitecture at the lumbar spine in women.

References: [1] El Hage R et al., J Clin Densitom 2014;17:320.

P206**PHYSIOTHERAPY REHABILITATION FOR OSTEOPOROTIC VERTEBRAL FRACTURE (PROVE): STUDY PROTOCOL FOR AN ADAPTIVE DESIGN RANDOMISED CONTROLLED TRIAL**

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Objective: Osteoporosis and vertebral fracture can have a considerable impact on an individual's quality of life. There is increasing evidence that physiotherapy including manual techniques and exercise interventions may have an important treatment role. This pragmatic randomised controlled trial will investigate the clinical and cost-effectiveness of two different physiotherapy approaches for people with osteoporosis and vertebral fracture, in comparison to usual care.

Material and Methods: 600 people with osteoporosis and a clinically diagnosed vertebral fracture will be recruited and randomly allocated to one of three management strategies, usual care (control–A), an exercise-based physiotherapy intervention (B) or a manual therapy based physiotherapy intervention (C). Those in the usual care arm will receive a single session of education and advice, those in the active treatment arms (B+C) will be offered 7 individual physiotherapy sessions over 12 weeks. The trial is designed as a prospective, adaptive single blinded randomised controlled trial. An interim analysis will be completed and if one intervention is clearly superior the trial will be adapted at this point to continue with just one intervention and the control. The primary outcomes are quality of life measured by the disease specific QUALEFO-41 and the Timed Loaded Standing test measured at 1 year.

Results: Data collection ongoing.

Conclusion: There are a variety of different physiotherapy packages used to treat patients with osteoporotic vertebral fracture. At present, the indication for each different therapy is not well defined, and the effectiveness of different modalities is unknown.

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P207**EVALUATION OF TENDER POINTS IN PATIENTS WITH FIBROMYALGIA**

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Objective: The purpose of the present clinical trial is to examine the tender points, their characteristics, dynamics and importance in patients with fibromyalgia (FM).

Material and Methods: The present trial is a prospective; it was carried out during years 2007–2013 in the University Clinic of Rheumatology (Sofia, Bulgaria). Four treatment groups with FM patients (97 patients), one group without treatment (35 patients) and a healthy control group (39 patients) were followed within 3 months. The study covered with precision the changes of the pain thresholds measured in kg/cm² in all trigger points applying dolorimetry method with a Fisher dolorimeter and assessing with an exact figure the pain scores and changes occurred within 3-month term. The measured tender points are Occiput L+R, Low cervical

L+R, Supraspinatus L+R, Left and Right second rib, Trapezius L+R, Lateral epicondyle L+R, Greater trochanter L+R, Gluteal L+R, Knee L+R.

Results: The cumulative contribution percentages of the first most sensitive tender points (7,9,11) are very close, e.g. we can even assess the effect of treatment from the measuring dynamics of 7 tender points. In the assessment of 3 tender points (having the best response to treatment for each patient group) only one of them is repeated in the treatment groups. In assessing 5 tender points, there is only one tender point, Occiput R, which is repeated in all groups. The grouping of at least 7 tender points showing most positive response to treatment is essential in order to obtain at least 4 repetitive tender point participations in the four treatment groups. These tender points are Occiput R, Greater trochanter R and Gluteal R. When grouping on 9 and 11 tender points, showing most positive response to treatment in all groups the following tender points are revealed: Occiput L+R, Low Cervical R, Lateral epicondyle L, Greater trochanter R and Gluteal L+R. A high frequency of participation of the aforesaid tender points when assessing dynamics of responsiveness to treatment of a group of 7 tender points was found. We can assess the response to treatment by their variance too.

Conclusion: For the first time in Bulgaria were established less than 11 tender points that may be measured and as a result was evaluated the effect of treatment on the basis of their changes. In the same time were detected the seven specific tender points undergoing the most dynamic changes in the course of treatment. The results allow addressing 7 of the 18 most sensitive tender points in FM in everyday clinical practice. They could target both the diagnosis and assessment of response to treatment in tracking patient visits, facilitating in this way the everyday work of the rheumatologist, based on preliminary clinical observations.

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EVALUATION OF CLINICAL SYMPTOMS IN PATIENTS WITH FIBROMYALGIA

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Objective: The purpose of the present clinical trial is examine the clinical manifestations in patients with fibromyalgia (FM) treated with Trazodone, Pregabalin, Tizanidine or Mydocalm for 3 months.

Material and Methods: The present trial is a prospective; it was carried out during years 2007–2013 in the University Clinic of Rheumatology (Sofia, Bulgaria). Four treatment groups with FM patients (97 patients), and a healthy control group (39 patients) were followed within 3 months. The accompanying clinical symptoms in FM patients were evaluated: sleep disturbances, headache, autonomic disturbances, heart palpitations, and presence of diffuse muscle pains.

Patients were asked to answer questions on all accompanying symptoms assessing them independently by a 5-point grading system (0—no symptom, 1—slightly expressed, 2—medium, 3—strong, 4—very strong). The symptoms changes were tracked by the 5-point grading system. The fatigue in FM patients was assessed by a Fatigue Severity Scale (FSS) and a Modified Fatigue Impact Scale (MFIS).

Results: In the group treated with Trazodone the decrease of fatigue is with 0.98 (21.26 %), in the Tizanidine treatment group with 0.794 (20.6 %), in the Mydocalm treatment group with 0.435 (12 %), and in the Pregabalin treatment group with 0.422 (10.8 %). The mean of fatigue in healthy subjects is 3.529. A statistically significant difference in means was observed in healthy subjects, Pregabalin ($p=0.0183$) and Trazodone ($p=0.000$) treatment groups before treatment. There is no statistically significant difference in the dynamics of fatigue ($p>0.05$) before and after treatment in all treated groups. The most sensitive are the positive dynamics of sleep quality in the Trazodone treatment group improving of sleep quality by 1.13 (44.7 %), in the Mydocalm treatment group improving of sleep quality by 0.86 (34 %), in the Pregabalin treatment group improving of sleep quality by 0.665 (24.4 %), and in the Tizanidine treatment group improving of sleep quality by 0.514 (23.4 %). The positive response to treatment in the patients groups with regard to the reduction of autonomic changes are as follows. For patients treated with Trazodone the reduction is with 0.288 (17.6 %), for patients treated with Pregabalin with 0.126 (12.6 %), for patients treated with Mydocalm with 0.078 (7 %), and for patients treated with Tizanidine with 5.5 %. In the healthy subjects the means of autonomic changes are statistically different ($p=0.0063$) from Mydocalm ($p=0.0011$), Pregabalin ($p=0.011$) and Trazodone ($p=0.0003$) treatment groups at the beginning as well as at the end of treatment ($p=0.0063$), and in the Tizanidine group before treatment ($p=0.0248$).

Conclusion: The most effective treatment during the 3 months follow up period was trazodone. It has best effectiveness on fatigue, sleep disturbances and autonomic symptoms. Mydocalm and Pregabalin are equally effective on pain threshold sleep and autonomic disturbances. Tizanidine was less effective. These results are useful for the everyday clinical practice and treatment of FM. No serious adverse effects and reactions leading to drug discontinuation were observed in FM patients.

P209

BONE BIOLOGY AND BONE METABOLISM AFTER THR

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Objective: Hip arthroplasty associated with bone alteration and activate local and systemic inflammatory response which can affects the systemic mineral homeostasis.

Material and Methods: The results of 72 patients activity with impaired bone metabolism after total hip arthroplasty had been analyzed. Functional activity, life quality and X-ray monitoring including whole body DXA and pQCT had been researched.

Results: Functional activity by HHS scale a year after arthroplasty was 82.9 points \pm 12.4 SD, which was significantly higher than comparison group 75.6 \pm 8.2 SD ($p < 0.01$), and significance of differences persisted for up to 18 months. Life quality parameters showed a positive trend during the rehabilitation period in both groups. However, significant benefits had been observed in main group after 3 months after the arthroplasty, in particular the parameters of physical, emotional and social component of quality of life. Patients comparison group noted a slow recovery of the vital and mental component of quality of life, which was associated with both the operated limb function, and subjective general health and low values of these parameters are marked even 6 months after arthroplasty. X-ray monitoring in 6 months showed the formation of areas of enlightenment mainly in 1 and 7 Gruen zones. At 12 and 18 months similar changes was in 2 and 6 Gruen zones. Whole body DXA after 6 months showed a significant decrease in BMD in all segments of the skeleton. The most intensive changes occurred in the thoracic spine and operated limb ranged from -3.39 to -6.22 %, which was significantly higher than main group of patients ($p < 0.005$). pQCT in distal tibia shown decreasing of volumetric bone density in compeering group and negative dynamic was significantly higher than main group of patient.

Conclusion: Thus we can conclude that antiresorptive therapy increase functional activity, life quality and stabilize bone metabolism in postoperative period after THR.

P210

BONE AND NEUROPSYCHIC DISPLAYS IN THYROID INSUFFICIENCY

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Objective: Hypothyroidism is representing a clinical expression induced by insufficiency of thyroid hormone

biosynthesis, the transport and/or their receptivity. Identification of thyroid insufficiency cases, clinical and biological objectifying of etiologic diagnosis of hypothyroidism, clinical manifestations nerve and psychological assessment, quantification of BMD by bone densitometry (DXA).

Material and Methods: In the study were included 26 cases(4 men and 22 women) between 27 and 46 years old, in which 9 have developed hypothyroidism post-thyroidectomy surgery and 17 through autoimmune mechanism. Were performed the following paraclinical investigations: FT4, serum TSH, thyroperoxidase antibody (TPOAb) determination, thyroidal echo and thyroid function was assessed indirectly by changes existing in metabolisms: lipid metabolism, carbohydrates, enzymes. Bone densitometry was assessed only in 3 cases with premature ovarian failure.

Results: Neuropsychiatric disorders are constant severe and characteristic. Presents a slowdown of all the elements that make up the higher nervous activity. Presents permanent sleepiness, especially subsistence and the attention is poor, with lack of interest especially to personal and social events. Sensory and neurological disorders are constant but varying intensity. In the 3 cases with DXA investigated T-score values were between -2.8 and -3.7 SD. All cases showed high levels of TSH and TPOAb was increased in cases with autoimmune hypothyroidism.

Conclusion: 1. Neuropsychiatric disorders are constant, characteristic and severe in hypothyroidism. 2. Osteo-articular disorders are common, especially at cases with severe hypothyroidism (myxedema). 3. The therapeutic approach is differentiated in relation to the evolutionary stage, visceral and osteo-articular complications.

P211

THE STUDY OF DENTAL MODIFICATIONS IN CHRONICLE TETANY

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Objective: Chronic tetany is individualized as clinical form of tetany through intense trophic disorders occurring as a result of tetany subtle over time worsening, with or without symptoms of acute tetany. Chronic tetany presents subtle tetany symptoms that can occur amid bouts of muscle stiffness, but the trophic

disorders of tetany subtle, barely sketched, become, by their multiplicity and intensity, the dominant clinical picture.

Material and Methods: The study was performed on 24 patients (8 men and 16 women) whose ages ranged from 19 to 37 years. Paraclinical investigations focused on the study: phospho-calcium metabolism (total blood calcium, calcium ion, urinary calcium, phosphorus blood, blood magnesium) electrophysiological investigations (EMG, EEG, EKG), evaluation of circulating PTH in selected cases, ultrasound and parathyroid CT, radiological exploration of long bones.

Results: Through enamel and dentin alterations show up many signs of dystrophy dental, teeth are losing their luster and become mat or coated, sometimes dirty yellow, with gray or black ribbed. Their strength is diminished, abrasion surfaces eroding overmuch. Appear numerous cavities side. The side edges of the tooth erode, the tooth taking aspect of a nail or screw appearance. Finally the whole dental crown disappears. In some cases, 3 highlighted parathyroid hyperplasia. Imagistical explorer of long bones could highlight in 3 cases with parathyroid hyperplasia and fibrocystic bone lesions.

Conclusion: 1. Chronical tetany is the most common clinical form of primary hypoparathyroidism (surgical, drastically, infiltrative, idiopathic autoimmune). 2. Treatment targets aimed eliminating the causes and correcting hypocalcemia

P212

STUDY OF BIOCHEMICAL MARKERS OF BONE TURNOVER AND BONE MINERAL DENSITY IN GONADAL DISGENESIAS

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Objective: Alteration of gonadogenesis process (the morphological dysgenesis) has multiples implications: perturbation of hormonal biosynthesis process, alteration of structure reactivity on gonadic hormones and, under clinical aspect, the perturbing of sexualisation process. The exclusion from the organism economy of sexual hormones is seriously influencing the bone structure, being the principal cause of osteoporosis. Identification of cases with alteration of sexualisation process (gonadal dysgenesis), hormonal evaluation on

gonadotrope axis and the study of BMD and biochemical markers of bone turnover.

Material and Methods: The study were performed on 26 cases with gonadal dysgenesis with ages between 12 and 31 years, from which: female genotype Turner syndrome (15 cases), Klinefelter syndrome (7 cases) and feminine testicle (2 cases, sisters). In the same time with karyotype study of gonadic and gonadotropic hormones were evaluated the biochemical markers of bone turnover (serum osteocalcin and crosslaps) and BMD were appreciated by dual absorptiometry with X rays (DXA).

Results: It was highlighted osteoporosis in 14 cases (53.7 %), osteopenia in 8 cases, and for the remaining patients (4) biochemical markers and mineral bone density were in normal limits.

Conclusion: The study of biochemical markers of bone turnover and mineral bone density is mandatory for all cases with gonadal dysgenesis. The precocious diagnosis of osteoporosis/osteopenia is claiming the hormonal substitution specifically to clinical form which represent the therapeutically attitude from the main intention. Hormonal substitution in association with therapeutically means specific to bone remineralisation is preventing the apparition of fragility fractures.

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MAXIMAL OXYGEN CONSUMPTION IS A STRONGER DETERMINANT OF BONE MINERAL DENSITY THAN BODY WEIGHT IN A GROUP OF YOUNG WOMEN

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Objective: To investigate the relationship between maximal oxygen consumption (VO₂ max) and BMD in a group of young Lebanese women.

Material and Methods: 29 adult women aged between 18 and 30 years participated in this study. Weight and height were measured, and BMI was calculated. BMD was measured by DXA at whole body (WB), lumbar spine (L1-L4), total hip (TH) and femoral neck (FN). VO₂ max (l/mn) was determined by direct measurement while exercising on a bicycle ergometer (Siemens-Eléma RE 820; Rodby Elektronik AB, Enhorna, Sweden). A progressive 2-min step protocol (20–30 W/step) was used as previously described [1].

Results: VO₂ max (l/mn) was positively correlated to WB BMD ($r=0.69$; $P<0.001$), L1-L4 BMD ($r=0.63$; $P<0.001$), TH BMD ($r=0.67$; $P<0.001$) and FN BMD ($r=0.71$; $P<0.001$). Body weight was positively correlated to WB BMD ($r=0.64$; $P<0.001$), L1-L4 BMD ($r=0.39$; $P<0.001$),

TH BMD ($r=0.53$; $P<0.001$) and FN BMD ($r=0.50$; $P<0.001$). Using multiple linear regression analysis models, VO_2 max (l/mn) was a stronger positive determinant of WB, L1-L4, TH and FN BMD than body weight.

Conclusion: This study suggests that VO_2 max (l/mn) is a stronger determinant of BMD than body weight in young women. Based on these results, it seems that maximizing VO_2 max (l/mn) during early adulthood may help to prevent osteoporosis later in life.

References: [1] El Hage R et al., J Clin Densitom 2014;17:320.

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THE STUDY OF OSTEOPOROSIS INCIDENCE IN THE SYNDROME OF PAUPER OVARIES

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Objective: At patients with premature ovarian insufficiency or the syndrome of pauper ovaries, the follicular dower is much reduced and as a result is the deficiency of ovarian hormonopoiesis. As the number of follicles is lower the ovary's life span is reduced, making the clinical spectrum to be characterized through the absence of puberty sexuality total or partial until the precocious installation of climacterium. The identification of ovarian failure secondary amenorrhea cases caused by premature ovarian insufficiency. During the perturbation of hormonal secretion which controls the bone homeostasis, ratio bone formation-resorption is damaged and thus, bone mass decreases and causes osteoporosis.

Material and Methods: The study was performed on 54 patients whose ages ranged from 20 to 43 years. Hormonal investigations focused on the study of FSH, LH, PRL, estradiol, progesterone. The patients underwent utero-ovarian pelvic sonography. BMD was measured by DXA (BMD) at the spine, pelvis and radius. The biochemical markers of bone turnover studied were serum osteocalcin and crosslaps by ELISA.

Results: Hormonal doses showed low levels of estradiol and progesterone, instead of gonadotropic that hormones were above the normal upper limit between 210 and 390 mUI/ml. BMD measurements revealed the presence of osteoporosis at 26 cases, which represents 48.1 % of all cases investigated. BMD values correlate with biochemical markers of bone turnover.

Conclusion: Evaluation of BMD and biochemical markers of bone turnover in premature ovarian failure must be done regularly to identify patients who rapidly lose bone mass and are at increased risk of osteoporosis. Estrogen-progesterone substitution is the main and first treatment in premature ovarian failure to prevent osteoporosis/osteopenia, metabolic and visceral complications. Patients with osteoporosis will receive antiresorptive agents or proformative medication to prevent fragility fractures.

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INCIDENCE STUDY OF OSTEOPOROSIS IN THYROTOXICOSIS

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Objective: Acute or chronic thyrotoxicosis is a complex of clinical manifestations, hormonal and biochemical intoxication of the body induced by thyroid hormone, regardless of its source (endo or exogenous). In function of thyroid hormone excess comes or not by thyroid hyperfunction, thyrotoxicosis is classified as with and without hyperthyroidism. The cases included in our study showed thyrotoxicosis with hyperthyroidism. Identification of thyrotoxicosis with hyperthyroidism cases, evaluation of thyroidal hormone status, the study of BMD.

Material and Methods: In the study were included 36 cases between 22 and 55 years old with hyperthyroidism in which: Graves-Basedow disease (14), multiheteronodular goiter toxic (19), toxic adenoma Plummer (3). In every case were studied: FSH, TSH, thyroid ATPO. The thyroidal echo were made in order to determinate gland's dimension, homogeneous/nonhomogeneous aspect, the presence of nodules and the type of vascularisation. In every case, BMD was evaluate by DXA.

Results:The osteodensitometry highlighted the presence of osteoporosis in all cases with Graves-Basedow illness, Plummer toxic adenoma and in 9 cases with multiheteronodular toxic goiter (72.2 %).

Conclusion: 1. A hormonal, immunological and osteodensitometry evaluation is necessary for all cases with thyrotoxicosis with hyperthyroidism. 2. The inclusion of antithyroidal synthesis therapy, β blockings and immunosuppressants in association with antiresorptive/proformative medication contributed to bone mass growth and reduction of

fragility fractures incidence. 3. The thyrotoxicosis with hyperthyroidism is affecting the trabecular bone and cortical one and the mechanism seems to be bound by the resorption trough acceleration of local turnover.

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TREATMENT OF IBANDRONIC ACID ASSOCIATED WITH MENAQUINONE-7 IN HYPOGONADIC OSTEOPOROSIS

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Objective: Discovering frequently cases with hypogonadism (feminine or masculine), is motivating the therapeutically broaching of hypogonadism osteoporosis that is installed more precocious in comparing with the menopausal one. Gonadal insufficiency diagnosis and its etiology, the BMD evaluation, adopting differentiated therapeutically measures in rapport with the evolutive stage of bone mass deficit (osteoporosis/osteopenia) and with hypogonadism etiology.

Material and Methods: In the study we included 65 cases with hypogonadotroph and hypergonadotroph hypogonadism with ages 13–35. At all cases BMD was evaluated by DXA. The therapeutically options were aiming to: nonpharmacological undertake (a diet with a positive level of calcium and vitamin D, modifying the lifestyle and easy physical exercises). Pharmacological therapy was applied in all cases with osteoporosis that received antiresorptive agent, ibandronic acid in 150 mg doses at 30 days in association with 45 mg vitamin K2 (MK7 or MENACHINONA-7)/d.

Results: Osteoporosis was confirmed in 34 cases. The efficiency of the treatment with ibandronic acid in association with vitamin K2 after 12 months of therapy was superior then the separately bisphosphonates therapy. It was observed an increase of BMD with 4.4 % at lumbar spine level and with 2.6 % at femoral cervix level compared to 4.2 and 2.1 % reported for ibandronic acid.

Conclusion: 1. The study is confirming the efficiency of association between ibandronic acid and menachinona 7 in hypogonadism osteoporosis. 2. MK7(vitamin K2), latest discovery in terms of vitamins, is the most bio-available and bio-active form, which increases the efficiency of bisphosphonate therapy.

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EFFECT OF VARIED INTENSITIES OF AEROBIC AND RESISTANCE TRAINING ON FUNCTIONAL CAPACITY AND SYMPTOMS IN OSTEOARTHRITIS PATIENTS

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Objective: Knee osteoarthritis (OA) is characterized by pain, articular cartilage deterioration, joint space narrowing and reduced muscle strength. The major symptoms of osteoarthritis are pain and physical disability. Here, the purpose of the study was to examine the effect of varied intensities of aerobic training and resistance training on the functional capacity and symptoms in knee OA patients.

Material and Methods: 24 patients who were having osteoarthritis in different levels were selected as the subjects of the study and divided into three groups of eight each ($n=8$). Group-1 underwent combined resistance-aerobic training but more emphasis on resistance training (70–30 %). Group-2 underwent aerobic-resistance training with more emphasis on aerobic workouts in the same proportion. Group-3 acted as control group. The duration of training was 1 h/d with 4 days per week for a total period of 12 weeks. To measure the functional capacity, rising from a chair, walking, stepping up and stepping down on stairs were used. Pain was assessed during rest and activities. All the variables were assessed through a Numeric Rating Scale (NRS) from 0 to 10. Paired t-test and ANOVA were used for statistical analysis.

Results: For all the dependent variables namely, rising from a chair, standing, walking, stair climbing and stepping down, the mean difference score of Group-1 was 8.9 ± 5.2 , for Group-2 the score was 3.9 ± 4.8 and for Group-3 the score was 0.9 ± 0.8 . The post test T-scores of all the variables of both experimental groups showed significant differences with their pre-test T-scores where the difference was less in control group.

Conclusion: The Group-1 of resistance-aerobic training showed more significant difference than the other experimental group and also than the control group for all the variables of study.

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EVALUATION OF THE LEVEL OF RISK FOR FALLS AND RISK FACTORS FOR OSTEOPOROSIS AFTER STROKE

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Objective: To assess the risk of falls among patients after stroke in relation to sex, age, localizations of lesions and functional status, risk factors for osteoporosis, frequency of falls, time and manner of falls.

Material and Methods: The study was designed as a cross-sectional study. To assess risk for osteoporosis and the risk of falls, data were collected from medical history and Morse scale was used for assessing the risk of falling. To assess the functional state by Barthel index, and cognitive status by Mini Mental State. The study 40 patients (21 male, 19 female) who were hospitalized and treated at the Clinic For Medical Rehabilitation, Clinical Center of Vojvodina during the 2014 year.

Results: The average patients age was 61.93 ± 12.74 years. Patients with left sided hemiparesis was 22, and with right sided hemiparesis was 18. The results showed that female patients with left sided hemiparesis have spontaneous fractures and family history of spontaneous fractures most frequent ($p < 0.05$). High risk of falling established in 19 % of men, 37 % of women after stroke. Statistically significant higher risk of falling was found in female patients after stroke and in the younger patients then 65 years ($p < 0.05$). The survey results indicated a statistically higher risk of falls in patients with left-sided hemiparesis. The average value Barthel index in patients with a low risk of falling was 80, and in patients with high risk 71. The results showed that statistically less Barthel index values was recorded in female patients and in patients with left handed hemiparesis ($p < 0.05$). The largest number of falls occurred during transfers in the last 6 months of the stroke.

Conclusion: Higher risk of falling have a female patients under 65 years with left-sided hemiparesis. Patients with worse functional status have a higher risk of falling. The largest number of falls occurred during the transfers in the first 6 month of stroke and was observed in female patients with left sided hemiparesis

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THE INFLUENCE OF WEIGHT STATUS ON FORE-ARM BONE MINERAL DENSITY IN A GROUP OF LEBANESE ELDERLY MEN

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Objective: To investigate the influence of the weight-status (obese, overweight and normal-weight) on BMD of the forearm in a group of Lebanese elderly men.

Material and Methods: 125 Lebanese men (64 obese, 28 overweight and 33 normal-weight) aged from 60 to 92 years old participated in this study. Weight and height were measured, and BMI was calculated. BMD of the ultradistal (UD) radius, the 1/3 radius, the total radius and the total forearm was measured by DXA (GE Healthcare Lunar Prodigy).

Results: In the whole population, body weight was positively correlated to UD radius BMD ($r=0.45$; $P<0.001$), 1/3 radius BMD ($r=0.39$; $P<0.001$), total radius BMD ($r=0.46$; $P<0.001$), and total forearm BMD ($r=0.46$; $P<0.001$) while age was negatively correlated to UD BMD ($r=-0.28$; $P<0.001$), 1/3 radius BMD ($r=-0.29$; $P<0.001$), total radius BMD ($r=-0.32$; $P<0.001$) and total forearm BMD ($r=-0.33$; $P<0.001$). Using multiple linear regression analysis models, age and weight explained 21, 17, 23 and 24 % of the UD radius BMD, 1/3 radius BMD, total radius BMD and total forearm BMD variances, respectively. Age was not significantly different among the three groups (obese, overweight and normal-weight). UD radius BMD, 1/3 radius BMD, total radius BMD and total forearm BMD values were significantly higher in obese and overweight men compared to normal-weight men ($P<0.001$). However, UD radius BMD, 1/3 radius BMD, total radius BMD and total forearm BMD values were not significantly different between obese and overweight men.

Conclusion: This study suggests that obesity and overweight are associated with higher UD radius, 1/3 radius, total radius and total forearm BMD values in Lebanese men. Thus, obesity and overweight seem to be protective against forearm osteopenia in Lebanese elderly men.

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THE ROLE OF SUPERVISED EXERCISES ON QUALITY OF LIFE AND DEPRESSIVE SYMPTOMS IN POSTMENOPAUSAL WOMEN

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Objective: To determine the effects of supervised exercises on health-related quality of life and depressive symptoms in postmenopausal women.

Material and Methods: 84 eligible postmenopausal women were assigned to an exercise program that combine high-impact and resistance training ($n=54$), or a control group ($n=30$). All participants received calcium and vitamin D supplementation. The patients in training group participated in a supervised training program, which consisted of the 1-h

exercise session three times a week for 6 months. Health-related quality of life and depressive symptoms were assessed using the QUALEFFO and Beck Depression Scale (BDS) at the beginning and 6-month of the study, respectively.

Results: The mean age of the patients was 54.9 ± 4.6 years, and the mean of BMI was 26.7 ± 3.9 kg/m². The mean age of menopause of the patients was 46.5 ± 3.9 years. There was not found any significant difference between the groups on the demographic and clinical characteristics of the participants ($p > 0.05$) at baseline assessment. QUALEFFO scores decreased 29.6 % in training group and increased 9.2 % in control group. BDS scores decreased 24.8 % in training group and increased 21.2 % in control group. Finally, in exercise group, the health-related quality of life and depressive symptoms improved significantly ($p < 0.001$).

Conclusion: Regardless of the effect of exercise interventions on bone metabolism and falls, our data suggest that the 6-month supervised, combined exercise improve health-related quality of life and depressive symptoms in postmenopausal women.

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THE INFLUENCE OF WEIGHT STATUS ON FORE-ARM BONE MINERAL DENSITY IN A GROUP OF YOUNG LEBANESE WOMEN

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Objective: To investigate the influence of the weight-status (overweight and normal-weight) on BMD of the forearm in a group of young Lebanese women.

Material and Methods: 151 young Lebanese women (35 overweight women: BMI > 25 kg/m², and 116 normal-weight women: BMI < 25 kg/m²) aged from 19 to 40 years old participated in this study. Weight and height were measured, and BMI was calculated. BMD of the ultradistal (UD) radius, the 1/3 radius, the total radius and the total forearm was measured by DXA (GE Healthcare Lunar Prodigy).

Results: In the whole population, body weight was positively correlated to UD radius BMD ($r = 0.38$; $P < 0.001$), 1/3 radius BMD ($r = 0.39$; $P < 0.001$), total radius BMD ($r = 0.43$; $P < 0.001$), and total forearm BMD ($r = 0.43$; $P < 0.001$). Age was positively correlated to UD BMD ($r = 0.29$; $P < 0.001$), total radius BMD ($r = 0.21$; $P < 0.01$) and total forearm BMD ($r = 0.20$; $P < 0.05$). Using multiple linear regression analysis models, age and weight explained 10, 6 and 5 % of the UD radius BMD, total radius BMD and total forearm BMD variances, respectively. Age was not significantly different between the two groups (overweight and normal-weight). UD

radius BMD, 1/3 radius BMD, total radius BMD and total forearm BMD values were significantly higher in overweight women compared to normal-weight women.

Conclusion: This study suggests that being overweight is associated with higher UD radius, 1/3 radius, total radius and total forearm BMD values in young women. Thus, being overweight seems to be protective against forearm osteopenia in young Lebanese women.

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CHANGES IN BONE MINERAL DENSITY AND TRABECULAR BONE SCORE (TBS) AS INDICATORS OF ON-TREATMENT ANTIFRACTURE EFFECT: THE MANITOBA BMD COHORT

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Objective: BMD and TBS (with clinical risk factors) identify individuals at high fracture risk for osteoporosis treatment (OSRx). Whether changes in BMD or TBS are indicators of on-treatment antifracture effect is unclear.

Material and Methods: A registry of all DXA results for Manitoba, Canada identified women age > 40 years with two DXA scans not receiving OSRx at baseline. We examined BMD and TBS change, OSRx use (medication possession ratio [MPR]) and incident major osteoporotic fracture (MOF).

Results: We studied 9044 women, baseline age 62 ± 10 years, FRAX MOF probability $9.4 \% \pm 6.1 \%$. During mean 7.7y follow up, 770 women developed incident MOF (448 before and 296 after the second DXA). Between the two DXA scans (average interval 4.1y), 5083 women initiated OSRx (MPR < 0.5 in 2044, MPR 0.5–0.8 in 1155, MPR > 0.8 in 1884; bisphosphonate use 89–91 %) while 3961 women received no OSRx. Change in BMD and TBS differed according to OSRx with larger changes seen in those with greater MPR (ANOVA $p < 0.001$). With first DXA as the index date, change in BMD or TBS did not predict fractures in untreated women. For women initiating OSRx, there was greater antifracture effect for each SD increase in total hip BMD (decrease 20 %, 95 %CI 13–26 %, $p < 0.001$) and femoral neck BMD (decrease 19 %, 95 %CI 12–26 %), while decreases in BMD (exceeding LSC) were associated with higher fracture risk (total hip HR 1.52, 95 %CI 1.21–1.90, femoral neck HR 1.70, 95 %CI 1.27–2.27). In contrast, change in L1–4 BMD showed only a borderline effect in all treated women combined (decrease 9 %, 95 %CI 0–17 %, $p = 0.049$) while change in L1–4 TBS showed no significant antifracture effect. With second DXA as the

index date, no BMD or TBS change measures showed a significant association with subsequent MOF.

Conclusion: Greater on-treatment increases in total hip and femoral neck BMD are associated with lower fracture risk while BMD decreases are associated with higher fracture risk. In contrast, change in spine BMD or TBS were not good indicators of antifracture effect.

Disclosures: D Hans: Co-ownership in the TBS patent. Stock options or royalties: Med-Imaps.

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CLINICAL PERFORMANCE OF AN UPDATED VERSION OF TRABECULAR BONE SCORE IN MEN AND WOMEN: THE MANITOBA BMD COHORT

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Objective: Lumbar spine TBS predicts osteoporotic fractures independent of BMD. Limitations of the TBS version 1.8 (optimized for women of average body size) were identified when TBS was used in men or extremes of BMI due to prominent soft tissue effects. The current study evaluates an updated TBS algorithm (version 2.1) modified to address these technical issues.

Material and Methods: From a registry with all DXA results for Manitoba, Canada, we identified women and men age >40 years with baseline spine DXA (GE Prodigy, 1999–2011). Spine TBS was measured using the previous (version 1.8) and updated TBS (version 2.1) algorithms by the University of Lausanne blinded to clinical outcomes. Incident major osteoporotic fractures (MOFs) and hip fractures (HFs) were obtained from population-based health services data. Descriptive statistics and correlations of both versions of TBS with age and BMI were determined. Fracture prediction was estimated from area under the ROC curve (AUROC). All analyses were sex-stratified.

Results: 47,736 women and 4348 men met the inclusion criteria. With the previous TBS algorithm, average TBS value for men appeared to be significantly lower than women. Under the updated algorithm, average values for men are slightly greater than for women. The updated algorithm is also minimally affected by BMI (Pearson $r=0.01$ in men, -0.01 in women). During mean follow up of 5 years in men there were 214 incident MOFs and 47 HFs; during 6 years in women there were 2895 incident MOFs and 694 HFs. Slight improvements in fracture prediction were seen with the updated TBS algorithm in both men (change in AUROC for MOFs +0.021 [$p=0.19$], HFs +0.046 [$p=.04$]) and women (change in AUROC for MOFs +0.012 [$p<0.0001$], HFs +0.020 [$p<0.0001$]).

Conclusion: The updated TBS algorithm: (1) is less affected by soft tissue effects, (2) gives results for men that are consistent with their lower fracture risk, and (3) improves fracture prediction in both men and women compared with the previous algorithm.

Disclosures: D Hans: Co-ownership in the TBS patent. Stock options or royalties: Med-Imaps.

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EPIDEMIOLOGY OF OSTEOPOROSIS IN POLISH PATIENTS WITH CROHN DISEASE

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Objective: Osteoporosis affects most commonly patients with Crohn's disease (CD). It might result as complication of steroid therapy. It is important to constitute the list of secondary osteoporosis risk factors. It is also important to design separate guidelines for secondary osteoporosis management. Aim: Evaluation of: BMD in patients with CD and correlations with corticosteroid intake, BMI, number of hospitalisations.

Material and Methods: The study group: 103 patients with CD aged 35.78 ± 12.79 years on the average, including 51 women aged 39.96 ± 14.09 years and 52 men aged 31.67 ± 9.86 years. DXA of the lumbar spine with L2-L4 assessment and densitometry of the proximal epiphysis of the femur with the assessment of the femoral neck was carried out on all patients, using the DXA-Lunar DPX-IQ. The analysis took into account, the values of BMD as well as the T-score and Z-score indices. Each patient filled a specially designed questionnaire concerning the current progress of the disease. Statistical analysis was carried out using the Statistica PL10 software (StatSoft). A correlation coefficient level of $p<0.05$ was regarded as significant in all tests.

Results: The average BMD (cm²) in CD was 1.107 ± 0.180 in L2-L4 and 0.941 ± 0.177 in the neck. The prevalence of normal BMD, osteopenia, osteoporosis and advanced osteoporosis in CD was: I—in L2-L4 (T-score): $n=51$ (49.51 %), $n=40$ (38.83 %), $n=8$ (7.77 %), $n=4$ (3.88 %); II—in neck (T-score): $n=60$ (58.25 %), $n=37$ (35.92 %), $n=5$ (4.85 %), $n=1$ (0.97 %). We observed correlation between BMD and body mass, duration of disease and number of hospitalization ($p<0.005$), we did not observed correlation between BMD and corticosteroids intake.

Conclusion: Secondary osteoporosis and osteopenia is frequent in Polish patients with CD. The incidence of osteoporosis increases with the duration of the disease and the number of hospitalizations.

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OSTEOPOROSIS IN POLISH PATIENTS WITH ULCERATIVE COLITIS

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Objective: Osteopenia and osteoporosis is common in ulcerative colitis (UC) and is also related to the severity of the disease. Severe UC presents a higher level of inflammation and therefore the need of steroid administration, which are one of risk factors for bone loss and fracture. Aims: Evaluation of BMD in patients with UC and correlations with corticosteroid intake, BMI, number of hospitalisations.

Material and Methods: The study group: 105 patients with UC aged 39.56±14.97 years on the average, including 56 women aged 39.23±15.38 years and 49 men aged 39.94±14.64 years. Densitometry of the lumbar spine with L2-L4 assessment and densitometry of the proximal epiphysis of the femur with the assessment of the femoral neck was carried out on all patients, using DXA Lunar DPX-IQ. The analysis took into account, the values of BMD as well as the T-score and Z-score indices. Each patient filled a specially designed questionnaire concerning the current progress of the disease. The analysis was carried out using the Statistica PL10 software (StatSoft). A correlation coefficient level of $p < 0.05$ was regarded as significant.

Results: The average BMD (cm²) in UC was: 1.165±0.143 in L2-L4 and 0.982±0.158 in the neck. The prevalence of normal BMD, osteopenia, osteoporosis and advanced osteoporosis in CD was: I—in L2-L4 (T-score): $n=67$ (65.05 %), $n=33$ (32.04 %), $n=3$ (2.91 %), $n=0$ (0.00 %); II—in neck (T-score): $n=74$ (70.48 %), $n=28$ (26.67 %), $n=2$ (1.90 %), $n=1$ (0.95 %). We observed correlation between BMD and body mass, duration of disease and number of hospitalization and corticosteroids intake ($p < 0.005$).

Conclusion: Secondary osteoporosis and osteopenia is frequent in polish patients with UC. The incidence of osteoporosis increases with the duration of the disease, number of hospitalizations and corticosteroids intake.

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THE BONE QUALITY CHANGES IN PATIENTS WITH RHEUMATOID ARTHRITIS AFTER 12 MONTHS OF TREATMENT WITH HIGH DOSES OF ALFACALCIDOL

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Objective: To assess changes in BMD and microarchitectural bone status by TBS in RA patients (pts), before and after 12 months of treatment with high doses of alfacalcidol (vitamin D analogue).

Material and Methods: The study included 48 consecutive females with RA. Glucocorticoids (GCs) were used at some point of treatment in 39/48 pts. However, no one had OP or GC treatment at the study entry. Five out of 48 pts had previous low trauma fractures. No other risk factors for OP were recorded. They were randomly assigned to one of three treatment groups with 1 µg (19/48), 2 µg (15/48) and 3 µg (14/48) alfacalcidol daily respectively. Pts were assessed for BMD and TBS at the beginning and after 12 months of the treatment (DXA measurement-Hologic Prodigy). If background therapy was changed, patients were excluded from the study. The study was approved by local Ethics Committee.

Results: All 48 patients were postmenopausal, age 54.8±12.03 years, with average disease duration of 7.6±6.85 years and methotrexate dose 15±3.31 mg weekly. D Average DAS28 was 5.29±0.914 and serum levels of 25OHD3 30.18±12.468 ng/ml. Mean baseline lumbar spine BMD was 0.819 g/cm², while femoral neck BMD was 0.692±0.034 and TBS was 1.226±0.1123. After 12 months of treatment 6 pts were excluded, due to using GC or bisphosphonates, in other 42 pts, regardless of alfacalcidol dose, both lumbar and femoral BMD increased by 1.6 and 0.78 %, respectively, while TBS increased significantly: 1.226 vs. 1.299 ($p < 0.05$). There was no alfacalcidol dose dependent difference in DXA changes. Urinary calcium increased significantly during treatment, but variations were in between reference ranges (0.16±0.069 vs. 0.26±0.150 g/24 h).

Conclusion: Twelve months of alfacalcidol treatment in vitamin D replete pts with active RA, significantly improved bone micro architectural structure assessed by TBS, in addition to slight increase of BMD, with acceptable safety profile.

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AQUATIC EXERCISE AND WEIGHT TRAINING: COMBINED EFFECT ON THE PREVENTION OF OSTEOPOROSIS IN SEDENTARY MALES- AN ANALYTICAL STUDY

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Objective: Aquatic exercises are effective at reducing the impact of osteoarthritis and osteoporosis. Further, weight training is a must for the prevention of osteoporosis. The purpose of this study was to find out the effect of aquatic exercise and weight training intervention programs in the prevention of osteoporosis

Material and Methods: 30 Sedentary males aged 50–60 year were subjects divided into two groups of 15 each. Group I experimental group underwent the aquatic exercise and weight training program for 15 weeks, 4 times/week and 50 min per session. Group II which was control group was asked to do their regular routine exercise avoiding the protocol of the group I. A pre and post-test was conducted for both the groups for the following variables: 1. Height 2. Weight 3. BMI 4. FM 5. FFM 6. Strength (1RM max) 7. BMD. Mean, SD and 't' test were the statistical instruments for analysis of the data with 0.05 level of significance.

Results: The results showed significant differences between the group I and group II with regard to BMI and FM from the pre to posttest with the 't' values reading 2.93 and 3.012, respectively, which showed a decrease. The FFM increased as the 't' value of 2.47 showed significant difference. The strength of group I increased in most of the body areas as compared to the group II. Lastly the main important variable BMD improved but not significantly.

Conclusion: Aquatic exercises and weight training have significant effect on the elderly sedentary males in improving strength and to certain extent BMD which ultimately helps in the prevention of osteoporosis.

References: Cosman F et al., *Osteoporos Int* 2014;25:2359. Hamilton CJ et al., *Osteoporos Int* 2010;21:11.

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HYPOVITAMINOSIS D DURING OSTEOPOROSIS TREATMENT WITH BISPHOSPHONATES CAUSE OF FAILURE?: CASE REPORT

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Objective: To show possible cause of failure bisphosphonates treatment of osteoporosis.

Material and Methods: Female patient, age 60, 164 cm, 62 kg, BMI 23.1, menopause duration 14 years, nonsmoker, without previous fractures and other risk factors of osteoporosis, came in our clinic because of back pain and RTG diagnosed vertebral wedge fracture of v L1. She was closely examined by her GP and secondary causes was eliminated.

Results: She was first examined in 2011, when DXA performed L1-L4 T-score -2.1; femur total T-score -2.5; Ca ++

1.18; osteocalcin 9.68 ng/ml; crosslaps 1016.1 pg/ml; 25OHD 66.9, treatment with bisphosphonates was prescribed, supplementation with 500 mg Ca and 2000 IU vitamin D daily and spinal orthosis. 2013 she came the next time, in the meantime she stopped taking supplementation with Ca and vitamin D but continued taking weekly bisphosphonates and she is complaining of new back pains. DXA performed again with L1-4 T-score -3.0; femur T-score -2.7; Ca++ 0.99; crosslaps 945 pg/ml 25OHD 60.3, iPTH 120 pg/ml. RTG showed new vertebral fractures of Th 11 and 12. Next year she was treated with the same therapy and sufficient amount vitamin D until she reached desirable level 25OHD 120 (r.range 75–250). 2014 her DXA L1-4 T-score was -2.4 and femur T-score -2.2 with no new fractures.

Conclusion: A new fracture despite treatment for a sufficient time (>1 year) is a possible sign that the treatment fails. BMD and bone turnover markers are often used, but the true measure is prevention of new fractures. Treatment may fail for several reasons, often it is noncompliance, but hypovitaminosis D and activation of compensatory mechanisms and secondary hyperparathyroidism must be also considered, what probably happened to our patient. We considered switching therapy to anabolic agents but our patient refused it.

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THE INFLUENCES OF VARIOUS ANTIHYPERTENSIVE DRUGS (CAPTOPRIL, CANDESARTAN & ATENOLOL) ON BONE METABOLISM IN ELDERLY WOMEN

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Objective: To investigate the influences of selected antihypertensive drugs (captopril, candesartan, or atenolol) on bone metabolism each utilized by elderly hypertensive women

Material and Methods: 30 Elderly hypertensive women (age >60 years old) treated by specialist physicians with captopril, candesartan, or atenolol (10 for each group) for a period 5–6 years while attending Al Yarmouk Teaching Hospital in Baghdad; in addition to 10 newly diagnosed hypertensive, and 10 normotensive of the aged-matched women to participate in this study. Exclusions criteria: rheumatoid arthritis, diabetes mellitus, taking thyroxin, steroid, estrogen, bisphosphonates, or nutritional supplements. Women in each group were measured for serum calcium, magnesium, inorganic phosphorus, total alkaline phosphatase activity, and PTH. In addition, a BMD and T-score by DXA were measured.

Results: There were no significant differences in the serum levels of either calcium, magnesium, inorganic phosphorus, total alkaline phosphatase activity, and PTH in postmenopausal hypertensive women treated for 5–6 years with either captopril, candesartan or atenolol compared to each other and to newly diagnosed and to aged-matched of normotensive women. In addition, nonsignificant differences in the level of BMD in all treated groups were observed.

Conclusion: The present study gives a preliminary data concerning the association between hypertension and BMD in newly diagnosed hypertensive postmenopausal women; where, hypertension is not associated with the decrease in bone metabolism in those patients. Furthermore, there were no significant influences of various antihypertensive drugs (captopril, candesartan, or atenolol) treatment for 5–6 years in postmenopausal hypertensive women on selected parameters of bone metabolism measured.

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EFFECT OF ALFACALCIDOL AND PLAIN VITAMIN D ON OSTEOPOROSIS: A RANDOMIZED CONTROLLED TRIAL

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Objective: Osteoporosis is a common problem in old age group population leading to fragility fractures. There are multiple drug regimens used for treatment of osteoporosis with a wide range of price variation. This study was conducted to compare the treatment of osteoporosis with either alfacalcidol (1 α -OHD₃) or plain vitamin D (cholecalciferol) combined with alendronate and calcium in terms of efficacy, safety and cost effectiveness.

Material and Methods: We conducted a randomized controlled trial enrolling 80 cases and randomized into two groups of 40 each, one in which alfacalcidol was used in combination with alendronate and calcium and the second in which plain vitamin D was used in similar combination. Student's test with 95 %CI was used to evaluate the difference between the two treatment groups. Categorical variables were analyzed using chi-square test. A p value of 0.05 was considered significant for all statistical tests.

Results: In the alfacalcidol group the mean percentage change in BMD was 9.3 % and in the plain vitamin D group it was 6.9 %, the mean being 8.1 %. The mean percentage change in T-score was 15.8 %. In the alfacalcidol group it was 16.9 % and in the other group it was 14.7 %.

Conclusion: There is no statistical difference in the results of two treatment groups, though there is increment in BMD and T-score both the groups. The efficacy and safety were similar in both the groups though the treatment cost is much higher in the alfacalcidol group.

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RELATIVE IMPORTANCE OF LEAN MASS AND FAT MASS ON BONE MINERAL DENSITY IN YOUNG LEBANESE ADULTS

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Objective: To determine the relative importance of lean mass (LM) and fat mass (FM) on BMD in a group of young Lebanese adults.

Material and Methods: A total of 68 men and 56 women (aged between 20 and 35 years) participated in this study. Whole body (WB) bone mineral content (BMC), WB BMD, lumbar spine (L1-L4) BMD, total hip (TH) BMD and femoral neck (FN) BMD were measured by DXA. Body composition was assessed using the same technique.

Results: In men, LM was correlated to WB BMC ($r=0.69$; $p<0.001$), WBBMD ($r=0.51$; $p<0.001$), L1-L4 BMD ($r=0.33$; $p<0.01$), TH BMD ($r=0.33$; $p<0.01$) and FN BMD ($r=0.33$; $p<0.01$) whereas FM only correlated to WB BMC ($r=0.40$; $p<0.001$), WB BMD ($r=0.40$; $p<0.001$) and TH BMD ($r=0.24$; $p<0.05$). In women, both LM and FM were positively related to WB BMC ($r=0.77$; $p<0.001$ and $r=0.41$; $p<0.01$, respectively), WB BMD ($r=0.71$; $p<0.001$ and $r=0.49$; $p<0.001$, respectively), L1-L4 BMD ($r=0.58$; $p<0.001$ and $r=0.26$; $p<0.05$, respectively), TH BMD ($r=0.66$; $p<0.001$ and $r=0.46$; $p<0.001$, respectively) and FN BMD ($r=0.67$; $p<0.001$ and $r=0.45$; $p<0.001$, respectively). In both genders, the positive associations between fat mass and bone variables (BMC and BMD) disappeared after adjusting for lean mass using multiple linear regression models.

Conclusion: This study suggests that lean mass is a stronger determinant of BMD than fat mass in young adult men and women.

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MOLECULAR AND GENETIC MECHANISM OF HEPICIDIN IN REGULATION OF BONE METABOLISM IN ZEBRAFISH

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Objective: Osteoporosis and other diseases of bone loss represent a major public health problem, with an estimated 100 million people at risk of developing the disease worldwide. Osteoporosis is characterized by a gradual reduction in bone mass to a point where the skeleton is compromised, leading to bone fragility and susceptibility to fractures. Numerous researches have been performed to determine the effect of iron overload on bone. Various animal models from mice to rat and pig, with experimental and acute iron overload have shown that iron-induced osteoclastic activity plays a crucial role. The iron regulatory hormone hepcidin is transcriptionally upregulated in response to iron loading. We hypothesized that hepcidin plays a critical role both in bone metabolism in zebrafish embryos.

Material and Methods: Here we used hepcidin splicing block and transcription block morpholino to knock down hepcidin of zebrafish to observe the change of phenomenon. 1. Zebrafish maintenance, 2. Design, construction of morpholino and micro-injection, 3. Genome DNA extraction, 4. Restriction- endonuclease-resistant restriction fragment length polymorphism (RFLP) assay, 5. RNA isolation and cDNA synthesis, 6. qRT-PCR analysis, 7. In situ hybridization, 8. Alizarin red staining the adult zebrafish and double staining the larvae, 9. HEK293 cell culture and transfection, 10. Rescue.

Results: We observed that hepcidin knockdown fish fail to develop opercula, and display curved tail fin and craniofacial malformation. qRT-PCR results showed that a number of the osteoblast markers were significantly downregulated in comparison with wildtype or heterozygous fish.

Conclusion: Together, these results indicate that hepcidin knockdown fish is required for zebrafish bone development and these zebrafish model should be invaluable for studying bone diseases in human.

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QUALITY OF LIFE IN PATIENTS WITH BILATERAL RUPTURE OF ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Objective: The injury of the ACL of the knee, in a number of cases is repeated on the other knee. The goal is to analyze the causes of the injury of the ACL on both knees in our materials, as well as notice the common denominators regarding the appearance of these injuries and the quality of life evaluation with the people suffering from this injury.

Material and Methods: The analysis included 32 patients with the reconstruction of the ACL on both knees. Patients were tasked with filling in the KOOS questionnaire, modified in such a way to

fit the bilateral reconstruction of the ACL in order to differentiate the time of the first and second knee injury, rehabilitation phases, combined injuries as well as the Lysholm knee scoring scale.

Results: KOOS questionnaire is perfectly acceptable for the assessment of life quality after reconstructive surgery of the ACL of the knee. There is no statistically important reduction in life quality after bilateral ACL surgery and there is no decrease when compared to the level before the initial surgery. The return to the same level of sport activity as before the reconstructive surgery, or even higher, is one of the prerequisites for the ligaments being torn in the other knee as well. Due to insufficiencies of the KOOS questionnaire itself, since it cannot be applied to the bilateral cruciate ligament injury, based on the time period after which the respondent is asked to provide answers with the potential error in memory and the methodologically small sample, a more detailed analysis of the results is necessary, along with a larger statistical sample.

Conclusion: Perception of life quality does not decreasing with time after bilateral knee ACLs. Lysholm score is proportional to KOOS score, Lysholm and score values decline in the function of time and they are inversely proportional to the age of the respondent.

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QUANTIFYING OF SERUM CONCENTRATION OF BETA CROSSLAPS AS AN FACTOR OF ESTIMATE IN EFFICACY BISPHOSPHONATE THERAPY IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: PROSPECTIVE STUDY

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Objective: Osteoporosis is a disease in which the density of bone are reduced with an increased bone fracture risk. Serum concentration of β crosslaps as factor of bone degradation it may be beneficial method of estimate in efficacy bisphosphonate therapy in postmenopausal women with osteoporosis.

Material and Methods: Two years prospective study. Women with postmenopausal osteoporosis diagnosed by DXA osteodensitometry, treated by bisphosphonates (alendronate weekly or ibandronate monthly). BMD and T-score was observed before and at the end of treatment and β crosslaps before and after 3, 12 and 24 months of beginning treatment.

Results: 218 women with osteoporosis with average age 61.58 years were treated from 2009 to 2013. Before treatment T-score-LS spine was from -2.6 to -4.6 SD and BMD generally was 0.702 g/cm²; T-score-hip was from -2.4 to -3.7 SD and BMD generally was 0.517 g/cm². After 2 years T-score-LS spine was from -1.8 to -2.8 SD and BMD generally was 0.844 g/cm²; T-score-hip was from -1.7 to -2.7 SD, and BMD generally was 0.702 g/cm². Serum concentration of β crosslaps before treatment generally was 822.42 μ g/ml, after

3 month 305.33 $\mu\text{g/ml}$, after year 142.28 $\mu\text{g/ml}$ and after 2 years 139.38 $\mu\text{g/ml}$. Considerable difference ($p < 0.05$ Student t-test) in increase T-score and BMD and highly significant ($p < 0.001$, Student t-test) in decrease of concentration of β crosslaps in the tested group of patients after treatment was statistically found. Positive coherency in increase T-score and BMD and decrease of concentration of beta cross laps was statistically found.

Conclusion: Serum concentration of β crosslaps can be used as efficient factor of estimate in efficacy bisphosphonate therapy in postmenopausal women with osteoporosis and maintenance of accomplished effect.

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RADIONUCLIDE MUSCULOSKELETAL IMAGING: INCREMENTAL VALUE OF SPECT-CT

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Objective: Bone scan is used in a broad spectrum of musculoskeletal (MSK) diseases; inflammatory pathology to secondary metastases. Hybrid scanners have ‘logarithmically’ enhanced the power of conventional radionuclide scanning. Purpose of this study was to review the incremental findings of SPECT-CT in MSK imaging.

Material and Methods: Retrospective review of SPECT-CT scans acquired as an adjunct to planar Tc^{99m} MDP bone scan (Oct 2013–July 2014). Data assessed in 2 subsets based on clinical indications.

Results: In a 9 month period 2663 bone scans were performed with 220 (8.3 %) having SPECT-CT as an adjunct. 115 females. Mean age: 51 years \pm 17.9 SD. Group A: Indication—Benign pathology? [$n=72$]. Patients with backache revealed osteophytes [$n=10$] and compression fracture [$n=2$], facet-joint arthropathy [$n=4$], osteoid osteoma [$n=1$], Schmorl’s node [$n=1$] and rib fracture [$n=1$]. Patients referred for pelvic/hip joint pain had: avascular necrosis of femoral head [$n=2$], fracture [femur $n=1$, coccyx $n=1$, ischium $n=1$], osteitis pubis [$n=1$] and sacroilitis [$n=1$]. 2 with pain in known fibrous dysplasia had active disease. 8 cases revealed osteomyelitis, 4 had soft tissue inflammation/cellulitis. Stress/sports injuries: stress fracture [$n=5$], shin splint [$n=2$] and enthesiopathy [$n=1$]. 1 mandibular graft confirmed as nonviable. 1 fractured femur confirmed as non-union. Group B: Indication—Skeletal Metastases? [$n=148$]. 51[34 %] scans revealed metastases, while 75[51 %] cases had benign pathology. Processes identified: degenerative spine [$n=38$], vertebral compression fracture [$n=5$], facet-joint arthropathy [$n=7$], fractures [$n=10$], hemangioma [$n=1$], Schmorl’s node [$n=1$], osteoarthropathy [$n=4$], bone island [$n=1$], pseudoarthrosis [$n=1$], extraskeletal soft tissue uptake [$n=7$].

22[15 %] remained uncharacterized after SPECT-CT. SPECT-CT added conclusive characterization to 86 % of cases.

Conclusion: Hybrid SPECT-CT imaging improves the diagnostic yield of planar bone scan and is the preferred modality for evaluating benign as well as malignant MSK disease.

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BODY COMPOSITION’S INFLUENCE ON ADOLESCENT BONE HEALTH: A CROSS-SECTIONAL STUDY FROM THE TROMSØ STUDY, FIT FUTURES

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Objective: Greater BMI is associated with higher BMD at all ages. In this study we explored how body composition relates to BMD at the total hip in adolescence.

Material and Methods: In 2010/2011, 93 % of the region’s first-year upper secondary school students attended the Tromsø Study, Fit Futures. BMD at total hip was measured as g/cm^2 by DXA (GE Lunar prodigy) as well as total body lean mass (LM) and fat mass (FM) in grams. Height and weight were measured, and BMI calculated. Lifestyle variables were collected by self-administered questionnaires and interviews, including questions on time spent on leisure time physical activity (PA), according to the Gothenburg instrument. Analyses of variance and different regression models included 395 girls and 363 boys aged 15–18 years. Crude results were adjusted for multiple covariates known to affect bone.

Results: In girls, hip BMD was related to LM with a beta of 0.010 g/cm^2 ($p < 0.001$) per kilogram increase in body mass and to FM with 0.002 g/cm^2 ($p = 0.003$), robust to adjustments for age, height, sexual maturation, PA-levels, vitamin D, calcium, alcohol consumption and smoking habits. By contrast in boys, relationships were

seen only between hip BMD and LM ($\beta=0.011$ g/cm², $p<0.001$). The odds ratio (CI) for having osteopenia was 6.0 (3.2–11.2) in boys and 3.4 (2.0–5.7) in girls per SD decrease in LM.

Conclusion: The results support a gender difference in relationships between body build and bone mass acquisition. High lean mass is of crucial importance for boys, highlighting the negative impact of inactivity on bone strength; whereas both lean mass and fat mass are essential contributors to bone strength in girls.

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RELEVANCE OF LACTOSE INTOLERANCE AND DEVELOPMENT OF OSTEOPOROSIS IN POSTMENOPAUSAL NORTH INDIAN WOMEN

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Objective: 1. To study the prevalence of lactose intolerance in postmenopausal North Indian women. 2. To study whether lactose intolerance has an effect on development of osteoporosis in these women.

Material and Methods: Study design: Prospective observational, cross-sectional. This study was conducted in the Department of Obstetrics & Gynaecology and Gastroenterology of Postgraduate Institute of Medical Education and Research, Chandigarh, India. A total number of 250 postmenopausal women in age group of 50–65 years were recruited after assessing their eligibility according to the selection criteria. A detailed history was recorded in the proforma. Complete systemic and pelvic examination and routine investigations for postmenopausal age group as per protocol of the institute was conducted. All women were subjected to noninvasive lactose hydrogen breath test using Clinical gas chromatograph (Microanalyzer) from Quintron, after 25 g lactose. Samples were taken every 30 min for 3 h. Values greater than 20 ppm over the fasting value was taken as positive for lactose intolerance and others as nonlactose intolerant. All women were also subjected to DXA scan of lumbar spine. A T-score of -2.5 or less was taken as osteoporosis.

Results: In our study we recruited 250 postmenopausal Indian women in age group of 50–65 years. All were subjected to H2BT (hydrogen breath test) and DXA scan. Prevalence of lactose intolerance was found out to be 61.6 % (155/250). Prevalence was found to be increased with increasing age, i.e., 21 % in age group of 50–55 years, 33 % in age group of 56–60 years and 46 % in age group of 61–65 years. Out of the total lactose intolerant (155) women, 86 had DXA scan results

with T-score <-2.5 , i.e., 55.5 % were found to have osteoporosis ($p<0.001$).

Conclusion: Our study showed that prevalence of lactose intolerance is high in Northern regions of India and higher percentage of lactose intolerant women had DXA scan BMD results in the osteoporotic range (55.5 vs. 33.7 % in NLT group, $p<0.001$).

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IMPLEMENTATION OF SECONDARY FRACTURE PREVENTION SERVICES AFTER HIP FRACTURE: A QUALITATIVE STUDY USING EXTENDED NORMALIZATION PROCESS THEORY

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Objective: Patients with hip fracture are at high risk of subsequent fragility fracture. Although secondary fracture prevention services are recommended, the extent of and nature of their delivery varies and no research has identified or explored service implementation. Understanding processes of implementation is crucial to improving service design and evaluation.

Material and Methods: To understand key elements of implementation of fracture prevention services, we conducted qualitative research using a theoretical framework. The qualitative research comprised 43 semi-structured interviews with UK professionals involved in delivering services. The theoretical framework was ‘extended Normalization Process Theory’ (ENPT), which suggests exploring implementation through four constructs: 1) capacity, 2) potential, 3) capability, 4) contribution. With informed consent, interviews were audio-recorded, transcribed and anonymised. Using QSR NVivo software, data were coded inductively and the four constructs of ENPT were applied.

Results: Participants included orthogeriatricians, fracture prevention nurses and service managers. 1) Capacity: the capacity of professionals to co-ordinate their actions was achieved using dedicated fracture prevention coordinators, but effective communication with GPs was a challenge. 2) Potential: professionals had potential to

deliver services, and coordinators and multidisciplinary team working facilitated this. 3) Capability: the involvement of coordinators enabled services to be integrated into working practice, but implementation was threatened by too few staff, lack of capacity to administer scans and poor patient access. 4) Contribution: contributions to ongoing service delivery were shaped through multidisciplinary team meetings, use of clinical databases and monitoring.

Conclusion: The study provides detailed, empirically and theoretically-based information on how best to implement future services.

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COMPLICATIONS AFTER SURGERY FOR HIP OSTEOARTHRITIS: A QUALITATIVE STUDY WITH PATIENTS AND SURGEONS

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Objective: Around 1 % of patients who have hip replacement have deep prosthetic joint infection afterwards. Infection is treated with antibiotics and revision surgery. We aimed to characterise the impact of deep joint infection and its treatment, to identify treatment preferences, and to describe surgeons' treatment decisions.

Material and Methods: In a qualitative study in the UK we interviewed 19 patients who had infection after hip replacement and 12 orthopaedic surgeons specialising in infection. Face-to-face interviews with patients explored experience of infection, treatment and recovery. Interviews with surgeons explored treatment decisions. With consent, interviews were audio-recorded, transcribed and anonymised. Once imported into QSR NVivo software, data were analysed using constant comparison.

Results: Patients with deep joint infection described mobility loss, pain, loss of valued activities, changes to home environments/moving into care, negative impact on personal

relationships and financial strain. Physical and psychological trauma was associated with revision surgery and antibiotic treatment. Patients had strong preferences for treatment options, emphasising impact of surgery, side effects of antibiotics and duration of treatment as key considerations. Although eradication of infection was important, patients felt that reducing impact of treatment was high priority and identified a need for more support. Surgeons' treatment decisions focused on patient characteristics and nature of infection to prioritise eradication of infection. During patients' recovery surgeons' were concerned about possible return of infection and patients' mobility and function.

Conclusion: Infection after joint replacement causes physical and psychological trauma. Balancing patients' preferences for reducing impact of treatment with surgeons' emphasis on eradication of infection should be an important consideration in care. There is also need to develop new interventions to support patients with infection.

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THE EFFECT OF LOCAL ANAESTHETIC INFILTRATION ON CHRONIC POST-SURGICAL PAIN AFTER TOTAL HIP AND KNEE REPLACEMENT: THE APEX RANDOMISED CONTROLLED TRIALS

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Objective: Around 10 % of patients with total hip replacement and 20 % of patients with total knee replacement report long-term pain after surgery. Local anesthetic infiltration reduces pain severity in the acute post-operative period, long-term effect is not known. We aimed to determine if intra-operative local anesthetic infiltration reduces pain at 12 months after surgery.

Material and Methods: Two single-centre double-blind randomised controlled trials were conducted: one with patients undergoing total hip replacement; one with patients undergoing total knee replacement. 1215 eligible patients were approached and 322 patients awaiting hip and 316 awaiting knee replacement were recruited. Participants were

randomised (1:1) to receive local anesthetic infiltration of 60 ml 0.25 % bupivacaine with 1 in 200,000 adrenaline intra-operatively and standard anesthetic care, or standard anesthetic care alone. Participants and outcomes assessors were masked to allocation. The primary outcome was joint pain severity, measured using the 5-item WOMAC Pain scale, 12 months after surgery. Analyses were conducted by intention-to-treat and per-protocol approaches, intention-to-treat is reported here.

Results: Hip replacement: Patients with hip replacement in the intervention group had less severe pain at 12 months after surgery compared with the standard care group (differences in means 4.47; 95 %CI 0.95, 8.54; $p=0.015$). Post hoc analysis found that patients in the intervention group were more likely to have none, mild or moderate pain than severe or extreme pain at 12 months than the standard care group (OR 10.19; 95 %CI 2.10, 49.55; $p=0.004$). Knee replacement: There was no strong evidence that pain severity at 12 months after knee replacement differed between patients in the intervention and standard care group (difference in means 3.38; 95 %CI $-0.83, 8.49$; $p=0.107$).

Conclusion: There was evidence that local anaesthetic infiltration reduces pain severity at 12 months after total hip replacement but not after total knee replacement.

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PAIN RECOVERY FOLLOWING HIP AND KNEE REPLACEMENT: A LONGITUDINAL STUDY

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Objective: To investigate pain and function recovery trajectories after hip and knee replacement and quantify the interrelations within and between pain and function over time.

Material and Methods: Self-reported joint pain severity (WOMAC), physical function (WOMAC), and objective physical function (20 m walk test) were assessed in a prospective cohort of 249 patients undergoing hip ($n=123$) or knee ($n=126$) replacement at 0, at 3 and 12 months after surgery. Pain and function were jointly analysed using a longitudinal mixed model. A linear spline model was used to compare short-term (0–3 months) change and long-term (3–12 months)

change. Analyses were conducted separately for hip and knee replacement patients.

Results: Pre-operative pain and self-reported function were highly correlated (hip $r=0.78$, 95 %CI [0.71,0.85]; knee ($r=0.81$ [0.75,0.87]), as were their short-term changes (hip $r=0.76$ [0.68,0.84]; knee $r=0.80$ [0.74,0.87]) and long-term changes (hip $r=0.64$ [0.53,0.75]; knee $r=0.64$ [0.52,0.75]). Greatest improvements in pain and function occurred in the short-term (hips: function, standardised monthly mean change= 0.33 [0.28, 0.38], pain coef. = 0.38 [0.33,0.43]); knees: function coef. = 0.29 [0.24, 0.33], pain coef. = 0.34 [0.28,0.39]). Hip patients with severe pre-operative pain had large short-term functional improvements in self-reported ($r=-0.36$ [$-0.52, -0.20$]) and objectively ($r=-0.45$ [$-0.60, -0.30$]) assessed outcomes. Short-term changes in pain were correlated with long-term change in self-reported function ($r=-0.25$ [$-0.43, -0.07$]), but not with objectively measured function. For knee patients, pre-operative pain and short-term changes in function, and short-term change in pain and long-term changes in function were weakly or not correlated.

Conclusion: Findings suggest that there are key differences in the relationship between pain and function in hip and knee replacement, with the majority of improvement in the first 3 months.

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PSYCHOLOGICAL ASPECTS OF HIP REPLACEMENT: A LONGITUDINAL QUALITATIVE STUDY OF PATIENTS' EXPERIENCES

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Objective: Psychological interventions for managing pain and disability are employed with patients with OA, but there are no tailored interventions for OA patients undergoing joint replacement. This is partly due to lack of knowledge about the psychological support needs of patients before and after surgery. Identifying these has the potential to inform intervention development to improve patients' wellbeing.

Material and Methods: We conducted a longitudinal, qualitative study with 24 patients undergoing total hip replacement in the UK. Interviews before surgery and at 1, 6 and 12 months afterwards addressed experience of OA, surgery and recovery. With informed consent, interviews were audio-recorded,

transcribed and anonymised. Using Atlas.ti software, inductive thematic analysis was undertaken. We present findings related to psychological experience.

Results: Before surgery, patients reported lack of confidence, fear and vulnerability. This limited their engagement in valued activities, particularly outside the home. In the time shortly after surgery, patients felt vulnerable because of surgery and expressed concerns about returning home after discharge. In the longer term, patients reported slow but considerable gains in confidence and ability to perform everyday activities. Although confidence and associated activity increased over time, this was tempered by concern not to damage or dislocate the operated hip. Patients' confidence was both enhanced and adversely affected by interactions with health professionals, friends and family.

Conclusion: Drawing on these findings, we conclude that the psychological concept of 'self-efficacy' is relevant to this patient group. 'Self-efficacy' is the extent to which a person believes that they can perform tasks, activities or goals. Interventions to enhance self-efficacy already exist for patients with OA. Our study provides evidence of scope to develop and evaluate theoretically-informed interventions to enhance self-efficacy in patients undergoing joint replacement.

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PROFESSIONALISM AND DECISION-MAKING: A QUALITATIVE STUDY OF ORTHOPAEDIC SURGEONS' PROVISION OF CARE FOR PATIENTS WITH OSTEOARTHRITIS

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Objective: Guidance for patients and professionals indicates that decisions about joint replacement for osteoarthritis should be shared between patients and professionals, based on best evidence and in light of previous treatments. Across health research, work has described professionalism in healthcare practice, but professionalism in orthopaedic decisions has not been explored. Understanding how decisions are made

in the context of professionalism complements research with patients and provides information for medical education and patient information. This study explored surgeons' decisions about joint replacement.

Material and Methods: In a qualitative study, 28 orthopaedic surgeons in the UK took part in face-to-face qualitative interviews to address decisions about joint replacement and experiences of working in the profession. With consent, interviews were audio-recorded, transcribed and anonymised. Once imported into QSR NVivo software, data were analysed thematically.

Results: Surgeons' assessment of need for joint replacement considered multiple factors based on examination, imaging and discussion. Surgeons worked to manage patients' expectations about post-operative outcome and saw this as key to securing satisfactory results for patients and surgeons. Referral processes were a source of frustration and surgeons saw reduced waiting times and triage systems as introducing additional work without always providing benefit to patients. Surgeons highlighted the importance of fostering patients' confidence and trust during the decision making process. Provision of expertise was paramount, and surgeons expressed strong sense of duty to patients.

Conclusion: Surgeons' depiction of how they conducted decision making in practice serves to identify key elements of professionalism. Structural changes to healthcare, and unhelpful systems presented threats to their duty of care and to professionalism. Future research and intervention might help to enhance professional satisfaction.

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MULTIVARIATE ANALYSIS OF BONE MINERAL DENSITY AND FRACTURE RISK ASSESSMENT IN HEMODIALYSIS PATIENTS

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Objective: Osteoporosis and fractures are common complications of renal osteodystrophy. DXA, being used to predict fracture risk in individuals with postmenopausal or age-related osteoporosis, is not so useful for predictions of fractures in dialysis patients, due to peculiarities of BMD distribution. The purpose of this study was to perform multivariate analysis of overall and hip fracture risk in hemodialysis patients.

Material and Methods: Prospective study of 522 patients (271 male and 251 female), receiving hemodialysis in several dialysis centers in St. Petersburg was performed. Lumbar spine, femoral neck, and distal forearm BMD were measured by DXA. PTH, alkaline phosphatase, 25(OH) vitamin D and C-reactive protean were analyzed. The patients were followed for a mean of 48 (range 16–118) months.

Results: During the follow up period fractures were registered in 22.9 % of male and in 26.7 % of female. Among the patients with fractures 34 % had fractures of axial skeleton (hip, pelvis, vertebra), 66 % had fractures of the other parts of the skeleton. The multivariate analysis showed that combination of BMD of lumbar spine, distal forearm and duration of renal replacement therapy were the best predictors of overall fracture risk in studied patients. The best predictor of hip fracture was combination of BMD of the hip and duration of dialysis.

Conclusion: DXA and BMD can be used as a predictor of fracture risk in hemodialysis patients when it's results are analyzed in combination with other factors such as duration of renal replacement therapy.

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MALE OSTEOPOROSIS: EPIDEMIOLOGY IN GEORGIAN POPULATION EXPERIENCE GAINED IN SEARCH OF BASIC THERAPEUTIC PERSPECTIVES

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Objective: To evaluate BMD in osteoporotic Georgian male population and analyse antiosteoporotic treatment outcome.

Material and Methods: Since 2007, 970 Georgian males with diagnosis of OP are under regular medical supervision. Age groups are as follows: 279 men <45 years; 460 men 46–60 years, 191 men ≥79 years. The diagnosis of osteoporosis was made by T-Scores using DXA method

Number of Patients <i>n</i> =970	Osteoporosis and osteoarthritis		Thyroid Disease induced OP		Osteoporosis related to secondary hipogonadism		Osteoporosis and artherosclerosis	
	%	Absolute number	%	Absolute number	%	Absolute number	%	Absolute number
	19 %	184,3	20 %	19,4	24 %	232,8	37 %	358,9

430 patients received antiosteoporotic treatment denosumab subcutaneous injection once in every 6 months, with calcium supplement of 1500 mg elemental calcium and vit D 800 IU. DXA was used for the evaluation efficacy of treatment once yearly in 3 years.

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. 3. The lowest BMD values and highest T-Score deviations were observed in males with atherosclerosis. 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.

Conclusion: The pursuit of pharmacologic agent against male osteoporosis is still in progress.

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THE PRESENCE OF MENISCAL LESIONS IS A STRONG PREDICTOR OF NEUROPATHIC PAIN IN SYMPTOMATIC KNEE OSTEOARTHRITIS: A CROSS-SECTIONAL PILOT STUDY

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Objective: Pain in osteoarthritis (OA) has been classically attributed to joint structural damage. Disparity between radiographic structural damage and symptom severity implies that factors other than the joint pathology itself contribute to the pain. Peripheral and central sensitization have been suggested

as underlying mechanisms that contribute to OA pain. We explored in symptomatic knee OA patients, the structural changes assessed by MRI that could be used as markers of neuropathic pain (NP).

Material and Methods: This cross-sectional observational pilot study included 50 knee OA patients with moderate to severe pain (VAS ≥ 40) in the target knee. The presence of NP was determined based on the PainDETECT questionnaire. Among the 50 patients included, 25 had PainDETECT-score ≤ 12 (unlikely NP), 9 had a score of 13–18 (uncertain NP) and 16 had a score ≥ 19 (likely NP). WOMAC, PainDETECT, and VAS pain scores as well as knee MRI were assessed.

Results: Data showed no significant difference in demographic characteristics between the 3 groups. However, a statistically significant positive association was found between the WOMAC pain ($P < 0.001$), function ($P < 0.001$), stiffness ($P = 0.007$) and total ($P < 0.001$) scores as well as higher VAS pain score ($P = 0.023$), and PainDETECT-scores. Although no difference was found in cartilage volume between groups, presence of meniscal extrusion in both medial ($P = 0.006$) and lateral ($P = 0.023$) compartments, and meniscal tears in the lateral compartment ($P = 0.011$), were significantly associated with increasing PainDETECT-score. Moreover, the presence of bone marrow lesions in the lateral plateau and synovial membrane thickness in the lateral recess were associated with increasing PainDETECT-scores ($P = 0.032$, $P = 0.027$, respectively).

Conclusion: In this study, meniscal lesions, particularly extrusion, were found to be among the strongest risk factors for NP in knee OA patients.

Disclosures: JMP and JPP are shareholders in ArthroLab Inc. JPR and MD are consultants for ArthroLab. FA, PP, and PD are employees of ArthroLab.

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INFLUENCE OF WEIGHT-STATUS ON TRABECULAR BONE SCORE IN YOUNG LEBANESE WOMEN

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Objective: To investigate the influence of weight-status (overweight and normal-weight) on lumbar spine BMD and trabecular bone score in a group of young Lebanese women.

Material and Methods: 210 young Lebanese women (63 overweight women: BMI > 25 kg/m², and 147 normal-weight women: BMI < 25 kg/m²) aged from 19 to 40 years old participated in this study. Weight and height were measured, and BMI was

calculated. Lumbar spine (L1-L4) BMD and lumbar spine TBS were evaluated by DXA (GE Healthcare Lunar Prodigy).

Results: Age was not significantly different between the two groups (overweight and normal-weight). L1-L4 BMD was significantly higher in overweight women compared to normal-weight women ($p < 0.001$). TBS values were not significantly different between the two groups. In the whole population ($n = 210$), body weight was positively correlated to L1-L4 BMD ($r = 0.34$; $p < 0.001$) but not to TBS ($r = -0.01$; $p > 0.05$). Height was positively correlated to L1-L4 BMD ($r = 0.14$; $p < 0.05$) and negatively correlated to TBS ($r = -0.24$; $p < 0.001$). Age was positively correlated to L1-L4 BMD ($r = 0.16$; $p < 0.05$) but not to TBS ($r = -0.13$; $p > 0.05$). L1-L4 BMD was positively correlated to TBS ($r = 0.54$; $p < 0.001$).

Conclusion: This study suggests that being overweight is associated with higher BMD values at the lumbar spine but does not affect trabecular bone score values in young Lebanese women.

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SERUM URIC ACID AND ULTRASONOGRAPHIC KNEE OSTEOARTHRITIS

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Objective: There are literature data about association between gout and osteoarthritis (OA). Urate levels in OA synovial fluid has been shown to associate with both knee OA radiographic severity and production of proinflammatory cytokines. However, the impact of serum urate (SUA) levels on ultrasonographic damage in patients with established knee OA remains unknown. To study the association between serum urate levels, pain and ultrasonographic knee osteoarthritis (KOA).

Material and Methods: We analyzed 50 patients with KOA in the Institute Niska Banja without history of gout attacks. Their serum uric acid levels (SUA) and ultrasonography (US) of knees were recorded during routine examination. Knee US included the measurement of the articular cartilage thickness in the condyles of the femur (medial and lateral) and detection of the presence of synovial effusion in the knee recesses. Level of pain was recorded on VAS. Patients were divided into groups with and without US detected effusion and with and without hyperuricemia (SUA > 360 $\mu\text{mol/l}$).

Results: Among 50 patients 31 were male and 19 female, with SUA levels: male 396.6; female 364.4 n.s. Hyperuricemia was observed in 40 % patients average age 66.6 year vs. normal SUA group 57.6 year ($p < 0.05$). SUA levels were negative correlated with articular cartilage thickness of the lateral condyles of the femur ($p < 0.05$) but for other compartments there were no correlation. SUA levels were significantly higher in patients with vs. without effusion (398.7 and 357.1,

respectively; $p < 0.05$). SUA was not associated with pain in whole group and also in groups with and without effusion.

Conclusion: Hyperuricemia is associated with severity of KOA but there is no strong correlation and further studies are necessary in the future.

P250

EFFECT OF LONG-TERM RISEDRONATE TREATMENT ON SERUM FERRITIN LEVELS IN OSTEOPOROTIC POSTMENOPAUSAL WOMEN

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Objective: Although ferritin has been considered as a possible link between accelerated bone loss and atherosclerosis, the long-term impact of therapeutic agents widely used to treat osteoporosis, such as bisphosphonates, on ferritin levels has not been investigated. The present study investigated the effect of risedronate on serum ferritin levels in osteoporotic postmenopausal women.

Material and Methods: In an open label, prospective study 68 postmenopausal osteoporotic women were evaluated for the study. Patients received risedronate orally in a dose of 35 mg per week, daily supplements of calcium and cholecalciferol during 6 month treatment period. Patients were evaluated for lipid profile, HbA1C, insulin, C-peptide, fibrinogen, CRP, osteoprotegerin and ferritin. Pulse wave velocity (PWV) and augmentation index (AIx) were performed as a simple noninvasive recording of the two artery sites pressure waveform using SphygmoCor (version 7.1, AtCor Medical, Sydney, Australia) at baseline.

Results: Serum ferritin decreased significantly from 62.1 ± 44.8 to 46.7 ± 29.4 $\mu\text{g/dl}$ ($p < 0.0001$) during treatment period. Significantly predictors of delta ferritin were: PWV ($p = 0.04$); CRP ($p = 0.021$), insulin ($p = 0.011$) and HDL cholesterol ($p = 0.046$) at baseline.

Conclusion: Risedronate treatment was associated with significantly decreased serum ferritin levels in postmenopausal osteoporotic women. This effect was the most prominent in patients with high cardiovascular risk such as increased arterial stiffness, CRP and insulin resistance and decreased HDL cholesterol.

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DOES METFORMIN TREATMENT INFLUENCE BONE FORMATION IN PATIENTS WITH NONALCOHOLIC FATTY LIVER DISEASE

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Objective: Antidiabetic drug metformin that improve insulin sensitivity and used in the treatment of nonalcoholic fatty liver disease (NAFLD), may affect the bone health. Our study was

designed to investigate a possible effect of metformin on bone formation marker P1NP in patients with NAFLD.

Material and Methods: In randomized, placebo controlled study, 63 patients with NAFLD were assigned to one of two groups: Group 1 received daily metformin; Group 2 received placebo. Metabolic parameters, insulin resistance markers and P1NP were determined.

Results: Although circulating P1NP levels were did not differ significantly between the groups at baseline, at the end of the study P1NP was significantly lower in patients treated with metformin than in the placebo group ($p < 0.007$). Within-group analysis indicated that P1NP levels significantly decreased ($p = 0.023$) in patients received metformin during 4-month follow-up period, while no change in P1NP was observed in placebo group ($p = 0.359$). In general linear model metformin treatment was the only significant independent predictor of endpoint P1NP.

Conclusion: Metformin treatment was associated with decrease in P1NP levels in patients with NAFLD. The effect on P1NP was independent of glucose lowering effect and caused from exposure to metformin per se.

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EFFECT OF ANGIOTENSIN II RECEPTOR BLOCKERS, CANDESARTAN, ON OSTEOPROTEGERIN LEVEL IN HYPERTENSIVE PATIENTS: LINK BETWEEN BONE AND RAAS

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Objective: The renin-angiotensin-aldosterone system (RAAS) has recently been considered as a possible link between bone and vascular disease. The present study was designed to determine the effect of the angiotensin II receptor blocker, candesartan, on circulating osteoprotegerin (OPG) in hypertensive patients with multiple cardiovascular risk factors.

Material and Methods: 69 hypertensive patients were randomized to 2 groups: group 1 included patients treated with candesartan in dose 16–32 mg per day, group 2 included patients that received antihypertensive treatment other than ARBs or ACEIs. Patients were evaluated for lipid profile, HbA1C, insulin, C-peptide, CRP, aldosterone, renin, Homeostasis model assessment-insulin resistance (HOMA-IR) and OPG.

Results: Baseline OPG levels did not differ significantly by treatment group. Post-treatment serum OPG levels were marginally lower in patients treated with Candesartan compared with the placebo group however this decrease did not reach statistical significance ($p = 0.077$).

Conclusion: In the present study, treatment with angiotensin II receptor blocker, candesartan, had no significant effect on circulating OPG levels in hypertensive patients with multiple cardiovascular risk factors. To the best of our knowledge, the present study is the first to estimate an effect of candesartan on bone

remodeling marker such as osteoprotegerin.

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HOW TYPE 2 DIABETES MELLITUS INFLUENCES BONE REMODELING MARKERS IN HYPERTENSIVE PATIENTS

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Objective: Growing evidence suggests the presence of a complex interplay between hypertension as well as type 2 diabetes mellitus (DM) and osteoporosis. The present study was designed to investigate a possible impact of type 2 DM on bone remodeling markers such as osteoprotegerin (OPG) and P1NP in hypertensive patients.

Material and Methods: The 100 study participants were divided into three groups according to presence of DM and hypertension: group one included diabetic hypertensive subjects, group 2 included hypertensive subjects without diabetes and group 3 included subjects without hypertension and DM (controls). Blood sampling for metabolic parameters, including OPG, P1NP, adiponectin, fasting glucose, HbA1C, CRP, HOMA-IR, HOMA- β function was performed.

Results: Circulating P1NP increased from Group 1 to Group 3 in a continuous fashion. P1NP was significantly lower in subjects with DM (Group 1), than in Group 2 and 3 ($p < 0.0001$). P1NP, was marginally lower in diabetic hypertensive subjects as compared to nondiabetics with hypertension ($p = 0.079$). Circulating OPG did not differ significantly between groups ($p = 0.593$).

Conclusion: In the present study, bone formation marker, P1NP, was significantly lower in diabetic hypertensive subjects as compared to nondiabetics with and without hypertension. P1NP was significantly, inversely associated with parameters of glucose homeostasis such as fasting glucose, HbA1C and positively with HOMA-beta cell function. Type 2 DM was associated with an adverse effect on bone formation independently of age, sex and exposure to antidiabetic drugs.

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GLUCOCORTICOID AS RISK FACTOR FOR OSTEOPOROSIS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: Glucocorticoid therapy (GC) is significant cause of changes in the value of bone density in patients with rheumatoid arthritis (RA).

Material and Methods: The 1-year study included 192 patients with RA, 155 women (86.1 %) and 25 men (13.9 %) of median age 56.3 with average disease duration of 9.2 years. All patients were on a stable dose of prednisone average value 10 mg/d during the year. The patients were undertaken to osteodensitometric (DXA) examination at the beginning and 1 year later. Statistical analyses were done in the Statistical Package for The Sciences 20.0 program.

Results: In the first measurement, (34.8 %) patients had normal DXA findings, osteopenia (45.1 %) with mean T-score and LS BMD (0.867 g/cm²) and at hip (0.875 g/cm²). Osteoporosis was present in (20.1 %) patients with the finding at the LS (0.774 g/cm²) and hip (0.815 g/cm²). At the medical examination after 1 year, normal DXA findings were present in (25.6 %) patients, (43.3 %) had osteopenia and (31.1 %) had osteoporosis. The average value of T-score and BMD in patients with osteopenia for LS (0.839 g/cm²) and hip (0.797 g/cm²) and osteoporosis for LS (0.711 g/cm²) and hip (0.737 g/cm²) showed a significant statistical difference compared to the first received valuable asset DXA examination ($p < 0.001$).

Conclusion: The usage of GC significantly affects the value reduction of the bone density in patients with RA. Because of this, early diagnosis, treatment, regime alteration and duration therapy reduction are of great importance.

References: Zvekcic-Svorcan J et al., Osteoporos Int 2013;24:S165

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FREQUENCY OF VERTEBRAL FRACTURES IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: One of the most common systemic manifestations of RA is the occurrence of osteoporosis, which is often complicated with fractures, especially vertebral. For any T-score reduction for one standard deviation, risk of fracture increases by 1.85 times.

Material and Methods: Retrospective study included 200 patients with RA, mean age 60.2 years, mean disease duration 10.5 years. There were 82.3 % women and 17.7 % men. The mean value of disease activity, Disease Activity Score (DAS28), was 4.23. 79.8 % of patients were on methotrexate therapy, while 20.2 % were on another DMARD. 62.4 % of patients were treated with corticosteroids. Patients underwent osteodensitometry (DXA). Besides anamnesis, X-ray was done. Statistical analyses were done in Statistical Package for The Sciences 20.0 program.

Results: In (32.5 %) patients DXA findings were normal, (46.8 %) had osteopenia and (20.7 %) had osteoporosis. 20.1 % of patients had vertebral fractures. In patients with normal findings DXA (1.1 %) had fractures, with osteopenia (8.6 %) and osteoporosis (10.4 %). One fracture had (28 %)

patients, two fractures (41 %), while three and more had (31 %) patients. The most common localization of the fracture was at level of Th12 and L4 vertebrae.

Conclusion: RA is a risk factor for osteoporotic vertebral fractures, regardless of the values of BMD. Therefore there is great importance of its early diagnosis and adequate treatment.

References: Jankovic T et al., Osteoporos Int 2013;24:126.

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THE PREDICTIVE VALUE OF PAST FALLS FOR INCIDENT FALLS DECREASES, BUT THAT OF FRAX REMAINS STABLE, WITH INCREASING FOLLOW-UP TIME: FINDINGS FROM MROS SWEDEN

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Objective: We investigated whether the previously demonstrated gradients of risk for past falls and FRAX probability as predictors of incident falls remained stable with increasing follow-up time.

Material and Methods: We studied 1836 elderly men recruited from the Swedish population of the MrOS study. Baseline data included falls history, clinical risk factors, BMD at femoral neck and calculated FRAX probabilities. Incident falls were captured during an average of 1.8 years follow-up. An extension of Poisson regression was used to investigate the relationship between FRAX, other risk variables and the time-to-event hazard function of falls. All associations were adjusted for age and time since baseline, and to enable comparison with past falls, FRAX probability was dichotomised to above (high risk) and below (low risk) 15 % for major osteoporotic fracture.

Results: At enrolment 15.5 % of the men had fallen during the preceding 12 months (past falls) and 39 % experienced one or more falls during follow up (incident falls). The hazard ratio (HR) for incident falls according to past falls (vs no past falls) decreased markedly with time since baseline ($p=0.002$): After 1 year follow-up the HR for incident falls was 2.68 (95 %CI: 2.25, 3.19) and after 3 years was 1.31 (95 %CI: 0.78, 2.19). In contrast, the predictive ability of high versus low FRAX probability at baseline appeared to be stable with time (p for interaction between fracture probability and time >0.30): After 1 year the HR for incident falls amongst participants with FRAX probability for major osteoporotic fracture

above vs. below 15 % was 1.64 (95 %CI: 1.36, 1.97) and after 3 years this was 1.62 (95 %CI: 0.99, 2.64).

Conclusion: FRAX probability captures a component of risk for future falls, which, unlike past history of falling, does not wane with increasing follow-up time. The waning of falls history over time as a predictor of future falls argues against the inclusion of falls history in long term models of fracture risk.

Acknowledgements: *NCH and HJ are joint first authors

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THE IMPORTANCE OF A MULTIDISCIPLINARY APPROACH IN PATIENTS WITH HIP AND KNEE OSTEOARTHRITIS

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Objective: To establish the differences in psychological status, as well as the differences in subjective feeling of pain and difficulties in doing everyday activities in patients with different psychological status.

Material and Methods: This cross-sectional study included 60 male and female patients (age: 66.27 ± 10.32 years) with hip and knee OA from the Clinic For Medical Rehabilitation, Clinical Center of Vojvodina. Questionnaires used to assess functionality, pain and psychosocial factors included the WOMAC index, SAIST and the Beck Depression scale (BDI).

Results: Eighteen (30 %) patients recorded high level of anxiety and depression while 40 (51.7 %) showed moderate to significant stiffness and 42 (70 %) patients experienced moderate to severe pain. Twenty five (41.7 %) patients recorded significant limitations while doing every day activities, according to the WOMAC scale. There was no statistically significant difference between the patients with hip and knee OA in psychological status. Results of the research do not show statistically significant difference in term of pain (WOMAC), stiffness (WOMAC), functional status and difficulties in doing everyday activities between patients with hip and knee OA. While determining the differences in psychological status, we found significant differences in pain intensity, difficulties in doing everyday activities according to WOMAC ($p < 0.01$). Pain intensity (WOMAC) difficulties in doing everyday activities were more noticeable in patients who were evidently depressive and anxious (WOMAC) ($p < 0.01$).

Conclusion: Our research findings confirm that patients with hip and knee OA who have higher level of anxiety and depression are more likely to perceive pain more intensely and have greater difficulties in doing everyday activities. No significant differences were found when comparing patients with hip and knee OA in terms of psychological status.

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CLINICAL COMPONENTS LINKED TO SARCOPENIA: THE SARCOPHAGE STUDY

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Objective: The SarcoPhAge project is an ongoing longitudinal study following community-dwelling elderly subjects with the objective to assess some health and functional consequences of sarcopenia. The sarcopenia diagnosis algorithm developed by the European Working Group on Sarcopenia in Older People (EWGSOP) and used in the present study needs further validation through cross-sectional and longitudinal studies. The aim of the present study is to assess, using this algorithm, the prevalence of sarcopenia and the clinical components linked to this geriatric syndrome.

Material and Methods: Participants were community dwelling subjects aged 65 years or older. To diagnose sarcopenia, we applied the definition of the EWGSOP. Muscle mass was measured by DXA, muscle strength by a hydraulic dynamometer and physical performance by the SPPB test. Large amounts of socio-demographic, anamnestic and clinical data were collected in all subjects.

Results: 534 subjects were recruited for this study (60.5 % of women, mean age of 73.5±6.16 years), among whom 73 subjects were diagnosed sarcopenic, which represents a global prevalence of 13.7 %. Prevalence was 11.8 % in men and 14.9 % in women. After adjustment for age and sex, sarcopenic subjects presented a significant lower BMI, 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).

Conclusion: Sarcopenia is linked with many harmful clinical components making this geriatric syndrome a real public health burden. Follow-up data of the SarcoPhAge study will

be helpful to assess the outcomes of sarcopenia based on the EWGSOP diagnosis algorithm and its different proposed cut-offs.

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VASTUS MEDIALIS MUSCLE FAT CONTENT AS ASSESSED BY MRI IS A RISK FACTOR FOR KNEE OSTEOARTHRITIS PROGRESSION: RELEVANCE FROM A CLINICAL TRIAL

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Objective: Vastus medialis (VM) muscle area has been suggested in recent osteoarthritis (OA) studies to be associated with cartilage volume loss over time. However, the VM may include a significant proportion of fatty infiltration, which could also influence tissue metabolism and function. This study contrasted the VM area and VM fatty infiltration (%Fat), separately and in combination, to predict symptoms, cartilage volume loss, and bone marrow lesion (BML) changes in knee OA.

Material and Methods: This study included the ATP ($n=143$) population of a 2-year knee OA randomized clinical trial¹, having MRI at baseline and 2 years. MR images were assessed for cartilage volume loss (CVL), BML, VM area, and VM%Fat.

Results: Greater baseline value for VM area and %Fat were significantly associated with gender (male, area; female, %Fat), higher BMI, and WOMAC score (better, high area; worse, high%Fat). Moreover, a VM%Fat increase of 1 % at 2 years was associated with worsening of CVL in the global knee ($p=0.015$) and some subregions ($p\leq 0.030$), and with an increase in BML global score change ($p<0.001$). A 1 % decrease in VM area at 2 years was associated with worsening of knee pain score ($p=0.048$). Importantly, the concurrent presence of low VM area, high VM%Fat, and high BMI identified a subgroup of patients with greater CVL in the medial compartment associated with the medial femur ($p=0.028$) than the rest of the cohort. The latter subgroup also showed a trend toward a higher number of patients having total knee replacement 4–7 years after study inception.

Conclusion: These data demonstrated, for the first time, that a higher VM fat content is a strong predictor of CVL and the occurrence and progression of BML. More importantly, a subgroup of patients having high baseline VM fat content and low

VM area in association with obesity based on BMI were identified as presenting a much higher risk for OA progression.

References: 1. Raynauld JP et al., *Ann Rheum Dis* 2009;68:938.

Disclosures: JPR and MD are consultants for ArthroLab Inc. JPP and JMP are shareholders in ArthroLab. FA and WL are employees of ArthroLab.

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DEVELOPMENT OF A SELF-ADMINISTRATED QUALITY OF LIFE QUESTIONNAIRE SPECIFIC TO SARCOPENIA IN ELDERLY AGED 65 YEARS AND OLDER: THE SARQOL

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Objective: The impact of sarcopenia on quality of life is currently assessed generic tools. However, these tools may not detect subtle effects of this specific condition on quality of life. The aim of this study was to develop a sarcopenia-specific quality of life questionnaire (SarQoL, Sarcopenia Quality of Life), and designed for community-dwelling elderly subjects aged 65 years and older.

Material and Methods: The study was articulated in four stages: 1. Item generation—based on literature review, sarcopenic subjects' opinion, experts' opinion, focus groups; 2. Item reduction—based on sarcopenic subjects' and experts' preferences; 3. Questionnaire generation—developed during an experts' meeting; 4. Pre-test of the questionnaire - based on sarcopenic subjects' opinion.

Results: The final version of the questionnaire consists of 55 items translated into 22 questions rated on a 4-point Likert scale. These items are organized into 7 domains of

dysfunction: Physical and Mental Health, Locomotion, Body Composition, Functionality, Activities of daily living, Leisure activities and Fears. In view of the pre-test, the SarQoL is easy to complete, independently, in approximately 10 min.

Conclusion: The first version of the SarQoL, a specific quality of life questionnaire for sarcopenic subjects, has been developed and has been shown to be comprehensible by the target population. Investigations are now required to test the psychometric properties (internal consistency, test-retest reliability, divergent and convergent validity, discriminant validity, floor and ceiling effects) of this questionnaire.

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IS THERE A SPECIFIC PATTERN OF LEAN/FAT MASS RATIO IN SARCOPENIC SUBJECTS?

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Objective: Body composition changes with aging. Cross-sectional and longitudinal data have shown that aging is associated with a decrease in lean mass and increase in fat mass. Sarcopenia is characterized by a decrease in lean mass but the distribution of fat mass in this population is still poorly investigated.

Material and Methods: Sarcopenia was diagnosed by the definition of the European Working Group on Sarcopenia in Older People (EWGSOP). Total lean mass and total fat mass was measured by DXA (Hologic Discovery A, USA).

Results: 534 subjects aged 73.5±6.16 years were recruited for this study: 322 subjects were women and 212 were men. Among these subjects, 73 were diagnosed sarcopenic. The sarcopenic subjects presented a mean of 37.8±7.58 kg of lean mass vs. 46.1±10.9 kg for nonsarcopenic ($p<0.001$). Regarding fat mass, a total of 21.1±6.69 kg of fat mass was distributed in sarcopenic subjects which was significantly lower than nonsarcopenic subjects (26.3±8.38 kg, $p<0.001$). However, the percentage of lean mass of the total body weight does not differ significantly between groups. Indeed, the amount of lean mass in sarcopenic subjects represented 63.8±8.69 % of the total body mass vs. 63.2±7.51 % for nonsarcopenic ($p=0.48$). Consequently, the percentage of fat mass of the total body weight do not differ either between sarcopenic and nonsarcopenic

subjects ($p=0.41$). No sex-effect was observed for these results.

Conclusion: Even if sarcopenic subjects presented a significant reduced amount of lean mass and fat mass in terms of kg, the percentage of lean mass and fat mass was identical in sarcopenic subjects compared to the nonsarcopenic subjects. Consequently, the ratio lean mass/fat mass does not seem to differ between sarcopenic and nonsarcopenic subjects.

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BMD CHANGES AFTER KIDNEY TRANSPLANTATION

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Objective: To study BMD changes in renal transplant patients between the first assessment at 9 months after transplantation and 2 years later.

Material and Methods: This longitudinal study included patients who underwent renal transplantation realized between 2005 and 2011 and followed at the University Hospital of Lille. Patients were included if they had a first bone evaluation (including bone densitometry, spine X-rays and biological assessment) and at least another BMD assessment. The first assessment was done on average 9 months after transplantation and 2 years later.

Results: 259 patients satisfied to the inclusion criteria, (96 women) with a mean age of 49.7 ± 12.1 years at transplantation. The mean duration of dialysis was 3.2 ± 3.3 years. 75 patients (29.0 %) withdrew corticosteroid 7 days after transplantation. Vertebral fractures were found in 28 patients (10.8 %). According to the WHO classification, 101 patients had osteoporosis and 125 had osteopenia at the first evaluation. Osteoporosis treatment with bisphosphonates was initiated for 95 patients. In all patients, BMD gains compared with baseline were significant ($p < 0.01$). The gains were significant for patients treated with bisphosphonates compared with baseline, respectively +5.0, +2.5 and +2.7 % at the lumbar spine, femoral neck and total hip respectively than patient without bisphosphonate ($p < 0.02$). The patients who withdrew corticosteroids early had higher gains in BMD than patients with more prolonged corticosteroid therapy +2.1 % for the lumbar spine ($p = 0.02$) and +2.0 % for the total hip ($p = 0.04$). The stepwise regression analysis (patients without bisphosphonates) showed associations between BMD changes (femoral neck) and the duration of corticosteroid therapy, the level of bone alkaline phosphatase at baseline, the lack of vertebral fracture.

Conclusion: Kidney transplant recipients have a pre-existing increased bone fragility. Bisphosphonates and early

corticosteroid withdrawal can improve BMD.

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NONSTEROIDAL ANTI-INFLAMMATORY DRUGS HAD SYNERGISTIC EFFECT ON BONE MINERAL DENSITY IN BIPHOSPHONATE TREATMENT OSTEOARTHRITIS PATIENTS, COMPARED TO COX-2 INHIBITOR

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Objective: We hypothesized the subject of NSAIDs use would be associated with increased BMD than the subject of Cox-2 use. So the purpose of this study was compared the change of the BMD between NSAID use group and COX-2 inhibitor use group.

Material and Methods: Between January 2005 and September 2011, we identified postmenopausal women with osteoporosis (OP) (T-score > -2.5) and osteoarthritis (OA) treated with Cox-2 inhibitor (Celebrex, $n = 319$) and NSAIDs (aceclofenac, $n = 104$), who underwent a BMD measurement by DXA every 1 year and structured interview in the 5th year of this study. The all subjects were taken bisphosphonate and the outcome measure was present difference in BMD (g/m²) and T-score. The affecting factors for elevated BMD evaluated included sex, age, BMI, disease duration, cumulative period of NSAIDs, COX-2 inhibitor and bisphosphonate. After extracting possible affecting factors through univariate analysis, multivariate logistic regression analysis was performed with backward selection to derive affecting model for increased BMD in patients with OA.

Results: Daily use of NSAIDs users were associated with a higher BMD at whole L-spine (2.54 % 1.7–3.1 CI) and both hip (1.21 %, 0.6–2.4 CI) than Cox-2 inhibitor users. Also, T-score was higher in NSAIDs users than Cox-2 inhibitor users. Univariate analysis revealed that old age ($P = 0.008$), low BMI ($P = 0.001$), and cumulative period of NSAIDs, COX-2 inhibitor and bisphosphonate ($P < 0.001$) were possible affecting factors. Multivariate logistic regression analysis showed that cumulative period of NSAIDs, COX-2 inhibitor and bisphosphonate [odds ratio (OR) 4.86, 95 %CI 1.27–18.55, $P = 0.021$] are factors for increased BMD in patients with OA and OP.

Conclusion: Daily use of NSAIDs is synergistic effect on BMD than daily use of Cox-2 inhibitor in postmenopausal women with OP treated with bisphosphonate. So our results suggest that NSAIDs use is preferred to use cox-2 inhibitor in patients with OA and OP.

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MUSCLE STRENGTH RATHER THAN MUSCLE MASS OF THE LOWER LIMB IS ASSOCIATED WITH KNEE PAIN: THE ROAD STUDY

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Objective: To examine the association of muscle strength and muscle mass of the lower limb with knee pain by using data from the nationwide cohort study, Research on Osteoarthritis/osteoporosis Against Disability (ROAD).

Material and Methods: Among the 2566 subjects who participated in the third visit of the ROAD study, 2303 subjects who underwent X-ray examination of the knee were enrolled in the present study. Thirty-two subjects who underwent total knee arthroplasty before the third visit were excluded. Knee osteoarthritis was graded according to the Kellgren-Lawrence (KL) grade. Knee pain was assessed by well experienced orthopedists. Anthropometric measurements, including height and weight, were taken, and BMI was calculated. Grip strength was measured on the right and left sides with a Toei Light handgrip dynamometer (Toei Light co. Ltd, Saitama, Japan). Isometric knee extension muscle was estimated with the Quadriceps Training Machine (QTM) (QTM-05 F, Alcare Co., Ltd. Tokyo, Japan). Skeletal muscle mass was measured by performing bioimpedance analysis with the Body Composition Analyzer MC-190 (Tanita Corp., Tokyo, Japan), and skeletal mass index (SMI) was calculated.

Results: Age, BMI, grip strength, and knee extension muscle strength were significantly different between subjects with and without pain ($p < 0.05$), while muscle mass was not. The KL grade was also significantly associated with knee pain ($p < 0.05$). We next used multiple logistic regression analysis with age, BMI, sex, muscle strength and KL grade as explanatory variables, and found that BMI (odds ratio 1.09, 95 %CI 1.06–1.13), female sex (1.34, 1.03–1.76), muscle strength (5 kgf increase, 0.87,

0.82–0.92), KL grade 3 (vs. KL grade 0/1, 3.77, 2.79–5.10) was significantly associated with knee pain, while age (1.01, 0.996–1.02) and KL grade 2 (vs. KL grade 0/1, 1.3, 0.96–1.75) were not.

Conclusion: The present study revealed that muscle strength had a stronger association with knee pain than muscle mass.

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GRIP FATIGUE RESISTANCE AND SELF-PERCEIVED FATIGUE IN RELATION WITH SARCOPENIA AND QUALITY OF LIFE

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Objective: In this study, we aimed to measure the relationship between the grip fatigue resistance (GFR) and the self-perceived fatigue (SFP), sarcopenia and quality of life.

Material and Methods: The SarcoPhAge study is an ongoing longitudinal study following 534 community-dwelling elderly subjects aged 73.5 ± 6.16 years. Sarcopenia was defined by the algorithm of the EWGSOP. Quality of life was assessed with the SF-36 questionnaire. GFR was measured with a handgrip dynamometer and was recorded with the following formula: $GFR = (\text{Grip Strength (kg)} \times 0.75) \times \text{Fatigue Resistance}$ (fatigue resistance = time taken for the grip strength to drop to 50 % of its maximum). SFP was estimated using the Mobility-Tiredness scale. The lowest quartile of grip work and the highest quartile of self-perceived fatigue were calculated and four groups of subjects were herewith defined (Table 1).

Results: Among subjects enrolled in the SarcoPhAge study, 97.9 % get measurements of GFR and SFP and were included in the present study. The prevalence of sarcopenia was significantly higher in group A (30.5 %) compared to group B (18.9 %), group C (13.5 %) and group D (10.3 %) ($p = 0.002$). Quality of life was dependant of the GFR and more importantly of the SFP. The lowest quality of life was observed in group A, followed by group C, group B and finally, group D ($p < 0.001$

for all domains of the SF-36) (Table 1). Moreover, correlations observed between SPF and all domains of

quality of life were systematically higher than correlations observed between GFR and quality of life.

Table 1. Clinic Characteristics of subjects of group A, group B, group C and group D

	Low grip work, high self-perceived fatigue—Group A (n=36)	Low grip work, low self-perceived fatigue—Group B (n=95)	High grip work, high self-perceived fatigue—Group C (n=52)	High grip work, low self-perceived fatigue—Group D (n=340)	p-value
Age (years)	76.8±6.7	74.5±6.5	74.5±5.54	72.7±5.93	<0.001
Sex					
Women n (%)	35 (97.2)	83 (87.4)	27 (51.9)	169 (49.7)	<0.001
BMI (kg/m ²)	27.1±6.3	25.9±4.35	28.3±5.32	26.5±4.61	0.03
Muscle mass (kg)	37.5±6.87	39.0±6.74	46.9±8.54	47.2±11.7	<0.001
Muscle strength (kg)	17.6±9.48	20.2±7.32	28.1±7.85	32.2±11.1	
Sarcopenia n (%)	11 (30.5)	18 (18.9)	7 (13.5)	35 (10.3)	0.002
Quality of life					
Quality of life	29.2±26.0	63.3±22.2	31.3±21.7	71.9±21.6	<0.001
SF-36 PF (%)	47.2±25.4	68.4±24.2	51.4±25.8	74.8±20.9	<0.001
SF-36 PF (%)	16.7±31.1	53.7±40.9	18.7±30.5	65.6±37.9	<0.001
SF-36 PF (%)	21.3±36.6	58.6±42.0	32.7±36.4	67.5±37.9	<0.001
SF-36 PF (%)	43.4±17.8	61.1±19.4	47.2±17.6	64.4±17.9	<0.001
SF-36 PF (%)	29.3±16.9	52.4±16.5	34.4±16.6	54.9±16.2	<0.001
SF-36 PF (%)	31.6±23.0	55.7±27.1	35.8±21.9	61.4±22.8	<0.001
SF-36 PF (%)	35.6±18.5	60.0±17.1	39.3±17.0	62.2±15.2	<0.001

Conclusion: Reduced GFR and high SPF seem both in relationship with sarcopenia and reduced quality of life. Sarcopenia should be assessed in elderly subjects complaining from fatigue or poor muscle resistance.

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HEALTH RELATED QUALITY OF LIFE IN SARCOOPENIA

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Objective: The aim of this study was to compare the health related quality of life (HRQoL) of subjects suffering from sarcopenia and severe sarcopenia with nonsarcopenic subjects.

Material and Methods: Sarcopenia was diagnosed by the definition of the EWGSOP. Muscle mass was measured by DXA, muscle strength by a hydraulic dynamometer and physical performance by the Short Physical Performance Battery test. HRQoL was assessed by the SF-36, the EQ-5D and the EQ-VAS scales.

Results: 534 subjects were recruited for this study (60.5 % of women, 73.5±6.16 years). Prevalence of sarcopenia was 13.7 % and prevalence of severe sarcopenia was 5.99 %. Sarcopenic subjects presented a significant worse HRQoL, assessed with the SF-36, in the domains of physical function (51.9±29.2 % for sarcopenic vs. 65.2±25.2 % for others, $p<0.001$) and general health (53.6±20.2 vs. 58.4±17.9 %, $p=0.04$). No difference was observed for the other domains of the SF-36 (role limitation due to physical problems, bodily pain, vitality, social functioning, role limitation due to emotional problem and mental health). Severe sarcopenia was associated with reduced HRQoL in 5 of the 8 domains of the SF-36: physical functioning ($p<0.001$), social functioning ($p=0.002$), role limitation due to physical problems ($p=0.047$), vitality ($p=0.009$) and general health ($p=0.002$). With the EQ-5D, no difference was found between sarcopenic and non-sarcopenic. However, severe sarcopenic subjects presented a significant worse HRQoL based on the EQ-5D (0.65±

0.24 points vs. 0.53 ± 0.26 points, $p=0.008$). With the EQ-VAS, no difference was observed for either sarcopenia or severe sarcopenia.

Conclusion: Severe sarcopenic subjects present a reduced HRQoL. For sarcopenic, only specific domains, such as mobility or physical function, are affected by sarcopenia. Subtle effects of sarcopenia on HRQoL could have been missed by the generic nonspecific instruments used in this study. A specific tool could be necessary to assess the real impact of sarcopenia on HRQoL.

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STRONTIUM RANELATE SEEMS TO WORK IN CRPS

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Objective: Complex regional pain syndrome (CRPS) also referred to as reflex sympathetic dystrophy (RSD), Sudeck's atrophy or algodystrophy is a chronic painful condition with allodynia and hyperalgesia. An evidence based treatment is not known.

Material and Methods: A 66-year old female was seen at the rheumatology unit in February 2013. She was unable to use the right hand in case of immobility in the metacarpo- and proximal interphalangeal joints and suffered from permanent pain in the right hand. Sudeck's atrophy of the right hand was diagnosed 1995 after distal radius fracture. Several therapeutic interventions including physical therapy had been tried without success. Chronic pain remained and major immobility of the right hand was given. Strontium ranelate 2 g daily orally was started immediately. Fingertip hand distance, SF-SACRAH2 and a VAS of 100 mm (0=no pain) were used to document disease activity.

Results: Already 6 weeks after first intake of strontium ranelate first improvements were reported. At the last visit in September 2014 the fingertip hand distance was 1 mm (70 mm at the beginning) and the right hand could again be used for easy working. According to the clinical improvement since February 2013 SF- SACRAH decreased from 6.2 to 1.8 and VAS from 80 to 9 mm. After our experience two more patients with painful CRPS were treated. Patient 1 (female, CRPS after trauma) and patients 2 (CRPS after surgery) were free of pain 3 months after first intake of strontium ranelate.

Conclusion: CRPS results with major disability and ongoing pain. A successful treatment is not known. We applied strontium ranelate and observed an impressive improvement in motion, a satisfying increase in functionality and a pleasant decrease of pain. We suppose that the effect is based on strontium ranelate's dual mechanism of action with increasing bone formation and decreasing bone resorption.

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PERCENTAGE OF WOMEN ACHIEVING NON-OSTEOPOROTIC BMD T-SCORES AT THE LUMBAR SPINE (LS) AND TOTAL HIP (TH) DURING UP TO 8 YEARS OF DENOSUMAB (DMAB) TREATMENT

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Objective: Osteoporosis treatment guidelines do not currently define treatment targets or goals. While absence of BMD loss and fracture are generally considered treatment successes, lack of a negative outcome does not set a real goal for therapy. Potential goals might include reaching a BMD T-score somewhere above -2.5 , representing an acceptable level of fracture risk. We report the percentage of women who achieved a range of possible target BMD T-scores at both the LS and TH during up to 8 years of DMAB treatment.

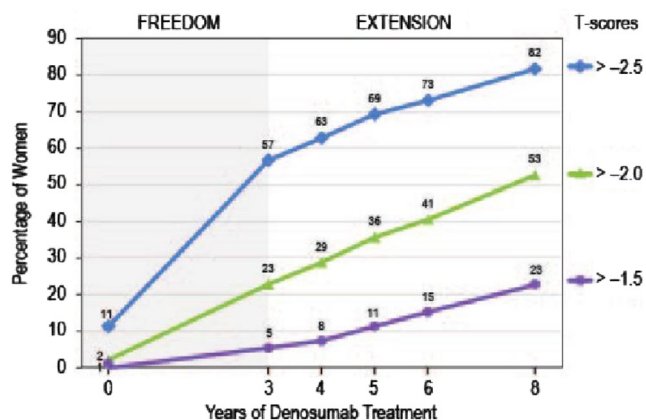
Material and Methods: From 2343 women who received up to 8 years continuous DMAB (60 mg SC Q6M) treatment, 3 years during FREEDOM and up to 5 years during the Extension, we determined the percentage with T-scores >-2.5 , >-2.0 and >-1.5 at both the LS and TH, and T-scores >-2.5 at either site, at baseline and over 8 years of DMAB.

Results: Mean (SD) LS and TH T-scores were -2.83 (0.67) and -1.85 (0.79), respectively, at FREEDOM baseline. The percentage of women with T-scores >-2.5 , >-2.0 and >-1.5 at both the LS and TH progressively increased over 8 years of DMAB treatment (Fig. 1). At individual sites, the percentage of women with a T-score >-2.5 increased from baseline over 8 years of DMAB treatment from 19 to 86 % (LS) and from 75 to 94 % (TH).

Conclusion: DMAB enables a substantial proportion of women with postmenopausal osteoporosis to achieve non-osteoporotic T scores. Furthermore, the BMD T-scores achieved at the hip during DMAB treatment are a robust predictor of the subsequent nonvertebral fracture risk, and suggest that achieving T-scores of -2.0 or higher are desirable to maximise treatment efficacy.

These data contribute insightful information to discussions on the topic of treatment goals for osteoporosis.

Fig. 1. Percentage of Women Achieving a Particular T-score at Both the Lumbar Spine and Total Hip



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VERTEBRAL FRACTURE CLINIC: ONE YEAR EXPERIENCE

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Objective: Vertebral fractures are the hallmark of osteoporosis as they are associated with significant morbidity, excess mortality, and an increased risk of future vertebral and nonvertebral fractures. We started a weekly vertebral fracture clinic with a dual aim of reducing morbidity in acute fractures and targeting asymptomatic patients for secondary prevention as most of these fractures are not picked up by the Fracture Liaison Service. **Material and Methods:** Local GP surgeries and other departments were informed of the service. Radiology services were requested to forward details of any patient found to have a vertebral fracture.

Results: 92 of the 115 referrals attended the clinic (DNA rate-20 %). There were 57 females (62 %) and 35 males (38 %) with an age range of 31–96 (mean-72 years) with no significant age difference between the two sexes (p 0.10). Maximum (34) referrals were received from GP surgeries followed by radiology (26) and other clinics (18). 77(84 %) of the total were referred as definite vertebral fracture and the rest as possible fracture with back pain. Only 30(32 %) patients were already on osteoporosis treatment. There was a significant ($p < 0.0005$) difference between the mean age (62 years) of 21 patients with history of trauma as compared to the 71 patients without such history (mean-75 years). 30 out of 53 patients with thoracic vertebral fracture, had more than one fracture, though 20 of 24 lumbar fractures were single. 32 patients had MRI

scan of which 18 were positive on STIR sequence. Of these 10 had vertebroplasty/kyphoplasty with good (8/10) pain relief at 8 weeks. DXA scan was done in 67 patients. This showed osteoporotic values in 32 patients, osteopenic values in 20 patients and 15 had normal bone density. 14 patients were not offered any anti-osteoporosis treatment (pt. choice -6, normal BMD and history of severe trauma-8).

Conclusion: Vertebral fracture clinic is a useful addition to any Fracture Liaison Service and at the same time can help manage, acute vertebral fractures, effectively.

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DENOSUMAB SIGNIFICANTLY INCREASES BMD COMPARED WITH ALENDRONATE IN POSTMENOPAUSAL WOMEN

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Objective: Low BMD is an important risk factor for fractures in postmenopausal osteoporotic women. Denosumab (DMAb) significantly improved BMD, mass and strength besides significantly reducing the risk for fractures. Alendronate (ALN) is the first bisphosphonate that has proved to be effective antifracture in the long term. Our purpose was to investigate the effect of two antiresorptives with two different mechanisms of action DMAb vs. ALN on BMD change in postmenopausal osteoporotic women.

Material and Methods: A study randomized, open-label in which 105 postmenopausal women were randomized 1:3 to DMAb 60 mg subcutaneously every 6 months or ALN 70 mg weekly for 3 years. Twenty-seven osteoporotic women received DMAb and 78 received ALN. All patients have received a supplement of 1000 mg calcium and alfacalcidol 1 µg/day. Mean age of our patients was 63 years for DMAb and 67 for ALN. BMD was measured by DXA at baseline and at 1, 2, 3 years. The diagnosis of osteoporosis was confirmed by BMD -WHO criteria.

Results: At baseline mean BMD at LS was 0.727 g/cm² and increased 0.852 g/cm² after 3 years, for women treated with DMAb a total of +17.1 %. For the women treated with ALN the baseline was 0.739 g/cm² and increased at 0.782 g/cm² a total of +5.8 % after 3 years. At TH the increase of BMD was +11.1 % for DMAb and +5.2 % for ALN after 3 years. For FN the change of BMD was +8.2 % after 3 years for DMAb treatment and +3.4 % for ALN. No adverse events or fractures under the therapy.

Conclusion: DMAb treatment significantly increased BMD at the LS, TH, and FN by comparing with ALN in patients with postmenopausal osteoporosis. Both drugs are effective at 3 years of treatment. For increasing importance of BMD can be taken into account and association with alfacalcidol in both cases of treatment.

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EVALUATION OF THE RESULTS OF VITAMIN D, PTH AND CALCIUM IN OSTEOPOROSIS

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Objective: Osteoporosis is a serious, life threatening disease in both men and women. Vitamin D deficiency can contribute to bone loss from decreased vitamin D mediated intestinal calcium absorption and resultant secondary hyperparathyroidism (HPTH). The parathyroid glands control of calcium and phosphorus in the blood and they do this by making PTH.

Material and Methods: As a part of the investigational project 760 participants were examined of the University Clinical Center of Sarajevo, age 20–80 during 6 months. For each patient we did personal history, age, medications, BMI, family history. We established presence of vitamin D deficiency, calcium levels, high level PTH, DXA higher than -2.5 SD.

Results: Investigated group of 760 patients. The frequency of occurrence of osteoporosis is most common 44 % between the ages of 40–59 years. Elevated levels of PTH at 65 % patients, the patients have a vitamin D deficiency 76 % and low-normal calcium levels 69 %. Analysis of BMI obesity 50 % as a potential factor for osteoporosis.

Conclusion: Vitamin D deficiency is associated with increased PTH and also associated with low BMD in patients who have diagnosed osteoporosis. Nutrition and BMI affect the metabolism and osteoporosis.

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SIMILAR PROXIMAL FEMUR STRENGTH FROM DIFFERENT BONE STRUCTURAL TRAITS: KLINEFELTER SYNDROME PATIENTS AND POST-MENOPAUSAL WOMEN

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Objective: Klinefelter Syndrome patients (KS) frequently show low bone mass [1]. An analogy in bone between KS and aging women has been suggested [2]. Our objective was to verify if proximal femur strength and bone structure of KS

and elderly women are actually similar. A control group of elderly men was included.

Material and Methods: Patients and imaging: Proximal femur QCT images were taken on: KS ($n=18$, aged 44 ± 8 , University of Padua), elderly women ($n=89$, aged 76 ± 6 , composed of VPHOP ($n=18$) and AGES ($n=71$) cohorts), elderly men ($n=39$, aged 79 ± 5 , AGES). Bone strength: QCT-based estimates of proximal femur strength were obtained with a finite element procedure validated in vitro [3] and in vivo [4]. Bone structure: In KS and VPHOP women cohort, trabecular and cortical volumetric BMD (Tb.vBMD, Ct.vBMD), and cortical thickness (Ct.Th.) were estimated [5]. Ct.Th. was mapped to 18 sectors covering the whole femoral neck. Femoral neck length and cross-sectional area were calculated.

Results: Bone strength: KS and women had similar bone strength (KS: 2981 ± 514 N, W 2822 ± 627 N, Mann–Whitney $p=0.14$), both significantly lower ($p<0.001$) than elderly men (4176 ± 985 N). Women ($n=18$) who underwent bone structural analysis did not differ in strength from KS ($p=0.11$). Bone structure: Bone cortex was significantly thinner in KS patients ($p<0.05$ in 13 out of 18 sectors). Ct.vBMD was equivalent in KS and women ($p=0.14$). Tb.vBMD was instead higher in KS ($p=0.003$). Femoral neck was significantly larger in KS patients (CSA 25 % higher, $p<0.001$).

Conclusion: We corroborate in terms of strength the proposed analogy [2] between KS and elderly women. This similarity emerged however from different structural traits: KS had thinner femoral neck cortex, compensated by a denser trabecular compartment, and by a larger cross-sectional area. Combined studies of bone metabolism and structure may elucidate the development of such critically thin bone cortex in KS.

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WORLDWIDE BURDEN OF HIGH FRACTURE PROBABILITY

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Objective: The aim of this study was to quantify the number of individuals worldwide aged 50 years or more at high risk of osteoporotic fracture in 2010 and 2040.

Material and Methods: A threshold of high fracture probability was set at the age-specific 10 year probability of a major

fracture (clinical vertebral, forearm, humeral or hip fracture) which was equivalent to that of a woman with a prior fragility fracture and no other clinical risk factors. The prevalence of high risk was determined worldwide and by continent using all available country-specific FRAX models applied the population demography for each country.

Results: 21 million men and 137 million women had a fracture probability at or above the threshold in the world for the year 2010. The greatest number of men and women at high risk were from Asia (55 %). Worldwide, the number of high risk individuals is expected to double over the next 40 years.

Conclusion: We conclude that individuals with high probability of osteoporotic fractures comprise a very significant disease burden to society particularly in Asia and is set to increase markedly in the future. The analyses provide a platform to evaluate risk assessment and intervention strategies.

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FRAX PREDICTS INCIDENT FALLS IN ELDERLY WOMEN: FINDINGS FROM AUSTRALIA

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Objective: Although falls are not included in the FRAX[®] algorithm, we have previously demonstrated that FRAX probability predicts future falls amongst elderly men. The aim of the present study was to determine whether fracture probabilities generated by FRAX might also predict the risk of incident falls in elderly women.

Material and Methods: We studied the relationship between FRAX probabilities and risk of falls in 2256 elderly women recruited in Australia to a vitamin D intervention study. Baseline data included falls history (past falls defined as having recently fallen or felt less steady), clinical risk factors, FRAX probabilities calculated without BMD and trial allocation to vitamin D. Incident falls were captured during an average of 1.5 years follow-up with maximum of 5.2 years. An extension of Poisson regression investigated the relationship between FRAX probability, other risk variables and incident falls. All associations were adjusted for age and time since baseline. Baseline FRAX probabilities of major osteoporotic fracture were additionally dichotomised into high and low risk categories (> and <15.5 %) to equalise the prevalences of high FRAX scores with falls so that the two risk variables could be compared.

Results: At enrolment 39 % of the women reported past falls and 71 % experienced one or more falls during follow up

(incident falls). The risk of incident falls increased with increasing FRAX probability at baseline (HR per SD (GR)=1.08; 95 %CI=1.01–1.15). The association between incident falls and FRAX probability remained after adjustment for past falls and vitamin D treatment (GR=1.07; 95 %CI=1.00–1.14). High, compared with low baseline FRAX score was not predictive of increased falls risk (HR: 1.08; 95 %CI: 0.95 to 1.22) and remained stable with time. Past falls were a significant predictor of incident falls (HR: 1.46; 95 %CI: 1.32 to 1.61) but the hazard ratio for past falls decreased markedly though not statistically significantly with increasing follow-up time ($p=0.054$), i.e. the risk of incident falls was less well predicted by past falls with increasing follow-up time.

Conclusion: These findings in women, consistent with previous results in men, show that FRAX captures a component of risk for future falls. Benefits of incorporating past falls directly into long-term fracture risk algorithms may be less than first appears.

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INVOLVEMENT OF YKL-40, MMP-9 AND PRO-INFLAMMATORY CYTOKINES IN OSTEOARTHRITIS

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Objective: The modern concept of osteoarthritis as a degenerative disease associated with inflammation imposes the search for different predictive biomarkers. The characteristic of osteoarthritis includes the progressive loss of the articular cartilage tissue and synovial tissue inflammation. YKL-40 is mammalian member of the chitinase protein family without enzymatic activity. Although the particular receptor of YKL-40 is still unknown, the pattern of its expression supposes a role in extracellular matrix remodelling. Increased serum YKL-40 levels are determined in chronic and acute inflammation and tumor processes. Few is known about the relationship between YKL-40 and pro-inflammatory cytokines and their impact on the pathogenesis of osteoarthritis. The aim of the current research was to analyze YKL-40 in serum and synovial fluid from patients with active osteoarthritis and to search correlation with MMP-9 and pro-inflammatory cytokines: IL-1 β , IL-6, TNF α .

Material and Methods: 35 patients with active osteoarthritis and 40 age-matched healthy subjects are included in the study. Serum and synovial levels of YKL-40, pro-inflammatory cytokines and MMP-9 are examined by ELISA, using commercial kits.

Results: Significantly elevated serum YKL-40 levels in patients compared to the control group were found. The synovial level of the glycoprotein was significantly higher compared to the serum level and a positive correlation between them was established. A strong association between serum and synovial levels of YKL-40 and serum TNF α and IL-6 was detected.

Conclusion: In conclusion, YKL-40 together with matrix metalloproteinases and some pro-inflammatory cytokines might be involved in the pathogenesis of osteoarthritis and could serve as markers of disease activity.

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DIFFERENT CHANGES OF TRABECULAR BONE IN GROWTH HORMONE DEFICIENT PATIENTS

ACCORDING TO DIFFERENT VITAMIN D STATUS

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Objective: Changes in bone status of growth hormone deficient (GHD) adults is influenced by many factors, such is onset of the disease, age and gender. The treatment with growth hormone (GH) affects trabecular bone, but the contributing effects of vitamin D status on trabecular bone wasn't discussed yet. Our objective was to compare changes of TBS in GHD patients with different vitamin D status.

Material and Methods: A prospective study was conducted in adult GH-deficient patients treated with GH for 2 years in IGF-1 normalization treatment regimen. TBS analysis by software TBS INsight from lumbar spine BMD was assessed at months 0, 12, and 24. Levels of 25-OH-D3, calcium and bone turnover markers were evaluated at baseline and months 3, 6, 12, and 24. Vitamin D deficiency was defined as levels of 25OH-D3 under 30 nmol/l. Patients with vitamin D deficiency were treated with dose of 800 IU vitamin D.

Results: 86 patients were included (mean 34.5 years of age, 48 males, 57 adult onset (AO) GHD) who suffered mostly from postsurgical GHD ($n=46$). At baseline 42 patients were vitamin D deficient. In GHD patients with vitamin D deficiency a lower TBS (1.24 ± 0.12) in comparison to vitamin D nondeficient GHD patients (1.35 ± 0.9) was demonstrated ($p<0.000$). GH replacement together with vitamin D

led to significant increase in TBS (+3.1 %) but there was no significant difference after GH replacement without vitamin D. Patients treated with vitamin D showed at month 24 greater level of 25-OH-D3 in comparison to untreated patients, 62.4 ± 7.2 and 28.2 ± 3.7 nmol/l ($p<0.000$), respectively.

Conclusion: Vitamin D deficient GHD adults showed impaired trabecular bone, analyzed by TBS in comparison to vitamin D non-deficient patients. After GH replacement there was a greater increase of TBS in patients additionally treated with vitamin D. It is obvious, that vitamin D sufficiency plays an important role in maintaining trabecular bone in secondary osteoporosis.

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EPIMEDIUM EXTRACT ISOLATED ICARITIN RESTORES ANABOLIC FUNCTION OF LATE PASSAGE OSTEOBLAST AND MESENCHYMAL STEM CELLS COMPARABLE TO EARLY PASSAGE

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Objective: Given the increase in global life expectancy, osteoporosis have become a longer term issue. As such, potential new treatment should be tested in an aged in vitro model in addition to current methods to prove that it is able to maintain its efficacy for a long term treatment. To investigate the anabolic effect of epimedium extract isolated Icaritin on aged human osteoblast and mesenchymal stem cells (MSC). To compare if the anabolic effect are comparable to those of a younger passage.

Material and Methods: Human MSC and osteoblast were purchased from LONZA. Cells between passages 3–5 were classified as early passages, while cells between passages 12–16 were classified as late passages. Both cell types were subsequently treated with Icaritin for up to 21 days. Bone anabolic parameters which included proliferation, alkaline phosphatase activity rate, and calcium deposition rate were measured via MTS, NBT/BCIP and alizarin red S respectively. Genes of interest for bone formation was performed via RT-QPCR with Taqman probes and comparison between early and late passages were compared. Western blot analysis of protein of interest were performed.

Results: In both late passage osteoblast and MSC, Icaritin treatment was able to increase proliferation, alkaline phosphatase activity rate, and calcium deposition rate. The increase in these anabolic parameters were comparable with that of the control young passages. In addition, several

bone formation genes of interest were up regulated in both cell type mRNA and protein expression after Icaritin treatment. Although the expression of certain genes was reduced in the late passages as compared to the early passage, treatment of Icaritin managed to restore them back.

Conclusion: In late passages for both cell types, Icaritin was still able to demonstrate its anabolic effects and are comparable with the anabolic parameters of early passage cells. This suggests the possibility that Icaritin would be able to perform its anabolic function over a period of time. Future work involving an ovariectomized aged rat model would be performed to ascertain the *in vivo* effects of Icaritin.

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ICARITIN, A PRENYLATED FLAVONOID, INHIBITS OSTEOCLAST DIFFERENTIATION AND FUNCTION IN VITRO

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Objective: It is not fully understood how estrogen deficiency leads to a surge in osteoclast formation and activity and thus a net increase in bone resorption. It has been suggested that the increased resorption occurs via upregulation of signaling pathways usually implicated in inflammatory diseases. As the search is ongoing for an effective treatment with minimal adverse side effects, we evaluated the effects of Icaritin, the main metabolite of traditional Chinese medicinal herb, Epimedium, on osteoclast formation and function.

Material and Methods: Using the RAW 264.7 monocyte cell line we evaluated effects of Icaritin treatment on RANKL-induced osteoclast formation, differentiation and osteoclast resorption. We investigated mechanisms by which Icaritin inhibits osteoclast differentiation by assessing levels of expression of pro-inflammatory cytokines IL-1 β and TNF α , production of reactive oxygen species (ROS) and NF κ B nuclear translocation.

Results: Icaritin treatment dose-dependently reduced osteoclast formation, downregulated expression of osteoclast-specific gene cathepsin K and inhibited osteoclast differentiation (indicated by NFATc1 expression). Icaritin led to 30 % inhibition of osteoclast formation and differentiation and significantly reduced osteoclast resorption (~50 %). This inhibition was independent of

Icaritin's effects on monocyte and osteoclast precursor viability. Additionally, Icaritin treatment dose-dependently reduced RANKL-induced ROS production in osteoclast precursors and downregulated expression of IL-1 β and TNF α . Icaritin also significantly inhibited NF κ B nuclear translocation.

Conclusion: These findings suggest that Icaritin downregulates osteoclast differentiation thereby reducing osteoclast numbers and resorption. We present novel findings of Icaritin's modulation of oxidative status and inflammatory pathway in osteoclast precursors, a potential mechanism that Icaritin inhibits osteoclast differentiation. Icaritin is thus a potential candidate for the treatment of postmenopausal osteoporosis.

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QOL IMPROVEMENT OF OSTEOPOROTIC PATIENTS TREATED WITH ALENDRONATE ALONE OR ALENDRONATE PLUS ALFACALCIDOL THERAPY: RESULTS OF THE JAPANESE OSTEOPOROSIS INTERVENTION TRIAL (JOIT) -02

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Objective: To clarify the effect of the combination therapy (alendronate plus alfacalcidol) or the monotherapy (alendronate alone) on QOL of osteoporotic patients.

Material and Methods: The trial design used was a prospective, randomized, open-label, blinded-endpoint (PROBE) method and the patients were allocated randomly into the monotherapy or combination therapy group. QOL scores were assessed using the Japanese Osteoporosis Quality of Life Questionnaire (JOQOL).

Results: A total of 2164 patients were enrolled in this trial from 186 institutions. QOL scores of patients enrolled were low at baseline. The combination therapy significantly increased QOL score of recreational and social activity of the patients compared to the monotherapy at 12 months. The rate of adverse drug reactions was exactly similar in both groups.

Conclusion: The combination therapy was more effective than the monotherapy on QOL of the osteoporotic patients with high fracture risks. These results suggest the positive effect of alfacalcidol on QOL of the patients.

References: Orimo H et al., *Curr Med Res Opin* 2011;27:1273. Ohta H et al., *Clin Ther* 2014;36:225.

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INFLUENCE OF LOCALLY DELIVERED
ZOLEDRONATE ON PERI-IMPLANT BONE RESORP-
TION AND FORMATION

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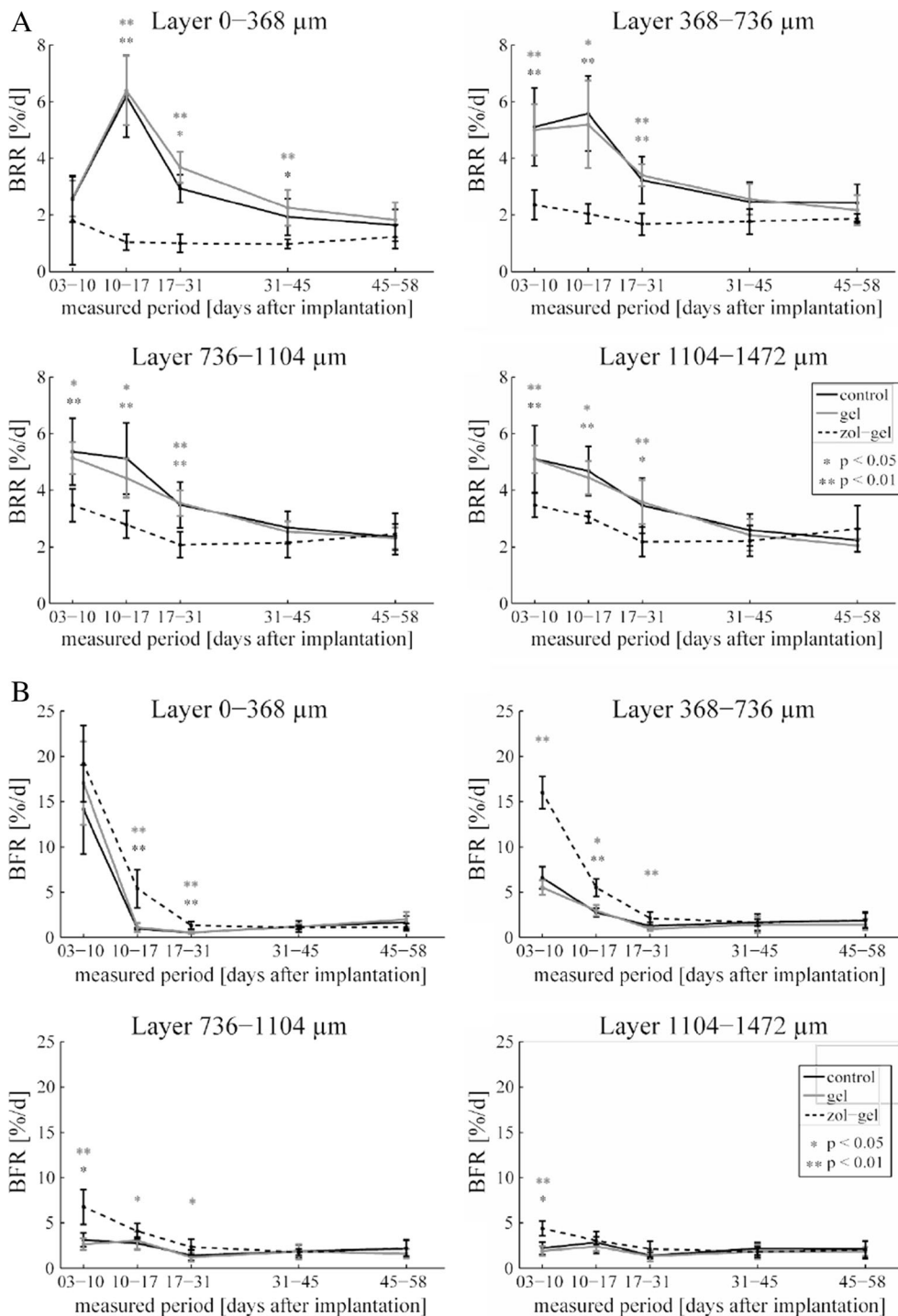


Fig. 1—Bone resorption rate (BRR) and bone formation rate (BFR) measured in 4 layers around the screw.

Objective: Osteoclasts are considered to be the main target for bisphosphonates, a group of drugs that efficiently inhibits bone resorption. Studies with cells from the osteoblast lineage, however, indicate an effect on bone formation [1]. The aim of the present study was to investigate the spatio-temporal effect of locally delivered zoledronate on peri-implant bone remodeling (resorption and formation) based on time-lapsed μ CT scans.

Material and Methods: Screws were implanted bilaterally in the femoral condyles of ovariectomized rats. Zoledronate was delivered via a hyaluronic acid hydrogel that was inserted in the predrilled screw holes (Zol-Gel-group). A second group of animals (Gel-group) received pure hydrogel with screws and a third one (Control-group) only screws. The dynamic bone response (bone formation and resorption rate, defined as percentage of bone volume gained/lost per day) was monitored with time-lapsed μ CT scans in four screw enveloping layers of 368 μ m each.

Results: The analysis of the bone resorption rate confirms an antiresorptive effect of zoledronate in all analyzed layers that diminishes over time (Fig. 1A). The bone formation rate shows an early bone formation peak in all groups close to the screw that is clearly enhanced by the presence of zoledronate (Fig. 1B). The pure hydrogel did not influence bone remodeling.

Conclusion: The present study was able to show that zoledronate delivered from a fast degradable hydrogel can boost early bone formation and efficiently inhibit peri-implant bone resorption close to an implant and stabilize the bone loss situation in an OVX rat model.

References: [1] Pan et al., Bone 2004

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A PILOT STUDY TO COMPARE TWO DIFFERENT HYALURONIC ACID COMPOUNDS FOR TREATMENT OF KNEE OSTEOARTHRITIS

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Objective: In the present study we investigated the clinical effectiveness of viscosupplementation using a novel highly crosslinked hyaluronic acid (HA), (experimental formulation) in patients affected by bilateral knee osteoarthritis and compared its efficacy with a traditional, widely and commonly used HA (control formulation).

Material and Methods: A total of 20 patients, aged between 24 and 74 years and affected by bilateral knee osteoarthritis, participated in this pilot randomized triple-blind clinical study. They received two injections (2 ml each) of the control formulation in the left knee and 2 injections (2 ml each) of the experimental formulation in the right knee spaced 15 days apart. Visual Analogue Scale (VAS) and Western Ontario McMaster Universities Osteoarthritis Index (WOMUOI)

score were used to evaluate the efficacy of HA injections before and 3 and 6 months after treatment.

Results: Treatment with the experimental formulation resulted in a high percentage improvement in VAS pain, WOMUOI score pain and physical activity, when compared to the control formulation, at 6 months ($p < 0.05$). Both treatment regimens resulted in a significant improvement vs. baseline in all endpoints at 3 and 6 months ($p < 0.001$).

Conclusion: These results are encouraging for larger clinical trials with the experimental formulation in larger cohorts of patients affected by osteoarthritis of the knee.

Acknowledgements: The authors contributed equally to this work. This research was supported by Adoderm, Langenfeld, Germany.

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VITAMIN D SERUM LEVELS, CHOLECALCIFEROL ORAL TREATMENT AND DIGITAL ULCERS RELATED TO SSC: IS THERE A CORRELATION?

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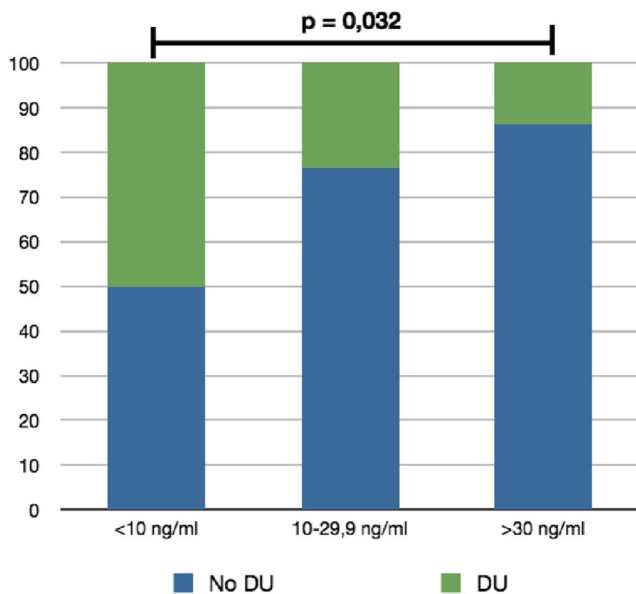
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Objective: Vitamin D deficiency is a condition often associated with autoimmune diseases such as systemic sclerosis (SSc). In patients with SSc the most severe manifestations appear in subjects with hypovitaminosis D too. In particular, it has been observed that vitamin D (vitD) deficiency is related to increased skin fibrosis and reduced peripheral vasculature. The aims of this work are: A) to test whether digital ulcers (DU), due to a severe blood supply reduction of fingers' extremities, are associated with low vitD levels; B) to check if the integrative therapy with cholecalciferol may play a role in SSc DU prevention strategy.

Material and Methods: We enrolled 87 consecutive patients from three rheumatology clinics. Each one had a SSc diagnosis according to ACR/EULAR 2013 classification criteria. For every patient serum levels of vitamin D were assayed. DU presence during the previous 6 months was recorded as well as cholecalciferol oral treatment (COT). A value of $p < 0.05$ was considered statistically significant.

Results: The prevalence of DUs (at least one) in subjects with vitD < 10 ng/ml was higher than in those with vitD levels > 30 ng/ml (50 vs. 14 % $p < 0.05$) (Fig. 1). Similar results, but not statistically significant, were found in

patients subgroups clustered according to COT presence (33 vs. 16 %) or absence (53 vs. 20 %).



Conclusion: The analysis of the results shows that DUs are more frequent in SSC patients with hypovitaminosis D. However, it cannot be established if there is a direct (hypovitaminosis D is a risk factor for DU) or indirect (hypovitaminosis D and DU are unlinked but due to the disease activity) relation. For the same reasons the possible COT protective effect against DUs is not so clear and needs to be further investigated.

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THE RELATIONSHIPS BETWEEN SERUM INSULIN, IGF-1, CORTISOL, ADIPOCYTOKINES AND BONE MINERAL DENSITY IN GROWING CHILDREN

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Objective: To investigate the relationships between serum levels of several hormones (insulin, IGF-1, cortisol, leptin and adiponectin) and BMD in a group of French children and adolescents.

Material and Methods: 124 children and adolescents (57 boys and 67 girls) aged from 6 to 17 years participated in this study. Weight and height were measured, and BMI was calculated. Body composition and BMD of whole body (WB), lumbar spine (L1-L4), total hip (TH) and femoral neck (FN) were measured by DXA. Serum

insulin, IGF-1, cortisol, leptin and adiponectin were measured using appropriate techniques.

Results: In girls, age, weight, height, BMI, fat mass and lean mass were positively correlated to WB BMD, L1-L4 BMD, TH BMD and FN BMD ($p < 0.001$). Serum IGF-1 and leptin were positively correlated to WB BMD, L1-L4 BMD, TH BMD and FN BMD ($p < 0.05$). Serum adiponectin, insulin and cortisol were not significantly correlated to BMD values. In boys, age, weight, height, BMI, fat mass and lean mass were positively correlated to WB BMD, L1-L4 BMD, TH BMD and FN BMD ($p < 0.001$). Serum IGF-1 and insulin were positively correlated to WB BMD, L1-L4 BMD, TH BMD and FN BMD ($p < 0.05$). Serum adiponectin was negatively correlated to TH BMD ($r = -0.54$; $p < 0.01$) and FN BMD ($r = -0.54$; $p < 0.01$). Serum leptin and cortisol were not significantly correlated to BMD values.

Conclusion: This study suggests that serum IGF-1 is a positive predictor of BMD in growing children. Moreover, it seems that serum leptin is a positive predictor of BMD in girls while serum insulin is a positive predictor of BMD in boys.

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HOW WELL DO RADIOGRAPHIC, CLINICAL AND SELF-REPORTED DIAGNOSES OF KNEE OSTEOARTHRITIS AGREE? FINDINGS FROM THE HERTFORDSHIRE COHORT STUDY

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Objective: Epidemiological studies of knee osteoarthritis (OA) have often used a radiographic definition. However, the clinical syndrome of OA is influenced by a broad range of factors in addition to the structural changes required for radiographic OA. Recently several studies have adopted a clinical or self-reported approach to OA diagnosis rather than a radiographic approach. The aim of this study was to investigate agreement between radiographic OA and the clinical and self-reported diagnoses of OA.

Material and Methods: Data were available for 199 men and 196 women who participated in the UK component of the European Project on Osteoarthritis (EPOSA) and, who originally participated in the Hertfordshire Cohort Study (HCS). Participants completed a questionnaire detailing self-reported OA. Clinical OA was defined based on American College of Rheumatology (ACR) criteria. Knee radiographs were taken and graded for overall Kellgren and Lawrence (K&L) score. To assess the strength of agreement between radiographic OA and i) clinical and ii) self-reported definitions of OA, sensitivity, specificity and relative risk statistics were calculated.

Results: The mean (SD) age of study participants was 75.2 (2.6) years and almost identical proportions of men and women. Clinical knee OA was present in 18, 42 % had a diagnosis of radiographic knee OA and 21 % of study participants had self-reported knee OA. Of those with self-reported knee OA 72 % (52 out of 72) also had radiographic knee OA, while 66 % (39 out of 59) with clinical knee OA also had radiographic knee OA. However 58 % of those participants diagnosed with radiographic OA did not have either self-reported knee OA or a diagnosis of clinical OA. Therefore in comparison with the radiographic definition of OA, both the clinical and self-report definitions had high specificity (91.5 and 91.5 %, respectively) and low sensitivity (24.5 and 32.7 %, respectively).

Conclusion: There is modest agreement between the radiographic, clinical and self-report methods of diagnosis of knee OA.

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CYTOKINES IN PATHOLOGY OF BONE METABOLISM IN POLISH PATIENTS WITH CROHN'S DISEASE

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Objective: The role of proinflammatory cytokines (IL-1 β , IL-6, IL-17, TNF α) and anti-inflammatory cytokines (IL-4, IL-10, IL-13) is associated with the initiation and progression of Crohn's disease (CD) and bone metabolism. Aims: Evaluation of BMD, serum concentrations of cytokines in patients with

CD and in control group and evaluation correlation between cytokines and BMD.

Material and Methods: The study groups: (I -CD) 103 patients with CD aged 35.78 \pm 12.79 years, including 51 women aged 39.96 \pm 14.09 years and 52 men aged 31.67 \pm 9.86 years (II -CG) 41 healthy volunteers aged 30.37 \pm 8.58 years, including 20 women aged 33.75 \pm 10.83 years and 21 men aged 27.14 \pm 3.65 years (control group -CG). Densitometry of L2-L4 and femoral neck (BMD, T-score, Z-score) carried out using the DXA-Lunar DPX-IQ. The serum concentration of interleukins was measured by ELISA. Each patient filled a questionnaire concerning the current progress of the disease. The statistical analysis was carried out using the Statistica PL10 software (StatSoft) [$p < 0.05$].

Results: BMD[g/cm²]/T-score/Z-score-L2-L4: I-CD: -1.107 \pm 0.181/-0.896 \pm 1.446/-0.465 \pm 1.296 II- CG:1.227 \pm 0.080/0.119 \pm 0.694/0.089 \pm 0.664. Neck: I-CD:0.941 \pm 0.178/-0.644 \pm 1.297/-0.248 \pm 1.112 II- CG:1.079 \pm 1.155/0.438 \pm 1.021/0.380 \pm 0.664. Serum interleukins concentrations [pg/ml]—IL-10/ IL-17/

TNF α /IL-4/IL-6/IL-13/IL-1 β : I-CD 1.217 \pm 2.585/ 7.995 \pm 10.189/ 4.540 \pm 5.762/0.070 \pm 0.119/5.737 \pm 4.927/59.671 \pm 41.504/0.663 \pm 0.882 II-CG: 0.813 \pm 1.670/5.224 \pm 1.971/2.056 \pm 0.785/0.033 \pm 0.029/1.343 \pm 1.278/31.417 \pm 12.43/0.478 \pm 1.433. We observed only negative correlation between IL-6 and neck T-score/Z-score in CD group ($p < 0.05$).

Conclusion: The incidence of osteopenia and osteoporosis in CD is high. IL-6, as a proinflammatory cytokine, can modulate BMD in the femoral neck and can cause a loss of bone mass in CD.

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AUTOGENOUS (INTERNAL) BONE GRAFTING WITHOUT INCISION AND MANAGEMENT OF BONE GAP BY RRBTT

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Objective: Recent era of minimal invasive surgery has revolutionized orthopaedic positive result. Fast vehicular traffic accidents results in comminuted fracture, bone loss and bone gap. Newly innovated bone grafting technique. Rakesh Remote Bone Transportation Technique (RRBTT) is a successful method by which bone grafts harvested from same bone then transported to fracture site without applying extra incision. Several cases of bone gap also managed by RRBTT and by cortico-cancellous bone defect is filled by cortico-cancellous bone. Advantage: RRBTT is only method to provide intramedullary bone grafts. Harvested bone from the

parental entry, bone transported Internally is vascular friendly, fracture heals in a much shorter time and less infection.

Material and Methods: 1. Bone scoop with cover. 2. Bone starter. 3. RRBTT transportation tube. 4. Flexible bone pusher. Bone grafts harvested from the entry point and then transported to the # site with the help of transportation tube. Grafts can also be transported by other various routes which accelerate fracture healing.

Results: n 12 cases of bone gap. n 106 cases of # bone transportation (tibia 66 and femur 40—shows mean 8 to 10 weeks healing time.

Conclusion: RRBTT has opened up a new window which has shown encouraging results of osteoconduction and osteogenesis without opening fracture site is vascular friendly. I would like to call it as “Internal Pfemister bone grafting.” Never done in orthopaedic history before.

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EFFECTS OF TESTOSTERONE REPLACEMENT THERAPY IN HYPOGONADAL CARDIAC TRANSPLANT PATIENTS

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Objective: Hypogonadism is common in cardiac transplant patients (CTX) and exerts negative effects on bone but also libido and quality of life. We investigated whether testosterone replacement therapy (TRT) on top of ibandronate in hypogonadal CTX recipients confers positive effects on bone mass, fracture incidence and quality of life.

Material and Methods: 52 patients were enrolled in the study and received ibandronate (IBN; quarterly 2 mg iv). 60 % were hypogonadal and 45 % of these were randomized to receive additional TRT.

Results: At baseline, hypogonadal compared to eugonadal men had lower Z-score values at the femoral neck (−1.54 vs. 0.15) and total hip (−1.34 vs. 0.01) (all $P < 0.001$) and significantly more prevalent vertebral fractures (63 vs. 14 %, $P < 0.001$). After 5 years, BMD increased in all patients, however, hypogonadal patients with additional TRT showed a higher increase (femoral neck 12.4 and 16.4 %, trochanteric region 10.2 and 14.7 %, total hip 9.2 and 12.4 %; all $P < 0.001$) as compared to eugonadal patients and unreplaced hypogonadal patients. Fracture incidence was significantly lower in patients receiving additional TRT (21 % compared to 41 %; $p = 0.001$). At baseline, 77 % of the hypogonadal patients reported a loss of libido with an average of 7 annual

sexual activities (27 % of eugonadal men, $P = 0.005$ with 15 sexual activities $P = 0.005$). Patients on TRT reported an increase in sexual activities after 1 (29 ± 8 ; $p < 0.001$) and 5 years (25 ± 9 ; $p < 0.001$), while no changes in sexual behavior were reported by the other groups.

Conclusion: Hypogonadism has deleterious effects on bone health in transplant patients. IBN therapy increases BMD in CTX patients independently of gonadal status. Hypogonadal patients benefit from additional TRT over 5 years with respect to bone mass, fracture rate as well as quality of life. This is the first study that suggests that not only IBN but also TRT is a safe, effective and well tolerated treatment in CTX patients with osteoporosis.

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ALENDRONATE IMPROVES BONE MATERIAL LEVEL PROPERTIES IN PAIRED HUMAN TRANSILIAC BONE BIOPSY SPECIMENS

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Objective: Bone strength, hence fracture risk, is dependent on bone geometry, microstructure and bone material level properties. Alendronate treatment maintains bone mass and prevents further microarchitecture deterioration. Indeed only an improvement of bone material level properties, could explain the decrease in fracture risk.

Material and Methods: We investigated the effects of alendronate treatment on bone material level properties and bone microarchitecture of transiliac bone biopsies from postmenopausal osteoporotic patients. In a longitudinal study, 76 paired biopsies in 38 patients were obtained at baseline and after 6 or 12 months of treatment with alendronate 70 mg once weekly. Elastic modulus, hardness and working energy were blindly analyzed by nanoindentation at the level of the interstitial and Haversian bone of the cortex and of trabecular nodes and remodeling units under humid conditions. Parameters of microarchitecture were evaluated by μ CT (Scanco Medical). Values are mean \pm SEM, significance of differences are evaluated by Student's unpaired *t*-test, ** $p < 0.01$, *** $p < 0.001$.

Results: Bone microarchitecture was not influenced by alendronate treatment. At the level of the interstitial cortical bone, changes in bone material level properties were observed; modulus was at base line 13.31 ± 0.18 gPa and after 6 months of treatment 14.46 ± 0.20 *** and hardness 3189 ± 37 pJ at base line and 3372 ± 43 ** after 6 months of treatment.

Conclusion: In summary, changes in bone material level properties were observed at the level of the interstitial cortical bone at the two time points and only by 12 months in Haversian bone, but not at the level of the trabecular bone.

Thus a prevention of deterioration cannot be excluded at the level of the trabecular bone since a progressive alteration was observed after the menopause. The positive effect on bone material level properties of alendronate could be partially explained by the known increase of mean degree of mineralization and could contribute to the known improvement of bone strength since no modification of bone mass was observed. Interestingly this study indicates that bone material level properties which represents a target for anti-osteoporotic treatment, could be selectively improved by alendronate.

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COMPARISON OF VERTEBRAL FRACTURE ASSESSMENT BETWEEN SEMIQUANTITATIVE IDENTIFICATION AND QUANTITATIVE MORPHOMETRY

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Objective: Vertebral fracture assessment (VFA) from images acquired by DXA is often based on a semiquantitative assessment (SQ) and quantitative morphometry (QM). We compared the results of VFA between SQ and QM.

Material and Methods: VFA were consecutively done with DXA for 217 postmenopausal women aged ≥ 50 years between February and October of 2013. The patients' age was between 50 and 90 years (65 ± 9.1 year). The duration of menopause was ≥ 1 year in all patients. Twenty patients had the diagnosed vertebral fractures before VFA. Vertebrae were evaluated with SQ first, and then QM 3 month later by the same doctor.

Results: In QM, there were no vertebral fractures in 158 patients and vertebral fractures in 59 patients with 101 fractured vertebrae including one fractured vertebra in 35 patients, 2 fractured vertebrae in 14 and ≥ 3 fractured vertebrae in 10. In SQ, there were no vertebral fractures in 157 patients and vertebral fractures in 60 patients with 102 fractured vertebrae. Four patients identified vertebral fractures in SQ were not identified vertebral fractures in QM. Three patients identified vertebral fractures in QM were not identified vertebral fracture in SQ. There was good agreement for the identification of vertebral fractures between SQ and QM assessment ($k = 0.80$). Disagreement between SQ and QM usually occurred in the patients with mild vertebral fractures.

Conclusion: Vertebral fractures is the hallmark of osteoporosis and only one third of patients come to medical attention. VFA is good for detecting the unrecognized vertebral fractures. VFA can be performed from the images taken by DXA with SQ and QM. There was good agreement for the

identification of vertebral fractures. Genant semiquantitative assessment is recommended for VFA by ISCD. Disagreement in the patients with mild vertebral fractures between SQ and QM showed that VFA did not perform well for diagnosing mild vertebral fractures. The doctors with appropriate training may be important for effective use of VFA.

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PREVALENCE OF FRAILTY IN NURSING HOME RESIDENTS ACCORDING TO VARIOUS DIAGNOSTIC TOOLS

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Objective: To compare the prevalence of frailty with regards to different diagnostic tools among elderly nursing home residents.

Material and Methods: Nursing home residents were defined as frail or not according to ten diagnostic tools: Clinical Frailty Scale, Groningen Frailty Indicator, Edmonton Frail Scale, Frail Scale Status, Frailty Index, Fried definition, Sega Grid, Share Frailty Index, Strawbridge Questionnaire and Tilburg Frailty Indicator. The percentage of pre-frail subjects was also evaluated by 3 of these 10 tools: Frail Scale status, Fried definition and Share Frailty Instrument. The percentage of frail and/or pre-frail subjects for each tool was calculated and the agreement between the different tools was measured using the kappa Cohen's coefficient and its 95 % confidence interval. The association between the different diagnostic tools and subjects characteristics was assessed by multiple or logistic regression.

Results: A total of 200 volunteers institutionalized subjects (83.4 ± 9.27 years, 75 % of women) were enrolled in this study. Prevalence of frailty varies from 1.99 % (Frailty index) to 79.9 % (Groningen Frailty Indicator) depending on the diagnostic tool used. The percentage of pre-frail subjects varies from 12.7 % (Clinical Frailty Scale) to 59 % (Fried definition). The agreement between the different definition, was very low, ranging from -0.0088 (-0.043 – 0.025), observed between Frailty Index and Strawbridge questionnaire, to 0.36 (0.20 – 0.51), observed between Sega Grid and Groningen Frailty Indicator. According to the tools, it seems that significant differences are observed regarding the age of

patients, their sex, their walking support, the energy expenditure, their nutritional status, their quality of life and their functional abilities.

Conclusion: Prevalence of frailty is highly dependent on the diagnostic tool used. It is necessary to reach a consensus on the diagnostic tools, as well as on the parameters to be measured, in order to make data obtained in epidemiological studies comparable.

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RELIABILITY OF MUSCLE STRENGTH MEASURES OBTAINED WITH A HAND-HELD DYNAMOMETER IN AN ELDERLY POPULATION

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Objective: To assess the reliability of a hand-held dynamometer for isometric strength measurements among nursing home residents.

Material and Methods: The isometric muscle strength of nursing home residents was assessed for 8 different muscle groups (knee extensors and flexors, hip abductors and extensors, ankle flexors and extensors, elbow flexors and extensors), using a wireless digital hand-held dynamometer, the MICROFET2 device (Hogan Health Industries, Inc. 8020 South 1300 West, West Jordan, USA). Strength measurements were performed at baseline and after 4 days, by the same operator and after 8 days by a second operator. Three maximal contractions for each muscle group were performed with 30 s intervals between contractions. The highest performance was considered for analysis. IntraClass Coefficient (ICC) was computed to assess the reliability of the test-retest of the MicroFET2 performed by the same operator or by two different ones. We considered an ICC over 0.90 as very high, between 0.70 and 0.89 as high and between 0.50 and 0.69 as moderate.

Results: A total of 30 elderly subjects (75.0±11.2 years, 50 % of women) were enrolled in this study. ICC used to characterize the reliability of the test-retest performed by the same operator, ranged from 0.60 (0.37–0.83) for the ankle extensors to 0.85 (0.74–0.95) for the elbow flexors. When considering the test-retest performed by two different operators, the ICC values ranged from 0.62 (0.41–0.84) for the ankle extensors to 0.87 (0.79–0.96) for the elbow extensors.

Conclusion: A high reliability was observed for all muscle groups, except for the ankle extensors (intra- and

inter-observer) and for dorsi-flexor ankle (intra-observer). However, these high reliabilities have been obtained with a standardized protocol but also with standardized instructions to patients. Under these conditions, the measure of muscle strength by the MicroFET2 is reliable for many muscle groups when performed either by the same operator or by two different ones.

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THE ASSOCIATION BETWEEN SERUM LEPTIN LEVELS AND THE SEVERITY OF HAND OSTEOARTHRITIS

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Objective: To determine the association between serum leptin levels and the severity of hand osteoarthritis.

Material and Methods: 50 patients with primary HOA diagnosed according to the American College of Rheumatology classification criteria for HOA were enrolled in this study. Local hand musculoskeletal examination was performed where distal interphalangeal (DIP) joints, proximal interphalangeal (PIP) joints, metacarpophalangeal (MCP) joints and trapeziometacarpal joints were examined for tenderness, soft tissue swelling, hard tissue enlargement, and deformity. BMI was calculated for each patient, pain was assessed by VAS. Grip strength was measured with a dynamometer, and pinch strength was measured with a pinchmeter. Pain, stiffness and physical function were assessed using AUSCAN-index. Serum level of Leptin was detected by ELISA technique. The Kellgren-Lawrence (KL) scale was used for assessing severity of OA radiologically. High resolution ultrasound examination of the hands was done using linear multifrequency transducer for assessment of joint abnormalities.

Results: Following the assessment of one hundred osteoarthritic hands, the results of the study were as follows: there was a significant positive correlation between serum levels of leptin and the age, disease duration and BMI of studied patients. The number of osteophytes detected sonographically in the PIPs, MCPs and IPs correlated positively with serum leptin levels. Also, there was a significant negative correlation between serum leptin and grip and pinch strength. Whereas there was no significant correlation between serum leptin levels and clinical findings, KL scale and AUSCAN scale.

Conclusion: Leptin could be an important factor in the development of HOA and its severity in obese patients.

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OSTEOPOROSIS “SILENT DISEASE”S. Almahdi¹¹Radiology department, Faisal Sultan Alessa, Kuwait Cancer Control Center, Kuwait city, Kuwait

To define out the main causes, signs and symptoms. How to prevent, diagnose, treat it. Osteoporosis is a disorder characterized by reduced bone strength, diminished bone density, and altered macrogeometry and microscopic architecture. Adult bone mass is the integral measurement of the bone mass level achieved at the peak minus the rate and duration of subsequent bone loss. There is clearly a genetic predisposition to attained peak bone mass, which occurs by a person's mid-20s. Bone loss with age and menopause are universal, but rates vary among individuals. Both peak bone mass and subsequent bone loss can be modified by environmental factors, such as nutrition, physical activity, and concomitant diseases and medications. Osteoporosis prevention requires adequate calcium and vitamin D intake, regular physical activity, and avoiding smoking and excessive alcohol ingestion. Risk of fracture determines whether medication is also warranted. A previous vertebral or hip fracture is the most important predictor of fracture risk. Bone density is the best predictor of fracture risk for those without prior adult fractures. Age, weight, certain medications, and family history also help establish a person's risk for osteoporotic fractures. All women should have a bone density test by the age of 65 or younger (at the time of menopause) if risk factors are present. Guidelines for men are currently in development. Medications include both antiresorptive and anabolic types. Antiresorptive medications – estrogens, selective estrogen receptor modulators (raloxifene), bisphosphonates (alendronate, risedronate, and ibandronate) and calcitonins—work by reducing rates of bone remodeling. Teriparatide (PTH) is the only anabolic agent currently approved for osteoporosis in the United States. It stimulates new bone formation, repairing architectural defects and improving bone density. All persons who have had osteoporotic vertebral or hip fractures and those with a BMD diagnostic of osteoporosis should receive treatment. In those with a BMD above the osteoporosis range, treatment may be indicated depending on the number and severity of other risk factors.

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CORTICAL POROSITY IN WOMEN OVER 80 YEARS OF AGES. Iuliano¹, R. Zebaze¹, A. Ghasem-Zadeh¹, E. Seeman¹¹University of Melbourne, Austin Health, Melbourne, Australia

About 85–90 % of the skeleton in over 80 year-olds is cortical because most trabecular bone has been resorbed leaving

mainly cortical fragments in the medullary canal. High remodeling due to sex hormone deficiency is exacerbated by secondary hyperparathyroidism variously due to vitamin D deficiency, a low calcium intake and malabsorption. As intracortical remodeling is the major source of cortical bone loss, we hypothesized that cortical porosity will be elevated in these women and more severely in those with elevated circulating PTH. We imaged distal tibial microstructure in 36 women (mean age 89±4 years) and 73 postmenopausal women (mean age 60±5 years) using HR-pQCT and quantified porosity using StrAx1.0. Despite similar total bone area, in older compared with younger women respectively, the compact-appearing cortical area was ~12 % smaller (101±24 vs. 114±17 mm²), ~21 % less dense (586±90 vs. 745±75 mgHA/cc) and porosity ~25 % higher (60.9±8.7 vs. 45.4±7.4 %) (all $p < 0.01$). In the older women, PTH was elevated (9.0±4.4 pmol/L) and dietary calcium intake low (636±175 mg/day) with 2/3 of women consuming <600 mg/day. In all women, porosity was related to age ($r=0.72$) and PTH ($r=0.46$) (both $p < 0.001$). In the older women, age accounted for 10 % of the variance in porosity. PTH levels in the elderly women were systemically elevated, and the small sample size may have limited the ability to detect a relationship with porosity. Dietary calcium in the elderly was related to porosity in those with intakes below 600 mg/day ($r=0.47$, $p=0.05$). We infer that a reduced calcium intake independently contributes to deficits in cortical mineralized bone matrix volume by influencing intracortical remodelling. Studies are needed to examine the effects of calcium intakes below 600 mg/day on bone loss and the effects on repletion in this high-risk elderly population.

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LEPTIN PROTECTS RAT ARTICULAR CHONDROCYTES FROM TNFA-INDUCED CYTOTOXICITYS. W. Lee¹, J. S. Kim², S. Y. Lee¹, W. T. Chung¹, Y. H. Yoo³¹Rheumatology, Dong-A University, College of Medicine, Busan, Republic of Korea, ²Rheumatology, Jeju National University, College of Medicine, Jeju, Republic of Korea, ³Anatomy & Cell Biology, Dong-A University, College of Medicine, Busan, Republic of Korea

Objective: Although leptin appears to be an important local and systemic factor influencing cartilage homeostasis, the role of leptin in chondrocyte death is largely unknown. TNF α is a pro-inflammatory cytokine that plays a central role in the pathogenesis of articular diseases. This study examines whether leptin modulates TNF α -induced articular chondrocyte death.

Methods: Primary rat articular chondrocytes were isolated from knee joint cartilage slices. To induce cell death, the chondrocytes were treated with TNF α . To examine whether

leptin modulates the extent of TNF α -mediated chondrocyte death, the cells were pretreated with leptin for 3 h before TNF α treatment followed by viability analysis. To examine the mechanism by which leptin modulates the extent of TNF α -mediated chondrocyte death, we utilized mitochondrial membrane potential measurements, flow cytometry, nuclear morphology observation, coimmunoprecipitation, western blot analysis and confocal microscopy.

Results: We demonstrated that leptin prevents TNF- α induced chondrocyte death. We further found that apoptosis partially contributes to TNF α induced chondrocyte death while necroptosis primarily contributes to TNF α induced chondrocyte death. In addition, we observed that leptin exerts anti-TNF α toxicity via JNK in rat articular chondrocytes.

Conclusion: Based on our findings, we suggest that the leptin present in the articular joint fluid protects articular chondrocytes against cumulative mechanical load and detrimental stresses throughout a lifetime, delaying the onset of degenerative changes in chondrocytes. We can further hypothesize that leptin protects articular chondrocytes against destructive stimuli even in the joints of OA patients.

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HIP AND KNEE OSTEOARTHRITIS IMPACT ON LOWER LIMB AMPUTEES' ABILITY TO WALK WITH PROSTHESIS

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Objective: Hip and knee osteoarthritis is a well-known complication which occurs after years of wearing prosthesis after lower limb amputation. However, not so many data are available about osteoarthritis influence on prosthetic fitting and rehabilitation outcome.

Material and Methods: Prospective study was conducted in period from 2010 to 2013 and it included patients with major lower limb amputation who underwent prosthetic fitting and rehabilitation at Medical Rehabilitation Clinic, Clinical Center of Vojvodina. Diagnosis of hip and knee osteoarthritis was made according to the criteria proposed by American College of Rheumatology. After prosthetic fitting and rehabilitation, before discharging the patients, we grouped them into three functional groups: group I which consisted of patients who were unable to walk with prosthesis, group II with patients who were able to walk with prosthesis only indoors and group III consisting of patients who could walk with prosthesis outdoors.

Results: There were 104 patients included in our study (average age 62 \pm 11, 80 males, 24 females). 40 patients suffered from transtibial and 64 transfemoral level of amputation. Among the patients at the beginning of prosthetic fitting and rehabilitation we identified 13(12.5 %) patients with hip or knee osteoarthritis. Upon discharge from Medical Rehabilitation Clinic 81 patients were able to walk with prosthesis outdoors (group III), 17 patients were able to walk with prosthesis indoors only (group II), and 6 patients were unable to ambulate with prosthesis. In group I, 3 (50 %) patients had osteoarthritis, in group II, 3 (17.6 %) patients had osteoarthritis, and finally in group III, 7 (8.6 %) had hip or/and knee osteoarthritis. These differences were statistically significant ($\chi^2=9.228$; $p=0.01$).

Conclusion: Transfemoral and transtibial amputees with hip or knee osteoarthritis have poorer walking capacity than patients without osteoarthritis.

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ANALYSIS OF RISK FACTORS FOR VERTEBRAL FRAGILITY FRACTURE AND THE DIFFERENCE AT DIFFERENT SPINAL FRACTURE SITES IN POSTMENOPAUSAL WOMEN

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Objective: To study risk factors of vertebral fragility fracture and explore the influential factors at different spinal fracture sites in postmenopausal women.

Methods: A total of 274 postmenopausal women over the age of 50 were selected. Their height and weight were measured and history of fractures was recorded. Every patient underwent DXA scans to measure the BMD of the total hip, femoral neck, and lumbar spine (L1-L4), T-scores were calculated at the same time. VFA scans was done using the same DXA device from T4 to L4. All patients grouped by the osteoporosis diagnostic criteria and fracture sites.

Results: Univariate analysis showed that age, menopause age, menopausal duration and bone mass were possibly associated with vertebral fragility fracture ($P<0.05$). Multivariate nonconditional logistic regression analysis indicated that long postmenopausal time (over 20 years) (OR=3.199, 95 %CI 1.392 to 7.350), osteoporosis with the history of fractures (OR=78.641, 95 %CI 7.450 to 830.153), osteoporosis of the hip (OR=3.664, 95 %CI 1.005 to 13.358), osteoporosis of the lumbar (OR=3.550, 95 %CI 1.003 to 12.566) were closely related to vertebral fragility fracture. The difference has statistic significance ($p<0.05$) in BMD, BMC and T-score between

thoracolumbar fracture and lumbar vertebrae fracture, thoracolumbar fracture and thoracic vertebrae fracture.

Conclusion: Long postmenopausal time (over 20 years), osteoporosis with the history of fractures, Osteoporosis of the hip and osteoporosis of the lumbar are the risk factors of vertebral fragility fracture. BMD, BMC and T-score in thoracolumbar fracture were lower than the other groups. It is necessary to pay more attention to the change of BMD and combined the vertebral fracture assessment.

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COMPARISON OF THE RESULTS OF QUANTITATIVE COMPUTED TOMOGRAPHY AND DUAL-ENERGY X-RAY ABSORPTIOMETRY IN THE EVALUATION OF BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN

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An important characteristic of osteoporosis is bone loss, which is a diagnostic criterion for decreased BMD. There is a relationship between the level of the BMD and the likelihood of fractures. In the diagnosis of osteoporosis leading local occupy ray methods, evaluating the BMD, which include DXA and QCT. An important advantage is the possibility of QCT study trabecular and cortical bone separately and avoid overlap of the surrounding tissues, as well as a great diagnostic accuracy in patients with degenerative changes in the vertebrae. Most bone loss occurs in women after menopause. In this regard, the study of BMD by various methods densitometry in women aged 50 years and older, as well as a comparative assessment of the DXA and QCT are relevant.

Purpose: To evaluate the correlation of the results of DXA and QCT in the diagnosis of postmenopausal osteoporosis.

Material and Methods: The study included 210 women aged 50 years and older, who were divided into four groups: I group 50–59 years ($n=73$), II group 60–69 years ($n=58$), III group 70–79 years ($n=53$), IV group 80 years and older ($n=26$). All women performed DXA and QCT. DXA was performed bone densitometry Lunar-DPX-NT (GE Healthcare, UK). Three-dimensional computed tomography densitometry was performed Somatom Emotion (Siemens, Germany) in a mode “Osteo”. Scanned second to fourth lumbar vertebrae.

Results: By DXA in the I group osteoporosis was diagnosed in 15.1 %, osteopenia—at 47.9 % of women; II group—from 24.1 to 44.8 % in the III group - from 41.5 to 47.2 % in IV group 46.2 and 30.8 %, respectively. In carrying out densitometry by QCT in I group osteoporosis was diagnosed in 20.5 %, osteopenia—at 57.5 % of the patients; II group—at

44.8 and 41.4 %, in III group—58.5 and 35.8 %, in IV group—76.9 and 23.1 %, respectively. In I group, no differences were found in the number of diagnosed cases of osteoporosis during the DXA and QCT ($p=0.1$). Beginning with II group with QCT incidence of osteoporosis was higher than DXA ($p=0.001$). In the study of the correlation between the results of the DXA and the QCT in all groups revealed a positive moderate correlation. With increasing age, the coupling strength of correlation decreases (I group: $r=0.68$, $p=0.001$; II group: $r=0.57$ $p=0.001$; III group $r=0.40$, $p=0.003$; IV group $r=0.40$, $p=0.04$).

Conclusion: With increasing age in women was a discrepancy densitometry results depending on the method used. Thus, women over 60 years of age is recommended to evaluate the BMD QCT to improve the quality of diagnosis of osteoporosis.

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DOES ESTIMATED CARDIORESPIRATORY FITNESS PREDICT BONE STRENGTH IN ADOLESCENCE? THE TROMSØ STUDY, FIT FUTURES

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Objective: Achievement of a high peak bone mass in early life may prevent future fractures. Possible modifiers include lifestyle factors like physical activity. Measurements of areal BMD and bone mass content (BMC) are reflections of bone strength. This population based study investigates the predictive value of estimated cardiorespiratory fitness (CRF) on BMD and BMC in Norwegian adolescents.

Methods: In 2010–2011 all first-year upper-secondary school students in two North-Norwegian municipalities were invited to a health survey, the Fit Future study. 508 girls and 530 boys aged 15–18 years attended. BMD and BMC were measured by DXA. CRF was estimated through algorithms including age, waist circumferences, resting heart rates and physical activity index. Statistical analyses were performed sex stratified, using independent t-test for comparison of means and multiple linear regression models adjusting for age, height and weight.

Results: Active participants had higher BMD and BMC at all sites ($p<0,001$), except for BMC total body in girls, compared to inactive participants. The mean estimated Vo_{2peak} in girls

and boys were 42.9 ml/kg/min and 54.8 ml/kg/min, respectively. Multiple regression analyses revealed a positive association in girls, with beta values of 0.065 (37.3 %), 0.431 (39.1 %) and 15.28 (64.3 %) for BMC femoral neck, BMC total hip and BMC total body respectively ($p < 0.001$). Corresponding associations were seen in boys with beta values of 0.099 (38.2 %), 0.641 (40.7 %) and 32.65 (63.9 %) for BMC femoral neck, BMC total hip and BMC total body respectively ($p < 0.001$). A similar positive association was observed in BMD measurements at all sites in both sexes.

Conclusion: CRF is associated with higher BMC and BMD levels in Norwegian girls and boys. The practical and effective method of estimating cardiorespiratory fitness may be useful for identification of individuals at increased risk of failing to reach their peak bone mass

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REFERENCE POINT MICROINDENTATION AS A COMPLEMENTARY TOOL FOR FRACTURE RISK ASSESSMENT

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Aim: Current fracture risk assessment tools have limited ability to predict hip fracture. Reference Point Indentation (RPI) is a novel tool with potential to improve fracture prediction by assessing the mechanical properties of bone. The aim of this study was to characterise the discriminative ability (fracture vs. control) of the Biodent HfcTM RPI device (Active Life Scientific) using femoral neck cortical bone samples.

Methods: 42 osteoporotic (OP) samples, explanted from hip fracture patients (median age 83 years) and ten cadaveric control samples (no history of bone disease or fracture, median age 63 years) were tested. During RPI the bone surface is cyclically indented to 10 N maximum load with increasing penetration depth, indentation distance increase (IDI), between the first and last (tenth) cycle being the main output measure. The device was held freehand, with two methods employed: 1) indents around the entire circumference at 20° spacing and 2) a further 15 indents within the 20° (thicker cortical bone) section of the infero-medial neck (the calcar).

Post-operatively (within 2 months), 16 OP participants returned for contralateral limb DXA BMD scan. Nonparametric Mann–Whitney U-Test and Spearman's Rank Correlation tests were used to explore differences between groups.

Results: For method 1, median IDI was greater in the OP group (20.1 μm) than in the control group (16.1 μm), $p < 0.001$. In those participants with measurements available, there was no correlation between IDI and contra-lateral femoral neck BMD ($r = -0.09$). For method 2, median IDI was not significantly different: 15.9 μm (OP), 14.6 μm (control) ($p = 0.22$). No significant relationships between either age or gender and IDI were found for either group.

Conclusion: RPI appears to aid differentiation of osteoporotic from healthy bone. Validation in larger prospective studies with fracture endpoints will be required before RPI can be explored as a potential adjunctive measure in risk assessment.

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CIRCULATING OSTEOBLASTS AND OSTEOCLASTS IN PERIPHERAL BLOOD RESPOND TO ANTI TNFA THERAPY DESPITE INADEQUATE RESPONSE OF INFLAMMATORY MARKERS IN SEROPOSITIVE RA PATIENTS

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Objective: We investigated the circulating osteoclasts and osteoblast activity in peripheral blood before and 6 months after anti TNF α therapy in seropositive RA patients.

Methods: Eight seropositive RA patients were enrolled. They had been refractory to disease modifying antirheumatic drugs (DMARDs) and were preparing for anti TNF α therapy including infliximab, adalimumab and etanercept. Peripheral blood mononuclear cells (PBMCs) were collected before and 6 months after anti TNF α Therapy. PBMCs (1×10^6 cells/well) were placed in a 96-well tissue culture plate and cultured for 14 days. Histochemical staining for tartrate resistant acid phosphatase (TRAP) was carried out using an acid phosphatase kit (Sigma 386-A, St. Louis, MO). TRAP positive giant cells with more than 3 nuclei were regarded as osteoclasts. PBMCs were also cultured for assessment of osteoblast activity. Once cell multilayering has been observed (about 7 days), cells were moved to differentiation medium and cultured for 3 weeks. Then, cells were fixed and stained with alizarin S stain to detect any calcified nodules. The optic density measurement of alizarin S was performed for quantitative analysis. In addition, inflammatory mediators including ESR and CRP and joint counts were compared before and after anti TNF- α therapy.

Results: After 6 months of anti TNF α therapy, number of osteoclasts decreased and optic density of calcified nodules increased as shown in table below.

	Before TNF- α therapy	6 months after therapy	<i>p</i>
Number of osteoclasts (/well)	625 \pm 372.7	340 \pm 147.6	0.049
Optic density (μ mol/well)	125 \pm 157.6	1215.5 \pm 676.6	0.013
ESR (mm/h)	34 \pm 27.7	28 \pm 35	0.5
CRP (mg/L)	16.4 \pm 13.79	11.2 \pm 21.15	0.5
Swollen joint counts	18 \pm 7.6	7 \pm 3.6	0.015
Tender joint Counts	18 \pm 7.3	7.13 \pm 3.6	0.012

Conclusion: Peripheral osteoclasts and osteoblast activity responded to 6 months anti TNF α treatment, despite inadequate response of inflammatory mediators. The clinical signs of patients also improved, as evidenced by markedly decreased joint counts.

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PENTOSIDINE AND DEGREE OF MINERALIZATION ARE INCREASED IN BONE FROM FRACTURED-PATIENTS WITH TYPE 1 DIABETES MELLITUS

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Type 1 diabetes (T1D) is associated with increased fracture risk, not explained by the measurement of BMD. If T1D causes deterioration in “bone quality” rather than reduction in BMD is an important question and little investigated in human. The aim of this study was to analyze the bone matrix of iliac bone biopsies, from T1D patients with fracture (FX, *n*=5), sex and aged-matched T1D patients without fracture (non-FX, *n*=5), and to compare them to controls (CTL, *n*=5). Analyses were performed separately on cortical (cort) and trabecular (trab) bone. Data were then correlated with patient’ information (Weight, BMI, duration of diabetes, HbA1c, 25(OH)D, creatinine, IGF-1). Non-enzymatic crosslinks (pentosidine, PEN), and enzymatic crosslinks (PYD+DPD) were examined by HPLC after extraction from embedded bone slices. Degree of mineralization (DMB) was assessed by microradiography, microhardness by microindentation and bone material properties by FTIRM. We confirmed that trab bone from FX-T1D patients contained significantly higher levels of PEN than in CTL (*p*=0.04). In non-FX T1D, PEN was not significantly increased but tended to be higher than CTL. PYD+DPD was not different between the 3 groups. In trab bone from FX-T1D, DMB was higher compared to both CTL (*p*=0.04) and non-FX T1D (*p*=0.04). Microhardness tended to increase in non-FX and FX T1D, both

in cort and trab bone. Mineral maturity and crystallinity were not modified. Interestingly, we found significantly positive correlations between HbA1c and PEN_{trab}, HbA1c and DMB_{total}, PEN_{trab} and DMB_{total}. This suggested that in T1D, HbA1c can predict both accumulation in bone of pentosidine and lead to a higher DMB. Indeed, it appears that bone from FX-T1D is more mineralized than both non-FX T1D and CTL. In conclusion, we showed that high serum HbA1c impacts both organic and mineral matrix in bone biopsies. Association of both high PEN and DMB could stiffen bone matrix and lead to fractures.

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HIGH RISK OF FALL, POOR PHYSICAL FUNCTION AND LOW GRIP STRENGTH IN MEN WITH FRACTURE: THE STRAMBO STUDY

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Objective: Data on physical function in men with fractures are scarce. Our aim was to assess the association of prior fractures with grip strength, physical function and risk of fall in 915 men aged \geq 50.

Methods: Upper limb relative appendicular skeletal muscle mass (u.l.-RASM) and lower limb RASM (l.l.-RASM) were calculated¹. Grip strength was measured¹. Physical function score was calculated². Fall risk was assessed prospectively for 5 years.

Results: In multivariable models, diabetes, Parkinson’s disease, high C-reactive protein (CRP) and low 25OHD were each associated with 6–13 % lower grip strength (0.2–0.7 SD, *p*<0.05). After adjustment for the above confounders and u.l.-RASM, men with spine fracture had 6 % lower grip strength (0.3 SD, *p*<0.01). In a similar model including u.l.-RASM, men with multiple spine and non-spine fractures had 7 % lower grip strength (0.3SD, *p*<0.05). In multivariable models, age, diabetes, prior myocardial infarction and stroke, high CRP and low 25OHD and free testosterone were each associated with higher odds of poor physical function (lowest quintile of the score), also when adjusted for l.l.-RASM (*p*<0.05). After adjustment for the above confounders and l.l.-RASM, spine fractures and non-spine fractures were each associated with higher odds of poor physical function (spine fracture: OR=2.1, 95 %CI: 1.2–3.7, *p*<0.05). In similar models, men with multiple non-spine fractures had higher odds of poor physical function (OR=6.7, 95 %CI: 2.0–22.4, *p*<0.01). Men with Grade 2&3 spine fracture and those with multiple fractures had higher risk of multiple (>1 vs. 0–1) falls (HR=1.7, 95 %CI: 1.1–2.8, *p*<0.05 and HR=1.9, 95 %CI: 1.1–3.4, *p*<0.05, adjusted for the above confounders, l.l.-RASM and prior falls).

Conclusion: Older men with fractures have higher risk of incident falls, poor physical function and low grip strength. Physical function should be accounted for in the management of osteoporotic men.

References: Szulc JBMR 2013;28:169. Szulc JBMR 2009;24:1116.

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BASELINE CHARACTERISTICS OF THE LIEGE HAND OSTEOARTHRITIS COHORT (LIHOC)

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Whereas hand osteoarthritis (OA) is a frequent disease, which may lead to considerable pain and physical limitations, limited research has been performed, compared to lower limbs OA. We decided to prospectively follow a cohort of 203 individuals, diagnosed with hand OA during consultations held at a tertiary care facility specialized in bone and cartilage metabolism and called the Liège Hand Osteoarthritis Cohort (LIHOC). As expected, the vast majority of patients (90.1 %) were of female gender with 46.8 % having a family history of hand OA. The median age of the population was 69.1 years (Q1 61.9-Q3 75.6). BMI (Kg/m²) median was 25.6 (22.9–28.9). Hand OA was associated with other joint involvement in 87.1 % of the cases {mainly spine (70.8 %) and knee (69.0 %)}. On a Visual Analog Scale reflecting pain in hand joints, graded from 0 to 100, the median score was 50.0 (29.0–59.0), with a median number of painful joints at pressure of 5.0 (2.0–10.0). The median number of swollen joints and of joint with bony deformations was respectively 2.0 (1.0–4.0) and 10.0 (6.0–15.0). The total normalized Auscan score (0–300) median value was 129.0 (71.1–182.5) while the median Functional Index for Hand Osteoarthritis (FIHOA) score (0–30) was 5.0 (2.0–11.0). Radiologic assessment of hand OA showed a Verbruggen total score (0–218) median value of 31.6 (20.9–48.2) whereas the Kellgren-Lawrence total score (0–128) median value was 54.0 (40.0–66.0). The LIHOC will be followed for a total duration of 5 years, with the objective to better understand the determinants of clinical and radiologic progression as well as the impact of hand OA on quality of life and health resources utilization.

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RARE CAUSE OF INCREASED LUMBAR BONE MINERAL DENSITY

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A 78-year old female with known osteoporosis was reassessed in December 2013 for BMD measurement. She was treated with calcium supplements, cholecalciferol 7000 IE per week and bisphosphonate. Her baseline BMD and T-score of lumbar spine (L1-L4), measured 9 years before were 0.699 g/cm², -3.5 SD and no echinococcal cyst was seen. The treatment was successful and the BMD was stable. On last control DXA scan of lumbar spine and hip, BMD of total lumbar spine was 0.910 g/cm², T-score was -1.2 SD. BMD and T-scores for each lumbar vertebrae were: L1 1.384 g/cm², +4.2 SD; L2 0.667 g/cm², -3.3 SD; L3 0.654 g/cm², -3.9 SD; L4 0.785 g/cm², -3.0 SD. The BMD and T-score of the neck were 0.463 g/cm², -3.5 SD and of the total hip were 0.590 g/cm², -2.9 SD. On examining of the picture, we identified a calcified mass in the projection of L1 vertebra. We repeated the analysis of DXA scan and excluded the calcified formation and L1 vertebra. BMD of analyzed lumbar spine (L2-L4) was 0.701 g/cm², T-score was -3.4 SD. BMD and T-scores were: L2 0.614 g/cm², -3.8 SD; L3 0.642 g/cm², -4.0 SD; L4 0.785 g/cm², -3.0 SD.

We checked her previous examinations. Eleven months before she had CT of abdomen because of suspected gastric carcinoma. Three centimeters large calcified Echinococcal cyst was found, which was previously unnoticed. On last DXA scan echinococcal cyst was probably projected to the L1 vertebrae because of the development of kyphosis and consequently reduction of height. Discussion: Several medical conditions, such as osteophyte formation, osteoarthritis, ankylosing spondylitis, vertebral fractures, aortic calcifications, nephrocalcinosis and kidney stones can interfere with BMD measurements. The study showed that artifacts, such as bra wires and calcium carbonate pills positioned lateral to the spine, can change BMD. However, after examining the literature on PubMed, to our knowledge there was no cases of falsely increased BMD of lumbar spine because of calcified Echinococcal cyst.

P308

EFFICACY OF ONE INTRA-ARTICULAR INJECTION OF 2 % NATURAL SODIUM HYALURONATE IS NON-INFERIOR TO CHEMICALLY CROSSLINKED HYLAN G-F 20 IN THE TREATMENT OF PAINFUL TIBIOFEMORAL OSTEOARTHRITIS

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This prospective, randomised, double blind, controlled, parallel group, non inferiority study was conducted from June 2011 through November 2012 at 50 sites in France. Patients were included if they were aged 40–85 years, with tibiofemoral OA

(Kellgren-Lawrence grade Ib to III) according to the ACR criteria and WOMAC A pain of at least 40 mm. After an NSAID washout period, eligible patients were randomised to receive one intra articular injection of either 40 mg/2.0 ml natural sodium hyaluronate (SH) (Ostenil Plus) or 48 mg/6.0 ml chemically crosslinked hylan G F 20 (hylan) (Synvisc One). Efficacy parameters were evaluated by a blinded assessor on Days 0, 30, 90 and 180. The primary endpoint was the change from baseline in WOMAC A at Day 180. The lower margin of non inferiority was pre specified at 8 mm. The per protocol (PP) set was used for the main analysis. A total of 292 patients were randomised into the study (SH=144, hylan=148): 142 received one injection of SH, 146 received one injection of hylan; 266 patients (91.1 %) completed the study. The efficacy analysis performed on the PP set (SH=113, hylan=112) showed that both preparations reduced pain and improved functional activity over 6 months. The mean WOMAC A change from baseline at Day 180 was 34.3 ± 19.0 mm and 36.2 ± 22.0 mm for SH and hylan, respectively ($p=0.4895$). The mean observed difference between groups was 1.9 ± 20.5 mm with a 95 %CI of [7.3; 3.5] mm. Therefore, the lower margin of the 95 %CI of the difference in mean WOMAC A was higher than the prespecified bound for non inferiority. The OMERACT OARSI responder rates at day 180 were 83.0 and 85.7 % in the SH and hylan groups, respectively ($p=0.5809$). Results were similar in the full analysis set (SH=139, hylan=141). Local reactions to the injection occurred in 8.4 % of patients in the SH group vs. 13.0 % in the hylan group. No serious reaction related to the injection was reported.

P309

INTRAVENOUS INFUSION OF NERIDRONATE IN PATIENTS WITH ALGODYSTROPHIC SYNDROME

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Objective: Algodystrophy is a regional syndrome with clinical manifestations often disproportionate to the inciting event which particularly affect the quality of life of the patient.

Methods: 12 patients, 8 females and 4 males, with involvement of the hand (4) and the foot (8) were enrolled in the study between January 2014 and December 2014. 11 patients reported a previous trauma of varying severity, 1 patient could not recall any trauma or other triggering event possibly correlated to algodystrophy. Algodystrophy was diagnosed according to “Budapest criteria”. Patients were treated with neridronate 100 mg i.v. every third day for 4 times within 10 days from the first infusion. Active exercise therapy of the affected limb was performed. When the affected area was the foot unilateral mobility aids were employed. Results

were evaluated according to the improvement of quality of life, restoration of joint function, decrease/disappearance of pain and edema of the soft tissues, and with radiological control. The health-related quality of life (HRQoL) was assessed with the Short Form Health Survey 36 (SF-36) before, and 3 and 6 months after the therapeutic intervention.

Results: After 3 months 8 patients showed good results. Three patients achieved partial clinical remission. One patient non-responder was the patient who could not remember an amnestically any triggering event and whose therapeutic intervention was implemented belatedly due to delay in diagnosis. After 6 months results observed at the 3 month follow up were confirmed.

Conclusion: These data confirm that the use of neridronate, associated with therapeutic exercise, is able to determine a significant and persistent clinical benefit in patients with algodystrophy, thus improving patients’ quality of life and achieving remission of disability caused by the disease. An early intervention likely determines better results in terms of disease remission and quality of life improvement.

P310

EVALUATION OF THE EFFECT OF THERAPY WITH AROMATASE-INHIBITORS ON TRABECULAR BONE SCORE IN POSTMENOPAUSAL WOMEN WITH EARLY STAGE BREAST CANCER AT MEMORIAL SLOAN KETTERING CANCER CENTER (MSKCC)

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Purpose: Trabecular bone score [TBS] reflects bone microstructure and is an independent indicator of fracture risk in patients [pts] with non-osteoporotic values of BMD. (Hans, D. et al. J Bone Miner Res 2011) The purpose of this study is to evaluate the change in TBS in postmenopausal pts with early stage breast cancer [BC] treated with adjuvant aromatase-inhibitors [AIs], and characterize its relationship with the BMI, since data shows higher BMD in obese pts. (Evans AL, et al., J Bone Miner Res 2014)

Methods: BC pts >60 years, treated with AIs (either letrozole, anastrozole, or exemestane) between 2005 and 11 at MSKCC, who had baseline and follow-up DXA scans were identified

($n=74$). BMD and TBS were evaluated at baseline for all pts. Follow-up BMD and TBS were assessed after 2 years of AI treatment in 58 pts and after 1 year in 16. The mean age was 68.8 (SD 6.2) and mean BMI 30 (SD 7). Values of TBS ≥ 1.35 indicate bone with normal microarchitecture [NM], values between 1.20 and 1.35 partially degraded microarchitecture [PDM] and values ≤ 1.2 degraded microarchitecture [DM]. We divided our populations into 3 groups based on BMI values (normal weight, overweight and obese).

Results: At baseline, mean lumbar spine (LS) BMD T-score was 0.1 (SD 1.8), and mean TBS was 1.283 (SD 0.142), consistent with PDM. Of the 52 pts with normal LS BMD at baseline, 23 % had DM and 46 % PDM; at follow-up, 12 % of pts ($n=6$) developed osteopenia, whereas 5 % of pts ($n=2$) developed DM. Of 18 pts with osteopenia at baseline, 22 % had DM and 50 % PDM; at follow-up 6 % of pts ($n=1$) developed osteoporosis, whereas 11 % of pts ($n=2$) developed DM. With AI, LS BMD decreased in 75 % of pts and TBS decreased in 58 % of pts, however the correlation between decreases in TBS and BMD was low ($r^2=0.04$). Changes in BMD or TBS were not appreciably different across BMI groups.

Conclusion: AIs caused a decrease in both TBS and BMD values over time. TBS was able to identify PDM or DM in pts with normal LS BMD or osteopenia. These results suggest that TBS and BMD identify different bone characteristics, and that TBS may help risk stratify pts treated with AIs for fragility fracture. Additional pts cohorts will be assessed.

P311

EFFICIENCY AND SAFETY OF IBANDRONATE IN TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS

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Osteoporosis is metabolic disease with low BMD and determined micro architecture of bone and is associate with increased risk for osteoporotic fracture. Ibandronate is oral bisphosphonate, medicine that is approved for treatment of osteoporosis.

Aim: To determine efficiency and safety of use monthly Ibandronate after 1 year of treatment, and relationship between risk factors and level of BMD and T-score.

Method: Prospective study was done on 85 postmenopausal women with diagnosis of osteoporosis. BMD was measured on lumbar spine and left hip, before and after 1 year of treatment with ibandronate, on Hologic Discovery C device. Also, data about present risk factors were collected. All patients were adequately substituted with vitamin D and calcium.

Results: Average age of the patients was 63.5 ± 8.5 years. Values of BMD before and after 1 year of treatment where: on lumbar spine 0.728 ± 0.181 g/cm² vs. 0.782 ± 0.092 g/cm² ($p < 0.01$) i na kuku 0.682 ± 0.158 g/cm² vs. 0.711 ± 0.07 g/cm² ($p < 0.01$). At 46 % of patients was present two or more risk factors. Increasing of BMD on spine was far more better in group with < 1 RF (3.8 % ($p < 0.05$) vs. 5.5 % ($p < 0.01$)) in comparison with the group with > 2 RF (2.7 % ($p < 0.05$) vs. 2.5 % ($p < 0.05$)). Reported unwanted effect: nausea (4/85); vomiting (1/85); abdominal ache (4/85) and diarrhea (1/85). Two patients interrupted therapy after 3–6 months.

Conclusion: The use of ibandronate has achieved expected increase of BMD on spine and hip independently of number of present risk factors with high safety.

P312

RELATIONSHIP BETWEEN RISK FACTORS, LOW VALUES OF SERUM 25(OH)D AND THE PRESENCE OF OSTEOPOROTIC FRACTURES

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Objective: Osteoporosis is metabolic bone disease which is characterized with deteriorate bone strength that leads to increased risk for osteoporotic fracture.

Aim: To determine correlation and significance between clinical risk factors for fracture and low values of serum 25(OH)D in population of postmenopausal women with osteoporotic fractures.

Method: Trial was conducted in Railway Healthcare Center in Belgrade in period of 12 months on 115 postmenopausal women with diagnosis of osteoporosis. They were determined by the value of concentration of serum vitamin D-25(OH)D. Referent values are defined: normal 25(OH)D > 75 $\mu\text{mol/l}$, deficiency 25(OH)D < 25 $\mu\text{mol/l}$, and insufficiency levels between those two values. From respondents were token data about presence of clinical risk factors for fracture, and about type of previous low trauma fractures. BMD was measured both on lumbar spine and left hip on axial DXA device Hologic Discovery C.

Results: Average age of patients was 67.15 ± 9.2 years. Previous fracture had 47 % of participants. At 89 % of the patients were found low values of 25(OH)D, and 74 % of them had two or more clinical risk factors for fracture. Level of 25(OH)D was different at patients without fracture: 39 ± 8.7 $\mu\text{mol/l}$ vs. 48 ± 7.8 $\mu\text{mol/l}$ ($p < 0.01$).

Conclusion: Postmenopausal women with low values of 25(OH)D in blood had higher frequency of risk factors.

Women with fracture had lower values of 25(OH)D in comparison with group of women without fracture. Adequate substitution of vitamin D, as well as early disclosure of osteoporosis, routine monitoring and treatment is necessarily for prevention the osteoporotic fracture.

P313

VITAMIN D INADEQUACY IN POSTMENOPAUSAL WOMEN WITH FRACTURES

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Objective: The primary role of vitamin D is in the metabolism of phosphorus and calcium.

Aim: To determine vitamin D status in postmenopausal women with low BMD and to investigate differences between its levels and previous fracture presence.

Materials and Methods: Study was performed in period from October 2013 to October 2014 and included 2328 postmenopausal women with the first time findings of low BMD. In all participants DXA scan on lumbar spine and hip was done as well as VFA (from Th4 to L4). Vitamin D status was determined by measuring 25(OH)D in blood using ELISA method and the results were presented in nmol/l. Normal values of 25(OH)D-above 75 nmol/l. Deficiency of vitamin D-values below 25 nmol/l and results between were determined as vitamin D insufficiency. In statistical analysis descriptive statistics, central tendency measures and parametric ANOVA test were used.

Results: Average age of participants was 65.7±8.33 years. We had data for vitamin D values for 570. Only 14.2 % had normal 25(OH)D values. Insufficiency was present in 60.5 % and deficiency in 25.3 %. ANOVA and post hoc test showed that those with lowest values of vitamin D levels are the oldest ones ($F=6.305$; $DF=2$; $p=0.002$). Participants significantly differ in presence/absence and type of fractures with inadequate vitamin D levels ($\chi^2=7.57$, $p=0.023$). Incidence of normal values, insufficiency and deficiency of 25(OH)D and presence and absence of fractures were as follows: 9.4 vs. 17 %; 61.3 vs. 60 %; 29.2 vs. 22.9 %.

Conclusion: A large number of postmenopausal women with T-score≤−1.0 have inadequate values of vitamin D at the time of the first DXA scanning. This values are decreasing with age, so those older than 70 years have the lowest values of vitamin D. Deficiency of 25(OH)D is more common in those with presence of fractures, especially vertebral fractures.

Assessment of vitamin D status and adequate substitution is necessary for therapy.

P314

SELF-REPORTED FRACTURES IN PATIENTS WITH DIABETES MELLITUS TYPE 2 (T2DM) IN A SINGLE OUTPATIENT CLINIC

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Goal: to estimate the prevalence of self-reported fractures and their risk factors in outpatients with diabetes mellitus type 2 (T2DM).

Materials and methods: outpatients with T2DM, who were under observation in a single Moscow clinic, were interviewed regarding the presence of low-traumatic fractures which happened after T2DM was diagnosed. Age, sex, postmenopause and disease duration, complications, HbA1c, calcium intake, risk factors for fracture (FRAX) and the instances of falling during the last year were recorded.

Results: 224 consecutive T2DM patients were enrolled. The median of age (Q25–Q75) 66 (59–75 years), 151(67 %) female, BMI 31 (26–35) kg/m², disease duration 7 (2–13) years, HbA1c 7.6 % (6.9–8.9), in 67.5 % of patients diabetic complications were registered (neuropathy in 69 patients, retinopathy in 77, nephropathy in 7 patients), 35 pts were smokers and 9 received glucocorticoids. At least one fall during the previous year was registered in 42 patients. Fractures were reported by 72 (32 %) patients, in 29 cases there were multiple fractures (vertebral fractures 3, humerus 3, wrist 18, clavicle 8, ulna 3, hip 1, lower legs 32, heel 3, ribs 7, skull 2). Only 8 patients stated having been diagnosed with osteoporosis. Patients with fractures in their medical history reported falling during the last year in 29 %, whereas patients without fractures fell in 13 % of cases, the difference was statistically significant with OR 2.56 (1.29–5.1) $p=0.006$. Male patients reported fractures more frequently (42 %) vs. female (27 %) ($p=0.018$). In addition, patients with fractures had lower BMI ($p=0.037$), which proved to be a less significant risk factor as compared to sex and falling when logistic regression analysis was applied. No other differences between groups were found.

Conclusion: Fractures are reported by more than 30 % of outpatients with T2DM. Fall propensity and male sex can be considered risk factors for fractures in these patients.

P316**FUNCTIONAL EVALUATION OF PATIENTS WITH ANKYLOSING SPONDYLITIS**

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Objective: Perform functional evaluation of patients with diagnosed ankylosing spondylitis using functional measuring instruments.

Material and Methods: Prospective study includes 64 patients. Patients were at least 18 years old and had a diagnosis of AS by the modified New York criteria. For functional evaluation has been used: BASFI, BASMI, Otto test, chest expansion and manual muscle testing (m. erector spinae, m. gluteus maximus, m. rectus abdominis, m. iliopsoas, m. quadriceps femoris and m. triceps surae).

Results: A total of 64 AS patients participated in the study. Percentage of men was 94, ages 48±11 years and disease duration of 15.9±8.52 years. Involvement of the axial skeleton has been evidenced at 100 % patients, uveitis at 28.12 % patients, peripheral arthritis at 34.37 % patients. Percentage of HLA-B27+ was 90.63. Mean total score of BASMI obtained in this group was 4.80±1.90. Mean total score of BASFI was 5.40±2.80 indicating moderate functional impairment. Chest expansion (cm) was reduced at 75 % patient and was 2.90±1.10. Otto test (cm) was reduced at 94 % patients and was 1.95±0.60. Muscle power has been reduced below 3 for m. erector trunci and m. gluteus maximus at 94 % patients, while m. rectus abdominis, m. iliopsoas, m. quadriceps femoris and m. triceps surae has been reduced at 35 % patients.

Conclusion: Ankylosing spondylitis reduced functional the ability of diseased, in the prospection of functional evaluation using specific functional tests (BASMI, BASFI), measurement of movement of the spine, chest expansion and basic kinetical chain muscle power.

P317**SEVERE SPINE OSTEOARTHRITIS IS ASSOCIATED WITH HIGHER RISK OF VERTEBRAL FRACTURE IN OLDER MEN: THE MINOS STUDY**

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Objective: Spine disc space narrowing (DSN) may modify spine biomechanics. In postmenopausal women, DSN has been associated with vertebral fracture independently of BMD, whereas there is no data in men. We assessed the

association of spine OA with BMD and fracture risk in 766 men aged ≥50.

Material and Methods: Spine OA was assessed using Lane's semiquantitative score on lateral spine X-rays¹. Total score of DSN is the sum of DSN scores at 6 intervertebral levels assessed. Abdominal aortic calcification (AAC) was assessed using Kauppila's semiquantitative score². BMD was measured by DXA (HOLOGIC QDR1500). Data on incident fractures were collected over 10 years (7.5 years for vertebral fractures).

Results: After adjustment for age and weight, BMD was higher by 2–7 % ($p<0.05$) in men with severe spine OA vs. controls (spine OA absent or mild). In men with elevated total score of DSN (upper quartile), hip BMD was higher by 5 % ($p<0.001$) vs. men having no DSN. Incident vertebral fractures occurred in 27 men. After adjustment for age, BMI, BMD, AAC as well as prior falls and fractures, the risk of vertebral fracture increased with the total score of DSN (HR=1.15 par 1 unit increase, 95%CI: 1.01–1.31, $p<0.05$). Vertebral fracture risk was higher in the upper quartile of total score of DSN vs. the three lower quartiles combined (HR=2.47, 95%CI: 1.04–5.86, $p<0.05$). Nonvertebral fractures occurred in 61 men. Their incidence was lower above the median total score of DSN vs. below the median (5 vs. 10 %, $p<0.005$). Risk of nonvertebral fracture was lower above the median total score of DSN vs. below the median (HR=0.44, 95%CI: 0.24–0.80, $p<0.01$ adjusted for confounders including hip BMD and physical function score).

Conclusion: In older men, severe DSN is associated with higher risk of vertebral fracture independently of BMD and with lower risk of nonvertebral fracture.

References: 1. Lane N et al., J Rheumatol 1993;20:1911. 2. Kauppila L et al., Atherosclerosis 1997;132:245.

P318**HIP FRACTURE IN HONG KONG CENTENARIANS**

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The number of centenarians has been increasing both locally and internationally. In Hong Kong, the number of centenarians has increased four-fold, from 289 in 1981 to 1,890 in 2011 (about 3/10,000). Whether hip fracture operations in this age group are beneficial is unknown. The aim of our study is to report the epidemiology of hip fractures, post-operative mortality rate and to discuss whether operation is justified in this particular group of patients in Hong Kong.

Methods: Data of centenarians with operated hip fracture in 2010–2013 in Hong Kong were retrieved from Hospital Authority clinical database, which take care of 99 % of geriatrics hip fracture patients in Hong Kong. Demographics, date of

admission, operation, discharge, and death were retrieved. Mortality was determined using survival analysis.

Results: 114 centenarians received hip fracture operation. 96 patients (84 %) were female. The age of patients ranged from 100 to 109, with age 100 comprising of the majority of 44 %. The follow up interval ranged from 5 to 1619 days (SD 444). The 1-month, 6-month and 1-year mortality rate is 8, 25 and 37 %, respectively. By Kaplan Meier survival analysis, the post-operative mean and 50 % median survival time was 2 years 2 months and 2 years respectively (95 %CI: 680–936; 519–994 days).

Conclusion: The 1 year mortality rate amongst hip fractures in Hong Kong centenarians was 37 %, which was comparable with 41.4 % of 1 year mortality in the general centenarians population ($p < 0.05$). Median survival time was 2 years after operation. It is worthwhile to offer operative treatment to selected cases.

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PREDICTORS OF EXCESS MORTALITY FOLLOWING A CLINICAL VERTEBRAL FRACTURE: A POPULATION-BASED COHORT STUDY

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Aims: We estimated mortality rates in the 3 years following a vertebral fracture (VF) and identified key predictors of 1-year mortality following a VF.

Methods: Population-based cohort study using data from the SIDIAPq Database (clinical information from primary care, hospital admission records, and pharmacy invoice data for >2 million patients in Catalonia). Subjects aged ≥ 50 years old registered on 01/01/2007 were eligible and those sustaining a VF in 2007–2009 were included for the study of predictors of mortality. Patients with cancer were excluded. Main outcomes were incident VF and all-cause mortality post-VF. Cox regression was used to calculate mortality according to VF status after adjustment for age, gender, glucocorticoids uses (GCU) and Charlson co-morbidity index (CCI). We used backwards step-wise logistic regression to identify predictors of 1-year mortality from a pre-defined list: age, gender, BMI, smoking, alcohol drinking, GCU, and individuals co-morbidities included in the CCI. We tested discrimination and calibration using ROC curves, and Hosmer-Lemeshow (HL) test.

Results: 3,905 patients with VF and 785,158 without. 302 (7.7 %) VF died in the study period (58.3/1,000 person-years) compared to 35,492 (4.5 %) non-VF patients (16.1/1,000), with

an adjusted HR of 2.23 [95 %CI, 1.99–2.49]. Key predictors of 1-year mortality were age > 80 , GCU, stroke and mild liver disease (MLD) (Table 1). The proposed predictive tool had an area under the ROC curve of 0.85, and a HL $p = 0.74$.

Conclusion: Patients suffering a VF are at a double risk of death in the up to 3 years following the fracture. Age, GCU, and a history of stroke or MLD are key predictors of 1-year post-VF mortality.

Table 1: Key predictors of 1-year mortality after vertebral fracture.

Key identified predictors*	Odds ratio	95 % CI
Male gender	3.13	2.14–4.57
Age		
55 to 55	Ref	
>80 to 85	2.47	0.91–6.69
>85 to 90	5.19	1.93–13.92
>90	8.45	3.13–22.82
GCU	2.56	1.60–4.09
Mild liver disease	2.25	1.03–4.91
Cerebrovascular disease	1.89	1.14–3.14

*Key predictors identified as those with a p -value ≤ 0.15

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VALUE OF TARTRATE RESISTANT ACID PHOSPHATASE (TRACO) ISOFORM 5B IN PATIENTS WITH ADVANCED LUNG AND BREAST CANCER WHO DEVELOPED BONE METASTASES

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In the majority of patients the cause of death will be a metastatic disease most of which is concentrated in the bone. A number of markers of bone turnover are measurable in blood or urine, usually categorized as markers of bone formation or bone resorption. The IOF and IFCC recommend the measurement of serum procollagen type I N propeptide (PINP) and C-terminal telopeptide of type I collagen (CTX) as reference analytes in clinical studies. However, noncollagenous proteins, such as the enzyme of osteoclast origin tartrate-resistant acid phosphatase 5b (TRACP), have also been investigated as marker of osteoclast activity. The objective of this study was to evaluate the usefulness of TRACP5b assay in the

early detection of bone metastases (BMs) in patients with lung cancer (LC) and breast cancer (BC).

Patients and Methods: A series of 33 patients (12 men, 21 women, median age 59 years, range 34–68 years) with radiologically confirmed BMs from LC ($N=17$, Group 1) and BC ($N=16$, Group 2) were enrolled in this retrospective study. Controls were 18 and 19 stage-matched patients with advanced LC and BC, respectively, in whom 18 F-FDG PET/CT excluded the presence of BMs. TRACP5b was measured in all patients at the time of discovering BMs, using a commercially available two-site quantitative enzyme-linked sandwich assay (ELISA).

Results: The results are the following (95 %CI): sensitivity=81.2 % (63.5–92.7), specificity=91.9 % (78.1–98.2), PPV=89.7 % (72.6–97.7), NPV=85.0 % (70.1–94.2), prevalence=46.4 (34.3–58.8). TRACO5b was more sensitive (93.7 vs. 68.7 %; $\chi^2=204.7$, $p<0.001$, OR=6.66, 95 %CI 5.08–0.04) and specific (94.4 vs. 89.5 %; $\chi^2=1.09$, $p=0.29$, OR=1.74, 95 %CI 0.61–4.98) in patients with LC in respect of those with BC. The accuracy was 94.1 and 80.0 % ($\chi^2=8.66$, $p=0.003$, OR=3.92, 95 %CI 1.50–10.23), respectively.

Conclusion: TRACO5b is a useful marker of BMs especially in patients with mixed osteolytic and PRHRP-related bone involvement, such as those with BC.

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SYSTEMATIC LITERATURE REVIEW ON THE EPIDEMIOLOGY OF MALE OSTEOPOROSIS IN EUROPE

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Objective: Assess recent evidence on the prevalence and incidence of male osteoporosis (OP) in Europe.

Material and Methods: A systematic literature search was performed in the Medline database (via PubMed). European population-based studies published in English not earlier than 2004, reporting the incidence and/or prevalence of male OP were searched for the following key words and their combinations: osteoporosis, epidemiology, prevalence, incidence, trends. Titles and abstracts of identified studies were screened using predetermined inclusion and exclusion criteria (population-based study with at least 20 subjects, etc.; not a randomized control or animal study). Eligible abstracts were retrieved for full-text review. Articles excluded following full-text screening were reviewed by a second researcher.

Results: Of 3,899 citations identified, 3,715 were rejected at abstract level screening. Of the 184 articles retrieved for full-text review, 166 were rejected. Of the remaining 18 studies reported age standardized estimates of OP prevalence in a male

population, ranging from 5.5 to 10.8 % [1–5]. The annual incidence rate among males aged 50 years and over was reported as 25.9/100,000 inhabitants in Denmark and 900/100,000 insurees in Germany [5, 6]. One study reported trends in OP incidence rate in the Netherlands between 1994 and 2002 [5]: 400 to 450 per 100,000 inhabitants with a suggestion of increasing trend for males versus a clear decreasing trend for females.

Conclusion: This review suggests more research is needed to gain better understanding of the burden of male OP in Europe, particularly its incidence. Such research would allow effective decision around disease management.

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LEVELS OF VITAMIN D ACCORDING TO THE AGE AND THE BONE MINERAL DENSITY

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Objective: To establish the difference between deficiency, insufficiency and normal results of vitamin D according to patients' age and BMD at the hip and at the spine.

Material and Methods: The retrospective analyze has been done in 570 postmenopausal women who were submitted to osteodensitometric examination at two referent DXA centers in Serbia (Special Hospital for Rheumatic Diseases and Serbian Railways Health Center), between October 2013 and October 2014. All patients had their vitamin D status analyzed. Normal values of 25(OH)D were defined as levels above 75 nmol/l, deficiency of vitamin D as values below 25 nmol/l and results between these two as vitamin D insufficiency. A difference was analyzed between patients with insufficient, deficient and normal levels of vitamin D in correlation to age and BMD at the hip and at the spine. In statistical analysis parametric ANOVA test and Post Hoc Test were used.

Results: Average age of patients was 65.7±8.33 years. 60.5 % of patients had insufficiency of vitamin D, 25.3 % had deficiency and 14.2 % had normal results. There is a statistical difference ($p<0.05$) between these three groups of patients only regarding the spine BMD ($F=3.107$; $p=0.045$). In patients with insufficient vitamin D, spine BMD was higher than in those with deficient vitamin D ($p=0.015$). Patients with vitamin D deficiency are older ($p=0,001$) than those with insufficient and normal results.

Conclusion: Patients with lower levels of vitamin D also have lower BMD and belong to older population, which indicates the need for adequate supplementation of this vitamin.

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OSTEOGENIC SARCOMA OF THE LIMB BONES: THE RESULTS OF TREATMENT

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Osteogenic sarcoma - an aggressive malignant tumor characterized by fast-flowing and early metastasis. Treatment of patients with osteogenic sarcoma is combined (chemotherapy and surgery). The purpose of the study was to show the advantages of the treatment of osteogenic sarcoma using chemotherapy and joint replacement.

Material and methods: Combined treatment (chemotherapy with methotrexate, cisplatin, doxorubicin, and surgery) performed in 28 patients with osteosarcoma of limbs. During arthroplasty were used Stryker and Link endoprosthesis. The functional outcome of the operated limb was calculated on a scale of MSTs. Quality of life is determined by the system of EORTC QLQ - C30. Survival estimated by the Kaplan- Meier method.

Results: As a result of the combined treatment of 28 patients with osteosarcoma were obtained the following results: complications after hip replacement 28.6 %, tumor recurrence 14.3 %. Functional outcome of the limbs: after knee arthroplasty 86 %, shoulder 64 %, hip 80 %, ankle 68 %. Quality of life of patients after treatment increased from 45 to 80 points. The overall 3-year survival rates were: 80.2±6.9 %, 5-year: 70.3±9.6 %. Three-year disease-free survival: 70.5±7.4 %, 5-year: 59.6±12.1 %.

Findings: The use of combined treatment of osteogenic sarcoma promotes overall and relapse-free survival of patients. Arthroplasty allows you to maximize the function of the limb and to improve the quality of life.

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VERTEBRAL FRACTURE ASSESSMENT BY DUAL-ENERGY X-RAY ABSORPTIOMETRY AND ANALYZE THE RISK FACTORS OF FRAGILITY FRACTURE IN POSTMENOPAUSAL WOMEN

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Objective: To assess the vertebral fracture by DXA and analyze the risk factors of fragility fracture in postmenopausal women.

Methods: Totally 203 postmenopausal women underwent vertebral fracture assessment and DXA. 146 postmenopausal women without vertebral fracture and the other 57 postmenopausal women with vertebral fracture. The vertebral fracture women were divided into 3 groups, 19 patients with fracture of thoracic vertebra, 23 patients with fracture of lumbar vertebra, 15 patients with thoracic and lumbar fracture.

Results: BMD and T-score both of thoracic fracture and thoracic and lumbar fracture were significantly lower than those without vertebral fracture ($p < 0.05$). The occurrence of vertebral fracture was affected by age.

Conclusion: Lower BMD and T-score may be important predictor of thoracic fracture and thoracic and lumbar fracture, meanwhile for the fracture of lumbar vertebra is limited. Increasing of age is the risk factor of incidences of the vertebral fracture. We suggest that BMD be integrated with VFA measurement in the diagnostic of vertebral fracture.

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PARATHYROID HORMONE RESPONSE TO SEVERE VITAMIN D DEFICIENCY IS ASSOCIATED WITH FEMORAL NECK BONE MINERAL DENSITY: AN OBSERVATIONAL STUDY OF 405 WOMEN WITH HIP FRACTURE

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Objective: PTH response to vitamin D deficiency consists of either secondary hyperparathyroidism or functional hypoparathyroidism (inappropriately normal levels of PTH). We hypothesized that secondary hyperparathyroidism could be associated with lower BMD than functional hypoparathyroidism in hip fracture women with vitamin D depletion.

Design: In this cross-sectional study, we investigated 405 women who had serum 25-hydroxyvitamin D below 12 ng/ml, 20.0±5.9 (mean±SD) days after a fragility fracture of the hip. PTH was assessed by a chemiluminescent immunometric assay, and BMD by DXA at the unfractured femoral neck.

Results: BMD was significantly lower in the 148 women with secondary hyperparathyroidism than in the 257 with functional hypoparathyroidism: the mean T-score (SD) was -2.88 (0.93) and -2.65 (0.83), respectively, in the two groups (mean difference 0.23; 95 %CI 5.6-40.7; $P = 0.01$). The association between PTH status and BMD persisted after adjustment for age, BMI, phosphate, albumin-adjusted total calcium, 25-hydroxyvitamin D, estimated glomerular filtration rate, and magnesium ($P = 0.01$).

Conclusion: Our results show that PTH response to vitamin D deficiency was significantly associated with femoral BMD in hip fracture women. Prevention and treatment of vitamin D deficiency may be particularly relevant in the women who develop secondary hyperparathyroidism. Data from intervention trials with vitamin D supplements should be analyzed taking into account basal PTH levels which may affect the clinical benefits due to vitamin D supplementation.

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SHORT-TERM FUNCTIONAL RECOVERY AFTER HIP FRACTURES IS SIGNIFICANTLY AFFECTED BY CONCOMITANT FRACTURES AT THE PROXIMAL HUMERUS BUT NOT AT THE WRIST: A RETROSPECTIVE STUDY OF 700 INPATIENTS

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Objective: In a subgroup of hip fracture patients, a single fall results in both hip and upper limb fractures. Our aim was to evaluate functional recovery in those patients with hip fracture who sustain a simultaneous fracture at the upper limb, taking into account the site of upper limb injury.

Material and Methods: We retrospectively investigated 700 of 760 patients admitted consecutively to our rehabilitation hospital because of a fall related hip fracture. Functional outcome was assessed using Barthel index scores.

Results: In 49 of the 700 patients, a single fall resulted in both a hip fracture and a fracture of either wrist ($N=34$) or proximal humerus ($N=15$). The patients with concomitant shoulder fractures had lower median Barthel index scores after rehabilitation (70 vs. 90, $p=0.003$), lower median Barthel index effectiveness (57.1 vs. 76.9, $p=0.018$), and prolonged median length of stay (42 days vs. 36 days, $p=0.011$) than the patients with isolated hip fractures. Significant differences persisted after adjustment for six potential confounders, including age, cognitive impairment, pressure ulcers, neurologic impairment, infections, and sex. The adjusted odds ratio for achieving a Barthel index score <85 was 6.71 (95 %CI 1.68 to 26.81; $p=0.007$) for the patients with concomitant shoulder fractures. Conversely, no prognostic disadvantages were associated with concomitant wrist fractures.

Conclusion: Data shows a worse functional recovery and a prolonged length of stay in the subgroup of hip fracture patients who sustained a concomitant fracture at the proximal humerus, but not at the wrist. Specific rehabilitation protocols and increased resources may be needed to optimize rehabilitation in this subgroup at particularly

high risk of severe disability. Models aimed at predicting the functional outcome in hip fracture survivors should take into account the presence of concomitant shoulder fractures.

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MODEL PRACTICES: A POTENTIAL SOLUTION FOR BETTER OSTEOPOROSIS AWARENESS AND IMPROVED BONE HEALTH IN SLOVENIA

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Objective: The total cost of osteoporosis in Slovenia was estimated to increase from approximately €224 million in 2010 to €296 million in 2025 due to aging of the population. With the treatment gaps in high risk Slovenian men and women estimated at 63 and 44 %, respectively, urgent action on the national level was needed to ameliorate the negative prediction.

Materials and Methods: Model practices were originally introduced into our primary health care in 2011 and progressively extended to involve 436 out of existing 930 general practitioners' offices in November 2014. This new concept reinforced the general practitioners' teams with a registered nurse dedicated to preventive screenings, use of protocols for the treatment of chronic patients with hypertension, diabetes, asthma and COPD, establishing registers and assessing quality by means of quality indicators. Osteoporosis became an essential part of model practices in 2014 with the protocol largely based on our recent osteoporosis guidelines introducing FRAX and complete reimbursement when decision for treatment is based on FRAX.

Results: In model practices all postmenopausal women and men over 50 years should have their fracture risk estimated by FRAX and risk of falling should be considered. If fracture risk is low (<10 %) lifestyle advice is provided on adequate intake of calcium, vitamin D and protein, weight bearing physical activity, smoking cessation and excess alcohol intake. If fracture risk is high (>20 %) or patients have a history of a hip or a vertebral fragility fracture they are also referred to the GP for treatment with pharmacological therapy. Falls prevention education is offered if needed. If fracture risk is moderate (10–20 %) DXA is considered by the GP to further stratify the risk. An agreement was achieved with the health insurance to reimburse DXA for the moderate risk patients. Fracture risk and management should be

reassessed regularly and lifestyle advice reinforced at follow-up visits.

Conclusion: Model practices might prove a potential solution for better osteoporosis awareness and improved bone health in Slovenia in the future.

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FOLLOW-UP TREATMENT OF OSTEOPOROSIS WITH STRONTIUM RANELATE AFTER LONG-TERM BIPHOSPHONATE THERAPY

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In a 2-year prospective controlled trial on men and women with established osteoporosis in whom once weekly oral alendronate was stopped after about 5 years we allocated pairwise 132 patients to a 2 year treatment with strontium ranelate (Sr-ran) 2 g/day (group A) and 132 to no specific therapy (group B). Both groups continued previous calcium-vitamin supplements (Ca 600 mg+Vit. D 1400 IU/day). There were no significant differences in mean age (67 years) and sex distribution (25 % men) between both groups and also mean BMD at the lumbar spine (LS-BMD) and femoral neck (FN-BMD) and numbers of prevalent vertebral and nonvertebral fractures did not differ. In group A with patients receiving Sr-ran mean LS-BMD increased by 5.3 % after 12 and 8.4 % after 24 months while in group B the corresponding changes were +0.4 and -3.3 %. Mean changes in FN-BMD showed a similar pattern. The 1 year increases were similar to those in the SOTI- and CASIMO-study proving that the efficacy of Sr-ran therapy was not blunted after long-term bisphosphonate (BP) treatment. During the 2 years we observed 12 new vertebral fractures in group A and 20 in group B ($p < 0.05$) while the numbers of new nonvertebral fractures with 10 and 14, respectively, did not differ significantly. In accordance with these results mean back pain scores (Visual Analog Scale 0–10) showed a clear advantage for the follow-up treatment with Sr-ran. We documented 54 and 60 adverse events (AEs) in groups A and B respectively with no differences regarding thrombosis or cardiovascular events. We conclude that after long-term osteoporosis therapy with oral BP a 2 year follow up treatment with Sr-ran is superior to a drug holiday in terms of the course of BMD, incidence of new vertebral fractures and back pain without a difference in the pattern of mild and transient AEs. Sr-ran is an interesting candidate for the increasing number of patients where BP-treatment has to be stopped for AEs or too long application.

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ELEVATED SPHINGOSINE 1-PHOSPHATE LEVELS ARE ASSOCIATED WITH VERTEBRAL FRACTURES IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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In vivo and in vitro studies showed that sphingosine 1-phosphate (S1P) to act as a coupling factor stimulating osteoclastogenesis and controlling the migration of osteoclast precursors between blood and bone components. Patients with type 2 diabetes (T2DM) are at increased risk of vertebral fractures (VFs) compared with non-T2DM subjects, due to poor bone quality. Recently, it was shown that non-diabetic subjects exhibited that high plasma S1P levels are associated with VFs independent of BMD. We investigated the changes in plasma S1P levels in relation to VFs among postmenopausal women with T2DM.

Materials and Methods: We assessed cross-sectionally 526 postmenopausal women with T2DM and 526 age-matched postmenopausal women without T2DM who were recruited at diabetic clinics and primary health care centers for inclusion in a bone health survey. The main outcome measures were plasma S1P [measured by ELISA method (Echelon Biosciences Inc., USA)] (overnight fasting samples), BMD, and bone turnover markers. Lateral X-rays of the thoracic and lumbar spine were taken to diagnose VFs.

Results: Plasma S1P levels were elevated in women with T2DM as compared with non-T2DM controls ($P < 0.001$). Plasma S1P levels were higher when T2DM women were stratified by the number of VFs ($P < 0.001$). Multiple logistic regression analysis showed that plasma S1P levels were positively associated with 1 VF (odds ratio [OR]=2.44, (CI:1.18–4.46), $P=0.012$), 2 VFs (OR=2.82, (CI:1.42–5.26), $P=0.004$), and ≥ 3 VFs (OR=6.64, (CI:2.94–23.2) $P < 0.001$). Plasma S1P levels were inversely correlated with BMD at various sites ($P=0.009$ to 0.021), whereas they were

positively correlated with bone resorption markers ($P=0.021$ to 0.032).

Conclusion: Increased plasma S1P were associated with VFs among postmenopausal women with T2DM, suggesting that S1P may be involved in increased bone fragility in T2DM and could be potential markers of VF severity.

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FREE CIRCULATING MIRNAS AND BONE TISSUE MIRNAS ARE NOVEL BIOMARKERS FOR OSTEOPOROSIS

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Many patients at risk of osteoporosis or osteoporotic fracture will be missed based on BMD assessment alone. Accordingly, there is a need to identify new biomarker(s) independent of BMD to improve fracture prediction. The identification of specific microRNA (miRNA) signatures is considered as possible new diagnostic and therapeutic targets. The objective of the present study is to identify specific miRNAs in patients with osteoporotic fractures compared with non-osteoporotic fractures.

Materials and Methods: Isolated miRNAs were examined from the serum of 30 patients with hip fractures that were transcribed and the samples were studied among 15 osteoporotic and 15 non-osteoporotic samples. With each pool of samples, human serum and plasma miRNA PCR Arrays were performed. A total of 90 different miRNAs were identified. Subsequently, miRNA samples were isolated from the serum and bone tissues of 45 osteoporotic and 45 nonosteoporotic patients and studied. Two-tailed Mann-Whitney test was used to compare between the groups. ROC-curve analysis was used to determine diagnostic miRNAs ability.

Results: A total of 13 miRNAs that were identified following the validation analysis including: miR-19b, miR-21, miR-221, miR-23a, miR-24, miR-93, miR-100, miR-122a, miR-124a, miR-125b and miR-148a. These were significantly upregulated in the serum of osteoporotic patients. In the bone tissue of osteoporotic patients, the following were identified: miR-21, miR-23a, miR-24, miR-25, miR-27a, miR-93, miR-100 and

miR-125b that were significantly highly expressed. A total of 7 miRNAs displayed an up-regulation both in serum and bone tissue.

Conclusion: The present study demonstrates a significant role for several miRNAs in patients with osteoporosis and suggests that they may be useful biomarkers for diagnostic purposes and possible target(s) for treating bone loss and optimizing fracture healing among osteoporotic patients.

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BONE MINERAL DENSITY IN OBESE AND NORMAL BODY MASS WOMEN

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Objective: Recent studies suggested that BMD correlates with fat amount, though the mechanisms of this interlinks are still unknown. We examined residents of St. Petersburg, Russia and analyzed BMD in women with different body composition to check this.

Material and Methods: A total of 1569 residents (including 697 women) were examined. DXA (Lunar Prodigy) was performed in 204 women (30–52 years old). Serum levels of 25(OH)D (AbbottArchitect 8000), iPTH (Beckman Coulter), adiponectin and leptin (ELISA) were analyzed.

Results: The results showed that 38 (18.6 %) women had low BMD and bone density was higher in obese women than those with normal BMI ($p<0.05$). Correlation analysis showed BMD in femoral region was associated with BMI ($r=0.43$, $p=0.008$), WC ($r=0.51$, $p=0.002$) and total fat ($r=0.43$, $p=0.0008$). Serum 25(OH)D level in women was lower than in men (53.9 ± 0.8 and 67.2 ± 2.2 nMol/L; $p<0.01$). Overweight and obese women had lower 25(OH)D level than women with normal BMI (44.8 ± 2.0 and 52.5 ± 2.8 nMol/L, $p<0.05$). We found high prevalence of vitamin D insufficiency: 16.8 % of all study population had a normal vitamin D level, 37.5 % had insufficiency and 45.7 % had deficiency of vitamin D. We also came to the conclusion that leptin and adiponectin levels were associated with fat amount ($r=0.43$, $p=0.001$ and $r=-0.26$, $p=0.008$, accordingly). We found that BMD correlated with Vitamin D level ($r=0.48$, $p=0.04$) and iPTH level ($r=-0.44$, $r=0.02$) only in women up to 40 years old. We did not find significant interlinks between 25(OH)D and adipocytokines concentration, but found an association between BMD and leptin concentration ($R^2=0.26$, $p=0.043$).

Conclusion: Each fifth woman had low BMD. Obese women had high prevalence of vitamin D deficiency and high serum leptin level. While low vitamin D and high iPTH levels in

obesity are considered risk factors for osteopenia in young women, a high leptin level could potentially play a protective role in bone remodeling in obese women.

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RESULTS OF COMPLEX REHABILITATION TREATMENT IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Approaching the patient with knee osteoarthritis depends on the clinical form and the associated diseases. Aim: The main purpose of the management of these patients is to ensure a normal and independent living and an appropriate quality of life. In this context we considered it appropriate to evaluate the effectiveness of evolution of the score for SF-36 Questionnaire.

Material and Methods: The prospective study included 92 patients with knee osteoarthritis, 54 % women, divided in three groups comparable in gender, residence, mean duration of the disease, age: two control lots with drug therapy (32 patients), respectively with kineotherapy (26 patients) and a test lot with physical therapy and exercises (34 patients). Average age of the patients was 65.3 ± 6.21 years, mean duration of knee osteoarthritis 15.5 ± 8.75 years. All patients were evaluated clinical and functional at the initiation of the study, after 3 months, 6 months and 1 year.

Results: SF-36 dynamics during the 12 months reveals a positive change especially in the physical-kinetic therapy group. Based on SF-36 indicator, we calculated number needed to treat, which represents the minimum number of patients to be treated for 52 weeks to prevent decreasing the quality of life in at least one of them: 2 in the lot with physical-kinetic therapy and 3 in the lot with kineotherapy.

Conclusion: The results show the contribution of complex physical-kinetic therapy to increasing the quality of life for patients with knee osteoarthritis.

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EFFICACY OF PHYSICAL EXERCISE IN PATIENTS WITH FIBROMYALGIA

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Aim: To assess the efficacy of a 6 months ambulatory exercise program on functional status and quality of life in patients with fibromyalgia.

Patients and Methods: The randomized, controlled, observational study included 41 patients with fibromyalgia, mean

age 48.7 ± 7.3 years, randomly assigned to a control group (20 patients) and an exercise group (21 patients). They followed exercise programs based on increasing spinal mobility, muscular strength and endurance, 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 6 months based on spinal mobility, muscular strength, pain assessment on a Visual Analogue Scale (VAS) and quality of life evaluation using SF-36 Questionnaire.

Results: The benefits of the kinetic programs were shown by a significant improvement on spinal mobility and muscular strength for spinal extensor and abdominal flexor muscles. For muscular strength, the values we obtained followed an ascendant curve for all the tested muscular groups and the results had high statistical significance. Pain, evaluated on a VAS, had a mean decrease of 3.558 points and the results were also high statistic significant ($p=0.000054$). For SF-36 Questionnaire, the best results were obtained for vitality (37.2 % amelioration), mental health (20.8 % amelioration) and body pain (53.5 % amelioration) domains and were also statistic significant ($p<0.05$). The results for the control group remained basically unchanged. The compliance of the study participants was very good: only three patients did not completed the 6 months training program.

Conclusion: The physical exercise program improves both functional status and quality of life in patients with fibromyalgia by increasing spinal mobility and muscular strength and by reducing pain.

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CORRELATIONS BETWEEN THE FUNCTIONAL STATUS AND THE QUALITY OF LIFE IN PATIENTS WITH HIP OSTEOARTHRITIS

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The studies concerning the quality of life for patients with hip osteoarthritis proved the impact of pain on daily activities and on their social and professional life. The purpose of this study was to evaluate the efficacy of complex rehabilitation treatment and its influence on the functional status and quality of life for patients with hip osteoarthritis.

The prospective, controlled, observational, randomized study included 141 patients with hip osteoarthritis, 54 % women, mean age 61.52 ± 11.63 years, randomized function the treatment in three lots: a control lot with medication (57 patients), a control lot with kineotherapy (42 patients) and the studied lot with complex physical and kinetic treatment (42 patients). The patients were evaluated

clinical and functional at the beginning of the study and after 3, 6 and 12 months. The efficacy of complex physical and kinetic treatment was emphasized by the statistic significant improvement ($p < 0.05$) for the mean values obtained for the indicators of the functional status and the quality of life, Léquesne functional index and HAQ (Health Assessment Questionnaire) and also for articular mobility and muscular strength. There was a moderate correlation (0.7) between the functional improvement (Léquesne functional index) and the quality of life increase (HAQ).

The improvement of the studied clinical and functional parameters obtained for the patients with hip osteoarthritis that followed a complex physical and kinetic rehabilitation program had a significant impact on their quality of life.

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CALCIUM CHLORIDE IONTOPHORESIS IS USEFUL TO DECREASE PAIN IN OSTEOPOROSIS

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Antiosteoporotic drugs may have important side effects that limit their use to patients, especially those with comorbidities. Therefore there is a need for alternative therapies, including electrotherapy that can be included in the complex management of osteoporosis. Iontophoresis is a noninvasive technique that uses a small electric charge to deliver a drug through the skin. Aim: We tried to assess the efficacy and tolerability of calcium chloride iontophoresis to osteoporotic patients with spinal pain.

Material and methods: Participants were randomly assigned into: interventional group (15 patients that followed twice a day, 12 days, longitudinal iontophoresis. Both electrodes were soaked in calcium chloride solution prior to application, the positive electrode on cervical spine and the negative electrode on lumbar zone) and control group (15 patients that followed simple longitudinal iontophoresis with the same parameters, but instead of calcium chloride was used water). The galvanic current intensity used was 5–10 mA for 20 min.

Results: Comparing to baseline scores on pain VAS, after 12 d of therapy, was registered a 31.6 % decrease on pain to the osteoporotic patients from interventional group and only a 21.3 % decrease for the control group. A mild to moderate erythema occurred on the skin where the electrodes were placed and there was no other side effects.

Conclusion: No treatment modalities that stop bone loss and cure osteoporosis have been developed. But local therapeutic modalities are useful to decrease pain to osteoporotic patients.

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RELATIONSHIP BETWEEN THE LEVELS OF BONE TURNOVERS AND 25(OH)D AMONG WOMEN POSTMENOPAUSAL OSTEOPOROSIS WITH AND WITHOUT NEPHROLITHIASIS

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Objective: An important regulator of calcium-phosphorus metabolism, including kidney, is vitamin D. Defection in calcium-phosphorus metabolism can cause nephrolithiasis, since most forms of kidney stones form with calcium. Also vitamin D is necessary for building bone. The aim of this study was to examine the serum levels of 25(OH)D and bone turnovers (osteocalcin and β -crosslaps) with and without presence of nephrolithiasis among women with postmenopausal osteoporosis.

Material and Methods: 92 women with postmenopausal osteoporosis were examined. Median age and BMI were 62.1 ± 5.39 years and 24.9 ± 3.67 kg/m², respectively. Exclusion criteria were the histories of any kind of proved endocrine or rheumatologic diseases, blood creatinine level of >100 mmol/l, intake of active vitD metabolites within 1 month prior the blood test. All the examined were divided into 2 groups according to presence of nephrolithiasis. Group I ($n=53$) had kidney stones, group II ($n=39$) did not have a history of nephrolithiasis. Measurement of BMD at lumbar spine and femurs was performed by the method of DXA (Lunar Prodigy, GE, USA). Serum levels of 25(OH)D, osteocalcin and β -crosslaps were determined using the chemiluminescent assay (analyzer - Cobas e 411). Statistical analysis was performed using the program Statistica 8.

Results: Group II showed a significantly higher serum level of 25(OH)D 26.16 [25.02:27.81] ng/ml, than group I, where serum level of 25(OH)D was 21.45 [20.31:22.53] ng/ml ($p=0.036$). There were no statistical differences between the groups for serum levels of osteocalcin and β -crosslaps ($p > 0.05$).

Conclusion: Postmenopausal women with osteoporosis without nephrolithiasis showed significantly higher serum levels of vitamin D, than women with kidney stones. In both groups among women with postmenopausal osteoporosis vitamin D insufficiency was identified. Require more in-depth study of the community of these states for their prevention and treatment.

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DETERMINANTS OF QUANTITATIVE ULTRASONOMETRY VARIABLES IN A GROUP OF YOUNG FRENCH ADULTS

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Aim: To define the determinants of quantitative ultrasonometry variables of the calcaneus in a group of young French adults.

Methods: 130 young adults (85 women and 45 men) whose ages range between 18 and 38 years participated in this study. Weight, height, fat mass, hip circumference and waist circumference were measured, and BMI was calculated. Physical performance variables were evaluated using standardized tests. Physical activity level, daily calcium intake and sleep quality were evaluated using validated questionnaires. Broadband ultrasound attenuation (BUA) of the calcaneus was measured using a new ultrasonometry device Pegasus Smart Medlink®.

Results: In women, weight ($r=0.46$; $p<0.001$), fat mass ($r=0.27$; $p<0.01$), BMI ($r=0.43$; $p<0.001$), hip circumference ($r=0.25$; $p<0.01$) and waist circumference ($r=0.31$; $p<0.01$) were positively correlated to BUA. In men, none of the measured variables was significantly correlated to BUA.

Conclusion: This study suggests that, in young women, morphological characteristics such as body weight, fat mass, BMI, hip circumference and hip circumference are positive determinants of broadband ultrasound attenuation of the calcaneus.

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LOW BONE MINERAL DENSITY BY PATIENTS WITH LIVER CIRRHOSIS

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Low BMD is a frequent and a common complication of liver cirrhosis.

Objective: To retrospectively monitor of low BMD by patients with liver cirrhosis, to review of some of the risk factors in relation to age, gender, BMI, etiology and stage of disease.

Patients and methods: The population consists of 135 patients with confirmed liver cirrhosis (88 males and 47 females). The age range is 20–70 years. We evaluated the low BMD in respect of the age of patients, gender, BMI, etiology of disease and stage of disease. The relationships between individual variables were assessed by standard methods of statistics analysis, the chi-squared test and Student's t-test, at a level statistical significance of $p<0.05$.

Results: Decreased BMD was found in 63.69 % of patients with liver cirrhosis (44.44 % osteopenia, 19.25 % osteoporosis). There were no significant differences with respect to age, severity of disease or gender. There was an association between decreased BMD and BMI. The levels of statistical significance were achieved when the etiology of liver cirrhosis was compared. The most significant decrease in BMD was noted in patients with liver cirrhosis resulting from primary

biliary cirrhosis and primary sclerosing cholangitis (76.46 %), the lowest decrease was associated with liver cirrhosis due to non-alcoholic steatohepatitis (38.45 %).

Conclusion: The study found that decreased BMD in liver cirrhosis is influenced by the etiology of cirrhosis, with BMI being a clearly negative predictor of decreased BMD. Age has no effect on BMD values in patients with liver cirrhosis. Early diagnosis of decreased BMD allows timely preventive and therapeutic measures inhibiting the development of severe bone change often leading to osteoporotic fractures, preventing patients from being removed the liver transplant waiting list, an improving the quality of life of patients with liver cirrhosis.

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RELATION AMONG BONE PHENOTYPES AND GENE POLYMORPHISM FOR OSTEOPROTEGERIN IN THE CENTRAL MORAVIA REGION

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Objective: Characteristics of a bone mineral are described in bone phenotypes: BMD, bone quality, bone turnover markers (BTM). A level of clinical expression of bone phenotypes is significantly influenced by genes for osteoporosis. Individual genotypes are determined by combinations of single nucleotide polymorphisms (SNP) of these genes. In our work we studied the polymorphism 1181G>C (rs2073618) of gene for osteoprotegerin (OPG).

Material and Methods: DNA was isolated by kit MagAttract DNA Blood Mini M48 using automated isolator Biorobot M48(Qiagen) from 200 µl noncoagulable blood samples. Detection of all polymorphism was carried out by using a method of real time PCR using hydrolysatation and FRET probes on LC 480 II(Roche). Correctness of the molecular examination results was randomly checked by sequencing on a sequenator (ABI 3130 Applied Biosystem). Osteological parameters were then compared with frequency of genotype occurrence. Bone turnover markers (BTM) as osteocalcin (OC) and C-terminal peptide collagen I, β-crosslaps (CTX) were measured using standard biochemical methods. BMD was measured in lumbar spinal column, total hip and femoral neck using densitometer (DXA) Lunar iDXA (GE Healthcare).

Results: We studied a group of 596 female patients with postmenopausal osteoporosis. Above stated polymorphisms were compared with a level of expression of bone phenotypes in the given individuals. Studied bone phenotypes are: BMD measured by DXA (GE Lunar iDXA machine), laboratory parameters (Ca, P), bone turnover markers (OC, CTX, bone ALP). From anamnesis we followed mainly typical osteoporotic fractures. We managed to prove a significantly lower BMD in the lumbar spine area for genotype GG SNP 1181G>C of gene for OPG: 0.852 g/cm² vs. 0.891 g/cm² ($p=0.05$).

Conclusion: Our observations show a slight but statistically significant difference in an amount of bone phenotype BMD expression in observed polymorphism 1181G>C.

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THE IMPACT OF PHYSICAL EXERCISE IN PREVENTING OSTEOPOROSIS IN PREMENOPAUSAL WOMEN

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The purpose of the study is to assess the compliance to educational programs of a group of patients at risk for osteoporosis, programs aimed for helping patients to understand the risk of disease and the role of overcoming the yielding risk factors and the importance of lifestyle modification.

Material: The study was conducted on a sample of 50 women in premenopausal stage, which were selected based on 1 min osteoporosis risk assessment test. This test has a maximum of one positive response. The average age of patients was 44.6 years.

Methods: Patients were offered a program of physical exercise for 30 min three times per week. We evaluated muscle strength and overall physical performance, we evaluated the risk of osteoporosis, FRAX score. We evaluated the quality of life by applying standardized questionnaire Qualeffo-41 and we applied a questionnaire of patients' satisfaction over lifestyle modification and compliance to this modification.

Results: They showed improvement that reach the limit of statistical significance ($p\leq 0.05$) on physical performance scales in patients with increased compliance to program. The risk of osteoporosis and FRAX score were modified by influencing the lifestyle. During the monitoring period we did not find a statistically significant association between physical exercise practicing and incidence of osteoporosis. The assessment of quality of life is different during monitoring, the evolutions with or without improvement are directly linked to the rhythm of practicing the physical exercise.

Conclusion: The organization of disease prevention strategies in premenopausal women may contribute to reduce the incidence and prevalence of osteoporosis. The aim is to improve the bone health before the starts the deterioration of bone mass. Physical exercise and lifestyle changes have a positive impact in premenopausal women.

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OSTEOARTHRITIS AS A CAUSE OF ACUTE ARTICULAR SYNDROME

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Objective: Since 2008 in Saint-Petersburg Scientific Research Institute of Emergency Care named I. I. Dzhanelidze 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. 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 chondroprotective 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 AAS. It is necessary to conduct further research to develop optimal algorithms for diagnosis and treatment of osteoarthritis in AAS patients.

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UNEXPECTED NON BONE EFFECTS OF VITAMIN DM. Cutolo¹, S. Paolino², C. Pizzorni², B. Serio², A. Sulli²¹Division Rheumatology Department Internal Medicine University of Genova, Genova, Italy, ²Research Laboratories and Division of Clinical Rheumatology Genova University, Genova, Italy

The endogenous metabolite of vitamin D (calcitriol, 1, 25(OH)₂D₃) is considered a true steroid hormone (D hormone), and like glucocorticoids (GCs) and gonadal hormones, may exert several immunomodulatory activities. Serum vit D deficiency (25(OH) D), and therefore reduced 1,25(OH)₂D₃ availability, is considered a risk factor for chronic/inflammatory or autoimmune conditions, i.e., autoimmune rheumatic diseases (ARD). In ARD, calcitriol regulates both innate and adaptive immunity, potentiating the innate response (antimicrobial activity) but reducing adaptive immunity (antigen presentation, T and B cell activities). Regarding a possible synergism between vit D and GCs several studies show that calcitriol has significant additive effects on dexamethasone-mediated inhibition of human lymphocyte and monocyte proliferation. Conversely, vit D deficiency seems to play a role in increasing autoantibody production by B cells. Vit D plays a role in the synthesis of antibacterial peptides and in autophagy and supplementation improves response to treatment of some viral (chronic hepatitis C infection) or bacterial infections (pulmonary tuberculosis). A role for calcitriol in peripheral estrogen metabolism and related cell proliferative activities was discovered. Since decreases the expression of aromatase, the enzyme catalyzing the peripheral estrogen synthesis both in inflammatory and cancer tissues (i.e., breast and prostate cancers) where the estrogen intracrine synthesis is increased. Inhibition of estrogen synthesis by calcitriol and its anti-inflammatory actions might suggest the use of calcitriol for prevention and/or treatment of breast cancer at least.

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MANAGEMENT OF MEDICAL SERVICES IN CLINICAL REHABILITATION HOSPITAL BAILE FELIXN. R. Suci¹, F. Cioara², S. Bungău³, M. Ceval², C. Nistor-Cseppentó²¹Medical Rehabilitation Hospital, Oradea, Romania, ²University of Medicine and Pharmacy Oradea, Oradea, Romania, ³University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Medical rehabilitation services promote the improvement of cognitive and physical function, of behavior, the quality of life

and change of the environmental and personal factors, being responsible of the prevention, diagnosis, treatment and management of rehabilitation of the people with disabilities and comorbidities at all ages. Medical rehabilitation is a clinical and therapeutical specialty, which through a multidisciplinary team provides specific services, using, only at the specialist doctor recommendation, all the available therapeutic means to reduce the impact of diseases with disabilities, activity limitation and restriction of participation, to facilitate optimal integration in the physical and social environment. The multidisciplinary team, led by the specialist doctor in rehabilitation, is made up of nurses, physiotherapists, psychologists, speech therapists, occupational therapists, social assistants, bioengineers and other professionals authorized to practice activities in this field. The carrying services provided to the patients take place at different levels, including inpatient and outpatient services, according to the specific needs of each patient. Management indicators taken into study, responsible for the quality of medical services are: human resources indicators, indicators of use of the services, financial indicators and indicators of quality. The results of the evaluation of these indicators are: number of consultations in out-patient conditions is 11,000 per year, 5000 consultations per year in hospital at 260 beds, average length of hospitalization is in 14 days and average utilization rate of beds exceeds 90 %. The results obtained by the evaluation indicators shows that are all necessary conditions for the provision of quality medical services.

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WHAT IS THE LINK BETWEEN VITAMIN D STATUS AND AUTOIMMUNE THYROID DISEASE?V. Culafic Vojinovic¹, J. Vasic², J. Zvekic-Svorcan³¹Internal Medicine, Railway Healthcare Center, Novi Sad, Serbia, ²Physical Medicine and Rehabilitation, Railway Healthcare Center, Belgrade, Serbia, ³Rheumatology, Special Hospital for Rheumatic Diseases, Novi Sad, Serbia

Objective: The evidence is increasingly pointing towards the role of vitamin D in reducing the incidence of autoimmune diseases. Autoimmune thyroid disease is widespread among postmenopausal women.

Aim: to examine the relationship between autoimmune thyroid disease in patients with hypothyreosis and vitamin D deficiency.

Method: Serum vitamin 25(OH)D levels were measured in 60 postmenopausal women with hypothyroidism due to Hashimoto thyroiditis utilizing the spectrophotometric method. Vitamin D deficiency was designated at levels lower than 25 nmol/l. Thyroid hormones (TSH, FT3 and FT4), PTH, antiTPO-Ab and calcium levels were evaluated in all participants. BMD on spine and hip were measured. Participants with risk factors for secondary osteoporosis were excluded.

Results: We divided patients into three categories, those who were severely deficient in vitamin D (had levels less than 25 nmol/l), insufficient in vitamin D (levels between 25 and 75 nmol/l) and those who were sufficient in vitamin D (over 75 nmol/l). Only 12.9 % had normal 25(OH)D values. Insufficiency was present in 60,8 % and deficiency in 26,3 %. ANOVA showed that participants significantly differ in T-scores on spine, according WHO criteria, with inadequate vitamin D levels ($F=3.02$; $DF=2$; $p=0.042$).

Conclusion: Postmenopausal women with autoimmune thyroid disease and hypothyreosis have low levels of vitamin D. A future studies and prospective interventional trials based on the community population are necessary to further clarify the role of vitamin D in thyroid autoimmune disease.

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BONE CHANGES IN MYELOMA MULTIPLEX

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Myeloma multiplex is the most common form and plasmacytoid dyscrasias characterized by the involvement of bone tissue in the form of osteolysis, osteoporosis and pathological fractures. The aim of our study was to analyze the frequency of occurrence and type of bone damages in patients with multiple myeloma. In the period since 2011–2014. At the Department of Hematology, Clinical Center Nis were monitored 84 patients diagnosed with multiple myeloma. Males was 47, average age 66.27 years, and 37 females, average age 65 years. The average duration of disease were 2.88 years. The diagnosis of multiple myeloma is based on the 1 “major” and 1 “minor” or 3 “minor” criteria (Kyle/Greipp criteria). Bone changes in these patients are registered radiographic imaging of bones of the calvary, spine and pelvis, and MRI of the spine. Bone densitometry was done on a Hologic Discovery DXA machine in the Institute “Niska Banja”. Bone changes are verified in 75 patients (89.28 %). Changes in the spine were found in 49 patients, 65.3 % of the patients with bone changes. The bone changes in the form of compressive fracture of vertebral bodies had 26 patients, and 23 patients had a change in an osteolytic lesion of the spine. Osteolytic damages on calvary were verified in 21 patients. Osteoporosis was verified in 46 patients (54,7 % of total patients). Based on these results, we can conclude that the high incidence of bone changes in patients with multiple myeloma, and bone damages are osteolytic lesions, osteoporosis and pathological fractures. Bone damages are the most commonly affected spinal cord

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BONE CHANGES IN MULTIPLE MYELOMA

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Multiple myeloma is the most common form and plasmacytoid dyscrasias characterized by the involvement of bone tissue in the form of osteolysis, osteoporosis and pathological fractures. The aim of our study was to analyze the frequency of occurrence and type of bone damages in patients with multiple myeloma. In the period since 2011–2014. At the Department of Hematology, Clinical Center Nis were monitored 84 patients diagnosed with multiple myeloma. Males was 47, average age 66.27 years, and 37 females, average age 65 years. The average duration of disease were 2.88 years. The diagnosis of multiple myeloma is based on the 1 “major” and 1 “minor” or 3 “minor” criteria (Kyle/Greipp criteria). Bone changes in these patients are registered radiographic imaging of bones of the calvary, spine and pelvis, and MRI of the spine. Bone densitometry was done on a Hologic Discovery DXA machine in the Institute “Niska Banja”. Bone changes are verified in 75 patients (89.28 %). Changes in the spine were found in 49 patients, 65.3 % of the patients with bone changes. The bone changes in the form of compressive fracture of vertebral bodies had 26 patients, and 23 patients had a change in an osteolytic lesion of the spine. Osteolytic damages on calvary were verified in 21 patients. Osteoporosis was verified in 46 patients (54.7 % of total patients). Based on these results, we can conclude that the high incidence of bone changes in patients with multiple myeloma, and bone damages are osteolytic lesions, osteoporosis and pathological fractures. Bone damages are the most commonly affected spinal cord.

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OBESITY: A RISK FACTOR OR PROTECTION AGAINST OSTEOPOROSIS

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Objective: To study the relationship between fat mass (FM), lean mass (LM) and BMD, as well as the association between adipokines and the components of body composition in postmenopausal women.

Materials and methods: In a cross-sectional study included 100 women aged 45–65 years. Exclusion criteria: the conditions and the drugs that cause secondary osteoporosis or

leading to changes in bone and fat metabolism. We took BMI 18.5–24.9 as normal, 25–29.9 as overweight, and ≥ 30 kg/m² as obesity. Because no criteria for overweight have been developed for quantitative determination of FM and LM the new ratios were introduced: FM trunk/FM limbs (FT/FL) and LM trunk/LM limbs (LT/LL). The serum levels of leptin and adiponectin were measured by ELISA. Assessments of BMD, BMC, FM, LM were performed by DXA (Delphi W, Hologic, USA).

Results: Osteopenia and osteoporosis diagnosed in 63 % of patients, among them 49 % were overweight and 27 % obese. In women with reduced BMD LM ($p < 0.01$) and FM ($p < 0.05$) compared to women with adequate bone mass were founded significantly lower. With increase of postmenopause duration BMD has been decreasing and the changes in body composition were founded: an increase of FM, a decrease of LM in the trunk and limb's FM decrease ($p < 0.05$). The ratio FT/FL associated with the abdominal obesity, correlated directly with BMD in the total femur ($p < 0.05$). The ratio of LT/LL also directly correlated with BMD of the total femur and spine ($p < 0.05$). Linear regression analysis confirmed the reliability of BMD relationship only with LM. Leptin had direct correlation with the amount of FM in the body ($p < 0.001$), BMD of the spine ($p < 0.05$) and total femur ($p < 0.001$). There were no correlation between adiponectin and BMD, FM and LM.

Conclusion: There is a redistribution of FM and LM of the body in postmenopausal women. FM and its distribution in the body has no effect on BMD. LM reduction, mainly in the trunk (the ratio LT/LL < 1.15) could be assumed as an independent osteoporosis marker as well as leptin's level.

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CLUSTERING OF LIFESTYLE RISK FACTORS AND LOW BONE DENSITY IN OLDER ADULTS: THE HERTFORDSHIRE COHORT STUDY

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Objective: Lifestyle factors may be negatively associated with BMD and contribute to fracture risk. We examined the relationship between a number of lifestyle risk factors and BMD in a population of older community dwelling men and women, and sought evidence of clustering of multiple risk factors in some individuals.

Methods: 498 men and 498 women aged 59–72 years, participants in the Hertfordshire Cohort Study, were studied. Physical activity, diet quality, history of prior fracture, family history of fracture, cigarette smoking and alcohol consumption were collated through questionnaire. Information on comorbidities (bronchitis, diabetes, IHD, hypertension and stroke) were noted. Measurements of grip strength and BMD of the lumbar spine and total femoral were recorded. In 314 men and 318 women, data on incident fracture was available, at a mean of 8.4 years after baseline data collection.

Results: In women, a graded association between number of risk factors and bone density was seen (see table).

	Total femur Adjusted* ($n=473$)			Lumbar spine Adjusted* ($n=473$)			<i>p</i> -value
	Number of risk factors	Regression Coefficient	95 % CI	<i>p</i> -value	Regression Coefficient	95 % CI	
0 (reference)	0	(0.000,0.000)	–	0	(0.000,0.000)	–	
1	0.129	(–0.078, 0.336)	0.223	0.115	(–0.096, 0.327)	0.285	
2	0.223	(–0.014, 0.460)	0.065	0.255	(0.013, 0.497)	0.39	
3+	0.758	(0.392,1.124)	< 0.001	0.531	(0.157, 0.905)	0.005	

*Adjusted for age and number of co-morbidities (bronchitis, diabetes, IHD, HTN, and stroke)

Strong relationships were observed between number of risk factors and incident fracture in women; women with ≥ 3 risk factors had an adjusted hazard ratio (HR) of incident fracture of 5.98 (1.67, 21.43; $p = 0.006$) compared with women without risk factors. Whilst women with 2 risk factors had an adjusted HR of 2.97 (1.14,

7.74; $p = 0.03$) and 1 risk factor, 2.28 (0.90, 5.75; $p = 0.08$). Similar and non-significant trends were seen in men.

Conclusion: Clustering of lifestyle factors is associated with increased risk of fracture and adverse bone health in women, with a similar but nonsignificant trend echoed in men. Health education programs may be important in reducing these risks.

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THE PREVALENCE OF CLINICAL RISK FACTORS (RF) AND EVALUATION OF A 10-YEAR PROBABILITY OF OSTEOPOROTIC FRACTURES IN THE RUSSIAN POPULATION ON THE BASIS OF FRAX WITHOUT BMD

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Objective: To investigate the prevalence of clinical RF included in FRAX and to assess the distribution of risk 10-year probability of fractures among residents of several areas of the Russian Federation.

Material and methods: The evaluation of fracture risk (FR) was conducted in the framework of population-based observational study “Epidemiology of cardiovascular diseases in the regions of the Russian Federation” for 2012–2013. Material for analysis were representative samples from 8 regions. Among 9204 study participants (women (W) 6172 and men (M) 3032) in age from 40 to 69 (average 54,7) the Russian model FRAX was used for the batch processing of data.

Results: Prevalence of RF of fractures is presented in a table.

RF	Women (%)	Men (%)
Fractures in relatives	6.78	6.06
Preexisting fractures	12.96	16.98
GC usage	4.34	1.91
Rheumatoid arthritis	5.5	1.9
Secondary osteoporosis	25.8	8.87
Alcohol abuse	0.27	3.23
Smoking	8.40	35.58

There was an increase of 10-year probability of major fracture as a function of age: 45–49 years- 5.45 % (W 7.36, M 2.16 %), 50–54 years - 5.7 % (W 8 %, M 0.93 %), 55–59 years 5.2 % (W 6.99 %, M 1.1 %), 60–64 years 6.1 % (W 8.34 %, M

1.14 %), 65–69 years- 7.24 % (W 9.98 %, M 1.26 %). Also showed an increase in the risk of hip fractures: 0.4 % in W and 0.2 % in M aged 40–44 years and 1.9 % in W and 0.8 % aged 64–69 years. According to the schedule¹, which determines the threshold for intervention in Russia, a high 10-year probability of major fractures have 546 (6 %) residents (44 M and 502 W).

Conclusion: The present study allowed to determine the prevalence of BMD-independent RF of fractures in the Russian population. Data on the distribution of the risk of major fractures in men and women showed a low prevalence of individuals at high risk of fractures among residents aged 40–69 years.

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UTILITY OF RISK FACTORS IN THE CURRENT DIAGNOSIS OF OSTEOPOROSIS

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There are two strategies for osteoporosis detection: 1. the strategy of risk factors, which involves identifying persons at high risk of disease and subsequently their orientation towards DXA investigation to diagnose the disease and 2. the strategy of case discovery, by analyzing symptoms of fragility fractures with various locations and in the presence of risk factors the diagnosis of osteoporosis is established and can be subsequently certified by DXA. The study aims to analyze the risk of osteoporotic fracture using FRAX algorithm.

Material and Method: To demonstrate the importance of risk factors we included 115 cases that were evaluated for osteoporosis detection. We used FRAX algorithm-calculation tool, which helps us determine the absolute risk of fracture for a person, taking into account risk factors such as gender, weight, height, the existence of a history or family history of fractures, especially if the mother had fractures, smoking, corticosteroids, rheumatoid arthritis, alcohol use and densitometric evaluation.

Results: FRAX revealed a risk of hip fracture in the next 10 years on average 4.71±6.03 % (minimum 0 %, maximum 37 %) and a risk for a major osteoporotic fracture on average of 11.96±8.18 % (minimum 1.7 %, maximum 46 %). We evaluated differently our patients, depending on the degree of risk fracture: low risk <10 % - 39 cases (50.7 %); moderate risk 10–20 % - 23 cases (29.8 %) and high risk >20 % - 21 cases (27.2 %).

Conclusion: Our study demonstrates that over half of patients with osteoporosis were included in a high risk category for developing an osteoporotic fracture in the evolution of the disease.

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THE ROLE OF CLINICAL VARIABLES AND BONE MINERAL DENSITY IN OSTEOPOROSIS DEVELOPMENT

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The study aimed to analyze the influence of risk factors in the development of osteoporosis. We evaluated 115 postmenopausal women. Subjects had a mean weight of 67.72 ± 12.80 kg, ranging between 42 and 105 kg, mean height 162.3 ± 6.54 cm with a range between 149 and 181 cm and mean BMI of 26.03 ± 4.97 kg/m², ranging between 17 and 43. Most patients, 43.8 %, were within the limits of normal BMI (18.5 – 24.9 kg/m²), 37.9 % were overweight (BMI 25 – 29.9 kg/m²), 7.75 % in the group with obesity (BMI >30 kg/m²) and only 1.7 % patients were underweight, with a BMI of <18.5 kg/m². Analysis of physiological personal history showed a mean age of menarche of 12.78 ± 1.14 years, ranging between 11 and 16 years and 94.67 months since menopause, the mean menopause age 45.81 ± 3.04 years, ranging between 34 and 51 years. Regarding positive family history, 24.6 % had the mother with osteoporosis. Use of alcohol and smoking was noted in 10.3 % cases and lack of exposure to sunlight or dairy intake in 27.2 % of cases diagnosed with osteoporosis. Evaluation of T-score profile revealed: for 15.5 % of cases there was a T-score compatible with the diagnosis of osteoporosis in both sites of interest examined (lumbar spine and total hip), 20.6 % of patients had a T-score value <-2.5 , i.e., osteoporosis for one of the sites, 29.3 % had T-score values corresponding to osteopenia. Of the 116 cases, 76 cases (65.5 %) were diagnosed with osteoporosis. Mean obtained lumbar spine T-score was -2.62 ± 1.31 with a minimum of -4.94 and a maximum of -0.8 , and mean T-score recorded at the total hip was -1.65 ± 1.18 with a minimum of -4.2 and a maximum value of -1.65 . Patients with vertebral osteoporosis achieved a mean score of -2.80 ± 1.13 , while patients with generalized osteoporosis had lumbar T-score -3.1 ± 1.45 and cases with osteopenia had -2.38 ± 1.83 . Conclusion: The study highlights the importance of identifying people at risk and the role of BMD in osteoporosis diagnosis.

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CYTOKINES IN PATHOLOGY OF BONE METABOLISM IN POLISH PATIENTS WITH ULCERATIVE COLITIS

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The role of proinflammatory cytokines (IL-1 β , IL-6, IL-17, TNF α) and anti-inflammatory cytokines (IL-4, IL-10, IL-13) in progression of ulcerative colitis (UC) and bone metabolism is still unclear.

Aims: Evaluation of BMD, serum concentrations of cytokines in patients with UC and in control group and evaluation correlation between cytokines and BMD.

Methods: Groups: (I-UC) 105 patients with UC aged 39.56 ± 14.97 years, including 56 women aged 39.23 ± 15.38 years and 49 men aged 39.94 ± 14.64 years. (II -CG) 41 healthy volunteers aged 30.37 ± 8.58 years, including 20 women aged 33.75 ± 10.83 years and 21 men aged 27.14 ± 3.65 years (control group - CG). Densitometry (L2-L4, femoral neck) was carried out using DXA-Lunar DPX-IQ (BMD/T-score/Z-score). The serum concentration of cytokines was measured by ELISA. Each patient filled a questionnaire. The statistical analysis was carried out using the Statistica PL10 software [$p < 0.05$].

Results: BMD [g/cm²]/T-score/Z-score 1. L2-L4: I-UC: 1.165 ± 0.143 / -0.418 ± 1.152 / -0.122 ± 1.180 II-CG: 1.227 ± 0.080 / 0.119 ± 0.694 / 0.089 ± 0.664 . 2. Neck: I-UC: 0.982 ± 0.1581 / -0.312 ± 1.217 / 0.082 ± 1.0654 II- CG: 1.079 ± 1.155 / 0.438 ± 1.021 / 0.380 ± 0.664 . Serum interleukins concentrations [pg/ml]: IL10/ IL-17/ TNF α /IL-4/IL-6/IL-13/IL-1 β : I-UC: 4.040 ± 14.192 / 11.587 ± 12.499 / 3.097 ± 3.309 / 0.272 ± 0.349 / 7.012 ± 12.717 / 94.412 ± 41.860 / 0.710 ± 0.891 II- CG: 0.813 ± 1.670 / 5.224 ± 1.971 / 2.056 ± 0.785 / 0.033 ± 0.029 / 1.343 ± 1.278 / 31.417 ± 12.43 / 0.478 ± 1.433 . We observed positive correlation between neck Z-score and IL-4, IL-13, IL-1 β in UC group and negative correlation between IL-6 and neck Z-score in UC group ($p < 0.05$).

Conclusion: Patients with UC are at a higher risk of skeletal pathology than control group. Interleukin-6 can modulate BMD in the femoral neck and can cause a loss of bone mass. IL-1 β and anti-inflammatory cytokines IL-4 and IL-13 protect bone mass in UC.

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BONE LOSS FOLLOWING SPINAL CORD INJURY

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Objective: To evaluate the pattern of bone loss and its consequences in a group of spinal cord injured patients managed at the Spinal Unit-Royal Rehabilitation Centre (RRC)-King Hussein Medical Center (KHMC) and its correlation to level, extent of injury, age and time post injury.

Methods: The BMD was measured in a group of patients who sustained Spinal Cord Injury (SCI) before 1–31 years (mean duration of SCI 8.6 years) who completed their medical and rehabilitation program at Spinal Unit-(RRC) during the period July, 2003 to Dec, 2013. BMD was measured by DXA in the lumbar spine and femoral neck, patients were diagnosed to have osteoporosis according to WHO criteria and their fracture's risk was described from this score using published data. Their spinal injuries were classified according to American Spinal Injury Association (ASIA) criteria, ranging from A-D.

Results: 55 patients were included in the study; there were 45 males and 10 females with male to female ratio (4.5:1). Their age ranged between 13 and 61 years (mean age 39.5 years). Bone loss indicated by low BMD revealed that femoral region is predominantly affected with relative preservation of the lumbar spine. Abnormal BMD values were detected in 83.6 % of subjects. A positive correlation was noticed between the time following the injury and the degree of osteoporosis. Individuals with complete injuries showed lower BMD values compared to those with incomplete lesions. No significant correlation was found regarding their age and gender.

Conclusion: SCI subjects are at high risk of developing osteoporosis which can lead to significant morbidity, particularly lower extremity fractures without significant trauma. Prevention and early treatment of bone loss are an important goal to prevent additional functional impairment.

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EXPLANATION OF CHANGES IN BONE FORMATION MARKERS USING ONCE-WEEKLY TERIPARATIDE BY TWO SIMULATION MODELS

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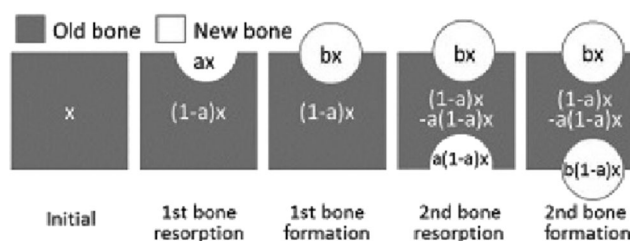
Objective: Teriparatide (human PTH 1–34) is an established therapy for severe osteoporosis. Both daily and once-weekly teriparatide treatment regimens increase bone mineral density (BMD) and prevent fractures by the anabolic action, but changes in bone turnover markers differ between daily and weekly administration regimens. We aimed to explain changes in bone turnover markers with the use of once-weekly teriparatide by simulation model.

Research design and methods: Temporal increase in bone formation markers and subsequent decrease were observed in Teriparatide Once-Weekly Efficacy Research (TOWER) trial for 72 weeks (Nakamura T. JCEM 2012). These observations support the hypothesis that repeated weekly teriparatide administration stimulates bone remodeling, replacing old bone with new bone and leading to a reduction in the active remodeling surface (Figure). We composed preliminary and plenary simulation model based on iterative remodeling cycle occurs on residual old bone.

Results: Increase in bone formation and subsequent decrease was observed in preliminary simulation. For each fitted time point, the predicted value by plenary simulation model was compared to the absolute values of the bone formation and resorption markers and lumbar BMD. This simulation model strongly matched the actual changes in bone turnover markers and BMD.

Conclusions: Although bone formation markers increase in the early stage of treatment and subsequently decrease, the model is consistent with persistence of remodeling based bone formation during the entire treatment period with once-weekly teriparatide.

Concept of preliminary simulation model



Formulation

a: bone resorption rate, b: bone formation rate,
x: Initial amount of old bone, t: cycle number of bone remodeling

[1st cycle]	Bone resorption volume:	$R_1 = ax$
	Bone formation volume:	$F_1 = bx$
	Residual old bone volume:	$X_1 = x - R_1 = (1 - a)x$
[2nd cycle]	Bone resorption volume:	$R_2 = aX_1 = a(1 - a)x$
	Bone formation volume:	$F_2 = bX_1 = b(1 - a)x$
	Residual old bone volume:	$X_2 = x - R_1 - R_2 = (1 - a)^2x$
[t -th cycle]	Bone resorption volume:	$R_t = a(1 - a)^{t-1}x$
	Bone formation volume:	$F_t = b(1 - a)^{t-1}x$
	Residual old bone volume:	$X_t = (1 - a)^t x$

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SARCOPENIA IN UKRAINIAN WOMEN: ASSESSMENT AND DETERMINATION OF LEAN BODY MASS DEFICIENCYV. V. Povoroznyuk¹, N. I. Dzerovych¹¹Institute of Gerontology NAMS Ukraine, Kyiv, Ukraine

The aim of this study was to evaluate the normative data of lean mass in the healthy Ukrainian women.

Materials and methods: 301 women aged 20–87 years (mean age 57.6±0.9 years; mean height 1.62±0.004 m; mean weight 63.5±0.5 kg) were examined. The women were divided into the following age-dependent groups: 20–29 years (*n*=25), 30–39 years (*n*=27), 40–49 years (*n*=22), 50–59 years (*n*=62), 60–69 years (*n*=91), 70–79 years (*n*=59), 80–87 years (*n*=15). The lean and fat masses, BMD were measured by the DXA method (Prodigy, GEHC Lunar, Madison, WI, USA). Appendicular skeletal mass (ASM) was measured at all the four limbs with DXA. We've also calculated the appendicular skeletal mass index (ASMI) according to the formula: ASM/height (kg/m²). Low muscle mass values conform to the following definitions: European guidelines (ASMI <5.5 kg/m²) [Cruz-Jentoft AJ et al., 2010], less than 20 % of sex-specific normal population and two SD below the mean of the young adult Ukrainian females (20–39 years).

Results: We observed a significant decrease of ASM with age (20–29 years-16.5±0.4 kg, 30–39 years-16.4±0.3 kg, 40–49 years-17.0±0.5 kg, 50–59 years-16.9±0.3 kg; 60–69 years-16.5±0.2; 70–79 years-15.8±0.3; 80–87 years-15.3±0.3; *F*=2.7; *p*=0.01). The ASMI values corresponding to a cutoff of low muscle mass by the definitions used were as follows: <5.5 kg/m² (European guidelines), <5.7 kg/m² (<20th percentile of sex specific population), <4.8 kg/m² (two SD below the mean of young Ukrainian females aged 20–39 years). The prevalence of low muscle mass in women aged 65 years and older based on the above three criteria was 12, 16 and 1.7 %, respectively. ASM was positively correlated with the total fat mass (*r*=0.20, *p*=0.0006) and BMD at all sites (BMD of spine (*r*=0.22, *p*=0.0002), BMD of femoral neck (*r*=0.29, *p*<0.0001)).

Conclusion: Peak muscle mass among the Ukrainian women is achieved in the age-groups 40–59 years old. Appendicular skeletal mass was positively correlated with total fat mass and BMD at all sites.

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VITAMIN D STATUS, SEASONAL VARIATIONS AND PARATHYROID ADENOMA WEIGHT IN PRIMARY HYPERPARATHYROIDISMD. Grigorie¹, A. Caragheorghopol², A. Teodorescu², A. Sucaliuc¹

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Objective: To compare, in a cross-sectional study, the prevalence of vitamin D insufficiency and deficiency between PHPT patients and controls and to assess associations between plasma 25OHD, adenoma weight and biochemical variables.

Material and Methods: A total of 221 consecutive patients with PHPT (mean PTH 317.2 pg/ml; mean Ca 11.4 mg/dl) aged 61 (17–84) years and 201 age-matched normocalcaemic controls with osteoporosis. 109 patients had surgically proven parathyroid adenoma and the net weight was measured. 25OHD levels were measured by chemiluminescence (DiaSorin, Liaison).

Results: PHPT group had significantly lower mean serum 25OHD (13.42 ng/ml vs. 17.66 ng/ml) and the prevalence of severe vitamin D deficiency (<10 ng/ml) was significantly higher (34.72 %) than in controls (12.83 %). The percentage of patients with 25OHD below 20 and 30 ng/ml was 85 and 96 %, respectively, compared with 63 % (*P*<0.001) and 82 % (*P*<0.001) of the controls. There was no seasonal variation in PHPT group (12.87 vs. 14.54 ng/ml in winter and summer, respectively). Larger adenomas were positively associated with higher plasma levels of PTH, Ca, AP, CTX, osteocalcin and lower levels of phosphate and magnesium; adjusted for PTH, the association remained significant only for magnesium (*r*=−0.265; *p*=0.055). Men had significantly larger adenomas than women (4.19 g vs. 2.37 g; *p*=0.015). No association was found between plasma 25OHD and adenoma weight (total or divided into tertiles). In PHPT patients low plasma 25OHD was associated with higher plasma levels of calcium, PTH and alkaline phosphatase and with lower phosphate; even adjusted for PTH, the association remained significant for calcium.

Conclusion: In PHPT patients there is a high prevalence of vitamin D deficiency, using several cutoffs, larger than in an age-matched control group with osteoporosis. Low plasma 25OHD levels do not affect adenoma size.

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FIRST EPIDEMIOLOGICAL STUDY ABOUT VITAMIN D STATUS AND LIFESTYLE FACTORS IN HEALTHY YOUNG ADULTS FROM LATVIA: DLAT STUDY (PART I)M. Mukane¹, I. Rasa¹, M. Mukans²

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Due to known vitamin D effects on overall health and association with mortality, it is necessary to know vitamin D status in every country. The aim of the study was to analyze vitamin D status and correlation with intact PTH (iPTH) level and association with lifestyle factors in healthy adults from Latvia. Cross-sectional study made twice a year (in summer and winter). All respondents were healthy adults with no diseases or medication

use, which affect vitamin D metabolism. In all cases, serum 25(OH)D and iPTH were measured, and questionnaires about lifestyle with 13 original questions were filled in. 25(OH)D deficiency was defined as <19.0 ng/ml, insufficiency as 20.0–29.0 ng/ml and sufficient level as ≥ 30.0 ng/ml. Reference range for iPTH was 12.0–65.0 pg/ml. In the winter (February–April, 2014), 254 adults responded and in summer (July–November, 2014) 153 adults. Winter and summer analysis and questionnaires from the same respondents were available in 143 cases (117 females; Me 24 (26–22) years old). 25(OH)D level in winter was 17.8 (23.2–13.6) ng/ml, in summer 21.1 (27.2–16.2) ng/ml ($p < 0.001$) in this group. In winter, 61.5 % of respondents had 25(OH)D deficiency, 27.3 % insufficiency and 11.2 % sufficient 25(OH)D level. In summer deficient were 43.3 %, insufficiency had 27.3 % and sufficient level 12.6 %. There was no correlation between 25(OH)D level and lifestyle factors (increased BMI, eating habits, sunbathing, sunscreen use) except polyvitamin use (in winter $r = -0.364$, $p < 0.001$, in summer $r = -0.320$, $p < 0.001$). There was weak negative correlation between 25(OH)D and iPTH level if compare all available analysis ($n = 402$), $r = -0.192$ $p < 0.001$. Young healthy adults in Latvia have insufficient vitamin D level regardless season. It is more likely that the prevalence of vitamin D deficiency in Latvia is not lifestyle factor determined, but probably depends on other factors, e.g., Northern latitude or food fortification.

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POSSIBLE CAUSES OF LOW MINERAL BONE DENSITY IN YOUNG ADULTS FROM LATVIA: QUESTIONNAIRE STUDY

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Peak bone mass is a significant factor in determining BMD in later life, and it is reached before the age of 30. There are modifiable risk factors directly impact bone biology and result in a decreased BMD. The aim of the study was to analyze modifiable risk factors of decreased BMD in young adults from one of the Northern Europe Union countries - Latvia. Anonymous questionnaires with 13 original questions (gender, age, body weight and high, eating habits, current smoking and alcohol use, physical activity, sunbathing and sunscreen use) were given to randomly chosen young adults (younger than 30 years) from Riga (Latvia) in time from February, 2014 till April, 2014. Total number of respondents, who filled in questionnaires was 192. Mostly females 79.7 % ($n = 153$), males were 20.3 % ($n = 39$). Median age was 24 (26–22) years. Valid were 188 questionnaires. Such modifiable risk factors were identified: increased BMI (> 25) had 18 % of all respondents, 20 % consumed insufficient amount of products containing calcium, 67 % consumed insufficient

amount of products containing vitamin D, current smokers were 12 %, every day or 3–4 units per week of alcohol used 15 %, only 20 % of respondents were exposed to sun at least 30 min/d when weather allowed it, sunscreen products used 30 %, insufficient physical activity was observed in 33 % of the cases, vitamin D and calcium supplementation used only 6 % of all respondents. Most of the respondents had at least one risk factor of decreased BMD. Total count of risk factors were following: 0.5 % ($i = 1$) of respondents had no risk factors of decreased BMD, 17.6 % ($n = 33$) had 1 risk factor, 47.8 % ($n = 90$) had 2 risk factors, 23.4 % ($n = 44$) had 3 risk factors, 9.6 % ($n = 18$) had 4 risk factors and 1.1 % ($n = 2$) had 5 modifiable risk factors. Taking into account results from the questionnaire study, we conclude that young adults from Latvia have increased risk of low BMD and osteoporosis in the future.

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OSTEOPOROSIS AND OSTEOPOROTIC FRACTURES IN PATIENTS WITH SLE IN REPUBLIC OF MOLDOVA

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The survival rate of patients with systemic lupus erythematosus (SLE) has improved significantly over the last 3 decades; therefore, the role of long term complication in patient's management is substantial. Osteoporosis (OP) represents a challenge in patients with SLE, because it can be complicated with bone fractures that influence the patient's quality of life and cause disability (Bultink I, 2012). The medical data attest a difference in prevalence of OP in lupus populations, ranging from 4 to 42 %. There are few data regarding the prevalence of OP in developing countries. Aim: to assess the prevalence of OP and spine osteoporotic fractures in lupus patients from the Republic of Moldova.

Methods: Cross-sectional study including patients fulfilling the SLICC, 2012 SLE classification criteria. Patients were assessed for OP and osteoporotic fractures by anamnesis, spine X-Ray and osteodensitometry, after completing a questionnaire containing general data and treatment regimens.

Results: The study included 106 patients with mean age \pm SD 41.1 (± 12.6) year, 91.5 % females, mean disease duration \pm SD 90.0 (± 87.2) months. The disease activity by SLEDAI \pm SD was 13.2 (± 8.2) points. The SLICC ACR/DI $> 1p$ 34.0 %, mean value \pm SD being 2.8 (± 2.5) points. The analysis of the treatment regimen showed that 89.6 % were taking oral glucocorticosteroids, including 29.2 % of patients with low doses, 55.6 % medium doses and 15.1 % with high doses, meanwhile only 49.0 % of them were administering calcium. We established that 39.0 % of patients had osteopenia, 22.6 %

had established osteoporosis in one or more regions (T-score > -2.5) and 6.6 % of them had osteoporotic fractures of the spine. We analysed the relation between OP and OP fractures with GCS dosage, age, disease duration and menopause. We found no significant correlation with GCS dosage, disease duration and menopause ($r=0.04-0.2$, $p>0.05$). Osteoporosis and vertebral OP fractures correlated with patient's age ($r=2.9$, $p\leq 0.05$). **Conclusion:** Osteoporosis is a frequent complication in SLE patients from the Republic of Moldova, being accompanied with vertebral OP fractures in 6.6 % cases.

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THE PERSISTENCE OF ORAL ANTIOSTEOPOROTIC DRUGS AT 6 MONTHS AND 1 YEAR

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Even if antiosteoporotic drugs have demonstrated in many randomized clinical studies its efficiency in reduction of fracture risk, the persistence of therapy remains a major issue in clinical practice. Aim: The aim of this prospective study was to compare the persistence at 6 months and 1 year of antiosteoporotic drugs, function on dosing frequency.

Material and Methods: 160 osteoporotic postmenopausal women, 45 years or older were included in the study. The patients came for a first time prescription of an oral antiosteoporotic drug during January 2013–July 2014. We defined persistence as the proportion of patients refilling the prescription after 6 months, respectively after 1 year.

Results: 65.3 % patients have been treated with weekly bisphosphonates, 18.5 % patients with monthly bisphosphonates and 16.2 % patients with daily strontium ranelate. After 6 months were refilling the prescription only 30.6 % of patients on daily treatment, 45.7 % patients on monthly treatment and 68.6 % of weekly bisphosphonates patients. After 1 year, adherence to all kind of drugs was lower: 18.4 % for daily treatment, 42.3 % for monthly drugs and 59.2 % on weekly bisphosphonates patients.

Conclusion: Persistence on 6 months ranged from almost 31 to 69 %, even lower after 1 year (from 18 to 59 %) across the different dosing frequency.

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FURTHER OBSERVATIONS OF SINGLE-DOSE DENOSUMAB EFFECTS IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM

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Objective: We have previously shown that Denosumab increases BMD at both lumbar spine and femoral neck, and significantly decreases bone resorption in PHPT. The effects on hypercalcemia were mild and transient. Aim: extension of patients and follow-up after drug suspension.

Material and Methods: Seven consecutive patients with PHPT (total Ca 10.8 mg/dl; PTH 148.9 pg/ml) were administered a single subcutaneous injection of denosumab, 60 mg. The patients (mean age 69.8 years) had osteoporosis and four were currently treated with various bisphosphonates. Subjects were followed up to 6 months with: serum Ca, PTH, CTX and osteocalcin, BMD at the hip and lumbar spine. Follow-up after 6 months: 4 pts were successfully operated, 3 pts were monitored.

Results: At 6 month mean LS BMD increased by 4.5 % ($p=0.04$) and FN BMD by 2.4 % ($p=0.09$). Serum CTX decreased by 90 % at 3 months, and by 48 % at 6 months; the similar changes for serum osteocalcin were 41 and 42 %, respectively. In the first 2 weeks, serum total Ca decreased vs. baseline by 0.5–2.8 mg/dl in six out of seven patients. After 6 months mean total serum Ca was increased vs. baseline (11.4 mg/dl vs. 10.8 mg/dl, $p=0.1$). Mean serum 25OHD was normal at baseline (30.9 ng/ml) and during the follow-up. Serum iPTH levels did not significantly change at both 3 and 6 months; after 6 months there was a trend toward decreased values. The patient (BP naïve) who had the largest increases in BMD also had the largest decrease in serum Ca. 11 month after dosing she was admitted with symptomatic hypercalcemia (13 mg/dl), rebound turnover (CTX 2 ng/ml) and bone loss.

Conclusion: Adding new patients confirm our previous data on DMB rapid and significant increase in BMD at both LS and FN, and decreasing bone turnover; the effects on hypercalcemia seem to be more pronounced in BP-free patients, and there is a rebound hypercalcemia which could be symptomatic.

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URATE IS POSITIVELY ASSOCIATED WITH BONE MINERAL DENSITY AT THE SPINE AND HIP IN HIV-INFECTED MEN: THE RELATIONSHIP IS EXPLAINED BY BODY MASS INDEX

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HIV is a global pandemic. Since the advent of combination anti-retroviral therapy (cART), the prognosis has been transformed and life expectancy has normalised. However, there is an increasing population of people living with long-term

infection on cART who develop so-called ‘non-AIDS morbidities’ including the metabolic syndrome. Hyperuricaemia is a recognised manifestation of the metabolic syndrome. Recently, studies have suggested a possible association between hyperuricaemia, gout and osteoporosis but the literature is conflicting. We investigated the prevalence of hyperuricaemia in a cohort of HIV-infected men and explored the relationship between serum urate and BMD.

Methods: A random sample of HIV-infected men were recruited from among 1900 attendees at an HIV Centre. All completed a questionnaire about medication and comorbidities, and lifestyle. Venous blood was taken for serum urate and casenotes were scrutinised for: duration of HIV infection, mode of transmission and exposure to cART. DXA of the femoral neck and lumbar spine was measured using one Hologic QDR machine.

Results: 422 HIV-infected men were recruited, mean age 47 years, 94 % Caucasian, 93 % infected by sexual transmission and a median of 9.6 years of infection. 90 % were currently taking cART. In total, 4 % had co-existent renal disease and 39 % dyslipidaemia. In univariate analyses, urate was associated with creatinine, BMI, cholesterol, and triglycerides but not HIV factors. BMD at the lumbar spine and femoral neck were positively associated with serum urate ($p < 0.001$ and $p < 0.001$ respectively). In multivariable analyses, urate remained independently associated with BMD in all models except those which included BMI.

Conclusion: Urate is associated with BMD at the spine and hip and the relationship is at least partly explained by BMI.

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HOW TO APPLY FOR A JOB IN A PHARMACEUTICAL COMPANY

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While the role of scientists from various biological disciplines is broad in the pharmaceutical industry, medical doctors are relatively few, but highly respected. Indeed, physicians working in the industry believe that they can help more patients by developing and commercializing new drugs than in any, although successful, clinical/hospital practice. Scientists with different biological background (chemists, biologists, pharmacists, etc.) must have a full knowledge of their sector and a very practical mind, to be employed in the discovery of active compounds, their initial nonclinical characterization and further in their development. Physicians are required to have experience in clinical pharmacology, i.e., not only in clinical medicine, but also drug safety, pharmacokinetics and pharmacodynamics, beside the human disease process, its pathophysiology, clinical presentation and outcomes in order to design appropriate protocols during the full clinical development. In

the end, Pharmaceutical Medicine is a true medical specialty and allows the full view on the drug development process. Regardless of their background, scientists in the industry must have excellent communication skills to be able to interact with external investigators, key clinicians, but also with regulatory agencies and, last but not least, the company senior management and other scientific functions in a collaborative environment. Physicians that are more marketing-oriented will be able to work in medical affairs to support adoption of the drug by the medical community, assuring the highest ethical standards of the medical profession. Depending on their background and abilities, physicians and other scientists may be able to work as experts in pharmacovigilance/drug safety, regulatory affairs, health economics, medico-legal affairs, medical communication. Managerial skills are essential to develop a career within the industry, that may lead to more commercial areas or even to general management of the company.

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LOW DOSE CHICKEN NATIVE TYPE II COLLAGEN IS ACTIVE IN A RAT MODEL OF OSTEOARTHRITIS

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Objective: Osteoarthritis is the most widespread joint-affecting disease. The characteristic of chronicity determines the need of new active disease modifying drugs. Aim of the present research is to evaluate the role of low doses of chicken native type II collagen in the rat model of osteoarthritis induced by sodium monoiodoacetate (MIA).

Material and Methods: 0.3–10 mg/kg chicken native type II collagen were daily per os administered for 14 days starting from the day of MIA intra-articular injection. Glucosamine (250 mg/kg p.o.) was used as reference compound. Pain behavior measurements were performed on days 7 and 14. On day 14, plasma samples were collected in order to evaluate biochemical parameters.

Results: Chicken native type II collagen (1–10 mg/kg) reduced significantly mechanical hyperalgesia (Paw pressure test) on days 7 and 14. The lower dosage was effective on day 14. Efficacy was comparable to those induced by 250 mg/kg glucosamine. On day 14, collagen counteracted thermal hyperalgesia as measured by the Plantar test. Moreover, collagen significantly decreased the response to a mechanical non noxious stimulus (Von Frey test) both on days 7 and 14. As evaluated by the Incapacitance test, collagen (1–10 mg/kg) was able to prevent MIA-induced spontaneous pain. Repeated treatment with collagen improved the

spontaneous motility of the animals as evaluated by the Animex test. Behavioral improvement paralleled with the prevention of the MIA-dependent plasmatic increase of $\text{IL-1}\beta$ and $\text{TNF}\alpha$. Finally, collagen repeated administrations reduced the degradation of endogenous collagen since the plasmatic levels of the degraded fragment C2C were significantly decreased whereas the stimulus to a de novo synthesis of collagen (propeptide CPII) was maintained.

Conclusion: These results describe the preclinical efficacy of low dosages of chicken native type II collagen as pain reliever by a mechanism that involves a protective effect on cartilage.

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IMPACT OF 12 WEEKS OF SPECIFIC WATSU THERAPY ON THE OSTEOARTHRITIS: A COMPREHENSIVE STUDY

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Objective: To find out the effect of specific watsu program on the range of motion and relieving of chronic pain in the individuals with osteoarthritis.

Materials and Method: 30 individuals with osteoarthritis between 50 and 55 years of age were selected as subjects. They were divided into two groups, group I experimental group ($n=15$), and group II control group ($n=15$). Group I underwent specific watsu program for 12 weeks, 2 day/week and 45 m/per session in water. Group II performed no specific exercise and watsu therapy as well. Pre and post-tests were conducted on the flexibility test by MVIC torques test of dominant lower limb and relief of chronic pain by a questionnaire designed to determine the decrease of pain threshold on the functional score (Waddell & Main, 1984). Mean, standard deviation, and t-test were used to analyze the data and percentages were calculated for the pain relief.

Results: The results showed some interesting observations with the peak torque, rate of torque development and functional test were similar between groups before exercise program. A peak torque increase ($P<0.05$) was found in hip extension, hip flexion and plantar flexion in the experimental group. The peak torque of knee flexion & extension and ankle dorsiflexion did not differ between groups in post training assessment ($P>0.05$). No changes were found in the control group ($P>0.05$). As far as the decrease of pain threshold was concerned the experimental group had a functional score of 60 % reduced pain when compared to the control group which had a score of 15 % only.

Conclusion: Specific watsu training had beneficial effect on the flexibility of the experimental group on three of the body

segments and had a reduced pain of more than normal range indicating that the above training is highly effective in the rehabilitation of osteoarthritis.

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CERVICAL PAIN ADMITTED IN EMERGENCY CLINICAL HOSPITAL, REHABILITATION DEPARTMENT: STATISTICAL STUDY

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Aim: To analyze the presence and type of cervical pain to patients admitted into Emergency Clinical Hospital, Department of Physical Medicine and Rehabilitation in October 2013–November 2014.

Material and Method: We analyzed 2200 clinical papers and selected those patients with localized, irradiate and referred cervical pain.

Results: Patients with cervical pain represented 28.55 % of the total number of patients admitted in this period, 67.34 % were hospitalized for other complains, cervical pain being less important. The causes for cervical pain were: spondylarthrosis (51.23 %), discopathies (12.56 %), inflammatory rheumatism (18.76 %), miofascial disease (8.67 %) and posttraumatic sequels (15.43 %). The most encountered symptoms were: localized cervical pain present to 33 % of patients, cervical-brachial pain to 31.56 % and cervical-cephalic pain (8.59 %). **Conclusion:** Most patients were admitted for other symptoms than cervical pain, this being a secondary complain. The diagnosis was made mostly using anamnesis, physical examination and standard radiograms, only few cases required other investigations.

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THE ASSOCIATION OF GASTROINTESTINAL EVENTS ON ADHERENCE TO OSTEOPOROSIS TREATMENT AMONG OSTEOPOROTIC WOMEN: RESULTS OF THE MEDICATION USE PATTERNS, TREATMENT SATISFACTION AND INADEQUATE CONTROL OF OSTEOPOROSIS STUDY (MUSIC-OS)

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MUSIC-OS investigates the burden of gastrointestinal (GI) events in osteoporotic women in terms of treatment (Tx) satisfaction, adherence and persistence to Tx, healthcare resource use, and quality of life.

Objective: To examine the association of new GI events on osteoporosis (OP) treatment adherence among osteoporotic women.

Methods: Osteoporotic women ≥ 50 years of age treated with OP medications were enrolled into the study during routine visits to their physicians. Women diagnosed with Parkinson's disease, neuromuscular disease, Paget's disease, malignant neoplasm or treated with any injectable OP medication at enrollment were excluded. Women treated for OP were asked to complete the Adherence Evaluation of OP Treatment (ADEOS) questionnaire regarding their adherence to treatment (Tx) at BL, 6 and 12 months post-BL. Women were considered adherent if they had an ADEOS score of ≥ 20 . Logistic regression models were used to estimate odds of adherence to treatment by the 6 month study visit (M6) for those who did not have a baseline GI event but experienced a GI event by month 3 (M3) or M6 post-BL.

Results: 2,943 women with a mean age of 69.5 years were enrolled in the study. 31.9 % of women did not report a GI event at BL. Of these, 22.5 % ($n=211$) of women developed a GI event by M3 and 32.6 % ($n=306$) reported a GI event by M6. For women who did not report a GI event at BL but who developed one by M3, the odds of being adherent to Tx by M6 were significantly lower compared to those who had never reported a GI event (OR: 0.69; 95%CI: 0.491, 0.974; $p=0.0346$). Women who developed a GI event by M6 are also less likely to be adherent to treatment by M6 compared to those who never reported a GI event (OR: 0.63; 95%CI: 0.464, 0.855; $p=0.003$). Additionally, history of falls reported before and after enrollment (compared to no falls reported) is associated with lowered adherence in the model (OR=0.65; $p=0.0131$; 95%CI: (0.459, 0.913)).

Conclusion: These data indicate that GI events are associated with lower adherence to OP treatment. Though this study showed a statistically significant association of GI events on treatment adherence, the clinical importance of this association may depend on the type of event experienced.

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FEATURES OF BONE METABOLISM IN PATIENTS ON BACKGROUND LESIONS OF THE PROXIMAL FEMUR TYPE 31 B2 AND 31 B3

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Clinical manifestations of systemic osteoporosis, compounded by the trauma of the and represents a significant medical and social problem. The aim of the study was the assessment of quality of life and parameters of x-ray and clinical biochemical monitoring in patients undergoing arthroplastic amid injuries of the proximal femur type 31 B2 and 31 B3. The estimation of the parameters of clinical x-ray and biochemical monitoring in 149 patients, aged 55–80 years (mean age 69.8 years) for 2 years was observed (from 2012 to 2014) after arthroplasty of the hip joint. The efficiency of the motor rehabilitation was assessed using a scale Harris (HHS) and YOUR level of bone metabolism using ionized calcium (Ca²⁺) in serum and deoxypyridinoline in the urine (DPID), quantitative parameters of the x-ray absorptiometry were analyzed using “Hologic discovery w” CIII.A. 24 months after arthroplasty of the most intensive decrease in BMD identified in the thoracic spine and the operated lower limb, which was the average for the group 7.29 ± 0.54 % 6.72 ± 0.48 %, respectively, compared to the postoperative period. Less intense demineralization identified in the upper limbs and the intact lower extremity, which averaged less than 3.6 ± 0.47 %. The level of functional activity in common was $72.5 \text{ points} \pm 5.3 \text{ SD}$, the intensity of the pain syndrome scale your level of 2.4 units, the average concentration DPID in the urine amounted to 12.4 nm/ml, the level of ionized calcium to 1.21 g/l. Thus, locomotor activity in patients undergoing hip replacement surgery for injuries of the proximal femur type 31 B2 and 31 B3 without a comprehensive antiresorptive therapy may be reduced in connection with various manifestations of decompensation metabolism in bone tissue. The most pronounced changes in the thoracic spine and the operated limb clearly demonstrate about the reaction of bone metabolism to the new conditions of biomechanics, clinical and radiological manifestations.

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TERIPARATIDE AND PTH 1–84 IN THE TREATMENT OF POSTMENOPAUSAL WOMEN WITH BISPHOSPHONATE-RESISTANT OSTEOPOROSIS: A CASE–CONTROL STUDY

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Osteoporosis is the most common metabolic disease of the bone, affecting especially postmenopausal women. Bisphosphonate therapy is usually the treatment of choice in osteoporotic women, but in bisphosphonate-resistant patients, drugs stimulating bone formation through osteoblast activation are needed. The aim of this study was to compare the efficacy of recombinant human PTH (PTH 1–84) and PTH 1–34 (teriparatide) in the treatment of postmenopausal osteoporotic women.

Patients & Methods: A group of 58 bisphosphonate-resistant osteoporotic women were treated with recombinant PTH 1–34 (20 µg sc daily, Group 1, *N*=39) or PTH 1–84 (100 µg sc daily, Group 2, *N*=19) for 18 months. All patients underwent both pretreatment biochemical screening and BMD measurement with DXA, baseline and at the end of the study.

Results: The age (76.4±5.8 vs. 75.3±6.3 years, *p*=0.07), BMI (27.7±2.2 vs. 26.9±2.7, *p*=0.23) and baseline biochemical parameters, such as serum calcium, total and bone ALP, 25(OH)vitamin D, and PTH, did not differ significantly (*p*=NS) between Groups (1 vs. 2), as well as lumbar spine LS-BMD (0.730±0.15 vs. 0.705±0.19 g/cm², *p*=0.59) and femoral neck FN-BMD (0.597±0.08 vs. 0.590±0.09 g/cm², *p*=0.76). At the end of the study, LS-BMD increased by 12.5 % (*t*=2.20, *p*=0.03) and 9.4 % (*t*=0.94, *p*=0.35) in Groups 1 and 2, respectively ($\chi^2=4.93$, *p*=0.023), while FN-BMD decreased by 3.1 % (*t*=0.83, *p*=0.41) in Group 1, and increased by 5.3 % (*t*=0–85, *p*=0.40) in Group 2.

Conclusion: In women with bisphosphonate-resistant postmenopausal osteoporosis, the administration of teriparatide is useful in increasing LS-BMD, potentially reducing the risk of osteoporosis-related adverse events at this site. Both PTH 1–34 and PTH 1–84 do not change significantly FN-BMD after 36 months of treatment.

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BONE MINERAL DENSITY (BMD) VERSUS DENTAL RADIOGRAPH IN THE DIAGNOSIS OF OSTEOPOROSIS

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Osteoporosis imposing public health burden especially in postmenopausal women and elderly population. Among

multiple modalities of osteoporosis diagnosis, BMD is considered as gold standard by WHO.

Aims: To compare the diagnosis efficacy of BMD and dental radiograph determining pixel intensity (PI), mandibular alveolar bone mass (MABM), generalized alveolar bone resorption (GABR) with radiovesiographic (RVG) finding, orthopantomogram showing mandibular cortical index (MCI) in diagnosis of osteoporosis.

Materials & Methods: Among 1315 postmenopausal patients included in this study, 967 were osteoporotic (group A), 276 were osteopenic (group B), 72 were normal (group C). All patients were evaluated by determining BMD and dental radiograph.

Result: Group A showed BMD of lumbar spine & femoral neck $-3.47\pm.99$ & -2.73 ± 1.65 , respectively, with PI- 63.63±28.37 to 104.73±32.86, MABM 83.5±12.27, GABR 91.21 %, and MCI- C2&C3 87.48 %. Group B showed BMD of lumbar spine & femoral neck were $-1.88\pm.6$ & $-1.25\pm.73$, respectively, with PI 70.02±29.22 to 1113.25±33.62, MABM 91.5±12.84, GABR 72.10 %, and MCI- C2&C3 31.34 %. Group C showed BMD of lumbar spine and femoral neck were $-.76\pm.38$ & $-.49\pm.34$, respectively, with PI 81.40±26.90 to 128.65±31.92, MABM 104.5±14, GABR 48.61 %, and MCI- C2&C3 12.5 %. Statistical analysis was significant with *p* value<0.05. All data showing Dental radiographic indexes fluctuates parallel with BMD.

Conclusion: Though BMD is gold standard for diagnosis and follow up of osteoporosis, dental radiographic findings comprising of PI, MABM, GABR and MCI determination can be used as effective alternative diagnostic tool.

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COMBINATION OF β-HYDROXY-β-METHYL BUTYRATE AND R(+) LIPOIC ACID IS EFFECTIVE IN A CELLULAR MODEL OF SARCOPENIA

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Objective: The decline of muscle mass and strength, known as sarcopenia, is a clinical problem associated with osteoarticular diseases, muscle disuse, cancer, renal failure, postmenopause, age and corticosteroid treatments. Aim of the present research was the evaluation of the pharmacological profile of the leucine metabolite β-hydroxy- β-methyl butyrate (HMB) associated with the natural R(+) stereoisomer of lipoic acid (R(+)LA) in a cellular model of muscle wasting.

Material and Methods: C2C12 cell line was used as myoblasts or differentiated in myotubes by 7 day culture with 2 % horse serum. Cell damage was induced by dexamethasone.

Results: Dexamethasone toxicity was evaluated measuring cell viability (MTT assay) and apoptosis induction (caspase 3 activity) after 24 h and 48 h incubation of myoblasts with the glucocorticoid (0.01–300 μ M concentration range). One micromolar dexamethasone (48 h) decreased cell viability by about 50 % and increased caspase 3 activity by 80 %. R(+)-LA (100 and 300 μ M) or HMB (1 and 3 mM) significantly prevented dexamethasone-induced cell mortality; efficacy was improved when 100 μ M R(+)-LA was combined with 1 mM HMB. The synergy fully prevented cell mortality and caspase 3 activation. R(+)-LA (100 μ M) and HMB (1 mM) significantly reduced dexamethasone evoked O_2^- production as well as protein carbonylation in myoblasts. In the early phase of myotube differentiation (72 h) the combination synergistically preserved the number of myogenin-positive cells. In myotubes (7 day differentiation), R(+)-LA (100 μ M) and HMB (1 mM) reduced the dexamethasone-dependent damage evaluated as cell diameter and percentage of multinucleated cells. Finally, the mixture prevented the protein oxidative damage.

Conclusion: These results highlight the protective effects of R(+)-LA combined with HMB in myoblast- and myotube-cell cultures damaged by dexamethasone. These data offer a rationale to candidate the mixture as a therapeutic option for sarcopenia treatment.

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HIP FRACTURE CARE FOR ELDERLY PATIENTS IN IRELAND: A PRELIMINARY LOCAL REPORT OF THE IRISH HIP FRACTURE DATABASE

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Objective: International figures show a 1-year mortality of up to 33 % for elderly hip fracture patients. With this high mortality rate, care of patients is paramount. There is an integrated care pathway (ICP) under development in our hospital for these patients, and we hope to follow the progress of its clinical effectiveness. In addition to this, our hospital is one of 15 centres in the country collecting data for the Irish Hip Fracture Database (IHFD): a national clinical audit to improve hip fracture care and outcomes in Ireland. The IHFD in particular focuses on 6 key performance indicators (KPI): Admission to orthopaedic ward within 4 h; surgery within 48 h; assessment for pressure ulcers; orthogeriatric medical support; assessment for osteoporosis treatment; and falls assessment. We aimed to audit our hospital's concordance with these KPIs, as well as chart other outcomes for our elderly patients.

Materials and methods: We interrogated our hospital's IHFD from March 2013 to August 2014. We examined records of patients over 65 years old, and compared them to national standards.

Results: 159 patients with hip fracture; 125 female, 34 male. Mean age 86 years (SD 2.83). 99 % were admitted from home. 99 patients (62 %) were admitted to an orthopaedic ward; the median time to admission to the ward was 8 h, with only 22.7 % of these meeting target time of 4 h.

100 patients (63 %) had surgery within 48 h; surgery was often delayed due medical instability. 152 patients (96 %) had pressure ulcer assessment. 122 patients (77 %) were reviewed by a bone health physician, and 124 (78 %) were reviewed by a geriatrician. Only 35 patients had a formal falls assessment, but 140 (88 %) had a physiotherapy assessment. Median length of stay 18 days. In-hospital mortality was 4. 26 % were discharged directly home, with 40 % going to off-site rehab, and 30 % going to nursing homes or convalescence.

Conclusion: While targets were met for the majority of patients, we have highlighted areas for improvement in both clinical care and data collection. This study represents the early role-out phase of our ICP, and gives us scope to continually improve care for this elderly, frail population.

References: J Osteoporos 2014;2014:656357

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ASSOCIATION OF GASTROINTESTINAL EVENTS ON QUALITY OF LIFE AMONG OSTEOPOROTIC WOMEN: RESULTS OF THE MEDICATION USE PATTERNS, TREATMENT SATISFACTION AND INADEQUATE CONTROL OF OSTEOPOROSIS STUDY (MUSIC-OS)

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MUSIC-OS investigates the burden of gastrointestinal (GI) events in osteoporotic women in terms of treatment (Tx) satisfaction, adherence and persistence to Tx, healthcare resource use, and quality of life (QoL).

Objective: To examine the association of new GI events at 3 months on overall and disease specific QoL among osteoporotic women.

Methods: Osteoporotic women ≥ 50 years of age and treated with osteoporosis (OP) medication were recruited into the study during routine visits to their physicians. Women diagnosed with Parkinson's disease, neuromuscular disease, Paget's disease, malignant neoplasm or treated with any injectable OP medication at enrollment were excluded. Women treated for OP were asked to complete the European Quality of Life-5 Dimensions (EQ-5D) questionnaire and the Osteoporosis Assessment Questionnaire (OPAQ-SV) regarding their overall and disease specific QoL at baseline BL, 6 months (M6) and 12 months (M12) post-BL. Multivariate regression analysis controlling for covariates such as comorbidities, history of fractures and history of falls was used to examine the association of GI events on QoL reported at M6 for those who did not have a BL GI event but experienced one by M6, compared to those who never reported a GI event.

Results: 2,943 women enrolled in the study with a mean age of 69.5 years. 31.9 % women enrolled in the study did not report a GI event at BL. Of these, 32.6 % ($n=306$) reported a GI event by M6. Women who did not report a GI event at BL but did experience a GI event by M6 had lower overall QoL than those who never reported a GI event (EQ-5D score LS Means difference: -0.04 ; $p=0.0005$; 95%CI: -0.067 , -0.019). Women who developed a GI event by M6 also reported lower disease specific QoL on all three OPAQ-SV dimensions (Physical Function, Emotional Status and Back Pain) at M6 compared to those who never reported a GI event (Physical Function LS Means difference: -3.14 ; $p=0.0239$; 95%CI: -5.857 , -0.416 ; Emotional Status LS Means difference: -3.12 ; $p=0.0297$; 95%CI: -5.935 , -0.308 ; Back Pain LS means difference: -4.98 ; $p=0.0095$; 95%CI -8.745 , -1.220).

Conclusion: GI events may lower or worsen QoL in women with OP who are receiving treatment. Though these study results demonstrate statistical significance regarding the association of GI events on overall and disease specific QoL, the clinical importance requires further investigation.

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THE VALUE OF BONE MINERAL CONTENT IN FRACTURE PREDICTION: FINDINGS FROM A UK PROSPECTIVE COHORT

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Objective: Birthweight has been shown to predict adult bone mineral content (BMC), but not BMD. Although low BMD is a well established risk factor for future fracture, little is known about the performance characteristics of BMC in this context. We therefore investigated the predictive value of bone area (BA), BMC and BMD for incident fracture in a prospective cohort of UK women.

Methods: 674 women aged 20–80 years underwent DXA assessment (proximal femur) between 1991 and 1993; 443 women were followed up in 1998–1999 to collect information on incident fractures, and potential confounding factors. Cox proportional hazards models were used to explore the risk of incident fracture and results are expressed as gradient of risk [GR=hazard ratio (HR) per 1 SD increase in the predictor] and 95%CI. Associations were adjusted for age, BMI, alcohol consumption, smoking, HRT, medications and history of fracture.

Results: 55 women reported a fracture. In fully adjusted models femoral neck BMC and BMD were similarly predictive of incident fracture [BMC: GR=0.57 (95%CI: 0.39, 0.82); BMD: GR=0.49 (95%CI: 0.32, 0.77)]. In contrast femoral neck BA was not associated with incident fracture, GR=0.94 (95%CI: 0.69, 1.28). Similar results were found with bone indices at Ward's Triangle and femoral trochanter, and with osteoporotic fractures as the outcome [BMC: GR=0.50 (95%CI: 0.31, 0.82); BMD: GR=0.29 (95%CI: 0.15, 0.54)].

Conclusion: BMC and BMD appear to predict incident fracture with similar gradients of risk, even after adjustment for body size. These findings suggest that factors in early life that are associated with total skeletal mineralisation are likely to have implications for adult fracture risk. SD and NCH are joint first author.

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SOCIAL INEQUALITY AND HIP FRACTURE: SECULAR TRENDS IN THE DANISH POPULATION

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Social inequality appears to be increasing in many countries. We explored whether risk of hip fracture was associated with markers of inequality and whether these relationships changed with time, using data from Danish Health Registries.

Methods: All patients 60 years or older with a primary hip fracture (ICD10: S720, S721, S722 and S729) were identified from 1 January 1995 to 31 December 2011. Hip fracture patients were matched 1:1 on age, gender and year of fracture to a non-hip fracture control. An individual's education attainment was defined as basic, secondary or higher, and their income was taken from their latest registered annual tax return (<200,000 DKK; 200,000 to 400,000 DKK; 400,000 to 600,000 DKK; >600,000 DKK). Poisson regression modeling was used to describe the association between income or education with rate of hip fracture, adjusting for confounders (smoking, alcohol, Charlson co-morbidity). Interactions were fitted between income and year of fracture, and education and year of fracture, to describe whether the association of income or education with rates of hip fracture changed over time.

Results: There were 69,774 hip fracture patients and 69,709 controls (both mean age 81.2 years) with complete data on income and education. Both increasing income and higher educational level were associated with reduced risk of hip fracture: Adjusted rate ratio (RR) for >600,000 DKK vs. <200,000 DKK income=0.81 (95 %CI: 0.75, 0.87), and for higher vs. basic education RR=0.91 (95 %CI: 0.89, 0.94). Over 1995 to 2011, hip fracture rates remained stable in the lowest income group, but increased substantially in other groups. Rates increased similarly in all strata of educational attainment.

Conclusion: Markers of social inequality relate to hip fracture risk, with disadvantaged groups at increased risk of fracture. Although in Denmark this gap has narrowed somewhat over the last 15 years in relation to income, the disparity is still large. NCH and LH are joint first author.

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THE RATE OF SELF-REPORTED GASTROINTESTINAL EVENTS AMONG OSTEOPOROTIC WOMEN: RESULTS OF THE MEDICATION USE PATTERNS, TREATMENT SATISFACTION AND INADEQUATE CONTROL OF OSTEOPOROSIS STUDY (MUSIC-OS)

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MUSIC-OS investigates the burden of gastrointestinal (GI) events in osteoporotic women in terms of treatment (Tx) satisfaction, adherence and persistence to Tx, healthcare resource use, and quality of life. Objective: To describe the rate of existing and new self-reported GI events in osteoporotic (OP) women receiving treatment for their OP 3 months after study enrollment.

Methods: Osteoporotic women ≥ 50 years of age treated for OP were enrolled during routine visits to their physicians. Women diagnosed with Parkinson's disease, neuromuscular disease, Paget's disease, malignant neoplasm or treated with any injectable OP medication at enrollment were excluded. At baseline (BL), women treated for OP were asked to report the GI events experienced in the past 6 months. At month 3 (M3), women were asked to report the GI events experienced in the past 3 months. Participants were asked to report the following GI events: heartburn/acid reflux, upset stomach/indigestion, nausea/vomiting, pain behind the breastbone, pain on swallowing or food sticking, stomach pain above the navel, diarrhea or constipation, stomach pain below the navel, and bloating. Women were stratified into subgroups based on duration of treatment, new users (same OP Tx for <90 days) or experienced users (same OP Tx for >90 days). Descriptive statistics were utilized to describe the rate of GI events 3 months after study enrollment.

Results: 2,943 women enrolled in the study with a mean age of 69.5 years. At BL, 68.1 % of women enrolled reported experiencing a GI problem in the past 6 months. Of the women who completed the M3 questionnaire ($n=2,762$), 75.9 % reported a GI event in the past 3 months. Of these, 10.1 % were women who had reported no GI events at baseline ('new' GI events). The remaining 89.9 % of women reported GI events at baseline and continued to experience them at M3. Among new users completing the questionnaire at M3 ($n=613$), 75.4 % of patients reported a GI event. Of these, 13.9 % reported a 'new' GI event at M3, and 86.1 % reported continuing GI events. Among experienced users completing the questionnaire at M3 ($n=2,149$), 76 % reported GI events. Of these, 9 % reported a 'new' GI event at BL and the remaining 91 % reported continuing GI events.

Conclusion: Two-thirds of osteoporotic women receiving OP treatment report experiencing GI events at baseline, and an even larger proportion (75 %) of women reported experiencing GI events at M3. The rate of GI events in women treated for OP presented here is higher than those reported elsewhere, perhaps as a result of the self-reported nature of the study design and types of GI events reported.

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HIGH PREVALENCE OF HYPOVITAMINOSIS D IN PATIENTS TREATED FOR OSTEOPOROSIS

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The standard of osteoporosis treatment should encompass adequate calcium and vitamin D intake. This is often overlooked by patients and health care providers. Aim: To analyse the levels of 25-hydroxy vitamin D in patient treated for osteoporosis with various antiporotic drugs.

Materials and methods: Cross-sectional, multicentre analysis of patient treated for osteoporosis 1 year either with teriparatide (TPTD), zoledronic acid (ZOL) or strontium ranelate (SR). All patients were recommended to take daily 800 IU of vitamin D and 1000–1200 mg of calcium for the whole period of treatment. The levels of vitamin D were analysed using electro-chemiluminescence binding assay (ECLIA) for the in vitro determination of total 25-OH-D3. Levels ≤ 30 ng/ml were insufficient and levels 20 ng/ml were considered for deficient.

Results: We analysed 1348 pts, mean age 69 years. The level of 25-OH-D3 was insufficient at the M0 visit - in TPTD group 23.4 ± 18.9 ng/ml, in group ZOL 21.9 ± 13.81 ng/ml, in group SR 26.01 ± 16.15 ng/ml. After 1 year of osteoanabolic treatment the levels remain very low 23.0 ± 22.1 ng/ml, and more than 20 % of pts were deficient. Also in group treated with ZOL was the 25-OH-D3 after 12 M low 26.5 ± 6.28 ng/ml, but only 8 % of pts were deficient. In pts treated with SR was the mean level of 25-OH-D3 after 1 year better, 40.5 ± 30.29 ng/ml, but also there was a large number of patient who were deficient (20 %). Discussion: Vitamin D saturation was despite the recommendations in all patients very low. Alarming is that about 20 % of the pts have the levels of 25-OH-D3 lower than 20 ng/ml. Prevalent hypovitaminosis D can be caused by lower supplementation to avoid severe hypocalcaemia or there is a very poor adherence of the pts.

Conclusion: The treatment is effective only together with adequate supplementation of vitamin D and calcium. All physicians should motivate patients to take calcium and vitamin D, as well they should regularly check the adherence.

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KNEE AND HIP OSTEOARTHRITIS ARE ASSOCIATED WITH A FASTER DECLINE IN PHYSICAL PERFORMANCE AS ASSESSED BY CHAIR RISES: RESULTS FROM THE EUROPEAN PROJECT ON OSTEOARTHRITIS (EPOSA)

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Cross-sectional studies have confirmed poorer physical performance in those with lower limb OA. However, after an individual develops OA, it is uncertain whether their physical

performance declines at the same rate or more rapidly than those without OA. We investigated this in the European Project on Osteoarthritis (EPOSA). 2,187 men and women underwent baseline interview assessing demographic and lifestyle factors. A diagnosis of clinical OA of the knee and hip was made on examination based on the American College of Rheumatology criteria. Individuals were timed rising 5 times consecutively from a straight-backed chair at baseline and 1 year follow up. The mean(SD) age of participants was 73.7(5.0) years. Mean(SD) chair rise time increased from 12.85(1.38) s to 13.36(1.38) s during the study, a difference of 0.51 s. This change was significantly influenced by country with the greatest mean increase of 1.75 s in Italy and a reduction by 0.64 s in Spain. After adjustment for baseline chair rise time, a greater increase was found in those of female sex and greater age [β (95 %CI) 0.66(0.33,0.99) s and 0.05(0.02,0.08) s, respectively]. After similar adjustment, the presence of clinical knee or hip OA was associated with a greater increase in chair rise time [β (95 %CI) 1.28(0.84,1.72) s and 0.85(0.07, 1.64) s, respectively]. Similar relationships were shown for self-reported OA in the knee and hip, and the presence or absence of knee pain, knee stiffness, hip pain, and hip stiffness individually. With the exception of clinical hip OA, these relationships were all maintained after adjustment for age, sex and country. Individuals with OA in either their knee or hip are likely to decline in physical performance more rapidly than their non-OA counterparts. Although disease progression may be an important factor, the similar relationships shown for pain and stiffness alone suggest symptoms may also play a significant role.

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QUANTIFICATION OF RISK FACTORS IN OSTEOPOROSIS DETECTION

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The study aimed to analyze the importance of risk factors in the prediction of osteoporosis in women that are, on average, 5 years after menopause. The study group consisted of 60 women with a mean age of 51 ± 3.98 years, and respectively 60.04 ± 33.43 months (on average 5 years) of menopause. Each subject completed the “1 min test” questionnaire and was investigated by DXA. The questionnaire has 19 questions including: primary factors that can be influenced like lifestyle and that cannot be influenced: menopause, family history of

osteoporosis and secondary factors: diseases affecting the skeleton, medications that disrupts bone health. Out of the 60 selected cases 1/5 had four risk factors, 1/10 had three risk factors, 1/4 had 2 risk factors, 1/4 had 1 risk factor and 1/6 no risk factor. After DXA investigation, 33 cases (55 %) corresponded to the diagnosis of osteoporosis. 1/3 of osteoporotic patients had four risk factors, 1/5 had 3, respectively 2 risk factors, 1/10 no risk factor. The combination of a large number of risk factors, on average 4, in women less than 5 years past the menopause, is accompanied by osteoporosis. **Conclusion:** In women at menopause for less than 5 years, the downward trend in the frequency of osteoporosis was noticed to be associated with the decrease of the risk factors number.

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IMPORTANCE OF MEDICAL INTERVIEW IN THE DIAGNOSIS OF OSTEOPOROSIS

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This study aimed to demonstrate the influence of risk factors on bone mass in women more than, in average, 10 years past the menopause. We examined 56 women that had 129.35 ± 15.94 months (mean 10 years) since menopause, mean age 64.39 ± 5.64 years. Two major risk factors are incriminated in the development of osteoporosis: loss of bone and the rate of bone loss. Approximately 70 % of the cases of osteoporosis is the result of genetic predisposition and only 30 % of cases are caused by environmental factors. Impediments to achieving optimal bone stock: genetic factors: positive family history, constitutional factors, deficiencies, low effort, intercurrent illness, delayed puberty. Factors that accelerate bone loss was: hypoestrogenism, old age, toxins, drugs, low calcium diet, sedentary lifestyle, endocrine, haematological, digestive diseases, inflammatory rheumatic diseases. Risk factors for osteoporotic fractures: Asian or Caucasian race, female gender, age, family history of hip fracture, premature menopause, primary or secondary amenorrhea, primary or secondary hypogonadism in men, low BMI, previous fragility fracture, smoking, alcohol, glucocorticoid therapy, low intake of dietary calcium, low vitamin D intake, low visual acuity, neuromuscular diseases, prolonged immobilization, low BMD, increased bone remodeling (turnover). Questions were directed so as to include all risk factors for osteoporosis. Risk factors were grouped and quantified. Results: 78.5 % of postmenopausal women, menopause for more than 10 years, had

osteoporosis, regardless of the number of risk factors. From these women: 16 % had four risk factors, nearly 18 % had three risk factors, 41 % had two risk factors, over 23 % had one risk factor. Note that, regardless of the number of risk factors with age, over 75 % of evaluated cases had osteoporosis.

Conclusion: After 10 years of menopause, the number of risk factors is not useful to predict the development of osteoporosis.

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REHABILITATION AND QUALITY OF LIFE IN OLD FEMALES WITH TYPE 2 DIABETES MELLITUS AND OSTEOPOROSIS

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Objective: The usual causes of osteoporosis associated with aging are diabetes - microvascular diabetic events generate bone quality changes and hip fractures are increased (1). Multimodal aerobic exercise for elder adults appears to be effective for falls prevention (2). We assessed the effects of a 6 week complex rehabilitation program (pharmacotherapy, educational sessions, multimodal exercise training and psychological support) on exercise tolerance and quality of life, in females with type 2 diabetes mellitus (T2DM) and symptomatic osteoporosis.

Materials and Methods: 42 old females (72.5 years mean age) with T2DM and total hip arthroplasty for osteoporotic fractures, were randomly assigned to a rehabilitation group - RG ($n=20$) and a pharmacotherapy (bisphosphonates) group - PG ($n=22$). Clinical evaluation, lab tests, exercise tolerance tests (6 min walking distance - 6MWD) and generic QoL scale SF-MOS were performed. BMD was measured by DXA in lumbar spine and hip region. 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 glucose sanguine level, in accordance with literature data about the effects of T2DM on bone mass. Both groups showed clinically and statistically significant improvements in 6-MWD and SF-MOS scores at 6 weeks; SF-MOS scores had improved by 42 % in the RG and by 26 % in the PG. The RG females were more satisfied with the overall outcome compared with PG subjects.

Conclusion: Old women who have T2DM and osteoporotic fractures benefit from strategies to prevent falling and improve their quality of life. Multimodal exercise (based on the coordination aerobic exercise and strengthening lower limb exercises) represents the adequate mode of physical

training in T2DM old females with osteoporosis because there are protective in falls.

References: Rubin MR et al., *Expert Rev Endocrinol Metab* 2013;8:423. Baker ME et al., *Age Ageing* 2007;36:375.

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THE ROLE OF EXERCISE SPA THERAPY IN SYMPTOMATIC DISH PATIENTS

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Objective: Diffuse idiopathic skeletal hyperostosis (DISH), characterized by spiny ankylosis and enthesopathy, spread to any joint of the body (1). DISH is not fatal but has been associated with various metabolic disorders and generates complex disability, which can be controlled with adequate rehabilitation program (2). The aim of our single blind, randomized controlled study was to assess the efficacy of comprehensive exercise spa therapy on back pain and physical performance in patients with DISH.

Patients and Methods: 36 symptomatic DISH patients were randomly assigned into exercise spa and drug therapy groups. Exercise spa group ($n=19$) received complex therapy - drugs and daily exercise spa program for 3 weeks consisting of mobility, stretching, and walking exercises in water. Drug therapy group ($n=17$) followed their individually prescribed medication. At 3 and 12 weeks an independent physiotherapist unaware of the treatment allocation performed outcome assessments - Schober's test, pain (VAS) and WOMAC scales for pain, stiffness and functional status.

Results: All patients had a significantly higher BMI (26.6 mean), hyperglycaemia, and hyperlipidaemia or hyperuricaemia. Comparing week 12 with baseline, Schober's test and pain improved significantly ($p<0.05$ each). Significant improvement in WOMAC scores for stiffness and functional status were found at week 3 and week 12 in the exercise spa therapy group compared to baseline. At 12 weeks, 16 (84.2 %) patients mentioned their functional status as improved and only 3 (15.8 %) as similar at baseline. The significant decrease in serum uric acid, total cholesterol and glucose levels were established at 12 weeks in the kinetic spa therapy group.

Conclusion: Our study demonstrated the superiority of exercise spa therapy compared to drug therapy in the treatment of DISH patients with various metabolic disabilities. The exercise program performed in minerals water led to improvements in pain and physical measures.

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P386

RESULTS OF TIBIAL PLATEAU FRACTURES IN PATIENTS OLDER THAN 65 MANAGED WITH SURGICAL TREATMENT

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Tibial plateau fractures represent 8 % of total fractures in elderly patients. In this age group, fractures are caused by low energy trauma. Operative treatment is generally preferred over conservative treatment in most of the cases. We present a retrospective study of tibia plateau fractures in patients older than 65 years treated with plate osteosynthesis in our center between Jan 2006 and Dec 2012.

Material and methods: 63 fractures were treated. Fractures were classified according to Schatzker classification. Mean age, gender, the presence of medical comorbidities and injury mechanism were assessed. Patients were followed at 6 weeks, 12 weeks, 6 months and 1 year after the index procedure and yearly from then. Full-leg radiographs were used to confirm fracture healing and signs of articular degeneration. The average follow-up time was 16,3 months.

Results: There were 63 patients (29 men and 34 women). Mean age was 74.6 years (range, 65–86). Most fractures were caused by low-energy casual fall (59.3 %). The most frequent fracture type was Schatzker's type III (33.3 %). 28 cases (44.4 %) needed some osseous substitute or allograft during the surgery. In the immediate postoperative period, the most frequent complication were infection (4 cases, 6.3 %) and secondary displacement (6 cases, 9.5 %). Degenerative signs in X-rays were the most common at midterm follow-up (14 cases, 22.2 %). A total of 12.7 % of patients required a new surgery. Six patients required hardware removal and one patient sustained a total knee replacement because of osteoarthritis. The articular degeneration was statistically related with the appearance of pain.

Conclusion: Open reduction and internal fixation by plating and screw fixation is a treatment with high rate of complications for tibial plateau fractures in elderly patients.

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FRAX IS A BETTER TOOL FOR IDENTIFYING SUBJECTS AT HIGH RISK OF VERTEBRAL FRACTURES THAN BMD, AGE OR SELF-REPORTED FRACTURES ALONE

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The aim of the study was to examine the association between vertebral fracture status, determined by an X-ray and hip BMD, FRAX and body composition.

Materials: A group of 204 postmenopausal females was included. Body weight, height, BMI and femoral neck BMD were measured. Lateral thoracic and lumbar spine X-rays were taken and vertebral morphometry was performed. FRAX was calculated with the standard online tool.

Results: The mean age was 71.8 ± 7.1 years and mean BMI was 28.4 ± 4.9 kg/m². Prior fractures were reported by 28 %, family history of hip fracture - by 14 % and height reduction by 53 %. Osteoporosis (WHO) was found in 27 (13 %), osteopenia in 117 (57 %) and normal BMD in 60 (30 %). X-ray was done in 70 subjects. Genant I fracture was found in 18 %, Genant II or III in 3 %, more than one vertebra was fractured in 26 % and no fractures were observed in 53 %. Vertebral Fx were proven in 41 % of the subjects who did not report sustaining fractures, in 42 % of the subjects who did not report height reduction and in 50 % of those who did report. FRAX was significantly higher in the subjects with X-ray fractures than in those without (major Fx mean rank 46.3 vs. 25.4, $p < 0.001$, and hip Fx mean rank 43.8 vs. 27.4, $p = 0.001$). The only significant predictor of fractures in the logistic regression was FRAX (OR 33 %, 11–58, $p = 0.002$).

Conclusion: A significant proportion of the subjects with vertebral fractures were unaware of them. FRAX was a better predictor of vertebral Fx than age, BMD or clinical fracture history alone.

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MAY DIGITAL IMAGE ENHANCEMENT OF CT SCOUTS IMPROVE THE ACCURACY OF SEMI-AUTOMATED VERTEBRAL COMPRESSIVE FRACTURES DETECTION

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Purpose: Prevalent and incident vertebral fractures are of clinical importance in osteoporosis diagnostics and treatment. Currently, vertebral morphometry is performed manually on lateral radiographs. The analysis relies on 6-point morphometry, is laborious and requires a high level of expertise from a trained radiologist. Automation of the process could be an essential step in reducing the false-positive rates and in fully automating the fracture assessment process.

Material and Methods: 250 computed tomography (CT) scanograms of patients admitted to Orthopaedic Trauma

Department were analyzed. Semi-automated quantitative vertebral morphometry was performed using a model-based shape recognition technology. Images were sharpened digitally using convolution techniques. Sharpening was used to facilitate semi-automated unadjusted shape recognition. Finally, the accuracy of fractured vertebra detection was evaluated.

Results: Unadjusted morphometry on the same set of images detected 63 fractures. 33 fractures matched with those that have been detected with unadjusted way. Unadjusted morphometry was repeated after image processing in 3 ways. In the first set (sharpen) algorithm detected the 57 fractures, 30 diagnoses agreed with matching morphometry (the one at the beginning of its recollection). Accordingly, in the other two sets were detected 30, corresponded to 13 (unsharp mask) and 24, including 9, which coincided with the initial measurement (convolution). With each technique, sensitivity declined from 16.5 to 4.5 %, while specificity increased from 97.7 to 98.8 %. Binomial proportions for all techniques were calculated for all estimates with p values at $< .0001$.

Conclusion: Digital image sharpening does not improve the accuracy of semi-automated unadjusted vertebral fractures detection.

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MAY SURGEON PREDICT PMMA VOLUME REQUIRED FOR VERTEBROPLASTY OR KYPHOPLASTY?

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ercutaneous minimally invasive spinal procedures, as vertebroplasty and balloon kyphoplasty, have been well established to address osteoporotic vertebral compression fractures. The vertebral volume measurement may be a valuable tool to assess the amount of bone cement to be used during the procedure as the preoperative planning method. The volume of the vertebral body may relate the amount of bone cement that could be injected during augmentation.

Materials and Methods: Eighty seven women (mean age 69.4 years; SD 10.9) and 15 men (mean age 64.3 years; SD 11.8) were diagnosed using computed tomography (CT). The study assessed 379 vertebrae. A mean number of vertebrae per person was 3.71. CT IAC 3200/250 using Vitrea 2 Workstation Software (Vitrea 2 Workstation, Vital Images Inc., Minnetonka, MN, USA) was used to measure vertebral body volumes from the predefined bone window. The patients were scanned in a 16 row CT scanner (GE Healthcare BrightSpeed,

Waukesha, WI, USA). An average volume of PMMA noted at the vertebroplasty or kyphoplasty was retrieved from surgical reports to compare with measured results. Statistical analysis was performed using SAS 9.3 (SAS Institute Inc., Cary, NC, USA).

Results: Mean vertebral volume was significantly greater in men than in women (27.79 vs. 20.33 cm³, *p*

Conclusion: Vertebral body volumes measured using dedicated software show presence of the difference between measured values and average PMMA amounts injected during vertebroplasty or kyphoplasty. Additional features than volumetric measurements should be considered while planning of PMMA volume required for surgery.

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BONE MINERAL DENSITY AND VITAMIN D STATUS IN ISRAELI IBD PATIENTS: POSSIBLE INFLUENCING FACTORS

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Inflammatory bowel disease (IBD) patients have decreased BMD. There is limited consensus regarding the major factors affecting BMD in these patients. Few studies have examined possible genetic factors. Aim: to evaluate bone metabolic status, to determine impact of different factors on BMD in IBD pts.

Patients and Methods: 142 IBD clinic patients (pts) in Rambam Health Care Campus (RHCC). All pts underwent metabolic bone status evaluation in the Bone metabolism clinic at RHCC: routine blood biochemistry, serum PTH, 25OHD, bone densitometry at the lumbar spine (LS), femoral neck (FN), total hip (TH). Genetic testing for common mutations in NOD2 was conducted.

Results: 142 pts, aged 17–79 years; 107 (75.3 %) had Crohn's disease (CD): 43 (40.2 %) men, 64 (58.8 %) women; 35 (24.7 %) had ulcerative colitis (UC): 13 (37.1 %) men, 23 (62.9 %) women. 126 (88.7 %) Jewish, 16 (11.3 %) not Jewish. 74 (52 %) were treated with glucocorticoids >3 months. 20 (18.7 %) of CD pts were treated with anti TNF >3 months. 96 (67.6 %) underwent genetic evaluation for NOD2 mutations. In 60 pts e 25OHD was <20 ng/ml, of them 14 <10 ng/ml. In UC pts 7 (21.1 %) 25OHD was <10, in CD pts 7 (7.1 %), *P*=0.06. 22 pts had BMD Z-scores <−2.5, 18 CD pts, 4 UC pts, 14 men, 8 women. In 70 pts-1 >Z-scores >−2.5; 51 of CD, 19 of UC, 24 men, 46 women. Higher

BMI was associated with increase in Z-score of 0.048 at LS, 0.044 at TH, *p*=0.04 and 0.02, respectively, per BMI unit. In multiple regression analysis mean LS Z-scores were lower in men than in women (CD and UC): −1.71 compared to −1.14, *P*=0.007. Anti-TNF treatment was associated with a decrease in TH mean Z-scores: −0.8 vs. 1.62, *p*=0.08. Jewish CD patients carrying the mutation SNP20 in the NOD2 gene, had mean Z-score −2.49 in TH compared to noncarriers −0.57, *P*=0.0079.

Conclusion: Lower BMD in IBD patients was associated with male gender, lower BMI, and mutation in NOD2 gene among Jewish CD patients.

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A CASE OF COMPLEX REGIONAL PAIN SYNDROME TYPE I LOCATED AT THE LEFT ANKLE DOES THE CALCANEAL DENSITOMETRY IN MONITORING THIS PATIENTS?

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Complex regional pain syndrome (CRPS) type I is the term used for the previously termed reflex sympathetic dystrophy. [1] A number of triggers can precipitate CRPS, but up to 10 % have no identifiable cause. The highest incidence rate is in the 61 and 70 year age group. There are no diagnostic tests for CRPS. Untreated this suffering can lead to patchy osteoporosis, muscle contractures and atrophy. [1]

Case presentation: Jul. 2014: Female, 51 years old, who presents for continuing pain and edema in the left ankle lasting for 5 month. Physical examination: tenderness of the left ankle. Lab tests: in normal ranges, including inflammatory tests. Musculoskeletal ultrasound of the left ankle: no modification. Bilateral feet radiography: diffuse homogeneous osteoporosis of the left foot. Calcaneal ultrasound bone densitometry: left side: T-score=−2.8; right side: T-score=−1. Left ankle IRM: lesions compatible with reflex sympathetic dystrophy. Treatment: calcitonin, ibandronic acid, NSAID. Nov. 2014: The pain in the left ankle decreased significantly compared to the previous presentation. Bilateral feet radiography also presented a significantly improved aspect. Calcaneal ultrasound bone densitometry: left side: T-score=−2.4; right side: T-score=−1.1. Treatment with ibandronic acid and NSAID was continued.

Conclusion: The diagnosis in this particular case was sustained by the typical aspect obtained on plain radiography and ankle IRM. Because the region was accessible, calcaneal ultrasound bone densitometry was performed. The results

revealed suggestive bone demineralization on the affected feet. Considering that this is a less expensive investigation and does not expose the patient to irradiation as plain radiography and IRM, we raise the question whether this investigation is a reliable tool for the monitoring of patients with CRPS located in the ankle.

References: Gorodkin R, Herrick AL, Complex regional pain syndrome in Rheumatology. Mosby, 2011

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NEUROPATHIC PAIN COMPONENT UNDER MUSCULOSKELETAL DISEASES

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Neuropathic pain caused by the musculoskeletal diseases has recently been the focus of numerous studies. The aim of this study was to estimate the structure of pain syndrome and reveal the presence of neuropathic pain component in patients suffering from the musculoskeletal diseases.

Material and Methods: We examined 68 patients aged 45–85 years (average age 67.6±1.3 years). Patients were divided into 3 groups: A - patients with osteoporosis and vertebral fractures ($N=29$), B - patients with low back pain ($N=22$), C - patients with osteoarthritis of major joints ($N=17$). To assess the NP component we used painDETECT, LANSS, DN4 questionnaires.

Results: Regression analysis shows correlation between the questionnaires: LANSS and painDETECT ($r=0.73$, $p=0.000001$), DN4 and painDETECT ($r=0.73$, $p=0.000001$). 63.6 % of patients with osteoporosis examined by painDETECT were unlikely to have the NP component, 17.2 % might possibly, 17.2 % probably. LANSS scale: 24.1 % were probably to have NP. DN4 scale: 37.9 % probably had NP. 63.7 % of patients with low back pain examined by painDETECT were unlikely to have NP, 22.7 % might possibly, 13.6 % probably. LANSS scale: 22.7 % were probably to have NP. DN4 scale: 36.4 % had probably NP. 64.7 % of patients with osteoarthritis of major joints examined by painDETECT were unlikely to have the NP component, 29.4 % might possibly, 5.9 % probably. LANSS scale: 23.5 % probably had NP. DN4 scale: 41.2 % had probably NP.

Conclusion: Thus, in patients with musculoskeletal diseases the pain syndrome may include NP features. Identification of these would promote a treatment strategy targeted at the NP.

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DETERMINANTS OF UNFAVOURABLE COURSE OF GENERALIZED PERIODONTITIS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Aim: To investigate the relationship between the course of generalized periodontitis (GP) and age, gender, markers of systemic inflammation and osteoporosis (OP) in patients with rheumatoid arthritis (RA).

Materials and methods: Patients with RA ($n=115$) underwent a standardized periodontal examination. Rheumatoid arthritis parameters, including the presence of rheumatoid factor (RF), antibodies to cyclic citrullinated peptide (anti-CCP), hand radiographs, were assessed. The association between RA parameters and periodontal condition was examined. Femoral neck and lumbar spine BMD was assessed by means of DXA.

Results: Estimates of GP patients of all ages showed a significant effect of age ($K=0.2720$, $\chi^2=29.61$, $p<0.05$), female gender ($OR=3.66$, $p=0.03$), presence of menopause ($OR=5.17$, $\chi^2=4.91$, $p=0.0267$) for GP severity in RA. Of the RA parameters, the following factors were proved significant: radiographic stage ($K=1.6914$, $\chi^2=1144.44$, $p<0.001$), the presence of anti-CCP ($OR=4.69$, $\chi^2=4.75$, $p=0.0293$), seropositivity for RF ($OR=4.29$, $\chi^2=4.75$, $p=0.0178$). A strong relationship between seropositivity of RA and the level of TNF α in saliva ($r_{bs}=0.74$, $t=8.28$, $p<0.01$) and in blood ($t=3.21$, $p=0.0021$) was found. The presence of systemic osteoporosis was shown to have a significant ($OR=20.72$, $\chi^2=8.80$, $p=0.0030$) effect on the risk of adverse course of GP.

Conclusion: Progression with unfavourable course of GP in RA was observed in patients aged over 45, in women, especially those of postmenopausal age and those with progressive course of RA. Important factors of GP severity in this patient population were the presence of anti-CCP and RF, which increased the risk of unfavorable course by 3.9 ($RR=3.93$) and 2.5-fold ($RR=2.54$), respectively. Patients with RA and osteoporosis suffer from periodontal pathology 3.8 times more often ($RR=3.82$) than the patients with RA and normal BMD indexes.

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EFFICACY OF TERIPARATIDE FOR PREVENTION OF VERTEBRAL AND NONVERTEBRAL FRACTURE IS NOT ALTERED BY BASELINE FRACTURE PROBABILITY

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Aim: Daily administration of 20 mg or 40 mg teriparatide has been shown to significantly decrease the risk of vertebral and nonvertebral fracture compared with placebo. The aim of this study was to determine the efficacy of teriparatide as a function of baseline fracture risk, assessed using the FRAX tool.

Methods: There was no difference in fracture efficacy of 20 and 40 mg teriparatide daily, and so the two active groups were merged. Baseline clinical risk factors (age, BMI, prior fracture, glucocorticoid use, rheumatoid arthritis, smoking and maternal history of hip fracture) were entered into country-specific FRAX models to calculate the 10-year probability of major osteoporotic fractures with or without inclusion of femoral neck BMD. The interaction between probability of a major osteoporotic fracture and treatment efficacy was examined by Poisson regression.

Results: The 10-year probability of major osteoporotic fractures (with BMD) ranged from 2.2 to 67.2 %. Treatment with teriparatide was associated with a 37 % decrease in all nonvertebral fractures compared to placebo treatment (95 %CI: 10, 56 %). Amongst patients in whom fractures were characterised as low energy, the decrease in fracture risk was more marked (Relative risk reduction=56 %; 95 %CI: 24, 75 %). The risk of vertebral fractures decreased by 66 %; (95 %CI: 50, 77 %). There was no significant effect on hip fracture. Hazard ratios for the effect of teriparatide on the fracture outcome did not change significantly with increasing fracture probability ($p=0.30$). Similar results were noted for the interaction when FRAX probability was computed without inclusion of BMD. Findings were similar for the interaction between probability of hip fracture and treatment efficacy.

Conclusion: Teriparatide significantly decreases the risk of nonvertebral and morphometric fractures in women by a similar extent, irrespective of baseline fracture probability.

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EFFECTIVENESS OF EDUCATIONAL PROGRAMS FOR KNEE AND HIP OSTEOARTHRITIS PAIN AND QUALITY OF LIFE IN PRIMARY CARE PATIENTS

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Knee and hip joints are the two most prevalent sites of osteoarthritis (OA). Pain and functional limitations are the two major factors influencing the quality of life in patients with OA. Few studies assessed the effect of educational programs on clinical features of OA in primary care.

Objective: To determine the influence of participation in educational programs performed by healthcare professionals on pain levels and quality of life in patients with knee and hip OA.

Methods: 32 patients with symptomatic hip and knee OA (radiographic stages II-IV) participated in educational program for primary care patients with OA. Patients participated in once-a-month 2-h classes performed by healthcare professionals. VAS pain, WOMAC (Likert Scale) and overall satisfaction with provided medical aid score (0–100 mm VAS scale) were measured at the baseline and after 3 months. Work productivity was assessed using the Work Productivity and Activity Impairment (WPAI) questionnaire. The comparison group included 30 patients with hip and knee OA comparable by age, sex and baseline VAS and WOMAC scores.

Results: After 3 months a significant improvements were found for VAS pain score (study group - 49.3±7.3- baseline, 34.2±4.8 - 3 months, control group - 50.1±6.9- baseline, 48.2±6.9 - 3 months $p<0.05$), WOMAC overall score (study group - 33.7±4.5- baseline, 27.6±3.9 - 3 months, control group - 34.2±4.8 - baseline, 32.9±4.0 - 3 months, $p<0.05$), as well as WOMAC pain and physical function scores in patients who participated in educational program. 81,9 % of patients achieved pain relief of ≥3 points in the WOMAC pain subscale. Both presenteeism and absenteeism percent were significantly higher in the control group patients (32 % of productive time while at work and 14 % through absenteeism) compared to intervention group patients (24 % of productive time while at work and 6 % through absenteeism) after 3 months. The overall satisfaction with provided medical aid score measured by VAS scale was higher in the study group patients compared to controls (79.3±10.2 vs. 55.8±14.0, $p<0.05$).

Conclusion: Participation of patients with symptomatic knee and hip OA in educational programs performed by healthcare professionals can decrease pain, increase quality of life and work performance.

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ANALYSIS OF THE INFLUENCE OF THE LEVEL OF PHYSICAL ACTIVITY ON THE MORTALITY OF PATIENTS WITH PROXIMAL HIP FRACTURES

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Aim: Analysis of the level of physical activity and its influence on the indicators of mortality in patients at the age of 50 and older during 24 months after a hip fracture.

Materials and methods: The prospective study included all inhabitants of Yaroslavl at the age of 50 and older with a hip fracture from 01.09.2010 to 31.08.2011. The indicators of the physical activity were assessed in 24 months after the date of the fracture in accordance with the walking duration and by the questionnaire Katz Activities of daily living (ADL) [1].

Results: The study included 446 patients: 334 (74.88 %) women and 112 (25.12 %) men (average age was 76.83 ± 10.32 years). The general mortality within 2 years was 43.90 %. Mortality was significantly higher in patients, who had the duration of walking ability before a trauma ≤ 30 min comparing with those who walked >30 min (30.27 % vs. 43.48 %; $p=0.02$), and after a trauma (8.63 % vs. 60.94 %; $p<0.0001$), and among those who had the indicators of physical activity after a fracture on the scale of Katz less than the level of “F” (dependence in performing most of the functions on self-service), $p<0.0001$. In 24 months the number of patients confined to bed among the survivors was 13 (7.20 %). Among patients who died 70 (60.30 %) people could not get up ($p<0.05$). Among the survivors, 102 (56.98 %) patients could go outside, among the dead patients during the time before a lethal outcome there were only 8 (6.90 %) people ($p<0.05$). The level of physical activity after a fracture significantly depended on mobility before the trauma. Among those who went outside before the injury 90/128 (70.30 %) patients returned to their previous level of activity. Among the patients who hadn't gone outside before a trauma 9/41 (20.89 %) patients remained confined to bed in 2 years. Only 24/41 (58.50 %) patients in this subgroup returned to the level of physical activity before a fracture. By the end of observation 157 (87.70 %) patients out of 179 operated-on could go outside independently, in comparison with 7 (31.81 %) patients in the group treated conservatively ($n=22$) ($p<0.05$).

Conclusion: Higher rates of mortality are connected with low level of physical activity before and after a fracture. Indicators of physical activity were higher with patients who used to go outside before a fracture, and also with those who were operated on.

[1] Horikawa A et al., Clin Interv Aging 2014;9:1847.

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CASE OSTEONECROSIS OF THE JAW PATIENT WITH POSTMENOPAUSAL OSTEOPOROSIS AFTER 10 YEARS OF TREATMENT WITH VARIOUS ANTIRESORPTIVE DRUGS

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Materials and Methods: We are seeing a patient in '51 with postmenopausal osteoporosis without fractures, which in 2003 received the therapy of various antiresorptive drugs together with calcium and vitamin D3: in the first year etidronate and calcitonin nasal spray, and then 2 years of weekly 70 mg alendronate, the next 3 years intravenous injection at 3 mg ibandronate once per 3 months. In 2011–2012 years the patient took only calcium and vitamin D3, and since the beginning of 2013 received subcutaneous injections of

denosumab 4 to 60 mg. In July 2014, after dental procedures, the patient was diagnosed with osteonecrosis of the jaw, confirmed by X-ray, performed rehabilitation centers of osteonecrosis.

Results: It was found that after 6 years of treatment with bisphosphonates was achieved increase in BMD by 11 %, 2 years receiving only calcium and vitamin D3 led to a decrease in BMD by 2 %, and 2-year treatment denosumab increased the BMD of 8 % and reduced the risk of fractures by FRAX. However, the patient developed osteonecrosis of the jaw on the background of the risk factor - dental procedures.

Conclusion: Analysis of our clinical observation confirms the reality of the risk of osteonecrosis of the jaws against the background of long-term intake of various bone antiresorptive drugs and highlights the need for timely consideration of correction therapy in these patients with prescribing anabolic action.

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OUTCOME AFTER SECOND HIP FRACTURE: WHAT MATTERS?

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Survivors of a first hip fracture are at substantially increased risk of a second hip fracture. There are controversial results in literature regarding outcome after second hip fracture. The aim of this study was to determine the outcome for patients who sustain a second hip fracture compared with those who sustain a first fracture.

Material and methods: We included 344 patients who presented with acute hip fractures to a university-associated orthopaedic hospital during a 12-month period. Patients with initial and second hip fracture were compared regarding all baseline variables, and outcome measures at discharge (functional status, complications, length of stay mortality) and 1-year after surgery (functional status, living conditions, mortality). We also performed univariate and multivariate regression analysis to assess the relationship between presence of second hip fracture and observed outcome variables.

Results: Patients who sustained a second hip fracture were more often admitted from an institution, were more functionally dependent, and sustained more often an extracapsular fracture. Regarding outcome at discharge, there was no difference concerning any observed outcome variable between the two groups at discharge. Patients with a second hip fracture had a significantly higher level of dependence when performing instrumentalized activities of daily living when compared to patients with first hip fracture patients at 1-year follow-up. Also, significantly more patients in the second hip

fracture group required transfer to an institutional care setting 1-year post fracture. There was no difference between the two investigated groups regarding mortality.

Conclusion: Patients who sustain a second hip fracture show a lower independence level at 1-year follow-up regarding instrumentalized activities of daily living. It seems that patients who sustained a second hip fracture had similar mortality rates as patients who sustained their first fracture due to the fact that they were not older, and not more cognitively impaired compared to patients with an initial hip fracture. This implies that outcome might vary between different resource settings due to dissimilar epidemiologic characteristics of elderly patients sustaining non-simultaneous bilateral hip fracture. The results of our investigations should be confirmed in future studies.

P399

DIFFERENTIAL DIAGNOSIS AND TREATMENT OF MYOTONIC AND MYOFASCIAL SYNDROMES OF NECK PAIN

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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 7–9 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); suprascapular 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.

P400

HEALTH-RELATED QUALITY OF LIFE AND PSYCHOLOGICAL STATUS IN PATIENTS WITH KNEE OSTEOARTHRITIS IN REPUBLIC OF MOLDOVA

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Patients with knee osteoarthritis have often debilitating symptoms, causing physical impairment and leading to decrease of patient’s psychosocial wellbeing. The impacts of knee OA on patient’s psychological status have not been insufficiently studied in developing countries. The objective of this study was to assess the health-related quality of life (QoL) and psychological suffering in patients with OA in Republic of Moldova.

Methods: In a retrospective, cross-sectional, nonrandomized study we recruited patients with confirmed knee OA (Altman, 1991), which were stratified according to disease severity. Subjects were recruited from primary care and Rheumatology Department, patient with joint prosthesis were excluded. Demographic and socioeconomic characteristics, functional limitation over the previous 12 months were evaluated. The QoL was assessed by SF 36 questionnaire and psychological status by General Well Being (GWB) questionnaire. This study was conducted according to the principles of the Declaration of Helsinki (1996) and good clinical practice.

Results: There were 256 patients integrated in the study including 196 females and 60 males, mean age 64.9±0.6 years (range 37–85 years). The disease duration was 8.1±0.02 years (range 1–51). The SF 36 results showed that the QoL was low - 45.1±4.6 points, both components being decreased: mental - 48.8±4.7 (range 0–91) points, physical - 41.35±4.3 (range 0–81). The GWB constituted 54.2±1.3 (range 11–100) points, considered as a state of severe distress. On sectioning the three levels of welfare overall results we obtained the following data: severe stress was appreciated in 55.9 % patients, moderate stress in 26.2 % and only 18.0 % of patients had a psychological good feeling. According to our data, the psychological status correlated strongly with the level of the QoL ($r=0.7$, $p<0.05$), the severity of disease ($r=-0.5$, $p<0.0001$) and the intensity of knee pain ($r=-0.5$, $p<0.0001$).

Conclusion: Patients with knee osteoarthritis have impaired QoL as well as substantial psychological burden attributable to the disease.

P401**MEANS OF REHABILITATION FOR PATIENTS WITH BACK PAIN**A. N. Filipovich¹¹Research Center of Medical Assessment and Rehabilitation, Minsk region, Belarus

Methods: 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.

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/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).

P402**THE POTENTIAL OF STATINS IN THE TREATMENT OF OSTEOPOROSIS**Z. Petkovic-Mirkovic¹, J. Mirkovic¹¹University of Pristina, Faculty of Medicine, Kosovska Mitrovica, Serbia

Osteoporosis is a systemic skeletal disease characterized by low bone mass, microarchitectural deterioration, low bone strength, enhanced fragility and consequently increased risk fracture leading to fracture either in the spine, hip or wrist. The method to the measure qualitative aspect of BMD or bone mineral content (BMC), DXA, is currently considered as the “gold standard” for the diagnosis of osteoporosis, recording to the WHO definition. Pleiotropic effect of statins in the population postmenopausal women with high risk for developing osteoporosis is reflected in the anabolic effect on the bone.

Aim: Discovery of statins HMG-CoA reductase inhibitors) as bone anabolic agents has spurred a great interest among both basic and clinical bone researchers.

Material and Methods: For the preparation of this document we used material from Internal departments of Health center in Kosovska Mitrovica.

Results: With a prospective study on a random sample of 60 patients who were examined in 2013 and 2014, and the analysis of examined patients with osteoporosis and hypercholesterolemia, on statin therapy number of patients was 32 (53.33 %), while suffering from osteoporosis and hypercholesterolemia without statin therapy was 28 (46.67 %). Looking at the age of patients examined, we found that most of them 43 (71.67 %) are older than 60 years, while there were 17 (28.33 %) patients with less than 60 years. Fractures were not found in patients who used statins, while there were 3 fractures found in the patients who did not use statins

Conclusion: Dose optimization and/or discovery of bone-specific statins or their bone targeted delivery offers great potential in the treatment of osteoporosis.

P403**DOES A SPECIFIC BONE PATTERN EXIST IN PATIENT SUFFERING FROM CUSHING’S DISEASE?**A. Boisson¹, R. Winzenrieth², A. Tabarin³, T. Schaeverbeke¹, N. Mehseu-Cetre¹¹Rheumatology Department, CHU Pellegrin, Bordeaux, France, ²R&D Department, Med-Imaps, Merignac, France, ³Endocrinology Department, CHU Pellegrin, Bordeaux, France

Rational: Cushing disease (CD) is a true model of a glucocorticoids (GCs) effects on bone metabolism due to a minimization of confounding factors. The aim of this study is to evaluate if a CD bone pattern exist.

Patients and methods: Monocenter retrospective study. Inclusion criteria: all patients from 2006 to 2014 with CD status confirmed by biochemical evaluations (ACTH, UFC), the presence of a pituitary adenoma and/or dynamic hormonal levels who underwent a DXA evaluation. The following parameters were collected from chart review: sex, age, BMI, CD status defined as active disease (AD), eucorticism treated patients (EU) or corticotrope insufficiency with hydrocortisone supplementation (CIH). Areal BMD at spine and at the hip has been evaluated using a iDXA densitometer (GE-Lunar, Madison, USA) as well as TBS at spine using TBS iNsite[®] v2.1 (Med-Imaps, France). Normative data of both TBS and aBMD have been used to assess CD impact on bone.

Results: 55 subjects suffering from CD were recruited with a mean age and BMI of 50.8±15.8 years and 27.3±5.2 kg/m². Among them, 80 % were women. Compared with the normal

values for age, CD subjects have lower TBS value (Z-score TBS = -0.8 ± 1.3 SD, $p < 0.01$) whereas no differences have been obtained for aBMD at spine (Z-score aBMD = 0.1 ± 1.5 SD, $p = 0.49$) or at total femur (Z-score aBMD = 0 ± 1.1 SD, $p = 0.95$). Microarchitectural texture impairment was significantly more marked on men than in women despite a normal aBMD (0.2 and -0.3 SD for men and women respectively) when compare with normal values (-1.96 vs. -0.62 SD, respectively, $p = 0.005$). More interestingly, significant differences have been obtained over CD subjects depending on the CD status without difference in terms of age (all $p > 0.25$). Those with AD (hypercortilism) have a significant TBS alteration when compared with reference values (mean Z-score TBS = -1.3 SD, $p < 0.001$) or with those with EU (Δ TBS = -0.054 , $p < 0.001$) despite a normal aBMD (mean Z-score aBMD = 0.1 SD). Subjects with EU have both normal aBMD and TBS values for age (mean Z-scores of 0.5 and 0.0 SD respectively). Finally, CD subjects with CIH have both decrease of aBMD and TBS (mean Z-scores of -0.6 and -0.7 SD, respectively).

Conclusion: A specific bone pattern exists in CD subjects consisting in a marked alteration of the trabecular texture despite a normal aBMD. This alteration seems to be gender related with a higher impairment in men. One striking findings of this study is that a specific bone pattern exists for each CD status (AD, EU or CIH) and that CIH subjects, considered usually as EU subjects, have also a bone pattern alteration. These results suggest that bone microarchitectural texture alteration, as assessed by TBS, should be taken into account in order to manage patient with CD.

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EVALUATION OF ITAKI SCALE AND FALL RISK AMONG PATIENTS HOSPITALIZED IN PHYSICAL MEDICINE AND REHABILITATION SERVICE

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Objective: During hospitalization patients falls result in individual injury and functional loss, decreased quality of life, increased hospitalization period and excessive treatment cost. In this study we intended to evaluate itaki fall risk scale and fall risk among patients admitted to physical medicine and rehabilitation inpatient service.

Methods and Design: 341 patients' files who were hospitalized between 1st January-31st December 2013 in the inpatient service of Physical Medicine and Rehabilitation Department were assessed. 31 immobile and 9 patients in whom itaki fall risk scale had not been filled out were excluded. Patients'

demographic and clinical characteristics, diagnosis in the course of admission, number of medications, number of falls, itaki fall risk scale score and vitamin D level were analyzed.

Results: 240 of 341 participants were female and 101 were male. Admission diagnosis in 224 (65.7 %) patients was musculoskeletal degenerative diseases, 82 (24 %) neurogenic and 35 (10.3) rheumatologic diseases. According to itaki fall risk scale score among 301 patients included to the study 203 (67.4 %) had high risk, 67 (22.3 %) had low risk and 31 (10.3 %) had no risk. Among 18 fallen patients 15 (83.3 %) were in high risk group and 3 (16.7 %) in low risk group. Itaki score of fallen patients (mean: 12.4) was significantly higher than in patients who had not fallen (mean: 7.2) ($p < 0.006$). Aiding device usage was 31.4 % among none fallen patients while it was found to be 72.2 % among fallen patients. Aiding device usage in fallen patients group was significantly higher than in none fallen patients. There was no correlation between itaki score and vitamin D levels.

Conclusion: In this study itaki fall risk scale score was significantly higher in fallen patients than not fallen patients. We presume that itaki fall risk scale may be useful for evaluating fall risk in patients hospitalized in physical medicine and rehabilitation inpatient service.

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IS OSTEOPOROSIS OVER-DIAGNOSED AND OVER-TREATED? THE GREEK FRAX VERSION EXPERIENCE

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Objective: An estimation of fracture risk is important in determining which patients to treat. FRAX allows clinicians to distinguish patients who are at high fracture risk from those who are not and thereby to offer treatment to those most likely to benefit from one. The purpose of this study was to evaluate the initiation of antiosteoporotic treatment retrospectively based on Greek version of FRAX score.

Material and Methods: This was a cross-sectional retrospective study. The sample of the study is composed by 1000 postmenopausal women aged 45 or above who have had a

consultation for osteoporosis evaluation. Patients were selected by doctors knowledgeable about osteoporosis randomly on a sequence of consultations, from five participating centres in Greece. Based on the protocol we recorded all the parameters in order to calculate FRAX retrospectively at the time of the anti-osteoporotic treatment initiation. We assessed FRAX score before the initiation of any antiosteoporotic treatment so as to evaluate the percentage of patients that received or not treatment because of the doctors' overestimation or underestimation of actual fracture risk.

Results: The mean age of the study sample was 58.5 (S.D 8.79). 50.7 % of the participating women was osteoporotic and the rest was osteopenic based on WHO criteria. In our study, 97.9 % of the women who participated had already initiated treatment for osteoporosis and particularly after their first time that had seek consultation for osteoporosis. 47.7 % of patient should have initiated treatment based on the US-adapted therapeutic intervention thresholds (probability for major osteoporotic fracture ≥ 20 or hip fracture ≥ 3) since Greek are not existent at the time.

Conclusion: There are indications that women who seek consultation for osteoporosis are over-diagnosed and as a result over-treated. Potentially those who actually need treatment but do not seek consultation are under-treated. We have to underline that FRAX does not replace good clinical judgment by the health care practitioner. All treatment decisions require clinical judgment and consideration of individual patient factors, including risk factors not captured in the FRAX model. Decisions to treat must be made on a case-by-case basis.

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GENDER EFFECT OF ACROMEGALY ASSOCIATED WITH HYPOGONADISM ON BONE HEALTH

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Subjects with acromegalia (AG) were more susceptible to sustained fracture. We have previously reported that AG induces bone microarchitectural texture impairment at lumbar spine. More precisely TBS seems to be more sensitive to bone modification than BMD and presence of hypogonadism worsens this impairment. The aim of this study was to assess the effect of acromegalia disease status, the presence of hypogonadism (AG+HG) or the gender on BMD and TBS. This observational study involved 47 subjects with AG (27 women and 20 men) with mean age and BMI of 54.9 ± 11.5 years and 29.6 ± 4.5 kg/m² respectively. Among them,

17 patients suffered from hypogonadism for <2 years, 15 for 2–8 years and 15 over 8 years. BMD and TBS were evaluated at PA Spine (L1-L4) using an iDxa DXA device (GE-Lunar) and TBS iNsign[®] (v2.1, Med-Imaps, France). BMD were normal when comparing AG or AG+HG patients with normative data ($p=0.4$). In contrast, TBS were significantly decreased in both AG and AG+HG patients in comparison with normal values ($p<0.001$). BMD remained normal when comparing (AG) or (AG+HG) with normal population in both gender while a gender effect has been observed on TBS. TBS in men exhibited normal values for age ($p>0.18$), whereas TBS was significantly lower in women in both AG or AG+HG patients ($p<0.001$ and $p<0.0001$, respectively). Presence of hypogonadism worsen BMD and TBS decrease (0.944 vs. 0.989 g/cm² $p<0.004$ and 1.226 vs. 1.256 $p<0.02$, respectively). We observed a link between BMD, TBS and the years of hypogonadism ($p<0.05$) considering the whole cohort with trends more pronounced in women than in men. The status of AG disease affected both BMD and TBS with significant higher values in those with active disease ($n=19$, $p<0.05$ and $p<0.01$, respectively) but in a larger extend for TBS (Δ BMD= 0.118 g/cm² vs. Δ TBS= 0.144). The present study is the first to report data on spine BMD and TBS at lumbar spine in AG patients while taking gender into consideration. As previously observed, AG induces bone microarchitectural texture impairment at lumbar spine. Presence of hypogonadism worsens this impairment which is more pronounced in women than in men. Years of hypogonadism has a negative impact on bone health whereas the active AG enhance both bone parameters.

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FRACTURE PREDICTION MODEL FOR WOMEN AGED OVER 50 IN THE REPUBLIC OF BELARUS

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Low-energy fractures are a common complication of osteoporosis for women aged over 50. The elaboration of national fracture prediction models based on risk factors with and without DXA is obligatory. Aim: To define the significant risk factors for low-energy fractures for women aged over 50 and to create prediction models for Belarusian population.

Materials and Methods: The study protocol included the following parameters: height, weight, age, age at menopause, chronic diseases (glucocorticoids intake, thyrotoxicosis, RA, GI ulcers, COPD, liver cirrhosis and ESRD), low-energy fractures in anamnesis at patients aged over 50 (forearm, hip fractures, spine), smoking, frequent falls (>1 per month), a parental history of hip

fractures and living alone. The measurements of BMD were performed by DXA for 1,533 females aged over 50.

Results: The mean age in the study group was 64.3 ± 8.0 (95 %CI 63.9; 64.7). During the survey it was revealed 416 previous low-energy fractures of typical localization in the cohort aged over 50: 283 (68.0 %) forearm fractures, 83 (20.0 %) spine fractures and 31 (7.5 %) hip fractures. The most significant variables identified by ROC-analyses: 'age' with the optimal cutoff point >65 (sensitivity 69 %, specificity 68 %) and the variable 'T-score FN' <-1.7 (sensitivity 74 %, specificity 75 %). Six significant ($p < 0.005$) variables were included into the regression analysis with optimal scaling (CATREG) to calculate the standardized coefficient B and scoring ($B \cdot 100$). The most significant risk factors were identified as the following: a parental history of hip fracture (+37 points), chronic diseases (+25), T-score FN <-1.7 (+16), living alone (+15), age >65 (+5) and falls (+2). The threshold value of the total score associated with a high risk of fracture was calculated using the ROC-curve. The predicted frequency for fracture prediction model by logistic regression with the cutoff of 33 points was 70.3 % (AUC 0.928 (95%CI 0.914; 0.941); $p < 0.001$).

Conclusion: The proposed fracture prediction model allows calculating the risk of low-energy fracture with high probability even in cases of DXA inaccessibility for timely starting of antiosteoporotic therapy.

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SERUM 25-HYDROXYVITAMIN D AND OSTEOARTHRITIS IN OLDER PEOPLE: THE PRO.V.A STUDY
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Purpose: To examine the relationship between 25-hydroxyvitamin D (25OHD) levels and any presence of osteoarthritis (OA) and pain in a cohort of older men and women.

Methods: This study was part of the Progetto Veneto Anziani (Pro.V.A), an Italian population-based cohort study on people over 65 years old. In this cross-sectional work, we considered

2756 subjects (1102 M and 1654 F) with a mean age of 74.2 ± 7.1 years. OA and OA-related pain were defined using a standardized algorithm investigating disease history, medical documentation, symptoms, and physical examination of the hand, hip and knee. 25OHD levels were classified using gender-specific quartiles.

Results: The presence of OA at the three sites investigated resulted significantly higher in women than in men. On logistic regression analysis, taking those in the highest 25OHD quartile for reference, those in the lowest quartile had significantly higher odds of OA involving the hands (OR=1.26, 95 %CI=1.15–1.38 in the sample as whole; 1.36, 95 %CI=1.15–1.60 in men and 1.22, 95 %CI=1.09–1.37 in women), and pain (OR=1.18, 95 %CI=1.06–1.32 in the sample as whole; 1.52, 95 %CI=1.21–1.90 in men and 1.15, 95 %CI=1.03–1.29 in women). Similar results were found for the hip. For the knee, on the other hand, low 25OHD levels were associated with the presence of OA in the sample as a whole, and in women, and with the presence of pain in the sample as a whole.

Conclusion: Low 25OHD levels are associated with the presence of OA and with OA-related pain, particularly when the hand and hip are involved.

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DEFINITION AND DIAGNOSIS OF SARCOPENIA: THE GERIATRIC APPROACH

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Sarcopenia, a reduction in muscle mass and function, is considered one of the hallmarks of the aging process. It was defined by Rosenberg, in 1989, as a condition involving a loss of muscle mass and strength due to age. Later on, Baumgartner et al. introduced a standard definition of sarcopenia based on muscle mass only. These authors performed a total body DXA scan in a random sample of the general population and defined sarcopenia as a value of lean body mass two SD below the average value calculated in healthy, young men and women. This strategy is analogous to that used to define osteoporosis, which is based on T-score values below a specific cutoff. The method also has the advantage of being easy to apply and immediately understandable by most clinicians. However, a definition of sarcopenia based on T-scores of muscle mass also has several disadvantages. It assumes as corollary that muscle mass is the most important clinical parameter to be assessed. On the contrary, a large body of pre-clinical and clinical data demonstrate that the force generated per unit of muscle mass is largely variable between individuals and tends to decline steadily with aging. There is strong evidence, however, that decline in muscle strength with aging is in excess of what is expected by the decline in muscle mass and suggests that a

direct measure of force is preferable for clinical practice. More recently, the European Working Group on Sarcopenia in Older People (EWGSOP), endorsed by ESPEN, EUGMS, IAGG(ER) and IANA, stated that “Sarcopenia is a syndrome characterized by progressive loss of muscle mass and strength with a risk of adverse outcomes”. The diagnosis was suggested to be based on the combined presence of a low muscle mass, i.e. more than 2 SDs below the mean measured in young adults, and gait speed ≤ 0.8 m/s in a 4 m walk test. The main objective of this presentation is to present the pros and cons of the current definition of sarcopenia in the geriatric practice.

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CLINICAL RISK FACTORS FOR OSTEOPOROSIS AND CALCIUM INTAKE FROM DIETARY SOURCES IN RUSSIAN WOMEN

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Objective: To study the frequency of main risk factors for osteoporosis (RFs for OP) and calcium intake from dietary sources among the female population of the Moscow Region (MR) in Russia.

Material and Methods: The survey was conducted by means of questionnaire 1712 female inhabitants of MR aged 20–87 years old. Adapted “One-minute osteoporosis risk test” and the questionnaire on calcium consumption with dairy products were used.

Results: RFs for OP are present in 44 % of female and 25.6 % of them have 1 RF, 11.0 % - 2 RFs, 7.4 % - 3 or more RFs. At the age of ≥ 50 years 27.5 % of women have an anamnesis of low-trauma fractures and 19.6 % of women have height loss more than 3 cm. Reliable gamma correlation between age and quantity of RF for OP is revealed: $g=0.352$, $p=0.00000$. 42.3 % of inhabitants of MR consume dairy products once a day, 33.7 % - less than once a day or don't consume them at all, and only 24 % of women consume dairy products several times a day. Calcium intake in premenopausal women is higher, than in postmenopausal ones - 1050 mg/day [749; 1291] against 904 mg/day [649; 1203], respectively, $p=0.0186$. At the age of 20–39 years average consumption of calcium meets recommended nutrient intake, however in all age groups of ≥ 40 years is the deficiency of calcium intake with a minimum consumption level at the age of ≥ 80 of years - 614 mg/day [479; 750] and daily deficiency of calcium intake about 590 mg. There were found weak but statistically significant correlations between calcium intake and age ($r=-0.198$, $p=0.0007$) and number of RF for OP ($g=-0.267$, $p=0.000008$), and there were not revealed any association of calcium intake with an education level and the social status.

Conclusion: Screening of RFs for OP and evaluation of dietary calcium intake must be recommended a compulsory part of routine medical monitoring of postmenopausal women as a tool to identify women at high risk of OP in Russia.

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PUBLICATION OUTCOMES OF THE ABSTRACTS PRESENTED AT THE 2011 EUROPEAN CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULO-SKELETAL DISEASES (ECCEO-IOF11)

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Musculo-Skeletal Diseases (IOF- ESCEO WCO, formerly ECCEO-IOF) is the largest worldwide event fully dedicated to the clinical, epidemiological, translational and economic aspects of bone, joint and muscle diseases. The role of the Scientific Advisory Committee (SAC) is to select abstracts for oral communication (OC or poster presentation (PP), based on a short summary of the research. We identified 619 abstracts accepted for OC ($n=45$) or PP ($n=574$) presented at the 2011 ECCEO-IOF11 annual meeting. Over a period of 3 years (2011–2014), the overall number of abstracts published as a full-length manuscript was 191 (30.9 %). The publication rate is higher for OC (75.6 %) than for PP (27.4 %) ($p<0.0001$). Publications issued from OC reach a higher Impact Factor (8.3+10.1) than those issued from PP (4.0+2.3) ($p<0.0001$) but the presentation format does not significantly influence the time to printed publication (17.4+10.6 months vs. 12.9+11.9 months; $p=0.17$). These results reflect a high research productivity and an appropriate selection of OC by the ESCEO-IOF SAC.

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CLINICAL EFFECTS OF DOCOSAHEXANOIC ACID (DHA) AS CORTICOSTEROIDS- SPARING DRUG IN PMR PATIENTS AT HIGH RISK FOR CS-RELATED ADVERSE EVENTS: PRELIMINARY RESULTS

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Polymyalgia Rheumatica (PMR) is a relatively common rheumatic disease of unknown aetiology that usually affects

elderly people. It is characterized by myalgia of the proximal part of the hip and of the shoulder girdles with morning stiffness and marked elevation of erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) serum levels. Corticosteroids (CS) are considered the treatment of choice of PMR but a long-term therapy may expose patients to an increased incidence of adverse events such as hypertension, hyperglycemia, osteoporosis. Objective: Emerging evidences suggest that long chain ω -3 polyunsaturated fatty acids (PUFA) may be involved in controlling immune responses and that docosahexanoic acid (DHA) displays potent anti-inflammatory properties inhibiting cyclooxygenase activity and suppressing the synthesis of proinflammatory cytokines. The aim of our observation is to evaluate the efficacy and safety of DHA as CS-sparing drug in PMR patients at high risk for CS-related side effects.

Material and Methods: Over a 6-month period we observed 45 PMR consecutive outpatients, 16 males and 29 females (mean \pm SD age: 69.3 \pm 6.7 years and mean disease duration: 7.8 months), under steroid treatment with prednisone or equivalent. All patients were treated with a daily dose of 600 mg of DHA, too. At T0, T1 and T2 follow up, they underwent laboratory evaluation and were assessed by pain VAS, HAQ test, Time Up-and-Go (TUG) test and 6-min walking test (6MWT). At baseline 38 patients (85 %) had high ESR and CRP levels and low TUG and 6MWT tests.

Results: At the 3-month follow up (T1), 33 patients (75 %) reported a significant resolution of joint swelling and duration of morning stiffness and they were evaluated for the possibility to CS tapering or stopping. After 6 months all patients had a satisfactory reduction on a pain VAS and a significant improvement on a fatigue VAS from baseline. 15 of them (35 %) had suspended CS and in 29 (65 %) the mean dose of CS was lower than at the beginning of DHA supplementation. All patients showed also a significant improvement in the TUG and 6MWT tests, correlated with muscle strength and performance.

Conclusion: These preliminary data confirm a potential interference of DHA supplementation in the control of inflammation. However the molecular mechanism underlying the actions of ω -3 essential fatty acids remain to be clearly defined, DHA has been shown to keep under control inflammation. Our PMR patients obtained an encouraging clinical benefit without relapses or side effects. DHA may be very useful in PMR patients with high risk of developing CS-related effects and might be recommended, but controlled studies are required.

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Platelet-activating factor (PAF) is a potent phospholipid mediator that triggers various cellular functions and plays an important role in bone metabolism. PAF directly stimulates osteoclast motility and resorptive activity. In a PAF-receptor-deficient mice, oestrogen depletion enhanced PAF production. We hypothesized that postmenopausal women with elevated plasma PAF levels might be related to greater risk for osteoporosis-related fractures (ORFs).

Materials and Methods: We studied, the association between circulating PAF [measured by ELISA kit (Echelon Biosciences Inc., USA)] and ORF risk in 707 postmenopausal women (age \geq 50 year), in a population-based study with a mean follow-up period of 5.2 \pm 1.3 years. Multivariate Cox proportional-hazards regression models were used to analyze fracture risk, adjusted for age, BMI, and other confounding risk factors.

Results: Plasma PAF levels (pg/ml) were significantly higher in women with ORFs (224.1 \pm 97.4) than in those without ORFs (42.4 \pm 13.1) (P <0.0001). High PAF levels were strongly associated with increased fracture risk. After adjustment for age and other confounders, the relative risk was >4.3-fold among postmenopausal women for each 1-SD increment increase in plasma PAF level. Women in the highest quartile of PAF levels had a 5.6-fold increase in fracture risk. Results were similar when we compared PAF at the 1-year visit to an average of 2–3 measurements. Fracture risk attributable to PAF levels was 26.4 % in the highest quartile. Associations between PAF levels and fracture risk were independent of BMD and other confounding risk factors.

Conclusion: High plasma PAF level appears to be a strong and independent risk factor for ORFs among postmenopausal women and could be a useful biomarker to improve fracture risk assessment.

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PLASMA PLATELET-ACTIVATING FACTOR LEVELS AND THE RISK OF OSTEOPOROTIC FRACTURES: THE CEOR STUDY

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BONE HEALTH IN GLUCOCORTICOID TREATED MEN AND WOMEN

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Objective: To evaluate GC-induced effects on areal BMD (aBMD) and bone microarchitectural texture measured by TBS.

Material and Method: TBS and aBMD were evaluated at L1-L4 PA spine by DXA in 1520 men and women aged 40 years and over. 416 subjects who received GCs (≥ 5 mg/day, for ≥ 3 months) were matched with 1104 sex-, age- and BMI-matched control subjects. Clinical data, osteoporotic fractures (OPF) and dietary habits were documented in the medical report.

Results: GC-treated patients were characterized by a significant decrease of TBS (1.267 vs. 1.298, $p < 0.001$) compared with control-matched subjects while no change in BMD was observed ($p = 0.88$). These decreases were even more pronounced when fracture status was taken into account (1.222 vs. 1.298, $p < 0.001$). The odds ratio (OR) for TBS was 1.44 [1.095–1.89] for OPF, whereas no significant ORs were found for BMD ($p = 0.36$). A similar effect on micro-architecture measured by TBS was seen by the presence of fracture as by the use of glucocorticoids. An influence on TBS by sex was also noted with a decrease in TBS of greater magnitude in men.

Conclusion: GC-treated individuals have a significant deterioration of bone microarchitecture as assessed by TBS which is more marked in those with OP fracture and in men. TBS seems to be more sensitive than aBMD for GC-related fracture detection and should be a good surrogate indicator of bone health in such secondary osteoporosis.

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RELATIONSHIP BETWEEN BONE MINERAL DENSITY, PTH, VITAMIN D AND INSULIN- LIKE GROWTH FACTOR-1 IN POSTMENOPAUSAL WOMEN WITH SECONDARY HYPERPARATHYROIDISM

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Secondary hyperparathyroidism (SHPT) represents a risk factor for adverse skeletal-related events, especially in elderly women with reduced BMD. Elevated circulating PTH levels leads to both anabolic and catabolic effects on bone cells. There is evidence that part of the effects of PTH are mediated by local production of IGF-1, which physiologically regulates skeletal growth and development. The purpose of this study was to evaluate the relationship between calcium-regulating hormones PTH, vitamin D and IGF-1 and BMD in postmenopausal women with SHPT

Patients & Methods: The data relating to a group of 19 elderly (median 68 years, range 65–70 years) osteoporotic (T-

score < 2.5) women with mild SHPT, mainly related to the use of loop diuretics, were retrospectively collected and analyzed. All patients underwent lumbar spine (LS) DXA and LS-BMD measurement, together with serum PTH, 25(OH)vitamin D, and IGF-1 assay.

Results: There was an inverse weak relationship between age and PTH ($R = 0.39$, $p = 0.09$) or BMD ($R = 0.41$, $p = 0.08$), but no correlation with 25(OH)vitamin D ($R = 0.23$, $p = 0.34$) or IGF-1 ($R = 0.15$, $p = 0.54$). A significant correlation was observed between IGF-1 and BMD ($R = 0.68$, $p = 0.001$) or PTH ($R = 0.47$, $p = 0.04$) and, as expected, a strong inverse correlation between PTH and BMD ($R = 0.63$, $p = 0.003$). No relationship between 25(OH)vitamin D and PTH ($R = 0.12$, $p = 0.62$) or BMD ($R = 0.28$, $p = 0.24$) was found.

Conclusion: In elderly women with SHPT, IGF-1 and PTH have synergistic actions on bone, and both are significantly related to BMD, while 25(OH)D seems to be independent from bone mineralization measured at LS site.

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ASSESSMENT OF DISABILITY AND QUALITY OF LIFE IN PATIENTS WITH ASEPTIC NECROSIS OF FEMORAL HEAD

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Objective: Aseptic necrosis of the femoral head is a common cause of developing musculoskeletal disability in young adults that are active from a socio-professional standpoint. In the final stages of the disease the main complains patients have are local pain and loss of function in the affected hip joint. The objective of our study is to highlight the occurrence of disability, mainly regarding walking, among patients diagnosed with aseptic necrosis of the femoral head, and highlight the consequences of its appearance on the patient's quality of life.

Material and methods: We included in our observational study, a number of 37 patients, with a clinical and laboratory diagnosis of aseptic necrosis of the femoral head, evolutionary stages III and IV (Ficat and Arlet classification). The following parameters were observed: the pain threshold (VAS scale), the perception of quality of life (MHAQ questionnaire), the evaluation of clinical and functional status (Get up and go test) and the algo-functional status (Lequesne index).

Results: The mean values of the followed parameters were VAS=6.71, MHAQ=14.67, Get up and go test=20, 62 s, Lequesne index=13.57. The results were statistically significant for the batches studied by gender (male / female), residence (urban / rural), age (< 50 years / > 50 years) and evolutionary stage of disease (stage IV / stage III).

Conclusion: The results confirm the important repercussions also-functional status of the joints has on the quality of life in patients with aseptic necrosis of femoral head, particularly in stage IV patients. Painful symptoms condition the walking pattern and daily living activities as well as performing physical activity, especially in patients over 50 years old. We consider that more attention should be given to correcting the walking pattern in these patients through an adequate rehabilitation program.

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EVALUATION OF BONE MINERAL DENSITY IN PATIENTS DIAGNOSED WITH ASEPTIC NECROSIS OF FEMORAL HEAD

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Objective: Aseptic necrosis of the femoral head is a condition caused by partial or total interruption of blood supply to the femoral head, eventually causing bone tissue destruction at this level. The objective of our study is the evaluation of BMD in a group of patients diagnosed with aseptic necrosis of the femoral head.

Material and methods: We included in our study, which was conducted over 6 months (June–November 2014), a total of 34 patients, aged between 23 and 62 years, diagnosed with aseptic necrosis of the femoral head, evolutionary stages III and IV (Ficat and Arlet). Evaluation of BMD was carried out using the conventional radiography of pelvic and lumbar spine (front and profile), and by using DXA, on the contralateral femur and lumbar spine.

Results: On plain radiography films, 24 patients did not show any osteoporosis specific modifications, in 6 patients there were highlighted changes in the affected hip and to the contralateral one, like decreasing bone density, increased transparency and trabecular structure loss, and 4 patients showed a decrease in radiodensity of the bone and vertebral compression with noticeable height difference in vertebral bodies. After DXA testing, 19 patients had a T-score < -1, 8 patients had T-score between -1 and -2.5, and 7 patients had a T-score > -2.5.

Conclusion: Although plain radiography does not highlight any specific changes of the disease, T-score (DXA) may indicate the presence of osteoporosis in patients with aseptic necrosis of the femoral head. We believe that the introduction of

bisphosphonate therapy in patients diagnosed with aseptic necrosis of the femoral head and osteoporosis, regardless of their age, can play an important role in stopping bone destruction in the affected area, as well as the entire skeletal system.

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MEDICAL COMPLIANCE IN OSTEOPOROSIS TREATMENT

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Objective: Medical compliance is an important factor in the prevention and treatment of osteoporosis. Educational status of patients, adverse effects of drugs, regimens of administered drugs, chronicity and symptomatic features of osteoporosis are important factors in compliance. The aim of this study was to assess these factors in the compliance to osteoporosis treatment.

Method: Patients who were diagnosed as primary or secondary osteoporosis or osteopenia by DXA measurement in our medical faculty osteoporosis outpatient clinic and prescribed antiosteoporotic drugs were included to the study.

Results: 130 patients were evaluated by a questionnaire. 90.2 % of patients were female. 56 % of patients were taking antiosteoporotic drugs, 88.2 % of patients were taking calcium and vitamin D combination. Median time of drug usage was 6 months. 16(15.7 %) patients reported taking drugs not regularly, while 57(55.9 %) patients were taking their drugs regularly. The rest of the patients stated that they did not use any drug for osteoporosis even though it was recommended. 34.7 % of patients reported drug adverse events. 10 of the patients who were taken their drugs irregularly reported adverse effects of drugs as the reason for their insufficient compliance. Patients who reported adverse effects had significantly higher irregular drug usage than patients who reported no or less adverse effects ($p=0.002$). There was no statistical significance found between drug usage regularity and educational status ($p=0.796$).

Conclusion: Though it is known that osteoporosis is preventable and treatable, drug adherence is still a prominent issue in effectiveness of the treatment. The importance of drug usage and maintenance in prevention of osteoporotic fractures and possible adverse effects have to be explained carefully by healthcare provider.

P419**3D-DXA: VALIDATION OF 3D MODELLING ACCURACY FOR HOLOGIC DXA SCANNER**

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Objective: Validation of the 3D-DXA technology using Hologic DXA images; accuracy evaluation in comparison with QCT.

Method: The 3D-DXA technology relies on a 3D statistical model constructed from a dataset of QCT scans and describing the statistical variations in shape and BMD distribution. A 3D subject-specific model is subsequently obtained by registering the statistical model onto the 2D DXA image of the patient so that the projection of the model matches the DXA image. The 3D modelling process is fully-automated. 3D modelling accuracy was evaluated by comparing 3D subject-specific models reconstructed from DXA images (Discovery W, Hologic) with QCT acquisitions. The study involved 37 patients, including patients with osteoporosis, osteopenia and normal bone density (mean age: 57±12 years, range: 30–87 years).

Results: Mean shape accuracy evaluated on the 37 patients was 1.0 mm. Volumetric BMD and BMC reconstructed by 3D-DXA were highly correlated with volumetric BMD and BMC computed from QCT ($r=0.90$ and $r=0.98$, respectively, $p<0.001$). A correlation coefficient of 0.90 was found between the average cortical thicknesses computed from 3D-DXA and measured by QCT.

Conclusion: This method presents a high potential for clinical routine use, by providing analyses of the femoral shape, vBMD and cortical thickness while maintaining DXA as the current standard modality. This should potentially improve the diagnosis of osteoporosis and fracture prevention.

P420**EVALUATION OF FRAX SCORE USE IN MALTESE OSTEOPOROSIS MANAGEMENT GUIDELINES**

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Objective: To evaluate the Maltese FRAX score-based osteoporosis management guidelines and identify the suitability of using such a risk factor engine-based protocol.

Material and Methods: Data from 1000 patients presenting for BMD estimation in 2010 were collected. In 2010, local guidelines on osteoporosis management were set up but not yet implemented. Of these patients, 702 were below 65 years of age (and above the minimum age for FRAX use: 40 years). Data included Age, Indication, Weight, Height, BMI, medication and the presence of any risk factor components of the FRAX score tool^[1]. BMD was assessed using Norland/Hologic densitometers. FRAX scores (excluding BMD) for each patient were calculated using the online tool www.shef.ac.uk/FRAX as accessed in 2014. The resulting major osteoporotic fracture risk was compared to age-specific risk thresholds as set by J.A. Kanis et al. (2013). Thus the appropriateness (or otherwise) of densitometry measurements as dictated by local guidelines was determined.

Age group	40–44	45–49	50–54	55–59	60–64	Overall
True positive	0	1	4	18	26	49
False positive	1	27	83	124	151	386
True negative	4	11	92	79	66	252
False negative	0	1	5	5	4	15
Sensitivity	–%	50 %	44.44 %	78.26 %	86.67 %	76.56 % 95 % CI: 64.3–86.24 %
Specificity	80 %	28.95 %	52.57 %	39.92 %	30.41 %	39.5 % 95 % CI: 35.68–43.41 %

Results: FRAX score (excluding BMD)-based guidelines for managing <65 year olds were found to have a positive predictive value of 11.26 % and a negative predictive value (NPV) of 94.38 %.

Conclusion: FRAX-guided local guidelines are well suited at excluding non-osteoporotic patients (NPV of 94.38 %, with a false omission rate of 5.62 %). Positive likelihood ratio for the protocol was found to be 1.27. This means that 1 in every 8.8 patients that would have been referred for BMD estimation were actually osteoporotic.

References: 1. Kanis JA et al., Osteoporos Int 2008;19:385.

P421**VITAMIN D DEFICIENCY AND CARDIOMETABOLIC RISKS: A JUXTAPOSITION OF ARAB ADOLESCENTS AND ADULTS**

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Objective: The recent exponential surge in vitamin D research reflects the global epidemic of vitamin D deficiency and its potential impact on several chronic diseases in both children and adults. Several subpopulations, including Arab adolescent boys and girls, remain understudied. This study aims to fill this gap.

Study Design: A total of 3055 apparently healthy Saudi adolescents (1187 boys and 1038 girls, aged 13–17 years old) and adults (368 men and 462 women, aged 18–50 years old) were respectively recruited from different public schools and medical practices within Riyadh, Saudi Arabia. Anthropometrics were taken and fasting blood samples withdrawn to examine serum glucose and lipid profile by routine analysis and 25-hydroxyvitamin D by ELISA.

Results: Almost half of the girls (47.0 %) had vitamin D deficiency as compared to only 19.4 % of the boys ($p < 0.001$), 36.8 % of the adult women and 17.7 % of the adult men ($p < 0.001$). Furthermore, in boys there were more significant inverse associations between serum 25(OH) vitamin D levels and cardiometabolic indices than girls, while in contrast women had more significant associations than men. Vitamin D deficiency tripled the risk for diabetes mellitus type 2 (DMT2) [OR 3.47 (CI 1.26–5.55); $p < 0.05$] and doubled the risk for pre-DM [OR 2.47 (CI 1.48–4.12); $p < 0.01$] in boys. Furthermore, vitamin D insufficiency was a risk factor for abdominal obesity in boys [OR 2.75 (CI 1.1–7.1); $p < 0.05$]. The risk for DMT2 and abdominal obesity were not significantly associated with vitamin D deficiency in adult males, girls and adult women.

Conclusion: Vitamin D deficiency is mostly associated with cardiometabolic risk factors in adolescent Arab boys. This reaffirms the innate cardioprotective hormonal and gender-specific advantage of adolescent females and challenges the extraskeletal protection of vitamin D correction in adolescent females.

P422

AUDIT OF THE USE OF TERIPARATIDE IN A TERTIARY CENTRE METABOLIC BONE CLINIC

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Teriparatide is a recombinant form of PTH licensed for the use of severe postmenopausal osteoporosis. It is used when bisphosphonates are not tolerated or there has been an

unsatisfactory response, with ongoing fractures and a T-score of -3.5 or less. There is a risk of hypercalcaemia on treatment. After a 2-year course antiresorptives must be restarted.

Method: All patients initiated on Teriparatide from March 2011 until May 2014 were included to see if the reason for initiation adhered to National Institute of Clinical Excellence (NICE) guidelines. The BMD at both the hip and spine was analysed post treatment to see if it had increased. The time between completing Teriparatide and starting antiresorptive treatment was recorded for all patients who completed 2 years of treatment.

Results: 41 patients were initiated on treatment, 4 male, 37 female, the age range was 31–90 years. 8 patients had an atypical femoral fracture (AFF) as the reason for treatment, and 2 patients were hypoparathyroid following parathyroidectomy and had severe refractory hypocalcaemia. 56 % of patients were on alendronate, 15 % were on zoledronic acid and 15 % had no treatment before their course of teriparatide. Patients with vertebral fractures reported improvement in their pain. After 2 years of teriparatide, 50 % of patients were started on zoledronic acid. The median time to start antiresorptive treatment was less than on 1 month. 3 patients had fractures whilst on teriparatide. The BMD increase at the spine was statistically significant, $p = 0.01$. No patients became hypercalcaemic on treatment.

Conclusion: Seventy percent patients complied with NICE guidelines. There was a statically significant improvement in BMD in the spine. No patients became hypercalcaemic on treatment. Use in AFF is an individualised decision outside NICE guidance as is the use of teriparatide for refractory hypocalcaemia. The time between completing teriparatide and starting antiresorptive treatment must be carefully monitored and future treatment decided pre-emptively.

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EFFECT OF TYPE 2 DIABETES MELLITUS ON BONE METABOLISM

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Objective: Type 2 diabetes mellitus (T2DM) has been associated with increased bone density and fracture risk, nevertheless the mechanisms through which diabetes alters bone are not completely clear. Here we evaluated the effect of T2DM on bone metabolism taking into account bone density, quality, turnover, and cells and the effect of diabetes on muscular strength and performance.

Material and Methods: We compared bone turnover, bone density and muscular performance in 50 T2DM women and 100 nondiabetic controls matched for age and BMI.

Results: In T2DM bone density was significantly higher at lumbar spine, accordingly bone resorption was reduced, whereas bone deposition was not significantly altered. Fragility fractures were not increased in T2DM and bone quality was comparable in T2DM and controls. Osteoclast precursors in peripheral blood were significantly increased in T2DM as respect to controls, whereas osteoblast precursors were decreased. Amongst cytokines involved in the control of bone turnover RANKL/OPG was decreased in T2DM, whereas sclerostin and DKK-1 were not significantly influenced by T2DM. Muscular strength and balance were significantly reduced in T2DM patients as respect to controls.

Conclusion: In this study we show a decreased turnover in T2DM even though osteoclast precursors were increased. This result may be due to an increase in immature osteoclasts that are not recruited in bone, as the RANKL/OPG was decreased in T2DM as respect to controls. We do not find significant increase in fragility fracture in T2DM, this could be due to the use of controls matched for obesity and age. We find no differences in bone quality in T2DM patients, even though scarce glycemic control worsened bone quality. Muscular force and balance is impaired in T2DM, this could influence the risk of nonvertebral fragility fractures, even if the low sample numerosity do not allow us to investigate this type of fractures.

P424

ESTROGEN RECEPTOR A GENE POLYMORPHISMS (PVU II AND XBA I) AND BONE TURNOVER AFFECT BONE MINERAL DENSITY IN POLISH MALE POPULATION

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Objective: To investigate the possible associations between estrogen receptor α gene polymorphisms, bone turnover and BMD in Polish male population.

Materials and methods: Data for 192 men (50–70 years old), from the EPOLOS program (random sample of Polish population) were used. Exclusion criteria included cancer, fracture during the last year, and overweight (>100 kg). BMD measurements of the lumbar spine (L2-L4), total hip, and femoral neck regions were expressed as t-scores (TS). Bone resorption and formation rates were evaluated by serum levels of C-terminal telopeptide of type I collagen (CTX) and osteocalcin (OC), respectively. Genotyping for the estrogen receptor α (ER α) polymorphisms Pvu II and Xba I was done after standard isolation of DNA, using TaqMan type primers and real-time PCR.

Results: The distribution of alleles was in agreement with Hardy-Weinberg equation and did not differ from values published elsewhere for European population. Association between Pvu I and Xba I and bone density was not found for the whole group, but only for the subgroup with obesity - the BMI above 30, where for both polymorphisms the PP and XX homozygotes showed higher densitometric values for all 3 localizations than pp and xx homozygotes, but with limited significance due to a low numerosity ($n=53$) of this subgroup. Both genotypes taken together were good predictors of obesity (logistic regression, $p=0.00097$). Subjects having simultaneously both CTX and OC levels in their top quartiles, were specified as an elevated bone turnover (EBT) as opposed to the rest of the group. Men with EBT had significantly lower TS values of their BMD measurements for L2-L4 (-1.23 vs. -0.26 $p=0.0015$), femoral neck (-0.70 vs. -0.05 $p=0.0022$), and total hip (-0.34 vs. 0.45 $p=0.0004$) than the remaining subjects. They also had significantly lower BMI value (25 vs. 28 ; $p=0.00021$).

Conclusion: We have shown the effects of a network of mutual associations between the polymorphic variants of the ER α gene, bone metabolism and energy metabolism. Investigating of such associations at molecular level might prove beneficial for preventing osteoporosis and possibly obesity in a neglected male population.

Funding: EPOLOS, and Medical University of Warsaw statute fund, for genotyping.

P425

ANTIFRACTURARY EFFECT OF COMBINED TERIPARATIDE AND DENOSUMAB TREATMENT IN A PATIENT WITH SYSTEMIC MASTOCYTOSIS AND SUCCESSIVE VERTEBRAL FRACTURES

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Systemic mastocytosis (SM) is a rare cause of secondary osteoporosis. Up to 51 % of patients with SM have bone involvement, with 37 % presenting osteoporotic fractures. Standard treatment of osteoporosis secondary to SM consists on bisphosphonates, although treatment of SM with interferon 2b β has shown an effect on bone density and fracture risk. However, the most efficacious osteoporosis treatment as measured by evolution of BMD consists in combination of teriparatide and denosumab. One unique report has described teriparatide use in 2 patients with osteoporotic fractures resistant to bisphosphonates in the context of SM, with good antifracture effect. No case report on denosumab has been published to our knowledge.

Case description: We present a case of severe osteoporosis in an 85 years old man addressed because of multiple successive

spontaneous vertebral fractures (9 in 3 months). Bone densitometry at the time of first fractures showed vertebral and hip osteopenia (minimal T-score -1.9 SD in lumbar spine and left femoral neck). Because of the severity of the osteoporosis in the absence of risk factors excepted for age, extended research of secondary causes was performed and showed persistent high tryptase values (48.5 $\mu\text{g/l}$ and 49.1 $\mu\text{g/l}$; $N < 13.5$ $\mu\text{g/l}$), suggesting the SM diagnosis. The patient developed skin pruritic lesions which are being investigated. Bone biopsies effectuated on the same time as vertebroplasties showed CD25+ mast cells aggregates of up to 10 cells. Because of the recurrence of vertebral fractures, we considered it as a case of severe osteoporosis and a combined treatment of teriparatide 20 μg s.c. q.d. and denosumab 60 mg twice a year was started. Since the introduction of the treatment 8 weeks after the occurrence of last vertebral fracture, till now, 9 months later, our patient did not present any more vertebral fracture. A follow up bone densitometry will be effectuated 1 year after the beginning of the treatment. Surveillance of tryptase values under treatment did not show any evidence of progression of mastocytosis.

Conclusion: We first describe here the use of the combined teriparatide-denosumab treatment in a case of secondary osteoporosis probably due to systemic mastocytosis. Although our patient developed 9 spontaneous vertebral fractures in 3 months, he did not present any more fracture since the introduction of the treatment 9 months ago. A combined treatment is to be considered in the presence of severe osteoporosis with multiple fractures.

P426

SUN EXPOSURE, SKIN COLOR AND VITAMIN D STATUS IN SAUDI ADULTS AND CHILDREN

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Background: Accumulating evidence suggests an increased prevalence of vitamin D deficiency in the Middle East and North African countries. Sunlight has long been recognized as a major provider of vitamin D. Exposure of skin color was associated with better vitamin D status. In this context, we aimed to determine whether 25-(OH) vitamin D levels is related to skin color, sun exposure and gender among healthy Saudi children and adults.

Methods: A total of 808 Saudi children and 561 adults of both genders were included in this study. Levels of sun exposure and skin color were determined using a standard questionnaire. Anthropometry and serum 25-(OH) vitamin D were analyzed.

Results: On the basis of duration of sun exposure (< 20 min vs > 20 min), a significantly low level of 25-(OH) vitamin D (40.9 ± 1.2 vs 35.5 ± 1.8 ; $p < 0.019$) was demonstrated only in dark skinned boys with exposure time less than 20 min. In addition, insignificantly higher levels of vitamin D were observed among girls of younger age and older females exposed to sunlight > 20 min (age 14.7 ± 0.2 versus 14.9 ± 0.2 years; BMI 22.4 ± 0.4 versus 23.2 ± 0.3).

Conclusions: No significant difference were observed in serum 25-(OH) vitamin D levels in adults and children based on skin color and gender. Racial differences, sun exposure time and gender are possibly not related to the circulating vitamin D levels.

P427

PREVALENCE OF SARCOPENIA IN HONG KONG CHINESE GERIATRIC HIP FRACTURE PATIENT AND ITS CORRELATION

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Sarcopenia and osteoporosis are age-related declines in the quantity of muscle and bone respectively. Both contribute in disability, fall and hip fracture in elderly. They impose significant costs on health care system. We report the Relative Skeletal Muscle Mass Index (RASM) in this group of patient and its correlation with other factors.

Method: We included all geriatric (≥ 60) primary hip fracture patient admitted to Caritas Medical Centre, which account for around 20 % of total geriatric population in Hong Kong. Anthropometric measurement, hand grip strength and body composition measurement using DXA were performed after admission.

Result: There are 239 patients (72 men and 167 women) included in the current study. The mean age is 82. By stratifying in male and female, the mean hand grip strength are 20.6 and 13.6 kg, the mean body weight are 54.1 and 48.9 kg, the mean RASM are 5.72 and 4.87 kg/m², the hip BMD are 0.696 and 0.622 g/cm². The prevalence of sarcopenia based on ARSM according to the AWGS definition is 93.1 % in male and 77.2 % in female. Using linear correlation, for male patient, RASM is positively correlated with hand grip strength, body weight, hip BMD, BMI and total fat mass. For female, RASM is positively correlated with hand grip strength, body weight, body height, BMI and total fat mass. All are statistically significant.

Conclusion: The prevalence of sarcopenia based on RASM is very high in geriatric hip fracture patient, and it is much higher than community dwelling elderly. Sarcopenia is positively

correlated with hand grip strength, body weight and total fat mass. Apart from the need to prescribe specific osteoporosis medicine in geriatric hip fractures, sarcopenia screening and treatment should be addressed. Treatment of both sarcopenia and osteoporosis is essential to reduce subsequent fall, subsequent fracture and the fracture-related complications and economic burden.

P428

VITAMIN D STATUS IN SAUDI SCHOOL CHILDREN BASED ON KNOWLEDGE

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The prevalence of vitamin D deficiency in the kingdom of Saudi Arabia is rising unexpectedly in every age group. Apart from several risk factors, the lack of awareness is posing a serious threat for low vitamin D levels in children as well. The aim of our study was to compare the knowledge and status of vitamin D in Saudi school children.

Methods: Saudi students, 1188 boys (15.1±2.2 years) and 1038 girls (15.1±2.0 years), were recruited and a predesigned questionnaire with regards to knowledge about vitamin D was administered. Blood samples were collected and serum 25 hydroxy vitamin D (25(OH)D) was measured.

Results: A significantly higher percentage of boys answered correctly than girls regarding knowledge questions as sun exposure ($p=0.002$, and 0.011), breastfeeding ($p<0.001$) and diseases ($p<0.001$). The percentage of girls was significantly higher who thought that fruits and vegetables are not rich sources of vitamin D (24.7 % girls vs. 15.4 % boys; $p\leq 0.001$ and 29.6 % girls vs. 20.9 % boys $p\leq 0.001$), respectively. Boys had a higher prevalence and frequency of sun exposure than girls ($p<0.001$ for both). Girls showed a significantly higher percentage of sunscreen use and full covering during sun exposure ($p=0.001$ for both). Vitamin D deficiency was significantly higher in girls than boys (47.0 % vs. 19.4.0 %; $p<0.001$). Vitamin D status in boys was significantly higher than girls ($p<0.001$). In girls, those who answered correctly about vitamin D related disease ($p=0.03$) and sources ($p=0.015$), demonstrated significantly higher vitamin D levels.

Conclusion: The awareness of vitamin D and sunlight in children needs to be improved by provision of trained physicians and school teachers. Creating more areas where girls can uncover freely during routine works and outdoor activities will help increase their vitamin D levels.

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BONE HEALTH IN DIALYSIS PATIENTS

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Chronic kidney disease (CKD) is an increasing health burden worldwide. A common complication of CKD is its detrimental effect on bone metabolism as reflected by an increased likelihood of fractures, but also its negative effect on cardiovascular morbidity and quality of life. The study presented here evaluates the bone metabolism in dialysis patients at a large university hospital. BMD was assessed at the spine, the hip and the distal radius. All patients had a lab sampling and an interview to record fracture status and musculoskeletal pain. Study endpoint was the analysis of a potential association between BMD, fracture status and bone markers.

Methods: This study included 72 dialysis patients (44 men, 28 women) with 47 on peritoneal dialysis and 25 on hemodialysis. The average age was 58±15 years, the mean dialysis duration 46±40 months. The BMD was measured by DXA (Lunar Prodigy GE). Biometric data like age, sex, BMI, duration of dialysis, numbers of kidney transplantations and comedication were collected. The biochemical analysis included total calcium, ionized calcium, phosphate, alkaline phosphatase and serum levels of PTH and 25-OH- vitamin D. All patients were interviewed regarding musculoskeletal pain and prevalent fractures.

Results: The fracture prevalence was 22.2 % ($n=16$; vertebral fractures $n=2$). Fractures were associated with a low bone density (Z-score) at the ultradistal ($p=0.006$) and the total radius ($p=0.022$). There was no correlation of fractures and the DXA results at the hip and spine. According to radial DXA, 52.3 % of the patients had a T-score below -2.5 SD. BMD was negatively correlated to the time on dialysis ($p=0.005$), age ($p=0.009$), PTH ($p=0.013$) and ALP ($p=0.003$) and positively to the BMI ($p=0.000$). 29.2 % of the dialysis patients reported musculoskeletal pain. Pain was associated with a history of hip fractures ($p<0.0001$) and vertebral fractures ($p<0.0001$), and there was a significant negative association with BMD results at the ultradistal radius ($p=0.004$) and the total radius ($p=0.003$).

Conclusion: According to our findings, DXA scans of the radius are suitable for predicting fracture risk in dialysis

patients. Musculoskeletal pain is associated with a low bone density and may be an early predictor for fracture risk.

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BMI, PAIN AND FUNCTION IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Purpose: To evaluate the relationship between BMI and pain and function in patients with knee osteoarthritis (KOA) undergoing multiprofessional clinical treatment.

Methods: 38 patients (4 men and 34 women) aged 47–83 years old (mean 63.2 years) in usual treatment for KOA for more than 3 months, i.e., oral diacerein and analgesics (according to pain), orthotics (when indicated) were selected for a 2-day 2 months apart multiprofessional (medical, nutritional, psychological, physical and occupational therapy, physical educator and social workers) educational program on osteoarthritis. X-rays were performed to classify the OA degree (Kellgren & Lawrence - K&L). All patients were evaluated at baseline (1 month prior to first class) and at 6 months (3 months after the second class) with height, weight (BMI estimation), and asked to complete WOMAC, Lequesne, and visual analogue pain scale questionnaires.

Results: 8 patients had grade I (K&L), 11 grade II, 13 grade III and 6 grade IV. The results regarding change in VAS, WOMAC pain, WOMAC and Lequesne did not correlate to the initial degree of osteoarthritis. There was no significant BMI variation in this study (average -0.2 , $SD=0.22$, range -4.9 , 2.7). The higher the initial BMI, the lower the improvement in pain (Spearman test, $p=0.03$). Pain did not improve significantly ($p=0.2$). Function improved ($p<0.001$) in inverse ratio to the initial BMI. However, the group that decreased BMI tended to improve pain and function and the group that increased BMI tended to improve pain and function (Kruskal-Wallis test, not significant).

Conclusion: BMI determines how patients will improve pain and function.

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ANALYSIS OF ANTHROPOMETRIC MEASUREMENTS AND DIETARY INTAKE IN PATIENTS UNDERGOING A MULTI-PROFESSIONAL PROGRAM OSTEOARTHRITIS TREATMENT (PARQVE - PROJECT ARTHRITIS RECOVERING QUALITY OF LIFE BY MEANS OF EDUCATION)

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Purpose: To evaluate the effect of the care and educational multi-professional treatment in patients with knee osteoarthritis (KOA) by anthropometric measurements, variation of percentage of body fat, and questionnaires and correlate results obtained.

Methods: 198 patients in usual treatment for KOA were randomized to 4 groups. All groups received a booklet and a DVD with information regarding KOA (causes and treatment modalities). Three groups (1, 2 and 3) also attended 2 days of lectures 1, 2 and 3 months apart, respectively. All groups were divided in subgroups A (bimonthly telephone calls) and B (no telephone calls). All patients were evaluated at baseline and at 1 year for BMI, waist-hip ratio, percentage of body fat, calorie intake, WOMAC, Lesquesne, VAS and SF-36 questionnaires.

Results: The waist-hip ratio showed 89.4 % of android obesity at baseline and 87.9 % at 1 year with no improvement ($p=0.38$). The average percentage of body fat decreased 0.44 from baseline to 12 months, regardless of group or telephone calls. Telephone calls determined lower calorie intake at 12 months on group 1 (1005.4, CI 314.6, 1696.3, $p<0.001$); what was lower than groups 2A (-781.8 , CI -1472.7 , -91.0 , $p=0.008$) and 3A (-885.8 , CI -1599.3 , -172.2 , $p=0.001$). BMI and percentage of body fat correlated with WOMAC, WOMAC pain, VAS and Lequesne scores at baseline and at reassessment. Only changes in BMI correlated with 1-year results of the WOMAC ($r=-0.172$, $p=0.016$), WOMAC pain ($r=-0.193$, $p=0.007$), Lesquesne ($r=-0.197$, $p=0.006$) and SF-36-MCS ($r=0.160$, $p=0.027$); and with changes in WOMAC ($r=0.220$, $p=0.002$), WOMAC pain ($r=0.199$, $p=0.006$), VAS ($r=0.170$, $p=0.018$). Changes in percentage of body fat did not correlate with any of the pain, function and quality of life changes.

Conclusion: The multi-professional treatment improved percentage of body fat at 1 year. This improvement does not correlate with classes, telephone calls or improvements in pain, function and quality of life questionnaires (WOMAC, WOMAC pain, VAS, Lesquesne and SF-36). Calorie intake improved and was influenced by telephone calls and classes 1 month apart, and does not correlate with changes in pain, function and quality of life. Changes in BMI correlated with changes in pain and function but not with quality of life.

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RELEVANCE OF POLYMORPHISM 6 GENE EXAMINATION IN FRACTURE PREDICTION AND ITS VALUE IN PATIENT TREATMENT STRATIFICATION FOR CAPTURE THE FRACTURE PROGRAM

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Project purpose: Six groups of patients with differently located fractures were examined. In particular, a relation of individual polymorphism genes and individual types of fractures were examined. Combinations of polymorphisms were not examined for its statistical insignificance. Polymorphisms were determined in case of 6 genes. LRP5 (Val 667 Met) a LRP5 (Ala 1330 Val) VDR-BsmI, ESR1-PvuII, OPG-1181G>C, SOST- 10565ins GGA. Cohort: 300 patients with primary fracture, n-50 with no fracture as a control group, 5 sets in each group (n-50). Fractures included distal forearm, vertebral column, femoral neck, combination of major osteoporotic fractures and other nonvertebral fractures. Patients treated with corticoids and patients with secondary osteoporosis diagnosis were not included.

Methods: Osteoporosis was diagnosed with DXA (WHO Criteria) and laboratory methods. DNA was isolated by kit MagAttract DNA Blood Mini M48 using automated isolator Biorobot M48(Qiagen) from 200 µl noncoagulable blood samples. Detection of all polymorphisms was carried out by using a method of real time PCR using hydrolysatation and FRET probes on LC 480II (Roche) In gene VDR BsmI polymorphism (rs1544410, G>A substitution), in ESR1 gene polymorphism PvuII (rs2234693, T>C), in LRP5 gene polymorphisms Val667Met (rs4988321) and Ala1330Val (rs3736228), in OPG gene polymorphism (rs2073618, C>G) and in SOST gene polymorphism (10565insGGA). Correctness of the molecular examination results was randomly checked by sequencing on a sequenator (ABI 3130 Applied Biosystem). Mathematical method: The data analysis was performed using the statistical R software in version 3.0.2 (2013-09-05). The Pearson's chi-squared test for independence with the p-value computed by Monte Carlo simulation with 2000 replicates was used for assessing the influence of the presence polymorphisms on the type of fracture.

Conclusion: The data analysis evaluated the influence of the presence of the polymorphism on the type of fracture as statistically significant ($p=0.023$) for the LRP5 (Val 667 Met) polymorphism and found the trend toward significance for the LRP5 (Ala 1330 Val) polymorphism ($p=0.052$). This relation reflects combined osteoporotic fractures and other combined fractures. This relation can affect the stratification of patient medication in the Capture the Fracture program and thus improve therapeutic methods in medicinal and economic aspects.

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MACROELEMENTAL STRUCTURE OF THE SKELETAL BONES IN RATS AFTER 60-DAY APPLICATION OF SODIUM BENZOATE

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Aim: to investigate mineral and macroelemental structure of different skeletal bones after 60-day sodium benzoate intake and to find possibility of correction of the state with mexidol.

Materials and methods: The study involved 175 male rats with body weight of 200–210 g. The first group comprised the intact animals (C group), the second and the third groups comprised the animals that received per os sodium benzoate in dosage of 500 and 1000 mg/kg of body weight for 60 days (B1 and B2), and the fourth and the fifth groups received sodium benzoate and IM mexidol in dosage of 50 mg/kg of body weight (B1M and B2M). All manipulations were performed in accordance with European Convention for Protection of Vertebrate Animals used for experimental and other purposes. Upon expiration of observation terms (3rd, 10th, 15th, 24th, and 45th day), the hip bone, the humerus, and the third lumbar vertebra were prepared for chemical analysis for calcium, phosphorus, sodium, and potassium contents. The data obtained were analyzed by means of variation statistics using standard applied software.

Results: Application of sodium benzoate resulted in demineralization in all the bones taken and dose-dependent imbalance of macroelemental contents. By the 3rd of observation share of minerals in the humerus, the hip bone, and the vertebra in B1 group was lower than that of the control group by 4.69–5.49 % and calcium share decreased by 6.21–7.22 %; sodium and potassium shares increased by 7.39–9.70 %. For B2 group deviations constituted 5.08–6.49 %, 7.25–8.01 %, and 9.03–12.19 % respectively. Alterations and B1 group persisted up to the 15th day of observation and in B2 group - up to the 24th day. Administration of mexidol together with sodium benzoate resulted in restoration of macroelemental contents of the bones as compared to B1 and B2 groups. In B1M group, positive effects of mexidol were registered between the 10th and 45th days of observation and in B2M group - between the 15th and 45th days.

Conclusion: 60-day sodium benzoate intake resulted in demineralization in all bones accompanied by dose-dependent imbalance of macroelemental contents. Application of mexidol had dose-dependent reparative effect on macroelemental contents as compared with B1 and B2 groups.

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HISTOLOGICAL STRUCTURE OF THE MANDIBULAR CONDYLAR CARTILAGE IN RATS OF VARIOUS AGES AFTER 60-DAY EXPOSURE TO TOLUENE VAPORS

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The study is aimed at investigation of histological structure of the mandibular condylar cartilage in rats of various ages after 60-day inhalation of toluene vapors (TV) and administration of thiotriazoline (Th) and Echinaceae Tinctura (ET) as medication.

Materials and methods: The study involved 420 male rats of three ages. The animals were split into the groups: 1st group comprised control animals, the 2nd group comprised the animals that received inhalations of TV in dosage of 10 MPC as a single 5-h exposure per day, 2nd group - inhalations of TV and intraperitoneal Th in dosage of 117.4 mg/ kg, 4th group - inhalations of TV and intragastric ET in dosage of 0.1 mg of active substance per 100 g of body weight. All manipulations were performed in accordance with European Convention for Protection of Vertebrate Animals used for experimental and other purposes. Upon expiration of observation terms (1, 7, 15, 30, and 60 days after toluene discontinue) the frontal sections of the mandibular rami were HE stained and put to light microscopy for measurements of condylar cartilage zones (V. Luzin, 2012). The data obtained were analyzed by means of variation statistics using standard applied software.

Results and discussion: By the first day after toluene discontinue, width of subchondral osteogenesis zone, and amount of primary spongiosa and number of osteoblasts in it in young animals decreased in comparison with the control group by 10.27, 9.23 and 10.64 %, respectively; in adult animals the same values decreased by 7.06, 8.75, and 7.05 %; in old animals those values decreased by 9.01, 5.32, and 6.78 %, respectively. In readaptation period, in young animals the cartilage restored by the 30th day, in adult animals alteration persisted up to the 60th day, and in old animals restoration of the cartilage was not observed. Administration of Th or ET resulted in restoration of structure of the condylar cartilage. After application of Th, restoration of bone formation in young animals was observed in the period from the 1st up to the 30th day, in adult animals - from the 1st up to the 60th day, and in old animals - from the 7th up to the 60th day of observation. After application of ET, restoration of bone formation in young animals was observed in the period from the 1st up to the 30th day, in adult animals - from the 1st up to the 60th day, and in old animals - from the 15th up to the 60th day of observation.

Conclusion: 60-day inhalation of toluene results in inhibition of morphofunctional activities of the condylar cartilage of

mandible. Restoration of activities well depends on age of animals. Young animals exhibited the fastest restoration rate while in old animals restoration rate was lower. Administration of Th or ET resulted in restoration of structure of the condylar cartilage. Th appeared to be more effective than ET.

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STRUCTURE OF LOWER INCISOR IN RATS AFTER IMPLANTATION OF MANGANESE ENHANCED HYDROXYAPATITE INTO THE TIBIA

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Objective: To investigate structure of lower incisor after implantation of manganese (Mn) enhanced hydroxyapatite into the tibia.

Materials and methods: The study involved 252 male rats with initial body weight of 135–145 g. The 1st group comprised intact animals, the 2nd group comprised animals with 2.2 mm defect in the tibia, and the groups 3–6 comprised the animals with the same 2.2 mm defects filled with biogenic hydroxyapatite enhanced with 0.1, 0.25, and 0.5 % share of Mn. Cross-sections of the lower incisor sampled as a segment next to the second molar tooth were HE stained. Morphometry included measurements of odontoblast layer (OL), predentin (PD), and mature dentin and mesiodistal size (MDS) (V. Luzin, 2011).

Results: A plain defect in the tibia had inhibiting effects on activities of odontoblasts. Peak of alterations was registered by the 60th day when odontoblast layer, predentin and mesiodistal sizes were narrower than of controls by 4.63, 4.23 and 3.10 %. In the 3rd group, alterations in comparison with the 2nd group continued manifesting from the 15th and up to the 90th day. By the 90th day OL, PD and MDL were narrower than 2nd group by 5.26, 4.45 and 2.62 %. Implants with 0.1 % of Mn share had nearly the same effect and few significant differences were revealed. With Mn concentration increase, restoration rate of structure of lower incisor appeared to be higher starting from the 30th day. Maximum value gap between the 3rd and the 5th groups was observed by the 90th day: OL, PD and MDL were wider than those of the 3rd group by 4.93, 3.57 and 4.11 %. Mn share of 0.5 % did not have positive effect on lower incisor structure. What is more, from the 90th to the 180th day OL and MDL were lower than that of the 3rd group. This can be explained as Mn intoxication.

Conclusion: The results obtained show that a plain 2.2 mm defect in the tibia has adverse effects on lower incisor structure. Implantation of pure hydroxyapatite produces manifesting lower incisor structure by the 15th to the 90th days. Application of Mn enhanced implants significantly reduces negative effects of bone fracture on lower incisor structure. Implants with 0.25 % share of

Mn proved to be the most effective while implants with 0.5 % share of Mn produced signs of Mn intoxication.

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EXAMINING THE RISK FACTORS FOR BONE FRAGILITY AMONG OLDER ADULTS WITH AN INTELLECTUAL DISABILITY

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Objective: Osteoporosis has been recognised as a major public health problem due to the psychological, physical, medical, social and economic costs. People with intellectual disability (ID) are known to have a higher prevalence of both osteoporosis and fractures. Identifying specific risk factors that contribute to bone fragility facilitates the improvement of preventative strategies to more accurately assess future fracture risk.

Materials and Method: Data for this paper was drawn from the Intellectual Disability Supplement to The Irish Longitudinal Study on Ageing (IDS-TILDA), a longitudinal study on ageing and ID. BMD was measured by quantitative ultrasound of the calcaneus performed on 578 people with all levels of ID, living in a variety of differing circumstances (independently, community group homes and residential type facilities). Multiple variable logistic regression analysis was performed to determine the significance of risk factors for low BMD.

Results: The prevalence of osteoporosis identified at 40.9 % among this cohort relative to 8 % in the most comparable data from the general population. This is attributed to differences in lifestyle, environmental and physiological factors. Level of ID and age appeared statistically significant regardless of gender. Further significant risk was identified for mobility difficulties, history of fracture and the presence of epilepsy.

Conclusion: Identifying risk factors enables a more accurate ability to target preventative strategies to decrease the possibility of future fragility fractures.

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CORRELATIONS OF SERUM 25(OH) VITAMIN D LEVELS WITH DIFFERENT INDICES OF OBESITY IN TYPE 2 DIABETES PATIENTS ON ORAL ANTIDIABETIC DRUGS: A PILOT STUDY

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Vitamin D insufficiency is more prevalent in obese people and in type 2 diabetes.

Objective: To describe the correlations of serum 25(OH)D as dependent variable with the BMI, waist circumference, weight and fat mass as independent variables in type 2 diabetes patients on oral antidiabetic drugs.

Material and Methods: 100 type 2 diabetes patients participated - 56 men and 44 women. The mean age and diabetes duration of the women was 59 and 9.8 years, of the men 58 and 7.7 years. None of them was taking vitamin D supplements. Serum levels of 25(OH)D were measured by electrochemoluminescence (Elecsys 2010, Roche Diagnostics, Switzerland). Weight, height and % fat mass were measured on a leg-to-leg bioelectrical impedance analyzer Tanita TBF-215 (Tanita Inc., Tokyo, Japan). BMI was calculated and waist was measured. Correlation analysis was performed on a SPSS 13.0 for Windows platform (SPSS Corp., Chicago, IL). The data were first analyzed for the group as a whole and then separately for men and women as well as in the different vitamin D tertiles.

Results: Serum 25(OH)D was negatively correlated only with % fat mass. The best fitting curves were the linear ($R=0.259$, $p=0.014$) and the quadratic one ($R=0.263$, $p=0.045$). There was a tendency for a negative correlation with BMI which was nonsignificant (cubic model, $R=0.146$, $p>0.05$). Waist was not correlated with serum 25(OH)D.

Conclusion: In type 2 diabetes serum vitamin D might be lower in more obese patients with a higher fat mass percentage. The impact of fat-free mass on serum vitamin D levels might be much weaker.

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ASSOCIATION BETWEEN BONE AND MUSCLE LOSS IN AGE-RELATED CHANGES: THE KOREAN LONGITUDINAL STUDY ON HEALTH AND AGING (KLOSHA) STUDY

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Objective: Growing evidences suggest that muscle and bone closely affect each other. Several cross-sectional studies have

shown that BMD is significantly associated with muscle mass. However, little is known about the associations between longitudinal changes of muscle mass and bone mass according to age. The aim of this study was to investigate the relationship between muscle and bone in age-related longitudinal changes.

Materials and Methods: The Korean Longitudinal Study on Health and Aging (KLoSHA) is an ongoing population-based longitudinal study initiated in 2005 in residents aged 65 or older in Seongnam, Korea. BMD and skeletal muscle mass were measured by DXA (Lunar Corporation, Madison, WI). 165 women aged 65–90 years who attended baseline and follow up measures of total hip BMD and whole body DXA were finally included from the original study. Appendicular skeletal muscle mass (ASM) was calculated as sum of the muscle mass in the arms and legs. “Accelerated loss” was defined as BMD loss at least one standard deviation below the mean annual BMD loss (the cutpoint for accelerated loss was -2.35% /year).

Results: Over a mean 3.16 years, a mean percent loss of total hip BMD was -0.94% /years and annual total hip BMD loss accelerated with increasing age. The annual change of total hip BMD was significantly associated with annual changes of leg muscle and ASM ($r=0.200$ for annual change of leg muscle and $r=0.167$ for annual change of ASM, $p<0.05$, respectively). After further adjusting for age, baseline total hip BMD and leg muscle, these significant associations were maintained. Moreover, older age and increased rate of leg muscle loss were significantly associated with “accelerated loss” in total hip BMD. However, baseline leg muscle or ASM were not related with “accelerated loss” in total hip BMD.

Conclusion: Age-related BMD loss was significantly associated with the rate of muscle mass decline. Therefore, maintaining or increasing muscle mass could be a good strategy for preventing acceleration of BMD loss with aging.

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VASCULAR RISK FACTORS FOR DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS

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Diffuse idiopathic skeletal hyperostosis (DISH) is characterized by ossification of different enthesal sites. Several metabolic factors have been suggested to be involved in DISH development. We assessed the prevalence of DISH and its relationship to vascular risk factors in a of patients diagnosed with cardiovascular diseases.

Objective: Among the 194 consecutive patients admitted to the heart diseases, who have visited the Rheumatologic practice in Medical Centre “St. Vrach” for the period 2013–2014 were analyzed.

Methods: Among the 194 consecutive patients admitted to the heart diseases, who have visited the Rheumatologic practice in Medical Centre “St. Vrach” for the period 2013–2014 were analyzed. From them with coronary artery bypass grafting were 16, with heart valve replacement 24, and with congestive heart failure (CHF) were enrolled 154 patients. All patients underwent a rheumatologic examination, blood sample collections, and chest radiographs. BMI, blood pressure, and information about sex, age, smoking habit, and other vascular risk factors were recorded. DISH was established according to the Resnick and Niwayama criteria.

Results: From all patients that were studied 61.3 % were male, the mean±SD age was 71.23 ± 3.91 years and the overall prevalence of DISH was 31.2 %. A logistic regression analysis showed that both age (odds ratio [OR] 3.234, 95 %CI 1.098–4991; $P<0.001$) and obesity (OR 6.71, 95 %CI 2.41–7231; $P=0.001$) were significant predictors of the presence of DISH. An increasing OR for the presence of DISH was found for increasing tertiles of age and BMI. BMI and age directly correlated with the levels of blood glucose, cholesterol and triglycerides.

Conclusion: Diffuse idiopathic skeletal hyperostosis was present in 31.2 % of the patients with coronary artery bypass grafting, heart valve replacement, congestive heart failure. Obese, older individuals and dyslipidemia a higher risk of DISH development.

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COMMON COMPLICATIONS IN PATIENTS WITH SPONDYLOSIS AND DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS

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In patients with spondylosis (SP) and diffuse idiopathic skeletal hyperostosis (DISH) complications often occur. Of them most common and severe are dysphagia, myelopathy and the correlating OPLL and fractures of the spine. These complications develop in different frequency in these two diseases and their research is a necessity for the whole treatment of the patients. The aim of this study is analyzing of the frequency of the complications in patients with DISH and spondylosis and comparing them to patients with ankylosing spondylitis (AS).

Materials and methods: 162 patients with DISH (110 women, 52 men, age 70.36 ± 5.48), 204 with spondylosis

(140 women, 64 men, age 72.4 ± 3.6), 42 with AS (4 women, 38 men, age 41.1 ± 2.4 were assessed as they were hospitalized in Clinic of Rheumatology of the UMHAT Sv. Georgi and private practice in Medical center Sv. Vrach, Plovdiv, Bulgaria). All patients had X-ray administrated of the three parts of the spinal column, KT was made to 85 patients, screening echography was done to 90 patients and DXA was made to 45 patients. The results were analysed

using SPSS Statistics 19 with a level of probability set at a cutoff point of $p < 0.05$.

Results: From the patients with DISH monitored from us the most common complications were the fractures of the (Table 1).

Table 1. Distribution of the number of patients with DISH, spondylosis and ankylosing spondylitis according to the developed complications, $n, p \pm Sp$

Indicators	DISH $n, p \pm Sp$	SP $n, \% p \pm Sp$	AS $n, p \pm Sp$	P1	P2
Dysphagia	$9/7.2 \pm 7.46$	0	$2/4.34 \pm 3.03$	0.001	NS
Myelopathy	$26/20.9 \pm 3.6$	$41/15.1 \pm 2.18$	$5/10.8 \pm 4.62$	0.02	0.01
All fractures	$52/41.93 \pm 2.18$	$91/33.7 \pm 1.2$	$4/8.69 \pm 4.19$	0.05	0.001
Fract. of Th-spine	$21/16.9 \pm 3.38$	$52/19.2 \pm 2.4$	$2/4.34 \pm 3.03$	0.05	0.001
Fract. of L- spine	$29/23.38 \pm 3.8$	$55/20.37 \pm 2.45$	$2/4.34 \pm 3.03$	NS	.01

Conclusion: Dysphagia is seen in 7.2 % of the patients with DISH, it was slightly expressed and yielding to treatment, no operation was needed. Myelopathy occurred 20,9 % of our patients with DISH, affecting mostly the lower limbs. Normally it proceeds with sensory changes (tingling, changes in local temperature, etc.), the motor changes were more slightly expressed. In 5 patients with DISH and myelopathy we have done MRI testing which showed evidence of ossification of the posterior LL. The fractures of the spine are most often seen in patients with DISH ($p < 0.01$), which is authentically more common than in patients with spondylosis and AS, moreover fractures of the cervical spine were only seen in patients with DISH. The fractures are from compressive type and occur in slight trauma and more rarely with no trauma.

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KNEE OSTEOARTHRITIS, PRISHTINA, 2010–2013

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Osteoarthritis is a degenerative disease of the osteomuscular system affecting the world population, including the population of Kosovo presenting a health, social and economic problem.

Aim: To analyze some epidemiological characteristics of the disease and determine the frequency of knee osteoarthritis in rheumatic patients.

Methods: The study includes 1370 patients (82.3 % female) with or without clinical signs of osteoarthritis of the knee joint that were visited in the Family Medicine Center, Rheumatology Cabinet, Prishtina, in the 2010–2013 period. To the same patients, relevant laboratory and radiological examinations and anthropometric measurements were done (BMI). Retrospective data processing (based on gender, age and occupation) and statistical analysis of these epidemiological characteristics is done with the help of the SPSS15 program.

Results: During 4 years, in the Cabinet of Rheumatology, within rheumatic diseases, a total of 1370 (4.7 %) cases with knee osteoarthritis were diagnosed. The majority of patients were female (82.3 %). Average age was 67.6 years (41–87), average weight 74.9 kg (50–120) and average body height 162.7 cm (144–192). The average BMI in females was 27.53 and 26.2 in males. According to BMI greater percentage of women belongs to the Overweight category (60.55 % of cases), to Obese (28.19 %) and to Normal (Healthy Weight) (11.26 %). On the other hand the largest percentage of males with knee osteoarthritis belongs to the Normal Weight category (51.65 %), next in line is Overweight (31.4 %) and finally the obese group (16.94 %). There are no patients belonging to the Underweight category. The percentage of cases with knee osteoarthritis increases with age, especially after the age of 50. 60.5 % of cases with knee osteoarthritis occur after the age of 60. The disease mostly attacks housewives.

Conclusion: The data show that the prevalence of the disease based on sex and age is no different from the values found in the different countries of the world. We have come to the conclusion that timely information of the population on the nature of the disease and on the importance of control of obesity, nutrition and physical activity is the best way of preventing this disease.

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DIFFERENCE BETWEEN THE FUNCTIONAL STATUS OF PATIENTS WITH OSTEOARTHRITIS OF THE KNEE BEFORE AND AFTER TREATMENT

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Arthrosis of the knee is accompanied by chronic pain, stiffness, limited movement, difficult walking often with the help of aids. All these symptoms prevent the patient in performing activities of daily use. Articular cartilage is made up of special collagen fibers that are able to perform depreciation. There are several reasons that lead to the rapid development of degenerative arthritis of the wrist (sports, heavy physical work, joint trauma, excessive body weight, congenital or acquired deformities of the joints, aging, minimal movement). There are various therapeutic modalities that aim to delay and slow the development of joint arthrosis. Objective of the study is to determine differences in functional status of osteoarthritis of the knee affected joints of patients before and after the selected therapy.

Materials and Methods: The study included 120 patients with osteoarthritis of the knee according to ACR criteria. All patients were evaluated by orthopedists, physiatrists-rheumatologists, and all were processed by a single criterion. The mean value of age was 68 years. 80 % of all the patients studied were women and 20 % men. The degree of radiographic changes was estimated for all patients according Kellgren-Lawrence classification. Treatment of patients with osteoarthritis of the knee consisted of applying average No III ampoules 1 % hyaluronate at intervals of 1 week and then applying various modalities of physical therapy (laser th, magnetic Th, electrical th, paraffin th and kinez ith). The functional status of the knee was evaluated before and after treatment using the Oxford knee score, and the degree of pain according to VAS.

Results: 70 % of surveyed patients had stage II radiological changes and 30 % stage III. The average value of pain in the knee before treatment was 8 and 4 after treatment. The mean value of the functional status according to the Oxford knee score before treatment was 22 and 38 after treatment.

Conclusion: Patients treated by applying ia 1 % hyaluronate and then applying physical procedures have a significant reduction of pain in the knee and increase functional status in relation to the period prior to the initiation of therapy.

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FALLS PRESENTING TO THE EMERGENCY DEPARTMENT: THE NEED FOR INTERFACE GERIATRICS AND AN EMERGENCY FRAILTY UNIT

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Falls and falls-related injuries are becoming an increasingly common presentation to the Emergency Department (ED) and lead to a significant number of admissions. Due to our ageing population, frail older adults and particularly those with falls, will continue to utilise a significant portion of ED activity.

Aims: To collect data on patients presenting with falls and fractures to the ED in St. Vincent's University Hospital with a fall/collapse.

Methods: Data was collected on all patients >50 years presenting to the ED over a 23 week period (January 2014 to June 2014) with a history of fall/collapse at triage. Data was analysed to assess length of stay, presence of fracture, type of fracture and outcomes.

Results: 1,412 patients presented to the ED with falls over a 23 week period, with 36.2 % (N=511) requiring admission. Of these, 33.9 % had sustained a fracture. Hip fractures represented the most common fracture type (49.5 %). Fractures were more prevalent in female patients across all fracture types, with the percentage of fractures increasing with age. Average length of stay in the fracture group was 18 days compared with 15.2 days in the nonfracture group, representing 10.2 % of total hospital bed days utilised.

Conclusion: Falls makes up a substantial proportion of overall emergency department presentations and total hospital bed days. Over 10 % of hospital beds are occupied by patients following a fall, or sustained fragility fractures. Planning an efficient falls pathway or targeted service for this patient cohort may improve patient outcomes as well as improving cost-effectiveness [1]. 1. Silvester KM et al., Age Ageing 2014;43:472.

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HAVE OSTEOPOROTIC PATIENTS IN POLAND RECEIVED PROPER TREATMENT RECOMMENDATIONS IF CLINICIANS USED OTHER COUNTRY-SPECIFIC REFERENCES BEFORE POLISH REFERENCE DATA IMPLEMENTATION?

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The FRAX[®] assessment algorithm is widely used for estimating fracture probability. The FRAX calculator was used to evaluate the differences between computed fracture risks for Polish postmenopausal women applying various available country-specific references. The aim of the study was to know which country population references should be used to treat patients properly before polish reference was implemented.

Materials and Methods: A group of 142 postmenopausal women (70.7±8.9 years) were evaluated using FRAX calculator with DXA hip T-scores. Major and hip fractures risks probability was calculated. Country-specific FRAX scores were calculated for 18 countries. Score differences and variability of recommendations for the introduction of pharmacological therapy were computed for 22 analyzed country-specific references.

Results: The mean weight was 63.53±9.83 kg, the mean height 159.33±7.27 cm and the mean BMI 25.79±3.62 kg/m². Mean T-score for femoral neck BMD was -2.13±1.44. No treatment was recommended for 67.6 % women in order to major fractures risk according to Polish reference data. Pharmacotherapy recommendations were qualified for 32.4 % women according to Polish guidelines. 45 % women required pharmacotherapy, according to National Osteoporosis Foundation (UK) but only 9.8 % women if Polish guidelines were considered. Hip fracture risk calculated with Polish FRAX was not significantly different from the risk calculated accordingly to British reference data ($p=0.8972$), Caucasian American ($p=0.7994$) and German ($p=0.6876$) epidemiological data. The Austrian model was significantly different ($p=0.0013$).

Conclusion: Osteoporotic patients, who were assessed before implementation of Polish reference data using UK, Caucasian American and German references, received most appropriate recommendations. Treatment recommendations based on any other references could not be effective for patients in Poland.

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ASSOCIATION OF OSTEOPENIA AND MUSCLE STRENGTH WITH LEVELS OF SERUM 25-HYDROXYVITAMIN D

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Low concentration of serum 25-hydroxyvitamin D (25-OHvitD) have been associated with bone loss, low muscle strength and risk of falls in postmenopausal women.

Aim: To investigate vitamin D concentration, bone density, muscle strength and correlation between serum 25-OHvitD levels and muscle strength in postmenopausal women.

Methods: A group of 33 postmenopausal women between 50 and 60 years who first came to measure bone density were included. We examined: risk factors for osteoporosis, BMI, waist circumference (WC), 25-OHvitD, BMD measured using DXA, muscle strength (MS) measured by proper grip

strength testing with JAMAR® Hand Dynamometer using average score of the three trials and compared to the normative data. The t-test used for continuous variables. Correlations between variables were calculated by the Spearman test.

Results: Our examiners was 56.39±2.83 years old, menopausal duration 6.48±2.67 year, BMI 28.01±3.38 kg/m², WC 89.03±8.05 cm, 25OHvitD 32.46±13.91 nmol/l, muscle strength 28.34±4.25 ponds, BMD 0.862 g/cm² on lumbar spine, BMD 0.668 g/cm² on hip. T-test was statistically significant between muscle strength of examined group measured by grip strength and normative grip strength data per referent range group ($t=-21.654$; $p<0.001$). Level of 25-OHvit D 28.1±14.6 nmol/l was lower in smoker group ($n=11$) but without statistical significant. There was a very weak correlation between serum 25-OHvitD and BMD on lumbar spine ($\rho=0.167$; $p=0.35$) with either BMD on hip ($\rho=0.228$; $p=0.20$). The statistical significant negative correlation between 25-OHvitD and WC, BMI was found ($\rho_{wc}=-0.646$; $p<0.001$) ($\rho_{bmi}=-0.497$; $p<0.003$) while positive statistical significant correlation with MS ($\rho_{ms}=0.447$; $p<0.009$).

Conclusion: Serum 25-OHvitD don't show an impact on BMD in early postmenopausal women. Decreased level of 25-OHvitD was found in postmenopausal women with high WC and BMI, and that low level of vitamin D have negative effect on muscle strength what have negative impact on falls and risk for fracture.

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THE MURAKAMI COHORT STUDY FOR THE PREVENTION OF MUSCULOSKELETAL DISEASES WITH VITAMIN D IN JAPAN

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Objective: The aim of this study was to establish a cohort study of musculoskeletal diseases, clarify the prevalence of vitamin D sufficiency in the Murakami region (latitude N38°13') in Niigata, Japan, and examined demographic, environmental, and lifestyle factors that might be associated with vitamin D sufficiency.

Subjects and Methods: A population-based cohort study on age-related musculoskeletal diseases was conducted from January 2011 to March 2013 in the Murakami region, which included Murakami City, Sekikawa Village, and Awashimaura Village. All 34,802 residents in the Murakami region aged between 40 and 74 years were invited to participate in the study. Of these, 14,390 agreed to participate in the study, and 9,084 provided blood samples. Plasma 25-hydroxyvitamin D

[25(OH)D] concentrations were determined with Liaison® 25OH Vitamin D Total assay (DiaSorin Inc, Stillwater MN, USA). Lifestyle information was also obtained.

Results: The prevalence of vitamin D sufficiency (i.e., plasma 25(OH)D concentration ≥ 75 nmol/L) was 9.1 %, and significant associations were observed with male gender ($P < 0.0001$; OR=2.37, 95 %CI: 1.84–3.05), older age (P for trend < 0.0001), lower BMI (P for trend < 0.0001), higher METs score (P for trend=0.0138), higher vitamin D intake (P for trend=0.0467), summer season (P for trend < 0.0001), longer duration outdoors (P for trend=0.0026), no sunscreen use ($P=0.0135$; OR=1.40, 95 %CI: 1.07–1.82), higher salmon consumption (P for trend < 0.0001), higher alcohol consumption (P for trend < 0.0001), and lower coffee consumption (P for trend=0.0025).

Conclusion: The prevalence of vitamin D sufficiency was low in this Japanese population. A number of demographic, environmental, and lifestyle factors are associated with vitamin D sufficiency, and thus lifestyle modification may present an opportunity to achieve vitamin D sufficiency.

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DROPPING THE BALL AND FALLING OFF OF THE TREATMENT WAGON: FACTORS CORRELATING WITH NONCOMPLIANCE TO SECONDARY FRACTURE PREVENTION PROGRAMS - EXPERIENCE WITH THE OSTEOPOROSIS PATIENT TARGETED AND INTEGRATED MANAGEMENT FOR ACTIVE LIVING (OPTIMAL) PROGRAM IN SINGAPORE

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OPTIMAL is a multicomponent FLS set up in the public hospitals of Singapore, a country with a multiethnic population. The program at SGH, the largest public hospital in Singapore has garnered international attention. We have previously presented descriptive statistics of patients who discontinued the program during follow up¹. The aim of this study is to objectively analyse the factors correlating with noncompliance to the program.

Methods: Review of the Centralized Computerized Recorded Data (CCRD) base of patients.

Results: 980 patients have had 2 year follow up at our hospital. Of the 216 patients who defaulted, 27.3 % found the follow ups too time consuming, 15.7 % found medications too expensive and 15.3 % felt that

osteoporosis was not important. Only 3.7 % quoted fear of side effects as a reason for dropping out. On MV analysis using logistic regression, factors correlating with non-compliance were race, education and type of fracture with non-Chinese more likely than Chinese [2.32 (1.353–3.977)], patients with secondary school and above education less likely than those with primary school and below education [0.571 (0.359–0.910)] and those with nonvertebral and/or multiple fractures more likely than those with spine fractures [1.562 (1.128–2.162)] to be non-compliant.

Discussion: It is critical whilst running fracture care programs to look back and evaluate why patients could have “fallen off of the treatment wagon”. It is vital that factors contributing to non-compliance be explored and the fracture cascade be disrupted. In the light of recent concerns about side effects of osteoporosis medicines and the worry amongst physicians that this fear may be a deterrent to patients, it was reassuring to note that very few dropped out of our program because of such fears. Those interested in developing FLSs may find it interesting that educational level played an important role in compliance and that the majority of the patients who dropped out of the program opined that it was because it was too time consuming. FLSs should be tailored such that they are not too labour intensive for patients and counselling and follow up should be meaningful and be understood by educated and uneducated alike.

References: Chandran M, Huang XF, Tan M. ASBMR. September 2014, Houston, Texas

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CORRELATION BETWEEN OSTEOCALCIN AND GLYCATED HAEMOGLOBIN IN PATIENTS WITH DIABETES MELLITUS

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Objectives: Assess whether there is correlation between serum osteocalcin (OSC), and hemoglobin glycosylated (HbA1c) in patients with type 2 diabetes mellitus (T2DM).

Materials and methods: We selected 143 patients (99 men and 44 women), which came to control his

T2DM in the service of Endocrinology of the National Police Hospital of Guayaquil No. 2 during the period of January 2013 to December 2014. We measured serum ionic calcium, creatinine, fasting glucose levels, hemoglobin glycosylated, osteocalcin, D-pyrilinks, PTH and vitamin D. We used a linear correlation analysis to calculate the coefficient of Pearson. The analysis of the data was performed using computer support, using the software EPIDAT v.4.1 for Windows.

Results: In the total Group found a negative correlation between OSC and HbA1c: $r=-0.30$ (95 % CI :-0, 444 / -0.145); to adjust by sex this negative correlation was kept: men $r=-0.293$ (IC 95 %:-0.463/-0.101) $p=0.003$; and in women $r=0.359$ (IC 95 %:-0,592/-0,069) $p=0.017$.

Table 1: Main characteristics of participants

	Men (n=99)	Women (n=44)	All patients (n=143)
Age	60.77±11.41	63.72±12.31	61.68±11.73
OSC (12–41 ng/mL)	19.16±9.75	17.32±12.24	18.66±10.49
HbA1c %	7.09±2.36	7.42±2.45	7.19±2.34
OSC vs HbA1c	$r=-0.29$	$r=-0.35$	$r=-0.30$

Conclusions: Our data show that there is a negative correlation between OSC and HbA1c. This correlation is maintained in both sexes. The OSC may be a marker of metabolic control in patients with diabetes mellitus.

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ANTIRESORPTIVE THERAPY IS SOMETIMES “TOO LATE”

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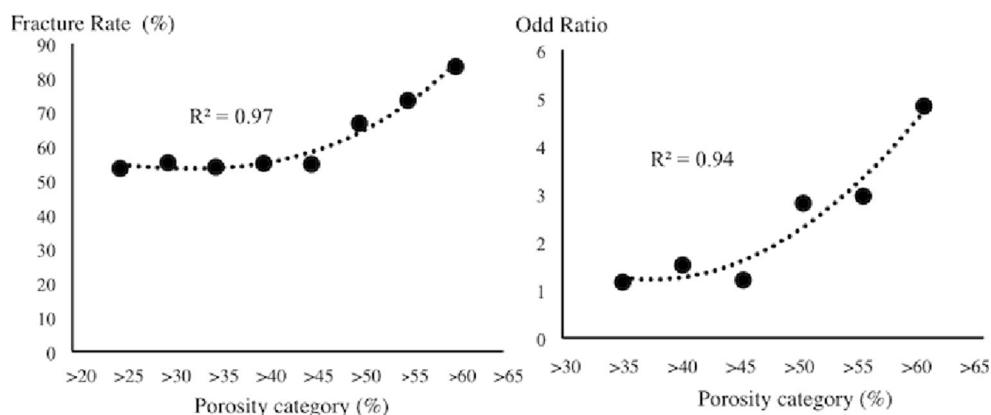
Objective: The aim of treatment of bone fragility is to prevent fractures. Antiresorptive therapies reduce nonvertebral fracture (NVF) risk by only 20 % despite compliance with therapy. Antiresorptives reduce the ever present but focally reversible deficit in mineralized bone matrix volume produced by the delay in onset and slow deposition of osteoid and even slower secondary mineralization; they do not restore deteriorated microstructure present at the onset of treatment. About 80 % of bone is cortical, 70 % of all bone loss is cortical of which most is lost by intracortical remodeling which produces porosity, a ‘footprint’ of structural decay that is an independent predictor of fractures. We therefore hypothesized that there is porosity value above which treatment does not reduce fracture risk.

Material and Methods: We studied 69 postmenopausal women; 37 sustained a NVF despite compliance with therapy; 32 remain fracture free during therapy. They were matched by age (71.2±1.2 vs. 73.6±1.6 years), type and duration of therapy (5.3±0.6 vs. 4.7±0.8 years). Images of the distal radius using HR- pQCT were quantified using StrAx1.0. The groups were stratified according to compact-appearing cortical porosity of >25, >30, >35, >40, >45>50, >55 and >60 %.

Results: Fracture prevalence did not differ in groups with compact-appearing cortical porosity of 45 % or less. Above this, fracture prevalence was higher at higher levels of porosity ($R^2=0.97$; $p<0.0001$), and was 66.7 %; 1.6-fold higher, than in those with porosity <45 % (41.6 %) ($p=0.05$). The OR increased exponentially to 2.8 in patients with porosity >45 % (as reported in untreated women; Bala JBMR 2014;29:1356).

Conclusion: We infer that a porosity >45 % signals a level above which antiresorptive therapy may be ineffective. This calls into question the use of antiresorptives as first line therapy in all subjects.

Conflict of interest: RZ, ES and AGZ are inventors of StrAx1.0 and shareholders of Straxcorp PTY LTD



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EFFECT OF VITAMIN D THERAPY ON BONE MINERAL DENSITY AMONG PATIENTS WITH DIABETIC NEPHROPATHY: A RANDOMIZED, DOUBLE-BLIND PLACEBO CONTROLLED CLINICAL TRIAL

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Objective: To determine the effect of vitamin D given to patients with early diabetic renal disease on BMD and BMC which were measured as secondary outcome variables in a randomized controlled trial.

Materials and Methods: Patients with early diabetic nephropathy were recruited. Selected patients were allocated to two groups by Block randomization method. Treatment group received 50,000 IU of vitamin D3 intramuscularly and the control group was given an equal volume of distilled water (0.25 mL) monthly for 6 months. Blood and urine were collected at the baseline for biochemical analyses and BMD and BMC in the total body, lumbar spine (L1-L4) and proximal femur were measured by DXA. After 6 months all the measurements done at the baseline were repeated. When the trial period of 6 months was over, a randomly selected subgroup of patients (total of 50 and 25 from each group) was followed up for further 6 months and another DXA testing was performed.

Results: Of 155 patients invited, 85 were randomly assigned to two groups. No significant differences were found between treatment and control groups at the baseline. After 6 months, the treatment group total body BMD, total body BMC and BMDs of spine, femoral neck and total hip regions increased by 2.0, 2.2, 1.8, 2.1 and 2.6 % ($P < 0.05$ for all within-group differences), respectively. Increase observed in the BMD measurement in the trochanteric region was not statistically significant among the patients in the treatment group. In the Control group, BMD or BMC of any region mentioned above did not change significantly during the initial 6 months ($P < 0.05$ for the between-groups differences). Furthermore, there was no significant difference in either total fat or lean mass in any of the groups before and after treatment. After 6 months of stopping treatment, a statistically significant reduction of total BMD and BMC was observed in the treatment group ($P = 0.009$). In the same group, changes in the regional BMDs were not statistically significant. In the control group none of the BMD/BMC measurements changed

significantly during the post-trial follow up 6 months period.

Conclusion: The improvements of total body BMC, total body BMD, BMDs of spine, femoral neck and hip were statistically significant among vitamin D treated patients compared to patients in the control group. Six months after stopping treatment the improvement in the regional BMD remained unchanged while only a marginal loss was observed in total body BMD and BMC.

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RELATIONSHIP BETWEEN DATA OF BONE MINERAL DENSITY AND IMMUNE INFLAMMATORY IN WOMEN WITH OSTEOPOROSIS AND IHD

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Aim: To evaluate the relationship between the BMD and the level of cytokines in women with osteoporosis and ischemic heart disease (IHD).

Methods: 98 women with IHD were examined. The patients were divided into 2 groups: group 1, $n = 60$ (mean age 68.7 ± 8.8), patients with IHD and osteoporosis; group 2, $n = 38$ (mean age 69.4 ± 8.1) patients with IHD. BMD was studied in 2 areas: the lumbar vertebrae and proximal hip by DXA densitometry (Challenger, France). Serum levels of IL-1 β , IL-4, IL-6, IL-8, IL-10, TNF α were determined by ELISA. We used Wald-Wolfowitz criteria for statistical analysis. A correlation analysis was with the help of Spearman correlation. A multifactorial regression analysis was performed for determination of independent determinants of reduction BMD.

Results: Decrease of BMD mean values in L1-L5 was found out in women of group (0.974 ± 0.230 1.031 ± 0.200 $p = 0.00006$). Z (0.59 ± 1.75 0.95 ± 1.27 $p = 0.0000$) and T-score (-0.8 ± 1.6 -0.3 ± 1.2 $p = 0.0004$) indices were lower in the group of patients with comorbid disorders. BMD Neck 0.62 ± 0.16 0.72 ± 0.18 $p = 0.00005$; Ward's area 0.47 ± 0.29 0.56 ± 0.21 $p = 0.0003$; Total hip 0.80 ± 0.16 0.86 ± 0.15 $p = 0.0000$, Z (Neck 0.67 ± 1.31 0.91 ± 1.41 $p = 0.0000$; Ward's area -0.67 ± 1.92 -0.14 ± 1.54 $p = 0.00009$; Total hip 2.7 ± 1.4 3.3 ± 1.7 $p = 0.0002$) and T-score (Neck -0.78 ± 1.59 -0.74 ± 1.78 , $p = 0.0000$; Ward's area -2.1 ± 1.9 -1.6 ± 1.5 , $p = 0.001$; Total hip 0.94 ± 1.66 1.19 ± 1.45 , $p = 0.0000$) were found to be significantly lower in women with IHD comorbid with osteoporosis than in women with isolated IHD. The serum level of IL-1 β , IL-4 was similar in the examined groups. Increased levels of IL-6 (4.67 ± 7.17 vs. 5.55 ± 5.27 $p =$

0.0005), IL-8 (29.0 ± 33.3 vs. 31.74 ± 40.9 $h=0.0000$), TNF α (3.11 ± 3.35 vs. 3.32 ± 3.15 $p=0.008$), IL-10 (7.25 ± 12.52 vs. 9.9 ± 17.42 $p=0.01$) were observed in women with comorbid disorders. BMD of lumbar spine was inversely correlated with the levels of IL-1 β ($r=-0.65$, $p=0.00014$), IL-8 ($r=-0.68$, $p=0.00006$), TNF α ($r=-0.53$, $p=0.003$), femoral neck BMD was inversely with the level of IL-4 ($r=-0.55$, $p=0.002$), IL-6 ($r=-0.4$, $p=0.03$), IL-8 ($r=-0.58$, $p=0.001$), TNF- α ($r=-0.64$, $p=0.00019$). Independent determinants of low BMD in the femoral neck was IL-6 ($\beta=0.93$; 95 %CI, 0.008, 0.011; $p=0.025$), and low BMD of lumbar vertebrae was IL-1 β ($\beta=0.72$; 95 %CI 0.22, 0.3; $p=0.015$).

Conclusion: Women with comorbid disorders show increased levels of IL-6, IL-8, TNF α , IL-4, IL-10. There was a negative relationship between the levels of IL-1, TNF α , IL-8, and BMD of the vertebrae; the concentration of IL-4, IL-6, IL-8 and TNF α was inversely related to hip BMD. An independent factor in the reduction of BMD at the femoral neck is IL-6, in the lumbar vertebrae IL-1. The findings show the relationship between increased levels of cytokines and decreased BMD in postmenopausal women with osteoporosis and IHD.

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PREVENTION OF OSTEOPOROSIS USING INNOVATIVE BIOLOGICAL-DMARD-THERAPY IN RHEUMATOID ARTHRITIS. RESULTS OF A PROSPECTIVE 5-YEAR ANALYSIS OF PATIENTS WITH RHEUMATOID ARTHRITIS UNDER TOCIZUMAB (AN INTERLEUKIN-6 RECEPTOR ANTAGONIST) MONOTHERAPY

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Objective: Although tolicizumab (TCZ) leads to rapid clinical improvement in rheumatoid arthritis (RA), a residual rheumatic activity can still be detected, therefore carrying the risk for bone fractures. TCZ is beneficial for bone remodeling and might be useful to prevent RA related bone fractures. The aim was to analyze the effect of TCZ on bone remodeling in severe RA.

Methods: 50 RA patients treated with TCZ as monotherapy since 2008 were prospectively analyzed. Ultrasound and DAS28 were performed at baseline and every 4 weeks. Lab parameters for bone metabolism, protein diagnostics and MRI were performed at baseline and every 6 months. Once a year CT/DXA scan were performed.

Results: In all patients (age 20–72 years) DAS28 normalized by the 3rd infusion cycle and BMD after 1 year. Initial RAMRIS score >5 was reduced to ≤ 2 after 6–18

months. Ultrasound score for synovialitis declined after 8 weeks and after 12 months for tenosynovialitis. At baseline in 22 women with early RA, axial QCT/DXA and lateral DXA values were within reference range. 3 patients with early RA had osteopenia, 2 osteoporosis. 1 patient with manifest RA had BMD in reference range, 3 had osteopenia and 2 osteoporosis. In 6 male patients, BMD was in reference range. 2 men with early RA had osteopenia and 2 osteoporosis. 1 man with manifest RA had normal BMD. 2 men with manifest RA had osteopenia and 4 osteoporosis. 10 patients had vitamin D3 deficiency and treated with vitamin D3. 2 patients with osteoporosis were treated with bisphosphonates.

Conclusion: TCZ treatment led to rapid decline of inflammatory activity in RA, minimized cartilage destruction and showed positive effects on bone remodeling. Thus, the risk for the development of osteoporosis and its related fractures can be minimized. Further, TCZ has positive effects on BMD in manifest RA thus preventing sarcopenia.

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LONGITUDINAL CHANGES OF SKELETAL MUSCLE MASS IN ELDERLY MEN AND WOMEN: THE KOREAN LONGITUDINAL STUDY ON HEALTH AND AGING (KLOSHA) STUDY

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Objective: Sarcopenia, loss of muscle mass, contributes to various adverse health outcomes in elderly. Little information, however, is available about longitudinal changes of muscle mass in elderly. The aim of this study was to investigate the longitudinal changes of muscle mass in men and women older than 65 years and to evaluate the gender difference.

Materials and Methods: The Korean Longitudinal Study on Health and Aging (KLoSHA) is an ongoing population-based observational study initiated in 2005 in residents aged 65 or older in Seongnam, Korea. Body composition was assessed by DXA (Lunar Corporation, Madison, WI) at baseline and follow-up visits. Appendicular skeletal muscle mass (ASM) was calculated as sum of the muscle mass in the arms and legs. 337 subjects (172 men and 165 women) aged 65–93 years who completed baseline and follow up measures of whole body DXA were finally included and mean follow-up duration was 3.16 years. Subjects were stratified into 4 groups according to their ages: 65–69 years, 70–74 years, 75–79 years and 80 years and older.

Results: Annual changes of muscle mass were significantly faster in men than in women for total muscle, trunk muscle and ASM (-4.4 ± 1.6 % for total muscle mass, -2.9 ± 1.8 % for trunk mass and -0.6 ± 1.7 % for ASM in men, -2.6 ± 1.9 % for total muscle mass, -2.2 ± 2.8 % for trunk mass and 0.1 ± 1.8 % for ASM in women, $p < 0.05$, respectively). These gender differences, faster muscle loss in men than in women, were commonly observed in all age groups except group of 80 years and older. In correlations with age, the rates of muscle loss in total body and ASM were accelerated with aging in men ($r = -0.194$ for total muscle and $r = -0.203$ for ASM, $p < 0.05$, respectively). However, in women, there was a gradual loss of muscle mass but the rates of muscle loss remained constant with aging.

Conclusion: In the longitudinal changes of muscle mass, elderly men showed faster loss compared to those of elderly women. Moreover, the rates of muscle loss were accelerated according to aging in men, but the rate remained constant in women.

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PRESENCE OF ARTIFACTS IN DXA SCANS FOR WOMEN OVER 70 YEARS OLD

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Objective: To examine factors affecting the reliability of the analysis results of DXA scans in women older than 70 years.

Material and Methods: The BMD was assessed with DXA by LUNAR Prodigy Advance, GE, USA, 2008 in the Lumbar Spine (LS) (assessment of BMD L1-L4, g/cm²; Z-score L1-L4, SD; T-score L1-L4, Standard Deviation(SD)) and Femoral Neck (FN) (BMD Region Total, g/cm²; Z-score Region Total, SD; T-score Region Total, SD). Standard radiography of the LS in the lateral projection carried out as necessary. Statistical processing was performed using the program Statistika 8.0.

Results: There were examined 214 women aged over 70 years with osteoporosis ($n = 214$, mean age in the examine group was 78.5 ± 8.5 years, BMI (kg/m²) was 43.14 ± 15.6). Vertebra's deformities of the lumbar spine, based on the standard radiography scans or vertebral morphometry scans, were detected in 89 (41.6 %) women; degenerative and focal changes processes lead to additional pathological ossification - Diffuse idiopathic skeletal hyperostosis (DISH or Forestier's disease), osteochondrosis of the lumbar spine, spondyloarthropathy were detected in 162 (75.7 %) women.

The quantity of artifacts (osteoarthritis, congenital or acquired hip dislocation, aseptic necrosis of the femoral head) in the DXA scans of the femoral neck was significantly less and was diagnosed in 10 (4.7 %) women.

Conclusion: FN DXA is more preferable and reliable for women over 70 years than LS DXA. DXA of the lumbar spine is recommended to complement by vertebral morphometry or standard radiography in order to visualize artifacts and improve the reliability of the analysis. Carrying out DXA of the femoral neck allows you to more accurately interpreting the results of the measurement of BMD in women over 70 years for the verification of osteoporosis. The presence of artifacts is not allowed to exactly estimate the BMD's changes in time.

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STUDY OF AGE-RELATED SPINAL ALIGNMENT

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Objective: We examined the alignment of the spine in healthy subjects, in order to provide basic data required for studying low back pain disorders.

Subjects and Methods: The study involved 98 healthy adult women, with a mean age of 59.2 ± 20.1 years. The purpose of this study was explained to the subjects who subsequently provided written consent to participate in the study.

Sagittal plane measurements of the lumbar spine, thoracic spine, and sacral curvature angles, as well as the spine tilt angle, were performed for standing subjects, using the Spinal Mouse spine measurement analyzer.

Results: No age-related differences were observed in the thoracic spine curvature angles; on the other hand, age-related differences were observed in the lumbar spine and sacral curvature angles, as well as in the spine tilt angle. No significant difference was observed between the thoracic spine angles of the adult group and the elderly group; however, the elderly group had smaller lumbar spine and sacral curvature angles, and larger spine tilt angles than the adult group. Moreover, the lumbar spine and sacral curvature angles decreased, and the spine tilt angle increased in 80-year-old subjects.

Conclusion: We were able to identify age-related changes in the spine alignment of healthy adult women. Understanding changes in spinal alignment associated with age will help prevent age-related postural changes and low back pain.

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OSTEOPOROSIS AND SARCOPENIA IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Rheumatoid arthritis (RA) is characterized by the development of erosive polyarthritis, loss of bone and muscle mass, which increases the risk of falls and fractures. The correlation between osteoporosis and sarcopenia in patient with RA requires clarification.

Material and Methods: 156 patients with RA were examined: 83 postmenopausal women (the mean age was 61.7 years) and 73 men (59 years). The control groups consisted of 35 healthy people matched by sex and age. BMD of lumbar spine (L1-L4), proximal hip and body composition (total and regional) were measured by DXA Stratos dR densitometer (DMS, France). Relative skeletal muscle index (RSMI) was calculated as appendicular lean mass (ALM, arms+legs) kg / height (m²), defining sarcopenia as a RSMI ≤ 5.45 kg/m² in women and ≤ 7.26 kg/m² in men (Baumgartner et al., 1998). Statistical analysis was performed using the software package Statistica 7.0 (Statsoft, USA). A *p*-value of < 0.05 was considered to indicate a statistically significant difference.

Results: The BMD reduction to the level of osteopenia/osteoporosis was observed in 83 % of women and 63 % of men with RA. BMD were significant correlated with radiographic stage RA ($r=-0.5$), DAS 28 ($r=-0.4$), HAQ ($r=-0.5$), rheumatoid factor ($r=-0.5$), total protein ($r=0.5$), albumin ($r=0.6$) and the level of 1,25 (OH) D ($r=0.5$). Study of the body composition showed a significant reduction of ALM and RSMI in patients with RA in comparison with healthy controls, whereas there was no significant difference between the groups in fat mass. The prevalence of sarcopenia was 25 % in women and 50 % in men, whereas the control groups

8.7 and 0 %, respectively. RASMI in patients with RA was associated ($p<0.05$) with BMD total hip ($r=0.4$), BMI ($r=0.6$), HGS($r=0.4$), total protein ($r=0.5$) and X-ray stage of RA ($r=-0.4$).

Conclusion: Patients with RA have a significant decrease of BMD, ALM and RASMI in comparison with healthy controls. Sarcopenia was observed in the majority of men (55 %) and 25 % of women with RA. ALM and RASMI had significant correlation with BMD which indicates a possible interdependence between sarcopenia and osteoporosis. A further study of the interdependence between bone and muscle loss in patients with RA will identify new approaches to the treatment of the disease and prevent fractures.

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AGING AND THE OSTEOPOROSIS EPIDEMIC IN CHINA - HOW BONE MINERAL DENSITY AND THE PREVALENCE OF OSTEOPOROSIS CHANGE WITH AGE IN BEIJING AND HONG KONG

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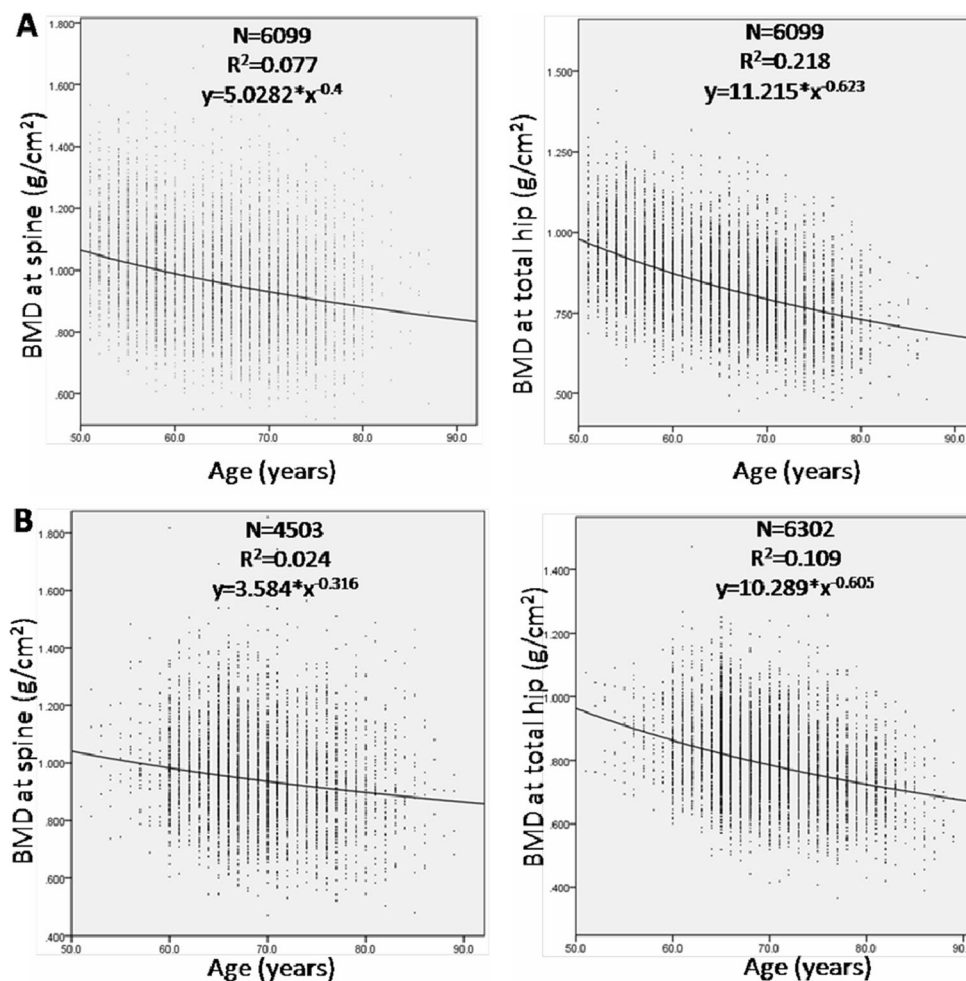
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Background and Objective: Osteoporosis and hip fracture is rapidly becoming a leading health problem in China. The rapidly aging population and increase in the number of old-old subjects will have a high impact on disease epidemically. The objectives of the current study are to compare how BMD at the spine and hip changes with age and anthropometric factors. The prevalence of osteoporosis in different age groups will also be compared. This is the largest comparative study between Beijing (Northern) Chinese and Hong Kong (Southern) Chinese to date.

Subjects and methods: The study included 6099 and 6302 Chinese women recruited from the community in Hong Kong and Beijing. BMD was measured at the spine (L1-L4 level), total hip, and femoral neck by DXA densitometers (Lunar Prodigy models). The relationship between BMD and age in Beijing and Hong Kong women was studied by generating different regression models. The regression model that yielded the largest R² was chosen to represent these relationships. Multiple regression was used to study the effects of adjustment of age, height, and weight on BMD. The prevalence of osteoporosis and osteopenia at the lumbar spine, femoral neck, and total hip or at any 1 site was calculated according to the WHO criteria.

Results: The results showed that women from Beijing had higher weight, height, and BMI. The BMD in Beijing women

at lumbar spine, total hip and femoral neck were significantly higher than those in Hong Kong women.



It was found that the power regression model best represented the relationship. The age-related change in BMD in Beijing and Hong Kong women is shown in Fig. 1. The equations are applicable in describing the relationship between BMD and age in the 2 populations. BMD in Beijing women dropped more with increase in age than that in Hong Kong women.

Table 1. Regression Equations of BMD for Lumbar Spine and Total hip on Age, Height and Weight in Beijing and Hong Kong Women.

	Hong Kong Regression equation	Beijing Regression equation
Spine	$0.667 - 0.0030 \text{ Age} + 0.0004 \text{ Height} + 0.0078 \text{ Weight}$	$0.646 - 0.0042 \text{ Age} + 0.0013 \text{ Height} + 0.0064 \text{ Weight}$
Total hip	$0.832 - 0.0059 \text{ Age} + 0.004 \text{ Height} + 0.0056 \text{ Weight}$	$1.053 - 0.0071 \text{ Age} - 0.0004 \text{ Height} + 0.0050 \text{ Weight}$

The results of multiple regression for age, body weight, and height on BMD at the spine and hip are shown in Table 1. BMD decreased significantly with age in both Beijing and Hong Kong women. The effects of body weight on BMD at all sites were also very significant, with body weight accounting for 10–15 % of the variation in BMD at various sites. The prevalence of osteoporosis increased rapidly with age in both groups, with a prevalence of osteoporosis reaching as high as 45.9 % in Beijing women and 48 % in Hong Kong women aged 80–89 years.

Conclusion: The power regression equation best describes the change in BMD with age in Hong Kong and Beijing Chinese women. The BMD in Beijing Chinese women decreased more with age than Hong Kong Chinese women. The prevalence of osteoporosis increased rapidly with age in both groups, with a prevalence of osteoporosis reaching 46 % women and 48 % in Hong Kong women. With increasing longevity and the number of old-old population in Beijing and Hong Kong, osteoporosis in China will be even a larger health problem in the future.

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CLOSED IMAGE-GUIDED VS. OPEN BIOPSIES IN BONE LESIONS: A RETROSPECTIVE REVIEW OF 987 BIOPSIES PERFORMED ON 912 PATIENTS

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Biopsy is considered to be a milestone in the diagnosis and treatment of the majority of skeletal lesions, since for most such tumours, the appropriate treatment cannot be initiated until the definite and correct tissue diagnosis is available. Closed core-needle biopsy performed under computed tomography (CT) guidance seems to be the gold standard, since it is much easier to perform than the open one, it is well tolerated by the patient, it secures the proper needle position, is accompanied with less morbidity and tumor cells spillage and it costs less. Open biopsy on the other hand provides the pathologist with more tissue and may lead to more secure diagnosis.

Objective: Review of all biopsies (closed and open) performed at our department during the last 11 years in patients suffering from bone tumours and the evaluation of the diagnostic accuracy of the closed procedure.

Methods: We retrospectively reviewed the case notes of all patients who were suffering from bony lesions, were hospitalized at our department and underwent biopsies (either closed or open) during the last 11 years. The necessity for an additional open biopsy following a closed one, the validation of the closed biopsy's result with that of the definite pathology report following the excision of a lesion (when excision was performed) and the complication and morbidity rates accompanying closed and open biopsies were registered and analyzed.

Results: Between December 2003 and December 2014, a total of 987 biopsies were performed on 912 patients (467 female and 445 male) suffering from 197 benign and 715 malignant (330 primary and 385 metastatic) skeletal lesions. Twelve patients were suffering from Giant Cell Tumour. In all 912 patients a closed biopsy under CT-scan image guidance was initially performed. In 75 cases (8.2 %) an open biopsy was deemed as necessary in order to reach a secure diagnosis, due to the insufficient quantity of tissue obtained during the closed biopsy or the necessity to perform additional immunohistochemistry evaluation. In 765 patients, the tumour was operatively excised. The final pathology report of the excised specimen was in accordance with the initial report which was based on the biopsy tissue in 733 cases; in the remaining 32 cases (4.2 %) there was a discrepancy between the two reports. In 27 out of these cases a closed biopsy had been performed. There were no cases of post-biopsy haematomas or infections

in patients who had undergone closed biopsies. On the other hand there were 7 cases of mild postoperative hematomas following open biopsies. In one case a painful neuroma was developed following a closed biopsy of a benign tumour, which eventually necessitated its operative excision. In another case an extrasosseous migration of a primary aneurysmal bone cyst following CT-guided core needle biopsy was developed, which also required surgical intervention (marginal excision).

Conclusion: Closed image-guided core needle biopsy seems to be the gold standard method to accurately and efficiently obtain tissue for pathologic examination for both benign and malignant skeletal lesions (both primary and metastatic). When performed by experienced radiologists, this method is accompanied by very high success rates, less morbidity than the open biopsy and very high rates of diagnostic accuracy.

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THE SAUDI CENTRAL OSTEOPOROSIS REGISTRY (T-SCORE): A KINGDOMWIDE OBSERVATIONAL AND LONGITUDINAL REGISTRY FOR SAUDIS WITH OSTEOPOROSIS

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Epidemiologic evidence points to increased incidence of osteoporosis in KSA. The aim of this research registry is to obtain the incidence, prevalence and patterns of osteoporosis, risk factors, treatment procedures, economic burden and related diseases in KSA. The registry was launched last July 2014 after the completion of the registry website and ethical approval from the College of Science, King Saud University in Riyadh, KSA. Data collection started in several hospitals in Riyadh (central region) but encompasses several regions in KSA as well to enroll Saudi patients with osteoporosis and related diseases based on BMD assessment. The follow-up part of the registry are to be completed at specified times in line with the patient's treatment. A general and validated questionnaire is to be administered to all enrolled patients which contains demographic and anthropometric measurements, family history, medications taken and results from imaging and several bone-related markers. As of January 2015, a total of 501 cases have been registered and is expected to increase since it is on-going. Pilot results will be presented based on the aims of the registry, including FRAX assessment specific to KSA patients.

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EFFECTS OF CHOLECALCIFEROL AND ALPHACALCIDOL ON THE GRIP STRENGTH IN WOMEN WITH POSTMENOPAUSAL OSTEOPENIA OR OSTEOPOROSIS

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Vitamin D (VD) has direct muscle effects, mediated by the specific nuclear receptor (VDR) in the myocyte. VD deficiency is associated with muscle fiber atrophy and decreased muscle force.

Objective: To analyse and compare the effects of cholecalciferol or alphacalcidol administration on the grip strength of women with postmenopausal osteopenia or osteoporosis.

Material and methods: We analysed 80 women with postmenopausal osteopenia or osteoporosis, either naïve to or who have not received vitamin D supplementation in the last 6 months before evaluation. We analysed the serum concentration of 25 hydroxyD (25OHD) to assess the VD status. We measured the grip strength with a portable hand-dynamometer Kern MAP80K1. The patients were randomised to receive cholecalciferol 1000 IU daily or alphacalcidol 1 µg daily, both associated with 500 mg calcium for 6 months.

Results: The subjects were aged between 47 and 83 years old (mean±SD 63.8±8.04 years). The mean baseline 25OHD concentration was 18.41±8.2 ng/ml (mean±SD). A significant proportion of all the cases examined had low grip strength compared to the reference values. Grip strength was significantly correlated with the serum concentration of 25OHD ($p=0.001$). After treatment the serum 25OHD level was 23.93±7.7 ng/ml, significantly higher in cases supplemented with cholecalciferol: 25.24±6.93 ng/ml compared to those treated with alphacalcidol: 16.88±8.61 ng/ml ($p=0.000$). After treatment, grip strength increased slightly but significantly: the mean percentage of change was 6.07 % compared to baseline. The increase was more significant in cases treated with alphacalcidol (8.32 %) compared to those treated with cholecalciferol (3.88 %), ($p=0.000$).

Conclusion: VD deficiency is significantly correlated with decreased muscle force in women with postmenopausal osteopenia or osteoporosis. A medium-term treatment with either cholecalciferol or alphacalcidol increases modestly but significantly the grip strength; the effects are more significant with alphacalcidol treatment.

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PHYSICAL PERFORMANCE IN WOMEN WITH POSTMENOPAUSAL OSTEOPENIA OR OSTEOPOROSIS: EFFECTS OF SHORT-TERM TREATMENT WITH CHOLECALCIFEROL OR ALPHACALCIDOL

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VD deficiency is associated with the atrophy of muscle fibers (predominantly type II). This leads to decreased muscle strength and impaired physical performance.

Objective: To analyse the relationship between the serum concentration of 25hydroxy D (25OHD), balance and physical performance.

Material and methods: We analysed 80 women with postmenopausal osteopenia or osteoporosis. We measured the serum concentration of 25 hydroxyD (25OHD) and the results of the balance Tinetti scale, chair-rise test (CRT) and timed-up-and go test (TUG). We randomised the patients to either cholecalciferol 1000 IU or alphacalcidol 1 mcg daily, for 6 months.

Results: VD deficiency (defined as 25OHD <30 ng/ml) was highly prevalent: overall 90 % of the cases had various degrees of VD deficiency. The balance subscore of the Tinetti scale was significantly correlated (after the correction for age) with the concentration of 25OHD ($p=0.006$). The mean results at the TUG and CRT test were 10.34±3.6 s and 18.89±9.89 s, respectively. They increased after treatment to 9.54±3.28 s and 16.8±8.01sm respectively, ($p=0.000$ compared to baseline) representing a mean change of -5.65 and -5.88 %, respectively. The global Tinetti score also improved by 5.45 % with a larger increment for the balance subscore (6.73 %). This modest improvement was however highly significant ($p=0.000$). The improvement in the balance subscore was more important in the older age groups. In patients over 65 years-old, the improvement of TUG was significantly better in the subgroup treated with alphacalcidol compared to the subgroup offered cholecalciferol ($p=0.04$). No difference was noted in the evolution of the Tinetti score between the treatment subgroups.

Conclusion: VD deficiency are significantly correlated with poor physical performance and impairment of balance. The effects are partially reversible with either VD supplementation or active VD analogs (alphacalcidol).

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BONE MINERAL DENSITY MODIFICATIONS IN ACCORDANCE TO VITAMIN D STATUS IN POSTMENOPAUSAL WOMEN TREATED WITH STRONTIUM RANELATE

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Vitamin D deficiency is widespread and often reported in subjects treated for osteoporosis. Optimal vitamin D repletion was previously shown to maximize the efficacy of antiresorptive agents. To date no information exists about the role of vitamin D in the response to strontium ranelate (StR) treatment. The aim of our study was to investigate the BMD response to StR in relation to change of vitamin D status.

Methods: A retrospective analysis of 108 women receiving StR for postmenopausal osteoporosis was carried. Women were treated with StR (2 g/day), with cholecalciferol (25000 to 50000 IU, monthly) and calcium carbonate as appropriate. Lumbar spine and femoral neck BMD, turnover markers (serum BGP and ALP, urine OH-PRO), and serum 25(OH)D were measured at baseline and after 18 months. All participants were divided into two groups according to the median variation of 25(OH)D over the observation period.

Results: StR was associated with improvement of BMD at lumbar spine (0.81 ± 0.11 vs. 0.88 ± 0.11 g/cm², at baseline and after 18-months, respectively, $p < 0.0001$) and to a less extent at femoral neck (0.62 ± 0.09 vs. 0.63 ± 0.09 g/cm², $p = 0.2$). Only subjects with $\Delta 25(\text{OH})\text{D} > 6.14\%$, reported a significant BMD gain in comparison to baseline (5.2 % (0.2–8.3)) ($p = 0.03$). Change of BMD at femoral neck was positively associated to modification of ALP ($r = 0.28$, $p = 0.01$). This association was not maintained when considering only women with $\Delta 25(\text{OH})\text{D} < 6.14\%$ ($r = 0.28$, $p = 0.09$). At a multiple regression analysis, ALP change was the only predictor of femoral neck BMD modification (β 0.13; SE 0.05; $p = 0.01$).

Conclusion: Improvement of vitamin D status was associated to enhancement of BMD response to StR in women with postmenopausal osteoporosis, in particular at femoral neck.

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ACCUMULATED ONE YEAR HEALTH UTILITY LOSS AFTER SUSTAINING A HIP FRACTURE IN MEXICO

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Objective: Hip fractures are common in older people and incur substantial pain and suffering, disability, increased risk of death and high costs. The burden of hip fractures is expected to grow considerably during next years due to population aging. We aimed to describe the health-related quality of life (HRQoL) and the determinants in patients sustaining a hip fracture in Mexico.

Methods: Data from Mexican patients enrolled in the International Costs and Utilities Related to Osteoporotic Fractures Study (ICUROS) was gathered. Patients had to be diagnosed with a low-energy- induced hip fracture and to be at least 50 years old. HRQoL was prospectively collected in three phases over 12 months after fracture using the EQ-5D instrument. The UK preference weights were used to determine health utility at different times. The accumulated HRQoL loss in the first year after fracture was calculated using the trapezoid method. Multivariate regression analysis was conducted to identify determinants of HRQoL reductions.

Results: 200 patients were evaluated. Mean (\pm SD) age was 77.4 ± 9.9 years. Eighty percent were women. 15.5 % of the sample reported a prior fracture in last 5 years; 54 % had a job before fracture and 78 % were classified into the low level of income category. Mean (95 %CI) utility value before fracture was 0.64 (0.59–0.68). Utility dropped to 0.01 (0.01–0.02) immediately after fracture and then improved to 0.46 (0.42–0.50) and 0.59 (0.55–0.63) at month 4 and 12 post-fracture, respectively. Accumulated utility loss over the first year was 0.35 (0.31–0.39). HRQoL before hip fracture and age at fracture were the two most relevant characteristics associated with the accumulated utility loss.

Conclusion: Hip fractures impair HRQoL in a significant way leading to utility values close to death shortly after fracture. Mean utility value elicited after 1 year follow-up was lower than before sustaining the fracture.

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EFFECT OF AROMATASE INHIBITORS ON BONE MINERAL DENSITY IN PATIENTS WITH BREAST CANCER

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Objective: To assess the effect of Aromatase inhibitors (AIs) on BMD in patients with breast cancer.

Materials and Methods: We have studied 83 patients receiving adjuvant therapy after breast cancer. We have measured BMI, calcium ionized (Ca⁺⁺); lumbar spine (LS) and proximal femur (PF) BMD values were obtained using DXA. DXA

baseline assessment was obtained within 3 months of commencing therapy. Patients were divided in two groups: in group 1 were enrolled 38 patients who experience premature menopause, in group 2–45 postmenopausal women receiving AI. Patients with T-score < -2 started OB (oral bisphosphonate). DXA BMD values were assessed after 24 months of therapy.

Results: After 2 years interval in women with low bone mass and treated with OB - DXA bone loss estimated to 1.6 %, women not treated with antiresorptive agents showed bone loss up to 4.7 % (lumbar spine median loss 4.0 %, total hip median loss 3.6 %).

Conclusion: An aromatase inhibitor (AI) treatment is associated with significant BMD loss (5 %).

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ASSOCIATION OF OSTEOPOROSIS WITH OTHER PATHOLOGY

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Osteoporosis is frequently a silent pathology affect almost all above in the body, not necessarily diagnosis though some patient complaint. Though some patients may present with ill defined, diffuse bone pain, backache, sometimes severe back pain due to osteoporotic vertebral collapse. We studied four hundred sixty six patients, in a period of 4 years, they will subjected to DXA, and prove to have osteopenia or osteoporosis, basically they presented with other pathological process like spinal stenosis (85), disc prolapse (26), spondylolistheses (36), diabetes (41), hypertension (28), degenerative (17). This obviously should be looked for before planning for surgery, particularly instrumentation, moreover the present of osteoporosis may spoil the outcome of spine surgery if not corrected.

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EPIDEMIOLOGY OF OSTEOPOROSIS IN DEVELOPING COUNTRIES

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Osteoporosis - an implicit epidemic of our times - takes the fourth place in noncommunicable diseases spreading rate (after cardiovascular diseases, cancer and diabetes mellitus) and maintains its relevance not only due to the complications associated with it, but also because of the fact that the elderly population of the Earth is steadily increasing. Osteoporosis becomes medico-social problem due to the high rates of its spreading, disease-associated disability and mortality and the costs related to its treatment and rehabilitation. According to WHO data, every third woman and every fifth man over 50

suffers from osteoporosis - that is over 200 million people around the world. Such an accurate data is not available in Georgia, but the numbers are impressive. Density studies confirm that every third woman over 40 and every fifth man over 50 suffer from osteoporosis. This data is determined by many different factors, among which we would like to highlight: genetic factors (Asian or Caucasian race), hormone range, inadequate nutrition, sedentary lifestyle, long-term glucocorticoid intake, intense tobacco and alcohol consumption, low level of public awareness (superstitions of the hormone replacement therapy). Unfortunately, number of undiagnosed cases in the world is 50 out of 100; In Georgia, the number of undiagnosed cases is much larger. Since Georgia is a developing country, it is important to consider many aspects - such as age, occupation, social and economic states of a woman in menopausal period, when deciding if which medicine to prescribe to the certain patient. It is essential to take into account patient's annual income before recommending a drug that should be taken in for a prolonged period. Financial aspect serves as a precondition to the fact that on Georgian market, alendronate sales figures are 3.5 times higher than those of strontium ranelate. Pharmaceutical companies carry out distribution of informational booklets in order raise public awareness in the field of healthcare.

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ASSOCIATION BETWEEN SIX GENE POLYMORPHISMS AND POSTMENOPAUSAL OSTEOPOROSIS IN BELARUSIAN AND LITHUANIAN WOMEN

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Objective: Genetic factors play an essential role in bone mass regulation and predisposition to osteoporosis. Identification of genetic determinants of osteoporosis will help clinicians of various specialties to evaluate the risk of this disease in various populations and to perform preventive measures. We analyzed the frequency of six polymorphisms in three candidate genes to reveal their contribution into development of postmenopausal osteoporosis (PMO) in Belarusians and Lithuanians.

Materials and methods: Case group included women with severe PMO (54 Belarusians, average age 58.3±6.2 years, and 28 Lithuanians, aged 74.1±1.2 years), the control group comprised postmenopausal women with the BMD T-score of > -2.5 and without previous fragility fractures (77 Belarusians,

56.7±7.42 years and 45 Lithuanians, 72.9±0.9 years, $p>0.05$). DNA was extracted from bloodspots dried on special cards (Macherey-Nagel, Germany). Polymorphic sites in candidate genes (osteoporosis predisposition genes, ApaI, BsmI, TaqI and Cdx2 polymorphisms of VDR gene, G2046T polymorphism of COL1A1 gene and T-13910C polymorphism of LCT gene) were determined using PCR analysis. Significance was assessed using χ^2 test. The differences were considered significant at $p<0.05$.

Results: The analysis of samples from Belarusian postmenopausal women revealed association of VDR ApaI, BsmI with PMO. The risk of osteoporosis was 3.3 times higher for the bearers of AA-genotype of VDR ApaI gene polymorphism and 2.6 times higher for B-allele bearers of VDR BsmI, compared to controls ($p<0.05$). The genotyping of Lithuanian women showed that the total frequency of unfavorable risk alleles (predisposing to PMO) in case group (52.1 %) was higher comparing to controls (48.6 %). No statistically significant difference was found between Lithuanian women with PMO and control group. Observed insufficient statistical power may be due to small number of genotyped subjects.

Conclusion: The findings of this study suggest that at least the ApaI and BsmI polymorphisms of the VDR gene are associated with the risk of PMO in Belarusian women. Screening of these genetic markers may enable early identification of risk groups to perform preventive measures and avoid osteoporotic fractures.

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HIGH LEVEL OF ENGAGEMENT OF POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS IN THE TREATMENT WITH DENOSUMAB

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Denosumab is a fully human IgG₂ monoclonal antibody targeting RANKL and inhibiting the osteoclast differentiation, activation and survival. With its specific mode of action, denosumab decreases bone resorption and stimulates bone formation, including improving the stability of trabecular bone. Denosumab significantly reduces the risk of vertebral, nonvertebral and hip fractures. We conducted a local investigation on the adherence of postmenopausal women with osteoporosis to denosumab treatment and then analyzed all factors influencing the regular administration of the product. The investigation was performed in the period 2011–2013 and included women (55–80 years) with osteoporosis from our outpatient clinical practice. Osteoporosis was diagnosed on the base of clinical, radiologic results as well as on DXA measures of lumbar and hip with T-score from -2.5 to -4.5 SD. All patients had at

least 6 months prior therapy with bisphosphonates. Denosumab 60 mg was administered subcutaneously once per 6 months. Control check-ups were performed also at every 6 months. The present study revealed that patients' compliance to the treatment in the first year was 92.4 and 93.2 % in the second year, respectively. In addition, the persistence of the patients in the administration of denosumab was 92.5 % in the first year and 94.7 % in the second year, respectively. With regard to patient adherence, all patients treated with denosumab showed high level of adherence, 90.2 % in the first year and 92.1 % in the second year, respectively. Based on our results we can conclude that postmenopausal women with osteoporosis demonstrated high engagement with denosumab during the whole 2-year- treatment period. Discontinuation of the therapy in most cases was associated with achievement of optimal treatment results and osteopenia.

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ANALYSIS AND CORRELATION OF PHYSICAL THERAPY TESTS, PAIN, FUNCTION AND QUALITY OF LIFE QUESTIONNAIRES IN PATIENTS FROM PARQVE (PROJECT ARTHRITIS RECOVERING QUALITY OF LIFE BY MEANS OF EDUCATION)

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Purpose: To evaluate the effects of a multiprofessional educational and assistance program to patients with knee osteoarthritis (KOA) by means physical tests and questionnaires and correlate results obtained.

Methods: 198 patients in usual treatment for KOA were randomized to 4 groups. All groups received a booklet and a DVD with information regarding KOA (causes and treatment modalities). Three groups also attended 2 days of lectures 1, 2 and 3 months apart. All groups were divided in subgroups A (bimonthly telephone calls) and B (no telephone calls). All patients were evaluated at baseline and at 1 year with Timed up and go (TUG) and five times sit to stand test (FTSST), and asked to answer WOMAC, Lesquesne, VAS and SF-36 scores.

Results: The FTSST improved in average 4.66 s (CI 3.95, 5.36) regardless of the group or telephone calls ($p<0.001$). Baseline and 1-year TUG and FTSST results correlated directly with WOMAC, WOMAC pain, VAS, Lesquesne ($r>0$ and $p<0.05$) and inversely with the Physical (PCS) and Mental components of the SF-36 (MCS) ($r>0$ and $p<0.05$) (Table). No correlation was found between improvements in the FTSST or TUG and any of the changes of the questionnaires.

Conclusion: The multiprofessional treatment improved strength of KOA patients as measured by FTSST. This improvement does not correlate with improvements in pain, function and quality of life questionnaires (WOMAC, WOMAC pain, VAS, Lesquesne and SF-36)

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PREDICTOR OF DIFFERENCES BETWEEN PATIENTS WITH SEVERE HIP OSTEOARTHRITIS AND OSTEOPOROTIC HIP FRACTURES WHO UNDERWENT PRIMARY ARTHROPLASTY

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Osteoporosis and osteoarthritis are frequent diseases in the elderly persons, both in men and women. Hip osteoarthritis is clinical manifestation of the degenerative changes in hip joint and periarticular structures that can lead to functional deficit. Osteoporosis is a progressive bone disease characterized by a decrease in bone mass and density which can lead to an increased risk of hip fracture. Total hip arthroplasty is an efficient treatment for advanced arthritis of the hip and for hip fracture that relieves pain and reduces functional disability.

Objective: To investigate occurrence of differences in age, weight, height and BMI between patients with severe hip osteoarthritis and osteoporotic hip fractures that underwent total hip primary arthroplasty.

Material and Methods: This prospective research includes 81 patients (average age 63.13 ± 10.33 years) of both sexes with a diagnosis of osteoarthritis of the hip (45 patients) and osteoporotic hip fractures (36 patients) who underwent primary total joint arthroplasty. Age, weight, BMI and height were measured for each patient. Student's *t* test and chi-square test and Binary logistic regression were used for statistical analysis.

Results: Differences were statistically significant in both groups for age, weight and BMI ($p < 0.001$), as well as for height and sex ($p < 0.05$). Logistic regression showed that sex was significant predictor of differences between two groups ($p < 0.05$).

Conclusion: These results suggest that there are significant differences between patients with severe hip osteoarthritis and osteoporotic hip fractures who underwent total hip primary arthroplasty. Significant predictor of differences is sex, when controlled by other confounders. These findings are important for improving quality of care of our patients, especially for women, and could be useful in practice and further investigations.

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SERUM CONCENTRATIONS OF OSTEOPROTEGERIN (OPG) AND DICKKOPF-1 (DKK1) POORLY PREDICT BONE MINERAL DENSITY CHANGES AND FRACTURE INCIDENCE IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN

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Osteoprotegerin (OPG) functions has a soluble decoy-like factor for RANKL and thus is a negative regulator of osteoresorption. Dickkopf-1 (Dkk1) is a secreted Wnt signaling antagonist produced mainly by osteocytes and acting as an inhibitor of bone formation. We investigated, in the placebo arm, of a previously published clinical trial assessing the efficacy and safety of strontium ranelate in osteoporosis (OP), the predictive value of baseline serum values of OPG and Dkk1 for changes in lumbar spine (LS), hip (TH) and femoral neck (FN) BMD and for OP fractures (Fx) occurrence. We included 1.084 postmenopausal women with OP (mean age 75.4 years) for whom at least one measure of Dkk1 and OPG at baseline and LS, TH and FN BMD at baseline and after 1 and 3 years were available. DKK1 was determined with the ELISA from Biomedica (Wien, Austria) and OPG with the ELISA from Immunodiagnostik (Bersheim, Germany). In our hands, the precision of these assays was $< 15\%$. Their median (Q1, Q3) values at baseline were 5.1 (4.3–6.5) pg/ml and 147.5 (104.4–205.5) pmol/l respectively. After adjustment for age, menopausal duration, prevalent OP Fx, BMD and BMI at baseline, no association was observed between Dkk1 baseline levels and LS, FN or TH BMD changes after 12, 24 or 36 months. For OPG, the only significant value was a negative relationship ($r = -0.64$; $p < 0.002$) observed between baseline serum concentrations and LS BMD changes after 3 years, with no impact on TH or FN changes. OPG did not predict the occurrence of incident Fx at any skeletal site during the 3-year follow-up while Dkk1 baseline levels were only predictive of the occurrence of major OP Fx: OR (95 %CI), for 1 SD increase at baseline = 1.27 (1.07–1.51). In conclusion, OPG and Dkk1 baseline serum levels poorly predict BMD changes and Fx incidence in a 3-year prospective follow-up of postmenopausal OP women.

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EVALUATION OF BONE HEALTH OF MALE WORKERS IN A RECYCLING FACTORY

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Correlation of baseline physiotherapy test and 1 year with the values the function of scales.

	Correlations	WOMAC	WOMAC pain	VAS	LEQUESNE	SF36 PCS	SF36 MCS
TUG	r	0.263	0.209	0.230	0.294	-0.243	0.223
Baseline	P	<0.001	0.005	0.002	<0.001	0.001	0.002
	N	182	182	182	182	182	182
TUG	r	0.313	0.260	0.274	0.383	-0.267	-0.273
1 year	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	N	182	182	182	182	182	182
Ft SST	r	0.325	0.239	0.245	0.299	-0.333	-0.198
Baseline	p	<0.001	0.001	0.001	<0.001	<0.001	0.023
	N	182	182	182	182	182	182
Ft SST	r	0.0294	0.276	0.177	0.247	-0.280	-0.156
1 year	p	<0.001	<0.001	0.017	0.001	<0.001	0.036
	N	182	182	182	182	182	182

Turkish Osteoporosis Society and Osteoporosis Patient Society of Turkey were invited to Marzinc recycling factory in Karabük which is located in Middle Anatolia region of Turkey. In this region exposure to heavy metal industry is an important health problem. Among workers lack of knowledge caused anxiety and fear concerning their bone health. The aim of this Project in collaboration with these societies and Marzinc was to evaluate the status of their bone health and provide education and awareness about the prevention of osteoporosis, and general information. 110 Labors were evaluated in terms of clinical osteoporosis risk factors by 1-min-Risk Test of IOF, DXA and serum lead, cadmium levels. The mean age of the labors was 31.5 years (21–59). Cigarette smoking was observed in 57 labors (63 %). 30 % of the workers had low bone density. Mean serum level of lead and cadmium were 25.5 mg/100 ml, and 0.5 mg/l, respectively. A specific workshop program was performed including toxic effects of heavy metals on bone, in three interactive groups in the factory. Lifestyle, awareness of vitamin D, calcium, and nutrition, especially the avoiding of smoking seem to be the most important factors to be addressed.

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ELDECALCITOL, A NEW ACTIVE VITAMIN D ANALOG, DECREASED BONE TURNOVER AND INCREASED LUMBAR AND TOTAL HIP BONE MINERAL DENSITY IN RHEUMATIC DISEASE PATIENTS

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Objective: Eldecalcitol is an orally administered analog of new active vitamin D that is available in Japan for the treatment of osteoporosis. It shows stronger effects than alfacalcidol to increase BMD and reduce bone resorption markers in postmenopausal osteoporotic patients, and oral once-daily 0.75 µg eldecalcitol reduced vertebral fracture incidence in a 3-year randomized, double-blind, active-comparator clinical trial. However, it is not yet known about the efficacy of eldecalcitol in osteoporotic rheumatic disease patients. The aim of this study is to evaluate the efficacy and safety of osteoporotic treatment with eldecalcitol in rheumatic disease patients.

Material and Methods: Eldecalcitol was daily administrated to 43 rheumatic disease patients at a dose of 0.75 µg for 24 months. 43 rheumatic diseases were included in 25 rheumatoid arthritis, 5 Sjogren syndrome, 2 systemic lupus erythematosus, 1 systemic sclerosis, 1 dermatomyositis, 3 spondyloarthropathies and 6 osteoarthritis. 24 patients (55.8 %) were treated with prednisolone (mean prednisolone dose was 5.3 mg/day). Lumbar and total hip BMD were measured at 0, 6, 12 and 24 month using DXA. Serum levels of calcium (Ca), phosphorus (P), tartrate-resistant acid phosphatase 5b (TRAP-5b) and bone-specific alkaline phosphatase (BAP), N-terminal propeptide of type I collagen (PINP), intact PTH (iPTH) and urinary type-I collagen crosslinked-N-telopeptide (uNTx) were measured.

Results: The percentage changes from baseline (0 month) in lumbar and total hip BMD were increased in eldecalcitol alone group ($n=19$) and eldecalcitol plus bisphosphonate group ($n=17$) at 6, 12 and 24 month. In addition, Serum Ca was significantly increased at 6 month and TRAP-5b,

uNTx, P1NP and BAP were significantly decreased at 6 month as compared to each biomarker at baseline. In contrast, hypercalcemia was found in 7 patients who have moderate renal dysfunction.

Conclusion: Eldecalcitol was effective in osteoporotic treatment in rheumatic disease patients. Especially, eldecalcitol was also useful for bisphosphonate-resistant osteoporotic treatments. In contrast, hypercalcemia had adverse effects in patients with renal dysfunction.

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ASSOCIATION BETWEEN AGE, ANATOMICAL STAGE, FUNCTIONAL CLASS AND FUNCTIONAL STATUS OF DISEASE IN PATIENTS WITH MODERATELY ACTIVE RHEUMATOID ARTHRITIS AFTER BALNEOPHYSICAL THERAPY

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Objective: To explore relationship between age, disease duration, anatomical stage, functional class and functional status of patients suffering from moderately active rheumatoid arthritis after they underwent balneophysical therapy.

Material and Methods: We performed a retrospective prospective study between October 1, 2010 and February 1, 2014 that involved 90 patients referred to Specialized Hospital for Rehabilitation Bukovička Banja in Arandjelovac. Physical therapy was administered during 24 days. They underwent following procedures: hot or cold clay applied to the affected joints or spine for 1 h, general or local baths, underwater massage, kinesitherapy in pool with mineral water (34 °C) for 30 min, MT10mT 50Hz 30', IFS 1-100Hz for 20 min to the affected joints or spine, group or individual kinesitherapy. Research tools we used were DAS28 and HAQ.

Results: There were 86.7 % women and 13.3 % men with a mean age of 60.01±10.19 years and mean disease duration of 12.95±6.24 years. According to anatomical stage of disease: 3.3 % of patients had stage I, 51.1 % had stage II, 35.6 % had stage III and 10.0 % had stage IV. According to functional class of disease: 2.22 % of patients were class I, 66.7 % were class II, 30.0 % were class III and 1.1 % were class IV. DAS28 was 4.39±0.41 at admission and decreased to 3.43±0.45 at discharge. HAQ improved from 1.36±0.83 at admission to 1.15±0.75 at discharge.

Conclusion: There is no statistically significant correlation between HAQ at discharge and age ($\rho=0.084$, $p=0.430$). We found statistically significant correlations between HAQ at discharge and disease duration ($\rho=0.326$, $p=0.002$) as well as HAQ at

discharge and functional class ($\rho=0.462$, $p=0.000$) and HAQ at discharge and anatomical stage ($\rho=0.253$, $p=0.0016$).

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ASSOCIATION BETWEEN CONCERNS FOR FALLS AND QOL IN ELDERLY JAPANESE WOMEN: A 9-YEAR FOLLOW-UP

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Objective: To clarify whether psychological concerns for falls were associated with decrease in QOL in community-dwelling elderly women through a 9-year follow-up.

Methods: Among the 110 community-dwelling elderly Japanese women at baseline, 82 who were alive at the end of follow-up were examined for a history of fracture, fall-related concerns, and health-related QOL.

Data were collected through interviews using a questionnaire consisting of SF-36 items and a scale for concerns for falls with 3 answer options (“always”, “sometimes”, and “never”). The complete responses to both QOL- and concern-related questions were obtained in 61 women at baseline and end of follow-up.

Results: The mean age of participants at baseline was 72.3±8.5 and 41.5 % had a history of falls during the follow-up. Fall-related concerns were always present in 16 women (26.2 %), sometimes in 28 (45.9 %), and never in 17 (27.9 %).

Women with fall-related concerns at baseline showed significantly weaker grip strength, and more frequent history of fracture, diabetes and hypertension than those without. Women with a history of fracture had significantly lower score only in role-physical (RP) subscale in SF-36 than those without, while there were no differences in the others. Furthermore, on comparison of SF-36 subscale scores between 2005 and 2014, there were no differences in the vitality (VT), social functioning (SF), or bodily pain (BP) score, while a significant decrease was observed in the others.

On the other hand, women with fall-related concerns showed markedly lower score in PF, RP, BP, GH and RE scales at follow-up than those without while no differences were observed in any of these items at baseline. Similarly, significantly greater decrease in PF, GH, and RE scores was observed in those with the concerns than in those without. This association was not observed for history of fractures.

Conclusion: Decreased health-related QOL was significantly associated with concerns for falls rather than history of fractures. Fall prevention seems to be important not only to prevent fractures but also to maintain QOL in elderly women.

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TRABECULAR BONE SCORE IN PATIENTS WITH CUSHING'S SYNDROME: RISK FACTORS FOR FRACTURE IN ENDOGENOUS HYPERCORTISOLISM

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Objective: To evaluate the value of bone microarchitecture as assessed by TBS in patients with endogenous Cushing's syndrome (CS) and to estimate risk factors for fracture in this cohort of patients.

Materials and methods: We enrolled 182 consecutive patients with proven active CS. All patients were interviewed in relation to low-traumatic fractures, underwent lateral X-Ray imaging Th4-L5. BMD measurements at L1-L4, femoral neck and total hip were performed using DXA Prodigy (GEHC Lunar, Madison Wisconsin, USA). Trabecular bone score was retrospectively derived from existing BMD scans blinded from clinical outcome using the TBS iNsight software v2.1 (Medimaps, Merignac, France). Urinary free cortisol (24hUFC) was measured by immunochemiluminescence assay (extraction with diethyl ether) on a Vitros ECi, reference range 60–413 nmol/24 h.

Results: Among enrolled patients with CS (149 female; 33 male) Cushing's disease was confirmed in 149 cases, 9 patients had benign adrenal adenoma, 24 - ACTH-ectopic CS. Median age was 35 Q25-Q75 (27–49) years, BMI - 29 (26–33) kg/m². Fractures were confirmed in 80 (44 %) cases, 70 patients suffered from vertebral fractures, which were multiple in 53 cases; 23 patients reported nonvertebral fractures. Mean spine TBS was 1.207±0.139, which is much lower as compared to expected healthy control subjects (~1.450); L1-L4 Z-score -1.37±1.32; Neck Z-score - 0.98±0.93. Both BMD values clearly do not reflect the severity of osteoporosis when considering the prevalence of fracture. Mean 24hUFC - 2384 nmol/24 h (140). Applying binary logistic regression analysis we found that the most significant predictor for fracture was the high level of 24hUFC ($p=0.002$). The high prevalence of vertebral fractures might influence the result of TBS and its ability to predict fractures in retrospective analysis.

Conclusion: Patients with endogenous Cushing's syndrome have low trabecular bone-score value. Moreover,

the most significant predictor for low-traumatic fracture is the severity of the disease itself, estimated by high levels of 24hUFC.

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ANALYSIS OF OSTEODENSITOMETRY FINDINGS ON THE SPINAL COLUMN IN PATIENTS WITH OSTEOPOROTIC FRACTURES

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Objective: To study and analyze the most important characteristics of osteodensitometry findings acquired by measuring BMD of the body of the vertebrae in the lumbar spine in patients with fractures of osteoporotic etiology, and to discover their possible correlation.

Material and methods: This study encompasses 1499 patients, of both sexes, and of various age. BMD was measured using the device Lunar DPX on the 1st till 4th lumbar vertebra. The following values were analyzed - BMD values (absolute, expressed in g/cm² and deviations from normal values expressed in percentages), T-score and Z-score values on the lumbar spine and FRAX index values (Major fracture). Information on the fractures and demographic data were acquired in medical history, and body weight and height measurements were performed using standard methods. Acquired data were statistically processed using chi-square test, T-test and ROC analysis.

Results: Average age of the examinees was 63.72 years. 235 of them had fractures caused by small mechanic force, 33 of examinees had a compressive fracture of vertebra, and 45 of them had two or multiple fractures. Based on the T-score values, L1 to L4 vertebrae in patients with osteoporosis - 23.8 % of them had a fracture and 11.1 % of patients with normal findings had fractures ($X^2=24.281$; $p<0.001$). Average BMD values of L1-L4 in patients with fractures were 0.961 g/cm² and 1.033 g/cm² ($p<0.001$) in patients without fractures. Average BMD deviation from normal values for the examinees with fractures was -18.846 and -12.612 % ($p<0.001$) in patients without fractures. In the group with fractures, average T-score value was -1.836 SD and without fractures -1.241 SD ($p<0.001$). Average Z-score value in examinees with fractures was -0.545 SD, and -0.308 SD ($p<0.027$) without fractures. Surface beneath the curve for Major fractures is 0.814, cutoff 12.5, ($p=0.000$).

Conclusion: Osteodensitometry findings acquired by measuring bone density on the lumbar spine vertebrae is highly reliable for the estimation of the density of the entire bone system and can predict with great certainty osteoporotic fractures,

since it greatly correlates with their frequency. As a reliable diagnostics method, it will significantly add to the proper methods of treating osteoporosis.

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ASSOCIATION BETWEEN VITAMIN D LEVELS AND ACUTE CORONARY SYNDROME

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Vitamin D (25(OH)D) physiologically reduces the inflammation associated with atherosclerosis, improves the endothelial, attenuates the hypertrophy of the cardiomyocytes that is stimulated by endothelin and reduces the expression of the renin gen. Low levels of 25(OH)D are related with a higher cardiovascular events incidence, amongst them is the acute coronary syndrome (ACS).

Aim: To measure the levels 25(OH)D in patients that entered the Coronary Care Unit in Clínica Dávila with the diagnosis of ACS confirmed by a coronarography and to compare them with control patients. Exclusion criteria: chronic renal failure, malabsorption syndrome, hyperparathyroidism, alkaline phosphatase elevation and use of medication (bisphosphonates, calcium supplementation, 25(OH)D, corticosteroids, antifungal, antiretroviral).

Methods: the present is a prospective study of a population of patients that entered Clínica Dávila with ACS. The controls are healthy patients that were not using any medication and attended the sample recollection at the laboratory. 33 patients that matched the inclusion criteria were selected from the Coronary Care Unit and 27 healthy controls. The statistical analysis consisted of comparing results with t- student tests and processed with STATA 12.0 version.

Results: we obtained information from 60 subjects, 33 (55 %) of them presented ACS. 57 subject were male and 3 were female. The mean age of the participants was 61.4 ± 10.7 years. There were no significant differences between the disease condition with gender ($p = 0.552$) nor with age ($p = 0.12$). The 25(OH)D level among the cases was 16.79 ± 7.7 , while among the controls was 29.00 ± 8.95 , presenting a significant difference ($p = 0.0001$). When the discrimination ability of 25(OH)D between ACS and control was analyzed, an area under the ROC curve of 83.9 % was found. Given a cutoff of 21 for 25(OH)D, the following results were found: sensibility 71.88 %, specificity 78.57 %, positive

predictive value of 44.4 % and negative predictive value of 90 %. The subjects correctly classified corresponded to 100 %.

Conclusion: patients with ACS have significantly lower vitamin D levels than the healthy controls.

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IMPACT OF EARLY-LIFE GROWTH ON THE RATES OF FRACTURE ACROSS ADULTHOOD IN THE NSHD BIRTH COHORT

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Objective: Fracture risk is dependent on the mechanical strength of bone, partly explained by bone mass, and the forces applied to it. Growth in early life has been shown to predict adult bone mass. However, little is known about the relationships between childhood growth and fracture risk in adulthood. In this study we examined whether there are associations between childhood height trajectories and fracture rates across adulthood using the MRC National Survey for Health and Development (NSHD).

Material and methods: The NSHD is a unique birth cohort study based on a nationally representative sample of men and women born within England, Scotland and Wales in 1 week in March 1946. A total of 2162 men and women have data on adult fracture up to ages 60–64. Height (m) in childhood (2, 4, 6, 7, 11 and 15 years) was measured and then used to calculate conditional growth. This was defined as the growth above or below what would be predicted from all previous height measurements: the standardised difference between observed height at time p and predicted height at time p (i.e. the residual error). Mid- adult fracture was defined as first fracture between 40 and 54 years and hazard ratios were calculated using Cox's proportional hazard models.

Results: 52 % (1115) of study subjects were females and 157 (9 %) reported a mid-adult fracture. Those with greater than expected growth between 11 and 15 years and 15–20 years tended to have increased rates/hazards of fracture. This reached statistical significance for the later growth phase (11–15 years hazard ratio of 1.15 (95 %CI 0.90, 1.46) and 15–20 years hazard ratio of 1.31 (95 %CI 1.04, 1.66) per SD conditional height change).

Conclusion: Greater growth between 15 and 20 years is associated with greater rates of fracture in mid-adult life. This

may be due to a later puberty in these individuals predisposing to greater fracture risk.

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COMPARATIVE STUDY ON THE EFFECTS OF HORMONE REPLACEMENT THERAPY AND PHYTOESTROGENS IN THE PREVENTION OF THE POSTMENOPAUSAL OSTEOPOROSIS

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Objective: Assessing the effectiveness of hormone replacement therapy, administered in small doses, compared to therapy with phytoestrogens in the prevention of postmenopausal osteoporosis.

Material and methods: The study was conducted on a total of 326 postmenopausal women that were divided into three groups: 96 women have taken daily continuously combined hormone product, each tablet containing 1 mg estradiol and 0.5 mg norethisterone acetate; 124 women have taken daily soy isoflavones - 40 % standardized extract containing 20 mg of pure isoflavones and 106 women that have not received any sort of treatment. Initially, at 6 months and at 1 year deoxypyridinoline was determined (D- Pyr), an indicator of the bone resorption and of the efficiency of antiresorptive therapy, and BMD was measured at 1 year.

Results: There were found significant variations of D-Pyr in the groups with phytoestrogens and hormone therapy the average values decreasing by 11.38 % in group with phytoestrogens ($p=0.046$), by 15.32 % in the group with hormone therapy ($p=0.035$) and increasing with 4.38 % in the control group ($p=0.638$). After 12 months T-score normalization was registered to a small number of cases (2.42, 5.26 and 0.00 %).

Conclusion: Following the assessment by comparison it was found that both THS as well as phytoestrogens have beneficial effects on bone metabolism, with no significant differences between the two therapies. Insignificant variations of the T-score, for patients with treatment indicate the effectiveness of the 2 therapies, in particular on the preservation of bone mass.

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YOGURT ENRICHED WITH CALCIUM AND VITAMIN D IS AN EFFICIENT APPROACH TO PROMOTE DAILY CALCIUM INTAKE IN OSTEOPOROTIC WOMEN

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Objective: Low adherence to calcium/vitamin D tablet supplements in osteoporotic women is a major concern. We investigate if a daily intake of a yogurt enriched with 500 mg calcium and 5 µg vit D (200 IU) (Densia Forte, Danone, Spain) might be an efficient alternative.

Methods: Consecutive women, treated with antiresorptive drugs, aged from 45 to 75 years and accepting to participate to this survey were advised by their GPs to take daily one bottle of Densia® in addition to usual diet. At baseline socio-demographic data, osteoporosis history and menopausal status were recorded. Daily calcium intake was estimated with a food frequency questionnaire (INDICAD). A belief about Medicines Questionnaire and a PAGI-SYM questionnaire (digestive complaints assessment) were used. Patients had Densia intake diary over 3 months. At final visit adherence was measured by analysis of diaries and completion of a Morinsky questionnaire. An OPSAT-Q and a PAGI-SYM were completed with a diet questionnaire. Main outcome was efficient advice defined by an adherence ≥ 50 % and a patient's satisfaction score ≥ 80 at the OPSAT-Q.

Results: Nine hundred nine women were enrolled (mean age $62.3 \pm (SD) 7.4$ years, BMI 26.0 ± 4.1 kg/m²). 96.7 % had menopause, since 13.5 ± 7.8 , mean \pm SD. Osteoporosis was diagnosed since 6.4 ± 5.9 years and 21.3 % had a history of fragile fracture. Median delay of starting antiresorptive treatment was 4.0 years. Median estimated daily calcium intake was 802 mg. Over 3 months, 76.6 % (95 %CI: 73 %, 80 %) of patients took 80 % or more of the maximal Densia intake. At OPSAT-Q, 72.7 % had a satisfaction score with Densia ≥ 80 . Overall, 71.6 % (95 %CI: 68 %, 75 %) took more than 50 % of Densia intake and had a satisfaction score ≥ 80 (efficient GP advice). Compared to baseline, no changes in digestive complaints and in their usual calcium diet were noted. No adverse events related to Densia were detected.

Conclusion: This Spanish survey conducted in usual practice shows diet enrichment with Densia is well accepted by osteoporotic women and constitutes an efficient alternative to calcium tablets to increase daily calcium intake. The only concern raised by patients was the cost of this non-reimbursed dairy supplementation.

Acknowledgments: Danone S.A. assumes the study funding in accordance with the guidelines of this protocol. This funding includes the costs of: all the materials needed to conduct the study; the EC and the health authorities' authorisation and control processes; the database design, maintenance and

management; the statistical analysis of the generated information; and the fees of the professionals involved in the generated data collection and analysis. The funding will, in all cases, be independent to the study results.

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IMAGING ASSESSMENT OF SPONDYLODISCITIS

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The infectious spondylodiscitis of TBC is a rare inflammatory process which selectively affects the disk- vertebral junction and which may be extended through contiguity in the epidural area and in the soft paraspinal tissues.

Aim: To emphasize CT visualized lesions or obtained through an MRI.

Material and method: Retrospective study which contains 15 symptomatic patients imaging investigated.

Results: In 9(60 %) cases was emphasized a sole focus, in 2 cases (13 %) multiple floor foci. At all patients was emphasized the narrowing of intervertebral area and the destruction of vertebral bodies. The angular kyphosis was present at 6 patients (40 %); the cold paravertebral abscess was present at 10 cases (66 %) out of which 3 unilateral and 7 bilateral. The pulmonary modifications of TBC miliary type were present at two cases (13 %). The incipient modifications are represented by a hyperfine signal at the level of the disk and by hypersignals T2 and STIR, hyposignals T1 in band at the level of vertebral plateau adjacent.

Conclusion: The CT scan best detects and characterizes the bone lesions. The MRI investigation is more sensitive in tracking down the early modifications which accurately characterize the affectation of vertebral bodies and the disk. The signal abnormalities cross the vertebral plateaus and the adequate disks which appear in hypersignal T2 and STIR, native hyposignal T1 with contrast effect present; MRI brings additional data regarding the extension at the level of soft tissues and the affectation of the ligament system.

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CLINICAL SCREENING TEST FOR REVEALING DYSFUNCTIONAL PAIN IN KNEE OSTEOARTHRITIS

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Traditionally pain in OA considered to be nociceptive one. But recent studies has shown that in some cases chronic pain in knee osteoarthritis(OA) can be also caused by other mechanisms (dysfunctional). Dysfunctional pain accompanies with dysfunction of biochemical process in CNS and does not characterize with organic changes of CNS. The main clinical feature of dysfunctional pain is hyperalgesia, that spreads not only on the damaged knee (primary hyperalgesia), but also on unaffected region (referred hyperalgesia). The process is caused by specific changes in the posterior horn - central sensitization. Dysfunctional pain is also well characterized by specific neuropathic transcripts, that can be widely represented in neuropathic pain scales.

Aim: to reveal referred hyperalgesia in pt with knee OA and demonstrate its correlation with clinical picture and intensity of chronic pain.

Materials and methods: Pts with chronic knee OA did not have any neurological deficit. But examination of sensitive disorder revealed primary hyperalgesia(in the damaged knee) and also referred hyperalgesia in the intact region(shank and even hip). The pts were divided into two groups according to sensitive changes: pts with primary hyperalgesia and pts with referred hyperalgesia. 89 women (middle age 58±5.4) with OA and chronic knee pain (duration more than 3 months) were examined with the help of WOMAC, X-ray and US of the knee. Duration of knee pain and its intensity were accessed. Additionally were used neuropathic pain scales (Paindetect and DN4). The prevalence of anxiety and depressive disorders in population with OA were passed for examining the interrelationships between severity of pain and emotional disturbances by Hospital Anxiety and Depression scale.

Results: Based on the results of neurologic examination: 41.5 %, (*n*=37) had referred hyperalgesia (not only knee localization(primary hyperalgesia) but also hip and shank localization) and 58,5 %, (*n*=52) had primary hyperalgesia. No somatosensory defects were found. No significant differences between groups were seen in age, body index, duration of knee OA, quality of life and level of structural changes. The presence of referred hyperalgesia accompanied with high levels of neuropathic pain scales, correlated with higher pain intensity (VAS), poor WOMAC and significantly associated with higher level of depression. The presence of referred hyperalgesia accompanied with more often observed neuropathic descriptors: numbness 60.5 % vs. 39.5 %, current rush 51.9 % vs. 48.1 % and tingling 55 % vs. 45 %.

Conclusion: Chronic OA has multicomponent mechanism: nociceptive pain and dysfunctional pain. The presence of referred hyperalgesia was revealed in 41.5 % ($n=37$). Dysfunctional pain in OA can be visualized clinically by the prevalence of referred pain, which can be caused by central sensitization. The degree of spreading sensitization is correlated with the level of clinical pain and does not correlate with structural changes.

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RISK FACTORS OF OSTEOPOROSIS AMONG INDIGENOUS PEOPLE OF TRANS-BAIKALIAN REGION OF RUSSIAN AND BURYAT NATIONALITIES

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Objective: To evaluate the structure of risk factors of osteoporosis (OP) and value of BMD among indigenous people of Trans-Baikalian region of Russian and Buryat nationalities.

Materials and methods: We have examined 103 women with OP: 62 Russian nationality and 41 Buryat nationality, aged 50–80 years, mean age was 64.5 ± 7.2 years. Risk factors OP allocated according to the “Russian clinical guidelines for osteoporosis,” 2012. Calculation of absolute 10-year risk of major osteoporotic fractures (major osteoporotic - MO) was made by means of online calculator FRAX. BMD at the femoral neck and lumbar spine was determined by X-ray densitometry according T-Score. The program Statistica 10.0 was used for data processing. Taking into consideration were used nonparametric tests: Spearman, gamma-correlation, descriptive statistics.

Results: Representatives of Russian nationality (I group) were older - the average age of 67 ± 7.3 years, while the average age of Buryat women (II group) was less - 61 ± 5.8 years ($p < 0.05$). Among the patients in group I tendency to fall 56.5 % ($p = 0.02$) and smoking 17.7 % ($p < 0.05$) were more frequent. Among the representatives of group II these figures were as follows: the tendency to fall 17 % and smoking 4.8 %. However, in group II in 85 % of cases risk factors for vitamin D deficiency were identified ($p < 0.05$). The average age of menopause was 47.8 ± 3 years ($p < 0.05$). In assessing the MO it was found that among Russian women had a higher value 16.8 ± 4.6 , than in patients of Buryat nationality 15 ± 4 ($p < 0.05$). The value of BMD in both groups was not significantly different, and the T-score averaged -1.6 at the femoral neck and -1.4 at the lumbar spine. The structure was dominated by fractures of osteoporotic fractures of the distal third of the radius - 41 %, and lumbar spine - 27 %.

Conclusion: Representatives of Buryat nationality have an increased risk of vitamin D deficiency. Most often patients suffer fractures of the distal third of the radius, which is possibly due to the reliance on hand during the fall. BMD at the femoral neck was more than in the lumbar spine, which may be due to a greater load on these skeleton part while walking.

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PROLONGED HYPOVITAMINOSIS D IN ELDERLY WOMEN IS ASSOCIATED WITH LONG AND SHORT TERM MORTALITY: RESULTS FROM THE OPRA COHORT

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Objective: Inadequate vitamin D levels in the elderly contribute to osteoporotic fracture and to reduced life expectancy; however whether vitamin D insufficiency contributes to mortality independently of comorbidities, including fracture, is unclear. In this longitudinal population based study we investigated the association between chronic vitamin D insufficiency and 10-year mortality in the whole study population and in a subgroup of women who were fracture-free during the entire observational period.

Material & Methods: Study participants were the 1044 women of the OPRA cohort from Malmö, Sweden. The women were age 75 at baseline with over 15 years of follow-up. Serum vitamin D (25(OH)D) levels were measured at age 75 ($n=987$) and 80 ($n=640$) and categorized as: <50 nmol/l (low), 50–75 (intermediate) and >75 (high) at both ages. Based on comorbidities at age 80, diagnoses were combined into 4 main categories (cardiovascular disease, respiratory disease, kidney disease and diabetes). Hazard ratios (HR) for all-cause mortality between ages 80–90 were calculated according to 25(OH)D category.

Results: All-cause mortality was significantly higher in women with continuously low 25(OH)D levels compared to women with high levels (HR=1.6, 95 %CI=1.1–2.4, $p=0.025$). In the subgroup who were fracture-free during the study period,

for women with 5 years duration of low 25(OH)D the risk of dying was higher again (HR=2.3, 95 %CI=1.3–4.0, $p=0.004$) and the association withstood adjustment for smoking and comorbidities.

Conclusion: In this observational study of elderly women followed from age 75–90, chronic vitamin D insufficiency was associated with increased all-cause mortality and this relationship was at least in part independent of health status.

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DICKKOPF-1 AND SCLEROSTIN SERUM LEVELS IN PATIENTS WITH SYSTEMIC MASTOCYTOSIS

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Bone involvement, mainly osteoporosis but also osteosclerosis, is frequent in patients with indolent systemic mastocytosis (ISM). The recent characterization of the canonical Wnt/ β -catenin pathway in the regulation of bone remodeling provided important insights for our understanding of the pathophysiology of a number of conditions. The regulation of Wnt pathway in bone is predominantly driven by the production of receptor inhibitors such as Dickkopf-1 (DKK1) and sclerostin (SOST). This study aimed to explore if the various bone involvement in patients with ISM might be explained by variations in serum levels of DKK1 and SOST. This is cross-sectional study in an adult ISM cohort (13 men and 13 women with diagnosed ISM) and 52 healthy sex and aged matched controls. Early morning, fasting and venous sampling was obtained in all subjects. Main Outcome Measure: Serum bone-specific alkaline phosphatase (bALP), C-terminal telopeptides of type I collagen (CTX), DKK1, SOST, and PTH, BMD and prevalent vertebral fractures. Mean DKK1 serum levels was about two-fold higher in patients, than in controls (65.0 ± 43.3 vs. 33.1 ± 19.4 pmol/L, respectively; $p < 0.001$), irrespective of the presence of osteoporotic or diffuse osteosclerotic bone involvement. DKK1 serum levels were positively correlated with PTH and both CTX and bALP. Mean SOST serum levels was not significantly different in patients vs. controls, and we did not observe any significant correlation between SOST and any available clinical or laboratory parameters, with the only exception of a positive correlation with age. In conclusion, in our study we observed that DKK1, but not SOST, serum levels are significantly increased in ISM patients with various bone involvement, and correlated with PTH and bone turnover markers. Our

results suggest that the Wnt/ β -catenin pathway is not primarily involved in the pathophysiology of the array of bone involvement in ISM.

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BONE MASS AND BONE TURNOVER IN WOMEN WITH THALASSEMIA MAJOR RELATED OSTEOPOROSIS: EFFECTS OF STRONTIUM RANELATE

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Subjects affected by thalassemia major often have reduced bone mass and increased fracture risk. Strontium ranelate (StR) is an effective treatment for postmenopausal and male osteoporosis. To date, no published data exist on the use of StR in the treatment of thalassemia major (TM) related osteoporosis. This randomized, placebo controlled study was designed to evaluate the effects of StR on BMD, bone turnover markers and Wnt signaling modulators as sclerostin and DKK-1.

Methods: 24 TM osteoporotic women were randomized to receive daily StR 2 g or placebo in addition to calcium (1 g) and vitamin D (800 IU). BMD at lumbar spine and femoral neck, bone turnover markers (C-terminal telopeptide of procollagen type I [CTX]; bone specific alkaline phosphatase [BSAP]), IGF-1, and Wnt signaling inhibitors (sclerostin, DKK-1) were assessed at baseline and after 24 months. Back pain was measured by VAS 6-monthly.

Results: After 24 months, TM women treated with StR increased their spine BMD values in comparison to baseline (+4 %, $p < 0.05$), but no significant change was observed at femoral neck. Only in StR group, bone turnover markers significantly changed, with a reduction of CTX (0.69 ± 0.19 vs. 0.60 ± 0.15 ng/ml, at baseline and after 24 months, respectively, $p < 0.05$) and an increase of BSAP levels (14.85 ± 1.91 vs. 17.3 ± 3.06 U/L; $p < 0.05$); sclerostin, but not DKK-1 levels were also reduced by StR treatment (–17 %, $p < 0.05$). A significant reduction of back pain was already observed at 18 months (–30 % vs. baseline values) in the StR group and was maintained at 24 months (–60 and –30 % vs. baseline and placebo values, respectively) ($p < 0.05$).

Conclusion: Our study reports for the first time the effects of StR on BMD and bone turnover in TM related osteoporosis. StR treatment improved BMD and normalized bone turnover markers, reduced also sclerostin serum levels, and improved back pain.

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STRONG RELATIONSHIP BETWEEN VITAMIN D STATUS AND BONE MINERAL DENSITY IN ANOREXIA NERVOSA

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Anorexia nervosa (AN) is associated with impaired bone health and low BMD as a consequence of an inadequate peak bone mass in adolescence and bone loss in young adulthood. The vitamin D status with its implications for bone health in AN patients has only been examined previously in small studies.

In this study we analyzed the vitamin D status and bone metabolism in a large cohort ($n=89$) of AN untreated patients, plus secondary amenorrhoea for at least 6-months, to evaluate the prevalence of deficiency and tested the hypothesis that AN patients with vitamin D deficiency might have worse bone metabolism and lower bone density as compared with AN with adequate vitamin D repletion.

We showed that vitamin D deficiency is widespread in AN untreated patients because 16.9 % of our patient had 25 OHD levels below 12 ng/ml, 36 % below 20 ng/ml and 58.4 % below 30 ng/ml.

PTH values were higher in patients with vitamin D deficiency (<20 ng/ml), without differences in bone turnover markers, and BMD at both femoral sites were lower in the vitamin D deficient patients. Progressively higher values of BMD were observed by 4 ranks of 25 OHD values (severe deficiency: <12 ng/ml, deficiency: ≥ 12 ng/ml and <20 ng/ml), insufficiency: ≥ 20 and <30 ng/ml and normal: ≥ 30 ng/ml). In patients with severe vitamin D deficiency both femoral neck and total hip BMD were statistically significantly lower than that measured in groups with values over 20 ng/ml ($P<0.001$ for trend). The level of significance did not change for values adjusted for BMI or body weight.

In conclusion: we found a strong relationship between vitamin D status and hip BMD values with additional benefits for those with 25OHD levels above 20 ng/ml. Our results has important clinical implications and support the opportunity to study the effects of vitamin D supplementation in order to bring 25OHD levels above 30 ng/ml in AN osteopenic patients, well before starting any other pharmacological therapy.

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CIRCULATING DICKKOPF-1 AND SCLEROSTIN IN PATIENTS WITH PAGET'S DISEASE OF BONE

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Paget's disease of bone (PDB) is a chronic metabolic bone disorder characterized by localized areas of increased bone resorption and new bone formation. Wnt/ β -catenin signalling pathway represents a major promoter of bone formation and its secreted antagonists sclerostin (SOST) and Dickkopf-1 (DKK1) act not only as inhibitors of bone formation but may also be involved in the regulation of bone resorption. Scarce and contrasting results have been reported on the role of these inhibitors of canonical Wnt/ β -catenin signalling pathway in patients with PDB. We studied 40 patients (15 females and 25 males) with radiological and scintigraphic evidence of PDB and 40 healthy subjects matched by age and sex. As expected, mean serum levels of bone turnover markers (N-propeptide of type I collagen [P1NP] and C-terminal telopeptide of type I collagen [CTX]) were significantly higher in the PDB group compared with the control group. No difference was observed between groups in DKK1 and SOST. DKK1 and SOST were never correlated with each other or with bone turnover markers. SOST was positively correlated with age. In conclusion, our results suggest that the regulators of the Wnt- β catenin pathway are not altered in patients with PDB.

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DIRECT COSTS OF HIP FRACTURE IN THE MIGUEL SERVET UNIVERSITY HOSPITAL DURING 2011

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With the growing size of the elderly population, osteoporotic fractures and disabilities resulting from them have a major impact on health. Several studies have quantified the global burden of osteoporosis by analysing the number of fractures: hip fracture sufferers were estimated at 56 million worldwide. The greatest number of osteoporotic fractures occurred in Europe (34.8 %). incidence and cost of fractures have been estimated in many countries and show substantial variation between populations, indicating the need for continued data collection.

Objective: To determine the incidence of hip fracture in a southern European city and set it's burden (associated direct economic costs) during 2010.

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, 2010. 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.

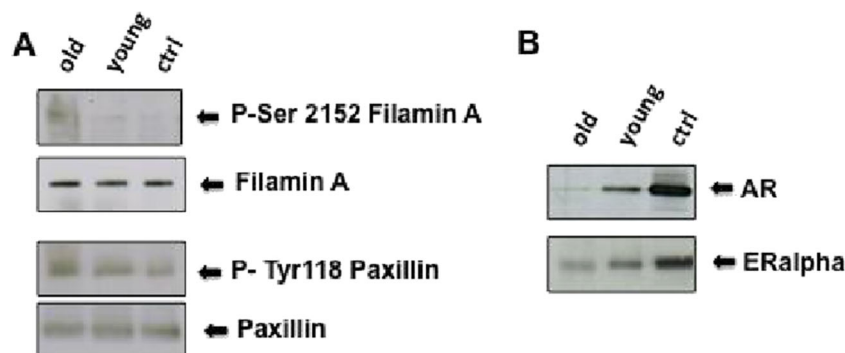
Results: 589 patients supporting osteoporotic hip fracture (415 female 174, male) were admitted in our hospital during the period of study. The estimated incidence rate was 117 new cases per 100.000 population - year. The majority of fractures (78 %) occurred in subjects older than 75 years, and the peak number of fractures occurred in individuals above 80-years of age. Seventy per cent of the 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 €).

Conclusion: 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.

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THE ANDROGEN RECEPTOR IN HUMAN SKELETAL MUSCLE BIOPSIES

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Phosphorylation of both Ser-2152 filamin A and Tyr-118 paxillin (A) is stronger in biopsies from old women, as compared with that obtained from young women. Conversely, the expression of AR and ER α (B) is weaker in samples from old women, as compared with that obtained from young women. Proteins from control breast cancer-derived MCF-7 cells are analysed in parallel (ctrl). Our study suggests that derangement of the AR axis occurs in skeletal muscle from old women. This event likely leads to excessive metabolic functions and loss of skeletal muscle. Further investigation in cultured cells and mouse models might help us in targeting the skeletal muscle AR axis with new compounds (new selective

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Androgens increase muscle size through the androgen receptor (AR), which rapidly activates signalling pathways to trigger various biological responses. Rapid androgen effects occur through interaction of AR with effectors or scaffolds, including the Src tyrosine-kinase and filamin A. Activation of the downstream effectors (paxillin, FAK, MAPK, Akt) then follows. Ageing is often accompanied by the loss of skeletal muscle mass, likely caused by derangements of hormonal responses. By using human skeletal muscle biopsies, we have analysed the key molecules linking the AR nongenomic axis with cytoskeleton organization. Proteins from young or old women (3 for each group) biopsies have been analyzed by Western blot, using appropriate antibodies (anti-phosphofilamin A and filamin A; anti-phosphopaxillin and paxillin). Proteins have been also analysed for AR and estrogen receptor alpha (ER α) expression levels. Representative blots from each subset of participants are presented in Figure.

androgen receptor modulators or stapled-peptides; 1 and 2) to improve the clinical outcome of age-related diseases.

1) Migliaccio et al., *Oncogene* 2007;26:6619. 2) Castoria et al., *Cell Death Dis* 2014;5:e1548.

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CORTICAL AND TRABECULAR BONE ANALYSIS OF PATIENTS WITH HIP FRACTURE AND CONTROLS USING 3D-DXA

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Objective: To analyze the cortical and trabecular bone of hip fracture patients and controls using 3D- DXA.

Material and Methods: A retrospective study was carried out to collect 130 DXA scans of postmenopausal Caucasian women (CETIR Grup Mèdic, Barcelona), half of them with a hip fracture event occurring between one and 7 years from baseline and the other half without any osteoporotic fracture during at least a 7 years of follow-up from baseline. None of the patients had osteoporotic fracture at baseline. The 3D-DXA technology was used to obtain patient-specific models from baseline 2D DXA projections. 3D-DXA is based on the registration of a 3D appearance model of the femoral shape and density onto the 2D DXA image and allow for the quantification of the volumetric BMD (vBMD), volume (for trabecular and cortical regions) and cortical thickness distribution. The clinical parameters were compared over both groups (student's t-test).

Results: No statistically significant differences were found between the average age, weight, height and BMI of both groups. Fracture group femurs were bigger than controls ($p=0.007$), and had a lower vBMD at both cortical and trabecular regions ($p<0.001$). The average cortical thickness was also lower for fracture group (1.49 mm) than for controls (1.62 mm, $p<0.001$).

Conclusion: By providing a 3D structural analysis of cortical and trabecular bony structures, 3D-DXA could potentially improve osteoporosis management while maintaining DXA as the current standard modality.

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TOTAL HIP ARTHROPLASTY. SQUATTING AS SPECIAL ARABIC HABIT

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Aim: To focus on the special Arabic custom of sitting on the ground and squatting as a patient concern before going to total hip Arthroplasty. The study will test the requests of patients to return to their pre- morbid status of deep hip flexion with Internal rotation. The study will aim surgery attitudes for their requests.

Material and Methods: The study will review the opinions and suggestions of patients. A questionnaire was designed and distributed to our patients with advanced hip osteoarthritis.

Inclusion:

* Arabs

* Males and females

* Age >40 yo

* Advanced hip osteoarthritis requiring arthroplasty

* Inability to flex the hip fully (praying on chair)

Exclusion

* Non-Arab

* Age <40 yo

* Previous Hip surgery

* Traumatic Hip Arthritis

* Rheumatoid arthritis

* Mild Hip osteoarthritis

Results: Almost all patients require full flexion of the hips after arthroplasty to perform their prayers and to sit on the ground. On the other hand, surgeons have to understand the patients need to explain the possible limitations of the range of motion after arthroplasty. Special approach to avoid dislocation and the excessive wear rate.

Conclusion: Arabic population have a special needs in the treatment of osteoarthritis of the hip. Besides, the hope of lack of pain, total flexion of the hip after arthroplasty is an important goal of traditional Arabs. We recommend the arthroplasty surgeons to avoid posterior hip approach if possible and if they decided to do so to suture the capsule and the short external rotators.

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BIOLOGIC EFFECTS OF CALCIUM-VITAMIN D SUPPLEMENTATION IN AMBULATORY POSTMENOPAUSAL WOMEN SUFFERING FROM OSTEOPENIA

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Calcium and vitamin D supplementation is nowadays a common recommendation. It is usually safe.

Materials and methods: Elemental calcium (1 g) and vitamin D (880 IU) were administered daily in 60 ambulatory postmenopausal women with osteopenia at the lumbar spine (T-score ≤ -1.5) aged 67.7 (6.4) y, with a level of 25OHD ≤ 30 ng/mL. In this population, the average dietary calcium was estimated at 643 (32) mg/d. At the start and after 2 months, a biologic work-up was performed (Table). Moreover, iPTH and 24H-calciumuria were assessed according to tertiles of initial 25OHD (3.7–10.0; 10.1–17.5; 17.6–30 ng/mL).

Results: iPTH significantly decreased after 2 months, in the lower tertile of 25OHD only. 1 g elemental calcium daily intake was accompanied with an increase in 24H urinary Ca excretion amounting on average to 50 mg. However, hypercalcemia (S-Ca >10.4 mg/dL) and increased 24-H calciumuria (>300 mg) were observed in 13

and 20 % of patients, respectively, chiefly in the higher tertile of initial 25OHD. 24H urinary excretion of NTX (nMECO/mM creat) decreased on average 25.7 % after 2 months. The decrease did not reach statistical significance owing to the large scatter of the initial values. Renal function was not modified.

Conclusion: Blind Ca-vit D supplementation can be considered in the majority of postmenopausal osteopenic women. A

small decrease in bone remodeling was observed, probably linked to a lowering of the iPTH levels, chiefly evidenced in the patients with the lower initial 25OHD values. However, in a minority of patients, hypercalcemia and/or hypercalciuria can occur, justifying checking S-Ca and 24-H calciuria once after ~3 months of Ca-Vit D supplementation. According to the result, calcium supplementation could have to be adapted in a minority of patients.

	25OHD ng/ml	S-Ca mg/dl	Corrected-Ca mg/dl	Creatinine clearance ml/min	IPTH pg/ml	24-H urinary Ca mg/d	24-H urinary Ca mg/kg	24-H urinary NTx nMECO/mM creat	24-H urinary NTx/WBBMC
T0	14.7 (7.0)	9.87 (0.30)	9.82 (0.29)	78.4 (26.5)	34.1 (14.8)	172.8 (82.7)	2.7 (1.2)	134.5 (165.5)	0.337 (0.281)
T+	29.2 (7.0)	9.92 (0.38)	9.99 (0.47)	78.0 (21.4)	25.3 (8.7)	223.0 (92.8)	3.5 (1.6)	100.2 (61.0)	0.290 (0.176)
p	<0.0001	NS	0.0744	NS	<0.005	<0.005	<0.005	NS	NS
13.3 % with			S-Ca higher than 10.4 mg/dl (up to 10.9 mg/dl)						
			24-H urinary calcium/kg higher than 5 mg/kg (up to 6.6 mg/kg)						
20 % with			24-H urinary calcium excretion higher than 300 mg (up to 44 mg)						

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THE ASSOCIATION WITH VITAMIN D LEVELS AND DISEASE ACTIVATION IN SYSTEMIC LUPUS ERYTHEMATOSUS

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Background and Objective: Recently, it was suggested that vitamin D plays an important role in immune response as well as bone metabolism. Previous studies showed that vitamin D supplementation was associated with disease activity in patients with systemic lupus erythematosus (SLE), which is a prototypic autoimmune disorder. However, it is controversial whether the levels of vitamin D in plasma was related with disease activity, in particular lupus flare in SLE. Therefore, aim of our study is to investigate the association between disease activity and vitamin D level in SLE patients.

Patients and Methods: SLE patients visited rheumatologic clinic of Asan Medical Center between May 2013 and December 2013 were evaluated 25(OH)D levels in blood samples. The medical records of total 202 patients were retrospectively reviewed. According to the levels of vitamin D, patients were divided into the low vitamin D group and the normal vitamin D group (25(OH)D <10 ng/mL and 25(OH)D ≥10 ng/mL, respectively). In addition, disease activity was evaluated with laboratory

and imaging study including organ involvement of lupus during study period (between 1 year before and 1 year after check for 25(OH)D levels).

Results: The mean 25(OH)D level of 202 SLE patients was 18.44 ng/mL and the mean SLE Disease Activity Index (SLEDAI) score was 4.46. Of 202 patients, 34.2 % (69) patients have been experienced lupus flares during study period and flare of lupus nephritis was observed in 18.3 % (37) patients among total patients. Prevalence of patients who had history of lupus nephritis were significantly higher in the low vitamin D group (60 %) compared to the normal vitamin D group (32.6 %). Further, patients with low vitamin D had experienced significantly higher numbers of lupus flare and nephritis flare than patients with normal vitamin D (53.3 % vs. 30.8 %, 43.3 % vs. 14.0 %, respectively).

Conclusion: In the present study, lupus flares were more commonly observed in the low vitamin D group than in the normal vitamin D group. Therefore, it suggested that vitamin D status might be associated with the development of disease activation in SLE.

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ATYPICAL FEMORAL FRACTURE ASSOCIATED WITH BISPHOSPHONATE THERAPY: A CASE REPORT

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Long term therapy with bisphosphonates (BPs) can be complicated by atypical femoral fracture. A curative effect of teriparatide has been suggested. We report a further case.

Patient and Methods: A woman aged 81 year with DXA diagnosed OP was treated with alendronate (ALN) from 1997 until 2006, then substituted with monthly ibandronate. FN-BMD increased 6.6 % since the initiation of ALN. In Aug 2010, a fall from her height provoked a transverse fracture of the R femur, which was nailed. The patient was weaned from BPs. After her operation, she complained of L-groin pain and was seen at our hospital.

Results: (cf. Table) CTX and BSAP were in normal limits, as well as S-Ca, 25OHD and renal function. Bone scan confirmed by X-ray evidenced a fissure-fracture of the lateral cortex of L-femur. She received S/C teriparatide (TPTD) (20 µg/day) with rapid pain alleviation. After 1 year, she could walk unaided and X-ray showed healing of the fracture. She developed hypercalcemia and TPTD was stopped without pain recurrence until now.

Conclusion: If an atypical femoral fracture does not spontaneously heal after stopping BPs, TPTD can be considered as rescue therapy. In our case, but not in all cases of the literature, the fissure-fracture healed on TPTD, but hypercalcemia developed.

	Aug 2010	Dec 2011	Jan 2012	Feb 2012	Jun 2012	Dec 2012	Jun 2013	Sept 2013	
Ca	9.61	9.74	9.60	9.80	10.11	10.80	9.77	9.62	mg/dL
P	3.5	3.6	3.2	4.1	4.2	3.9	4.1	3.7	mg/dL
Mg	(-)	0.83	0.73	0.69	0.69	0.64	0.64	0.82	mmol/L
AP	31	39	82	55	57	50	50	38	IU/L
25OHD	(-)	30	23	26	(-)	19	38	39	ng/mL
CTX	(-)	277	362	354	401	326	164	229	pg/mL
SpAP	(-)	6.7	20.0	12.1	(-)	(-)	6.4	(-)	µg/L
GFR	81	63	65	63	64	(-)	54	61	mL/min/1.73 m ²

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OUTLINE OF PERSONALITY PROFILE OF A MAN AND WOMAN AS AN OSTEOPOROSIS PATIENT AND A PARTICIPANT OF ART-THERAPY WORKSHOPS

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Aim: To consider men's and women's attitudes to chronic disease and their needs so that deeper consideration of psychotraumatic influence can be analysed in context of patient and doctor communication. In total eight randomly selected patients, four men and four women, diagnosed with osteoporosis and receiving treatment at Zlín Osteological Centre for up to 5 years participated in an activity focusing on colour reception where an associative method was used in a

thematic colour test using a semantic differential. Personal profiles of these patients were created to identify those specifics of patients' psyche which can be used in somatic and psychotherapeutic care.

Methods of analysis: Analysis of colour semantic differential TBSD test results. This test operates with a concept of unconscious tendencies expressed via colour associations. In its interpretation we use theory of colour diagnosis by Dr. Max Lüscher. Semantic analysis of a subsequent interview where authentic opinion reflecting differences in men's and women's attitudes to skeletal disease was expressed. Three basic areas were covered: experience of the illness and its impact on the psyche of men and women, effect of the illness on a spouse, expectations and needs pertaining to an ideal medical treatment. In the test analyses we followed ten parameters out of which five were selected for medical-psychological praxis: a) how

patients perceive the existence of their illness; b) how they perceive symptoms of their illness and what options there are to deal with these symptoms; c) how patients see themselves in relation to their illness; d) disagreements or inner conflicts in opinions and attitudes towards illness; e) relation of the patient towards therapeutic activities, medications, art therapy, exercise, rehabilitation and any further support and help.

Interpretation: Results of interpretation lead to a formation of five personality types regarding possible maladaptive patterns of behaviour versus adaptive attitudes and behavioural patterns: strong-positive, slightly positive, disoriented, anxious-distrustful, and negativistic-rejecting. Scope of the subject area of this experimental probe has pointed to a further source of information for better understanding of patient's personality.

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INFLUENCE OF IMPLANT AUGMENTATION WITH BONE CEMENT ON ADJACENT SUBCHONDRAL BONE AND CARTILAGE

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Augmentation of implants with polymethylmethacrylate (PMMA) bone cement in osteoporotic metaphyseal fractures is a promising approach to increase implant purchase. Side effects of PMMA for the metaphyseal bone, particularly for the adjacent subchondral bone plate and joint cartilage, have not yet been studied. The following research investigates whether subchondral PMMA injection compromises the subchondral bone and/or the joint cartilage.

Material and Methods: Ten mature sheep were used to simulate subchondral PMMA injection in close proximity to joints. Follow ups of two (4 animals) and four (6 animals) months were chosen to investigate possible cartilage damage, subchondral plate alterations and the effect of PMMA on the metaphyseal trabecular structure in the knee. Evaluation was completed by means of macroscopic evaluation pQCT imaging, histopathological osteoarthritis scoring, and determination of glycosaminoglycan content in the joint cartilage. Results were compared to the untreated contralateral knee.

Results: Evaluation of the histological osteoarthritis score revealed no obvious cartilage alterations for the treated knee; median histological score after 2 months 0 (range 4), after 4 months 1 (range 5). There was no significant difference when compared with the untreated control site after 2 and 4 months ($p=0.234$ and $p=$

0.755 , respectively). pQCT imaging showed no damage to the metaphyseal trabeculae and subchondral plate. Glycosaminoglycan measurements of the treated joint cartilage after 4 months revealed no significant difference compared to the untreated cartilage ($p=0.244$).

Conclusion: The findings of this study support initial clinical observation that PMMA implant augmentation of metaphyseal fractures appears to be a safe procedure for fixation of osteoporotic fractures without harming the subchondral bone plate and adjacent joint cartilage.

P499

THE PROPORTION OF RUSSIAN ADULTS AT RISK OF FRACTURE DUE TO GLUCOCORTICOID USE TO WHOM ANTIOSTEOPOROSIS PHARMACEUTICAL THERAPY WOULD BE RECOMMENDED

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The national guidelines on the prevention and treatment of glucocorticoid-induced osteoporosis were updated in 2013 on the basis of the document created by IOF and ECTS Working Group.

Objective: To estimate the proportion of Russian adults at risk of fracture due to glucocorticoid use to whom antiosteoporosis pharmaceutical (AOP) therapy based on the clinical criteria of the national guidelines would be recommended.

Methods: We used the GLUCOST study data for 1129 adults (235 male and 894 female, mean age 53.3 ± 13.9) reporting current chronic (≥ 3 months) oral glucocorticoid (OGC) use. The study was conducted in 34 centers of different Russian regions in 2012–2013. The median duration of OGC therapy was 5 years, median daily prednisolone dose 10 mg. The patients completed a special questionnaire (including fractures, major risk factors for osteoporosis, prescriptions of specific osteoporosis drugs, etc.).

Results: 25.4 % participants reported osteoporotic fractures. 87.0 % of postmenopausal women (PMW) and 78.0 % of men age ≥ 50 years had one or more indications for AOP therapy (aged ≥ 70 year, previous fragility fracture, high daily dose of oral glucocorticoids, high 10-year probabilities of a major osteoporotic fracture (Russian version of FRAX) after adjustment to daily dose of glucocorticoids). Of patients for whom treatment recommendations could be made, only 48.3 % of PMW and 25.8 % of men age ≥ 50 years reported AOP

use. AOP therapy would be also recommended to 9.7 % of premenopausal women and 8.2 % of men age <50 years with osteoporotic fractures, but was prescribed only 45.8 and 50 % of them, accordingly. In general, to 62.0 % of patients of GLUCOST study AOP therapy would be recommended, but 27.6 % of them received treatment actually.

Conclusion: Based on the updated national guidelines, treatment would be recommended in at least 60 % of the GLUCOST patients. Self-reported AOP use was documented in <30 % patients before the guidelines publication.

P500

VITAMIN D, CALCIUM AND SPECIFIC OSTEOPOROSIS TREATMENT: FROM PATIENTS VIEWPOINT

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Objective: We aimed to assess calcium (Ca), vitamin D (Vit D) and specific osteoporosis treatment correlation with BMD among postmenopausal women in Latvia.

Material and Methods: 1598 women took part in a national cross-sectional study. All woman filled out a questionnaire with multiple choice questions regarding to Vit D, Ca and specific osteoporosis treatment. BMD was subsequently measured in all participants by DXA in lumbar spine (L1-L4) and total hip.

Results: Women with osteoporotic values in lumbar spine Ca used supplementary 25.9 %, but woman with osteoporotic values in the hip Ca supplementary used 10.8 %. Women with osteopenic values in lumbar spine Ca supplementary used 50.4 %, but women with osteopenic values in the hip Ca supplementary used 64.2 %. Woman with osteoporotic values in lumbar spine Vit D supplementary used 28.3 %, but women with osteoporotic values in the hip Vit D supplementary used 9.8 %. 50.7 % women with osteopenic values in lumbar spine and 67.1 % in the hip used Vit D supplementary. 64 % women with osteoporotic and osteopenic values used Ca and Vit D supplementary. 85.7 % of woman who used specific osteoporosis treatment take medications as recommended doctor. 11.6 % women

were continuing specific treatment with normal BMD values in lumbar spine and 16.1 % in normal BMD values in the hip. Only 15.6 % woman used specific osteoporosis treatment with osteoporotic values in the hip and 39.4 % with osteoporotic values in lumbar spine.

Conclusion: This survey suggests that physicians need to pay more attention for explanation Ca, Vit D role in treatment of osteoporosis. We need to motivate more women to use specific osteoporosis treatment.

P501

BONE MINERAL DENSITY OF LUMBAR SPINE OF PATIENTS BEFORE AND AFTER FUSION

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Objective: To assess BMD outcomes of minimally invasive lumbar interbody fusion surgery for degenerative lumbar spine disease.

Material and methods: This study included 17 men patients, who had a solid union after instrumented intertransverse process fusion at the L4-S1 and L5-S1 levels. The average patient age at the time of this study was 42.5±2.23 years. The vertebral BMDs at the unfused levels (L1-L3 and L1-L4) were measured (DXA Explorer QDR W, Hologic) before surgery and at a mean follow-up period of 5.3±0.3 months after fusion.

Results: All patients (BMD 1,058±0.07; T-score=-1.1±0.5 before fusion) with fusion at the L4-S1 levels had reduced vertebral BMDs at the L1-L2 level on average by 5.6 % after the operation (BMD 0.908±0.07; T-score=-1.4±0.6 after fusion), and in patients with osteoporosis by 7.3 %. BMD changes were not found in adjacent vertebral bodies (L3, L4) at the different fused level in these patients. With the fusion at the L5-S1 levels was showed a reduction vertebral BMD at L2 by 2.9 %, that is 2.7 % less in comparison with the fusion at the L4-S1 levels.

Conclusion: Decrease in bone density at L1 and L2 may be associated with the Frost's concept of bone remodeling defined as a regional accelerating phenomenon. This phenomenon could be considered a sign of the loss of bone density during 1 year. BMD can be used as a noninvasive method to monitor the state of the adjacent segments of patients in different periods after fusion. This method reveals early changes in adjacent segments. Patients with osteoporosis require special attention, as far as they have a high risk of BMD reduction in early period after spinal fusion

P502

MODERN APPROACHES TO THE TREATMENT OF PATIENTS AFTER ARTHROPLASTY OF THE HIP JOINT BASED ON THE ASSESSMENT OF SEGMENTAL MINERAL METABOLISM

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In recent years, many research physicians are interested in osteoinductive as one of the methods of increasing the mineral density of bone tissue around the implant. Clearly, progress in traumatology and orthopedics is possible only with the introduction of new technologies, based on the fundamental mechanisms of reparative regeneration of bone tissue.

Objective: The purpose of the research is to evaluate the advantages and disadvantages of combination therapy 1α hydroxyvitamin D3 and calcium salts of change and mobilization of mineral metabolism, after arthroplasty of the hip joint using active functional rehabilitation.

Material and Methods: Under our supervision under the terms of voluntary informed consent 71 patients had been divided into two equal groups: Group 1 included 35 patients mean (SD) age 56.6 ± 5.8 years, mean (SD) BMI 26.8 ± 5.2 kg/m² DXA T-scores total spine -1.6 ± 0.45 SD and Group 2 of 36 patients mean (SD) age 56.6 ± 5.8 years, mean (SD) BMI 27.1 ± 4.6 kg/m², DXA T-scores total spine -1.5 ± 0.71 SD. In the postoperative period, the patients were divided into two groups. From the 7th day after surgery patients of the main group ($n=35$) were prescribed drugs: 1α hydroxyvitamin D3 $0.25 \mu\text{g}$ and salts of calcium carbonate as 500 mg of the corresponding elemental calcium 200 mg. To assess the functional activity and quality of life the Harris scale was used, measurement of mineral density of bone tissue had been done by the apparatus Hologic discovery w[®] of the USA, the calculation was carried out under the program "Total Body" g/cm², T-score lumbar spine according to the recommendations of the national guide to osteoporosis

Results: Indicators of functional activity by Harris scale up operations in 1i 2-nd group was $26.8, \pm 11.2$ points and 27.1 ± 10.5 points, after 1 month of 43.5 ± 2.1 and 42.3 ± 5.3 points and 6 months and 82.2 ± 3.4 points and 74.1 ± 6.1 points, at the end of 12 months of 85.2 ± 5.8 points and 79.2 ± 6.4 , respectively ($p < 0.05$). Dependence of BMI and age examined at 12 months revealed a decline in the median index from 29.3 to 25.6 kg/m in the range of 50–60 years. In the area of the upper limbs: in the main group the figure was from 0.738 to 0.734 g/cm², in a control group of 0.741 to 0.711 g/cm², contra lateral segment 0.751 to 0.722 g/cm² and from 0.759 to 0.708 g/cm², respectively, the main and in the control group. Thoracic segment, indicators BMD ranged from 0.745 to 0.697 g/cm² and 0.751 to 0.697 g/cm². The lumbar segment of the value of BMD ranged from 0.977 to 0.974 and 0.982 to 0.949 g/cm², the

dynamics of the pelvis BMD from 1.48 to 1.46 and 1.487 to 1.41 g/cm², the operated limb showed pronounced demineralization compared with the intact limb from 1.547 to 1.47 g/cm² and 1.535 up to 1.436 g/cm². The intact limb from 0.973 to 0.964 and 0.979 to 0.940 g/cm², respectively, of the main group and control. The level of 25(OH)D3 and CA+2 16.11 ± 7.42 nmol/l; 1.13 ± 0.23 mmol/l and 18.3 ± 6.9 nmol/l; 1.24 ± 0.3 mmol/l, respectively, after 12 months figure 25(OH)D3 increased to physiological norms of 38.5 ± 5.6 nmol/l this increase was significantly ($p=0.002$) compared to the control group 15.8 ± 5.6 nmol/L. Values of Ca²⁺ ranged 1.28 ± 0.2 mmol/l and 1.1 ± 0.2 mmol/l, respectively, the main and control groups.

Conclusion: Dynamics of indicators segmental analysis showed that in the context of the therapy mineral metabolism of negative value passed in the positive direction followed by stabilization parameters not only the structure of bone metabolism, but also to stabilize the parameters of 1α hydroxyvitamin D3 in the body for adequate calcium absorption in the body. Early correction of calcium and 1α hydroxyvitamin D3 creates optimal conditions for the transition from a stressful remodeling in satisfactory condition, stabilizing parameters not only bone metabolism as the prevalence of bone formation over resorption, but also improving the quality of life through early functional loading.

P503

DETECTION OF INCOMPLETE ATYPICAL FEMUR FRACTURES: A COST-EFFECTIVENESS ANALYSIS

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Material and Methods: A probabilistic decision tree model was used to compare costs and effectiveness of single and combined diagnostic algorithms for detection of AFFs in patients with osteoporosis and leg pain, treated with long-term bisphosphonates. Accuracy, costs and safety of five singles tests (SE-femur exam by DXA, conventional radiography [XR], CT, bone scintigraphy, MRI) and 38 combinations of SE-femur exam or XR with higher performance tests were examined. The incremental cost-effectiveness ratio (ICER), expressed in costs (\$CAD) per accurate diagnosis of one incomplete AFF was calculated.

Results: Of all diagnostic algorithms, XR alone and XR combined with either CT or MRI in test-positive patients ranked best. Compared to XR alone, adding CT was associated with an increase in the mean accuracy and mean costs of 0.038 and \$13.08, respectively (ICER: \$344/accurate diagnosis).

Replacing CT with MRI resulted in a small increase in accuracy (0.0006) and a further increase in costs (\$13.3, ICER: \$22,218/accurate diagnosis). Similarly, SE-femur exam alone or combined with either CT or MRI in test-positive patients ranked best among all DXA-related algorithms (respective mean accuracy and costs: 0.93, 0.99, 0.99, and \$40.4, \$59.8, \$79.8). The cost-effectiveness of the best ranking algorithms depended on the incidence rate of incomplete AFFs and cost of SE-femur exam.

Conclusion: An algorithm that combines one high-performance diagnostic test with XR or SE-femur exam by DXA is cost-effective for detection of incomplete AFFs.

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DISEASE PREVALENCE AND AGREEMENT OF DIFFERENT OPERATIONAL DIAGNOSTIC CRITERIA FOR SARCOPENIA IN A HOMOGENOUS COHORT OF 68-YEAR OLD SUBJECTS

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Objective: Sarcopenia is a devastating feature of aging associated with extensive burden. However, consensus on an operational definition, combining or not muscle mass and function diagnostic criteria, has not been reached yet. Indeed, different criteria and cutpoints have been proposed for weakness and low lean mass, among which recent ones from the Foundation for the National Institutes of Health (FNIH) Sarcopenia Project. In a homogenous cohort of 68-year old community-dwellers, we applied different criteria and cutpoints to evaluate disease prevalence and agreement of operational diagnostic criteria, as proposed by the European Working Group on Sarcopenia in Older People (EWGSOP), the International Working Group on Sarcopenia (IWG), and the FNIH.

Material and Methods: 767 subjects (608 women; age 67.9 ± 1.5 years), enrolled in the Geneva Retired Workers Cohort (GERICO), were studied. Appendicular lean mass (ALM), ALM/height² and ALM/BMI ratios were determined by DXA. Gait speed was measured over a 4-m distance and grip strength using a digital handheld dynamometer. Disease prevalence was estimated using EWGSOP, IWG and FNIH proposed criteria, and degree of agreement assessed using kappa statistics.

Results: Low lean mass prevalence ranged from 3.8 % (FNIH) to 16.0 % (EWGSOP). Weakness prevalence ranged from 0.7 % (FNIH) to 3.9 % (EWGSOP). Prevalence of low lean mass combined with either weakness or slowness fulfilling various proposed sarcopenia definitions was the lowest for FNIH (0.3 %) compared with IWG (1.2 %) and EWGSOP (1.6 %) criteria, with higher prevalence in women across all definitions. There was poor agreement between the groups identified according to the different definitions, with kappa values below 0.3.

Conclusion: Our results in a large cohort of healthy 68-year old subjects suggest that muscle weakness, slowness and low lean mass prevalence widely vary depending on the criteria and cutpoints applied. Similarly, sarcopenia, which is infrequent among this population, considerably varies according to the definitions, with poor agreement between classifications. Further studies should compare the predictive ability of candidate sarcopenia criteria for hard outcomes, like incident falls, fractures, activities of daily living and quality of life.

P505

CLODRONATE 200 MG I.M. WITH 1 % LIDOCAINE IN POSTMENOPAUSAL OSTEOPOROSIS COULD SIMPLIFY THE THERAPEUTIC DOSING REGIMEN

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Objective: To demonstrate the not-inferiority of clodronate 200 mg i.m. with 1 % lidocaine administered every other week (C200) vs. clodronate 100 mg i.m. with 1 % lidocaine administered once-a-week (C100). The C200 was to be declared as not inferior to C100 if the lower limit, of the difference between treatments in lumbar BMD mean percent change from baseline to 1 year, was ≥ -1.5 percentage points. Per-protocol population (PP) has been considered as the main analysis for the demonstration of non-inferiority.

Methods: This was a prospective, multinational, randomized, open label, parallel-group controlled trial involving women with postmenopausal osteoporosis. The primary efficacy variable was the value of lumbar BMD (evaluated with blinded reading of DXA scans) after 1-year treatment. Vitamin D3 25000 IU was administered once-a-month to both groups. Secondary objectives included the changes in femoral neck BMD, biochemical markers of bone turnover (CTX and BALP), local pain and tolerability (hardening and reddening), safety and compliance.

Results: The PP population included 219 women. BMD values increased in both groups after 1 year. The adjusted mean percent difference between C200 and C100 was -0.340 (95 %CI -1.420 to 0.740 , $p=0.535$) confirming the not-inferiority. The comparisons between groups did not show differences in the secondary variables and both treatments

were associated with decreases from baseline in mean values of CTX and BALP, as a result of a reduced bone turnover with both treatment regimens. Local tolerability did not show differences between groups both immediately and 30 min after injection. The pain intensity after the injection, assessed with VAS, was minimal in both groups (adjusted mean 1.677 cm in C200 and 1.236 cm in C100 immediately after the injection) without difference between groups ($p=0.134$). The results of safety showed that both treatment regimens were well tolerated; there were no adverse events due to alterations in renal function. The compliance was higher in the C200 than in the C100 ($p=0.020$).

Conclusion: C200 administered twice-a-week could be a solution to improve treatment adherence on postmenopausal osteoporosis compared to C100 every week.

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A CLINICAL TRIAL ON THE EFFICACY AND SAFETY OF TWO TERIPARATIDE FORMULATIONS

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A randomized, simple blind clinical trial was performed to compare the efficacy and safety of a new pharmaceutical product containing teriparatide (Osteofortil™, Biosidus S.A., Buenos Aires, Argentina) with the reference teriparatide formulation (Forteo™, Eli Lilly, IN, USA). The study was conducted in a single osteoporosis reference center. A total of 100 postmenopausal women with osteoporosis, defined as a BMD T-score < -2.5 at the lumbar spine or the presence of a prevalent vertebral fracture and a BMD T-score < -2 at the lumbar spine, femoral neck or total hip were included and randomized to receive either Osteofortil™ (OGroup, $n=51$) or Forteo™ (FGroup $n=49$), both in a daily subcutaneous dose of 20 µg, plus calcium and vitamin D supplements for 6 months. An independent Ethics Committee and the national drug regulatory agency of Argentina (ANMAT) approved the trial. Serum osteocalcin (OC), N-terminal propeptide of procollagen type I (P1NP) and C-terminal crosslinked telopeptide of type I collagen (CTX) levels were measured by electrochemiluminescence at baseline and months 1, 3, 6, 9 and 12. BMD at the lumbar spine, total hip and femoral neck was measured by DXA at baseline and after 6 and 12 months of treatment. The induction of anti-teriparatide antibodies was evaluated by ELISA. At baseline there were no differences between groups in demographic characteristics, previous use of bisphosphonates, serum 25(OH) vitamin D levels and presence of prevalent fractures. At 6 months the increase in bone turnover markers in the OGroup ($n=48$) was 60.3±30 ng/ml for OC, 146.8±98 ng/ml for P1NP and 816.2±467 pg/ml for CTX,

whereas the corresponding figures for the FGroup ($n=46$) were 67.8±29.4 ng/ml, 179±97 ng/ml and 1046±656 pg/ml, respectively ($P=0.46$, 0.56 and 0.45). The increase in lumbar spine BMD at month 6 was 6.12±4.59 % with Forteo™ and 4.42±3.95 % with Osteofortil™ ($P=ns$). There was no induction of anti-teriparatide antibodies in any patient and the occurrence of adverse events was similar between groups. In conclusion, both products induced similar changes in bone turnover markers and BMD and showed a similar safety profile.

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BASELINE CHARACTERISTICS OF THE POPULATION ENROLLED IN DIRP (DENOSUMAB IN REAL PRACTICE) STUDY

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Objective: Vertebral fragility fractures increase morbidity, mortality and health care costs related to osteoporosis. Persistent pain and disability are common in patients with vertebral fractures. Anti-osteoporotic drugs reduce significantly the risk of new fragility fractures and might reduce pain and functional impairment due to vertebral osteoporotic fractures. DIRP (denosumab In Real Practice) is a study that aims to evaluate the effectiveness of denosumab in pain control, in reducing functional limitation and improving quality of life in a cohort of postmenopausal women with at least one osteoporotic vertebral fracture.

Materials and Methods: This study includes a cohort of osteoporotic women with indication for denosumab. According to the Italian reimbursement criteria for osteoporosis (National Health Service 79), denosumab is indicated for postmenopausal women with at least one vertebral fragility fracture, detected with radiographic imaging or Lateral Vertebral Assessment (LVA). In this population, pain and functional limitation are assessed with the Spine Pain Index (SPI), and health-related quality of life with the 12-Item Short-Form Health Survey (SF-12).

Results: A total of 217 women, mean aged 74.5 years were evaluated. Of these, 35 (16.1 %) had a single vertebral

fracture, 51 (39.6 %) 2 fractures and 131 (44.3 %) more than 2 vertebral fractures. 132 women (60.8 %) had a BMD value of $T\text{-score} \leq -2.5$ SD. The severity of back pain was mild or negligible in 34 patients (15.7 %), moderate in 112 (51.6 %), while 71 women (32.7 %) had a severe pain. Overall, 183 patients (84.3 %) needed a treatment for pain, according to WHO. The quality of life perceived by patients treated with denosumab was significantly reduced in both physical (SF-12 PCS) and mental (SF-12 MCS) components.

Conclusion: In Italy, Denosumab can be prescribed only in patients with advanced osteoporosis characterized by multiple fragility fractures, moderate to severe persistent back pain, disability, and a poor quality of life. This is in contrast with what it should be expected for a front-line drug for osteoporosis.

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SCLEROSTIN LEVELS AND CHANGES IN BONE METABOLISM AFTER BARIATRIC SURGERY

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Context: The role of sclerostin as a key regulator of bone formation remains unknown after Roux-en-Y gastric bypass (RYGB) or laparoscopic sleeve gastrectomy (SG).

Objective: Evaluation of sclerostin and Dickkopf-1 (DKK-1) serum levels after surgery and correlations with bone turnover markers (PINP, CTX), parathyroid hormone (iPTH) and areal BMD, changes at total body, lumbar spine and total hip.

Design and Setting: A prospective observational single-center two-arm study in premenopausal women with acute adipositas over 24 months. Participants: 52 premenopausal women (40±8 years, BMI 43.4) after RYGB and 38 premenopausal women (41±7 years, BMI 45.7) after SG. Main Outcome Measures: Prior to surgery and 1, 3, 6, 9, 12, 18 and 24 months after surgery sclerostin, DKK-1, CTX, PINP levels and BMD were measured.

Results: Sclerostin, CTX and (to a lesser extent) PINP increased after surgery and remained elevated during the entire study period ($p < 0.001$). DKK-1 declined during months 3–9 ($p < 0.005$) and then remained unchanged, serum phosphate continuously increased ($p < 0.001$), iPTH remained within the upper normal limit. Sclerostin increases were significantly positively correlated with CTX and PINP increases and negatively correlated with BMD loss. BMD independently declined regardless of RYGB and SG. Elevations of sclerostin, CTX, PINP and phosphate but not DKK-1 and iPTH, were significant discriminating factors for BMD loss (AUC 0.920).

Conclusion: Rapid and sustained increases of sclerostin, CTX and - to a lesser extent - PINP cause an increase in bone metabolism and result in BMD loss at all skeletal sites.

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ACUTE AND PROLONGED CHANGES OF SERUM BONE TURNOVER MARKER AND BONE MICROARCHITECTURE IN MALE PATIENTS AFTER SEVERE BURN INJURY

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Patient enduring severe burn injury have acute elevations of bone metabolism, triggered by inflammatory processes. This study tests the hypothesis that early changes of bone metabolism cause prolonged cortical and trabecular bone deterioration. The primary objective was to investigate changes of bone turnover marker (BTM: PINP, CTX, sclerostin, vitamin D) in the acute phase in stratum I and in stratum II. Secondary objectives included the evaluation of bone microarchitecture after a mean period of 2 years assessed by HR-pQCT (in vivo resolution 82 µm) of radius and tibia in stratum II.

Material and Methods: In stratum I 21 male otherwise healthy and untreated Caucasian patients (45.6±20.0 years; 18.7±16.1 days of immobilization) with burn injury grade IIb-III and a TBSA of 37.2±14.8 % were included. BTM were evaluated after 48 h, at days 7, 21, 56. In stratum II 20 male Patients (40.2±11.3 years; TBSA 43.9±12.3 %; 27.5±2.9 months after trauma) were compared to 45 age matched healthy controls (HC).

Results: In stratum I a rapid and prolonged increase of BTM without changes of low calcium and vitamin D levels was found: (CTX: $\Delta +178$ %, PINP $\Delta +389$ %, $p < 0.0001$ for both). All BTMs in stratum II were still severely altered compared to HC: CTX: $\Delta +71$ %, PINP $\Delta -43$ %, sclerostin +91 %; $p < 0.001$ for all. At both, the radius and the tibia, a significant deterioration of bone microarchitecture was observed compared to HC: Trabecular bone volume, cortical porosity, cortical and trabecular parameters; endocortical perimeter; $p < 0.001$ for all.

Conclusion: We observed an early and sustained increase in BTM and structural alterations in bone microarchitecture after severe thermal trauma. These deteriorations are likely due to the impaired early and ongoing changes in bone metabolism after trauma and could increase the individual risk for fragility fractures.

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IBANDRONATE INCREASES BONE STRENGTH AND SCLEROSTIN LEVELS IN MALE PATIENTS WITH IDIOPATHIC OSTEOPOROSIS

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The pathomechanism of male idiopathic osteoporosis (MIO) seems to differ from postmenopausal osteoporosis with regard to alterations in osteoblast activity. We evaluated intravenous ibandronate (IBN) in 25 patients with MIO and fragility fractures in a prospective, monocentric, single-arm, open-label study for 24 months. The impact and changes of sclerostin (Scl), Dickkopf-1 (DKK-1), CTX and P1NP were examined. Additionally, volumetric cortical, trabecular and areal BMD, TBS and finite element analysis (FEA) were evaluated. Median Scl levels increased (Δ 121 %, $p < 0.0001$) and remained elevated for 12 months. DKK-1 decreased ($p < 0.001$) to a lesser extent until month 9 with comparable values at study endpoint. Early changes of Scl negatively correlated with DKK-1 (-0.72), CTX (-0.82) and P1NP (-0.55 ; $p < 0.005$ for all). Scl changes over the entire study period negatively correlated with decreased CTX (-0.32) and DKK-1 (-0.57 , $p < 0.0001$ for both); CTX and P1NP changes positively correlated at each time point ($p < 0.001$). Volumetric hip BMD increased by 12 and 18 %, respectively ($p < 0.0001$ for both). Cross-sectional moment of inertia, section modulus and buckling ratio for total hip significantly improved ($p < 0.05$ for all). Areal BMD at total hip, spine and TBS improved. FEA displayed an increase in bone strength both in the hip (17 %) and vertebrae (13 %, all $p < 0.0001$) at anatomical sites susceptible for fragility fracture. IBN improves cortical and trabecular bone strength by the uncoupling of Scl and DKK-1 with early and ongoing vigorous suppression of bone resorption and, to a lesser extent, bone formation in the early phase.

P511

DYNAPENIC SKELETAL MUSCLE FUNCTION DEFICIT AS DETERMINANT OF SKELETAL FRAGILITY: A RETROSPECTIVE ANALYSIS

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Objective: Recent studies demonstrated a significant association between sarcopenia and severe osteoporosis in older women.¹ However, the decline in muscle performance and mobility

limitation are due only in part to the age-related reduction of muscle mass.² The dynapenic skeletal muscle function deficit (SMFD) is a new terminology used to integrate the age-related muscle dysfunctions. The aim of our study was to investigate this concept in a cohort of postmenopausal women.

Materials and methods: In this retrospective study we analyzed data derived from the medical record of postmenopausal women aged 55 or older referring to an outpatient rehabilitation service. In our population, we defined dynapenic SMFD according to the Foundation for the National Institutes of Health's (FNIH) criteria,² based on reduction of usual gait speed (< 0.8 m/s), handgrip strength (< 16 kg), and normal appendicular lean mass adjusted for BMI (> 0.512). We analyzed the Vertebral Fracture Assessment (VFA) from DXA spine images to identify vertebral fragility fractures.

Results: Shown in the table. In our cohort, women with dynapenic SMFD had an odds ratio (OR), adjusted for age, for vertebral fragility fracture of 1.79 (95 %CI=1.40–3.68; $p = 0.044$).

	Population (n=70)	Non-dynapenic SMFD (n=45)	Dynapenic SMFD (n=25)	p-value
Age	67±7.71	64.73±1.10	71.08±1.34	<0.001
BMI (kg/m ²)	25.21±3.34	25.13±0.52	25.34±0.64	0.80
Falls (n)	13 (18.57 %)	8 (17.78 %)	5 (20 %)	0.82
VFx (n)	36 (51.43 %)	17 (37.78 %)	19 (76 %)	0.002
BMD L1-L4 (g/cm ²)	0.893±0.203	0.871±0.031	0.934±0.038	0.23

Note: data are expressed as mean±SD.

Abbreviations: BMI=body mass index; VFx=vertebral fragility fractures; BMD=Bone Mineral Density; SMFD=Skeletal Muscle Function Deficit.

Conclusion: In our opinion, the concept of dynapenic SMFD might be useful to provide a comprehensive assessment of the risk fracture in osteoporotic women.

References: 1. Iolascon G et al., Aging Clin Exp Res 2013;25 Suppl 1:S129. 2. Studenski SA et al., J Gerontol A Biol Sci Med Sci 2014;69:547.

P512

TWO YEAR RESULTS OF MULTIPROFESSIONAL CARE AND EDUCATION IN OSTEOARTHRITIS

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Objective: Evaluate the impact of multiprofessional educational program on patients with osteoarthritis of the knee.

Design: prospective randomized controlled trial. Setting: Tertiary care in Brazil. Participants: 195 patients with knee

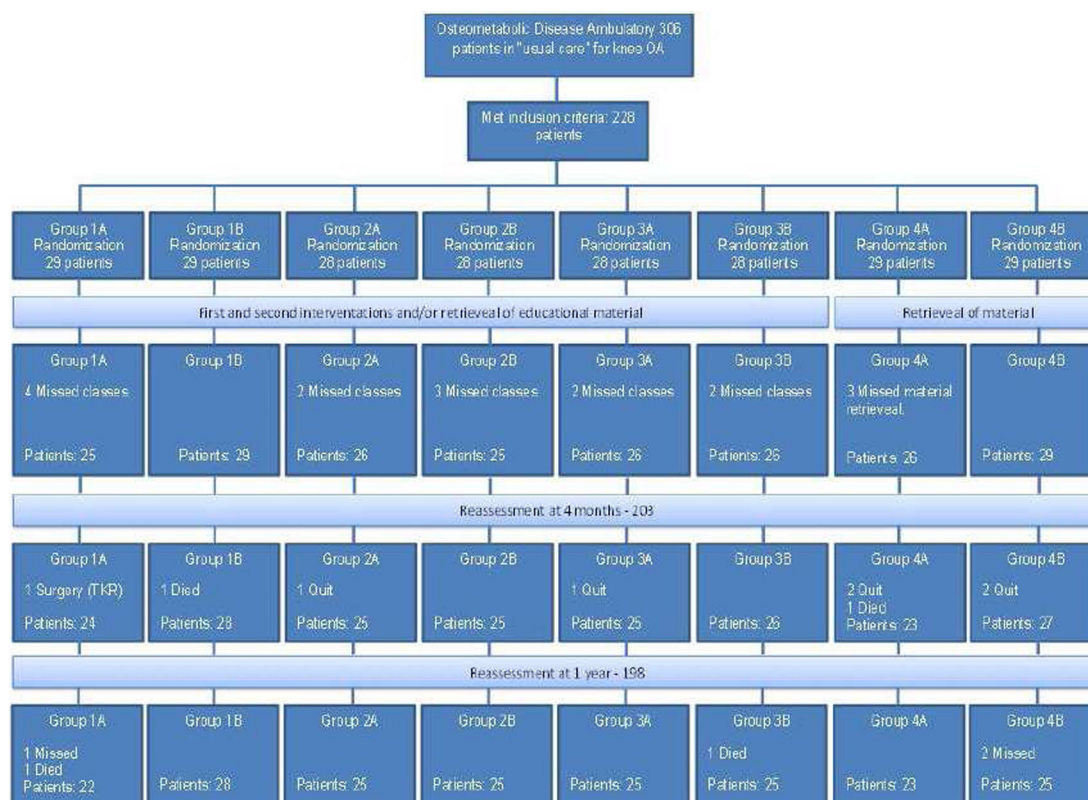
osteoarthritis (KOA). Interventions: Two days lectures plus educational material on KOA 1, 2 and 3 months apart and a control group - educational material only (figure). WOMAC, WOMAC pain, Lequesne, VAS, SF-36 at baseline, 4, 12 and 24 months. Bimonthly telephone calls to half of the participants (first year). BMI, % of body fat, minutes per week of exercise, years of schooling and coping results were correlated to the functional and pain results.

Results: Groups were similar in gender, affected side, OA severity, schooling, coping and % of body fat. Group 2 had BMI lower than group 3 ($p=0.026$) in all times. Body fat increased in the second year in all groups. WOMAC, PCS and MCS improved at short-term ($p=0.007$, 0.025 and 0.021). MCS remained improved at 1 year ($p=0.027$). Telephone calls, Patient's schooling and BMI reduction did not correlate with pain and functional results. BMI

changes at 2 years correlated with MCS ($p=0.043$). Coping focused on emotions was inversely related to BMI changes ($r=-0.182$, $p=0.023$). At baseline 25 patients exercised whereas at 2 years, 123 exercised. Only 14 (7 %) of the patients reduced more than 2 points in BMI whereas 39 (20 %) increased physical activity above 180 min/week (m/w). Exercising over 300 m/w and/or reducing 4 points in BMI determined improvement in pain, function and quality of life at 2 years.

Conclusion: The educational program reduced BMI, improved function and quality of life irrespective of the level of education and of telephone calls at best for a year. Emotion focused patients increased BMI. The very small percentage of patients that changed eating and/or exercise habits improved in pain, function and quality of life.

Registration: Clinical trials NCT01572051.



P513

FRACTURE RISK ASSESSMENT OF PATIENTS WITH INFLAMMATORY JOINT DISEASE RECEIVING BIOLOGICAL AGENTS ATTENDING A RHEUMATOLOGY SERVICE IN A UNIVERSITY AFFILIATED TEACHING HOSPITAL

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Objective:

Osteoporosis, characterised by deteriorating bone microarchitecture with a concomitant increase in bone

fragility, represents a growing public health concern. From an inflammatory arthropathy perspective, especially RA, it is a well known extra-articular characteristic of concern. Fracture risk can be examined using the WHO FRAX[®] tool, which has been formulated to estimate a 10-year absolute risk of fracture using validated clinical risk factors. The aims of our study were to determine the fracture risk in patients receiving biologic therapies using the FRAX tool and to determine if a care-gap exists in this cohort.

Materials & Methods: A cross-sectional telephone based questionnaire study, employing the FRAX tool, was conducted on Inflammatory arthropathy patients (RA, PsA, SNA, AS), receiving biological therapies, attending our Rheumatology service. Patients received a letter informing them of the study and pending telephone call 1 week in advance. Those not contactable within two attempted telephone calls were excluded from the study. Patients were randomly selected from the Departments Biologics database. Following FRAX assessment, patients were classified as low, intermediate or high fracture risk using The National Osteoporosis Guideline Group (NOGG) analysis.

Results: 182 patients were telephoned with 123 patients being contactable within two attempts. 101 patients partook in the study. 8 (8 %) had a prior osteoporosis diagnosis. 93 (92 %) were eligible for FRAX assessment with a mean age was 55.5 years (range: 40–75) and 53 % male. Of the untreated group 77 % had RA, 14 % PsA and 8 % AS. FRAX assessment gave a median 10-year hip osteoporotic fracture probability of 2.1 % (mean=3.5 %) and major osteoporotic fracture probability of 11 % (mean=12.4 %). NOGG analysis would advise offering treatment to 25 %, DXA imaging to 56 % and osteoporosis/fracture risk lifestyle advice to 19 % of patients. Thus a potential 81 % of untreated patients may require osteoporosis/risk fracture prevention measures.

Conclusion: A large care-gap was identified among this patient group. Results highlight the need to identify and modify fracture risk in patients with inflammatory arthropathies receiving biologic therapies.

P515

MUSCLE STRENGTH AND PHYSICAL PERFORMANCE IN PATIENTS WITH VITAMIN D DEFICIENCY

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Objective: Many observational studies and some clinical trials suggested a role of vitamin D counteracting bone and muscle loss in aging. Low serum levels of 25-hydroxyvitamin D (25OHD) seem to be associated with

reduced muscle strength and physical performance. The aim of our study was to compare physical performance and muscle strength in subjects with different serum levels of vitamin D.

Materials and methods: We compared 40 patients with vitamin D deficiency (25 OHD <30 ng/ml) to 37 subjects with normal serum levels of 25 OHD (≥30 ng/ml). The muscle strength and muscle performance were, respectively, assessed with the Jamar handheld dynamometer and the Short Physical Performance Battery (SPPB).

Results: Shown in the table.

Parameters	Vitamin D deficiency subjects (n=40)	Normal subjects (n=37)	p-value
Age (year)	66.9±7.27	67.54±8.29	NS
Body Mass Index (BMI) (kg/m ²)	25.37±3.59	25.72±3.25	NS
HGS (kg)	12.81±5.10	15.70±6.89	0.038
Gait speed	<1 m/s: 25/40 (62.5 %)	<1 m/s: 20/37 (54.1 %)	NS
	>1 m/s: 15/40 (37.5 %)	>1 M/s: 17/37 (45.9 %)	
SPPB score	<8: 17/40 (42.5 %)	<8: 10/37 (27 %)	NS
	>8: 23/40 (57.5 %)	>8: 20/37 (73 %)	

Conclusion: Subjects with hypovitaminosis D resulted to have a reduction in SPPB score, gait speed, and handgrip strength, but only for the latter there is a statistical significant between-group difference. References: Tomlinson PB et al., J Sci Med Sport. 2014 Aug 11 pii: S1440-2440(14)00163-7.

P516

STRONTIUM RANELATE AFFECTS DIFFERENTLY CELLULAR ACTIVITIES IN NORMAL OR HEALING TRABECULAR BONE

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Treatments of osteoporosis act on resorption and/or formation, and could differently affect bone turnover in normal mature bone or in bone healing process. Thus, we investigated whether systemic strontium ranelate (SrRan) administration differently modulates bone cellular activities in normal trabecular bone remodelling or bone defect healing. Proximal tibia bone defects were created in 6-month-old female rats, which received then orally SrRan (625 mg/kg/day, 5/7 days) or vehicle (controls) for 4, 8, or 12 weeks. Bone samples were analysed by histomorphometry in metaphyseal 2nd spongiosa (normal trabecular bone) and within the healing defect. In trabecular compartments, from 8 weeks of

treatment and independently of the site, SrRan treatment decreased bone resorption as indicated by reduced active osteoclast surfaces (at week-8: -45 % in normal trabecular bone, $p < 0.001$ and -46 % in healing area, $p < 0.001$). At week-12 this parameter is still significantly decreased. Bone resorption was increased by 25 % in healing defect only at week-4 ($p < 0.05$). Bone formation was stimulated within the healing defect at an early stage as shown by increased bone formation rate by week 4 and 8 (+70 %, $p < 0.001$ and +35 %, $p < 0.05$). Osteoid surface and thickness were not altered in those compartments, suggesting that osteoblast function was modulated toward mineral apposition rather than differentiation. This is supported by increased adjusted apposition rate in early healing phase. In contrast, bone formation rate was not affected by SrRan treatment in normal trabecular bone. These results clearly demonstrate that SrRan treatment inhibits bone resorption and maintains bone formation in normal trabecular bone. SrRan late inhibits bone resorption and early stimulates bone formation leading to a positive bone balance. These observations in two different areas of the same tibia could explain most of the discrepancy observed between the different clinical and preclinical studies.

P517

ASSESSMENT OF ATYPICAL FEMORAL FRACTURE RISK IN PATIENTS WITH LONG-TERM TREATMENT WITH BISPHOSPHONATES

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Currently, osteoporosis is a condition with a very high prevalence that leads to several complications, including secondary atypical fractures. Since the year 1995, the use of bisphosphonates in the treatment of this pathology has been authorized, thanks to its inhibitory power against bone resorption. However, along the past years, many side effects have been found, including atypical fractures of the femur and osteonecrosis of the jaw. In order to classify them as atypical, these fractures must meet some main criteria, including a transverse or oblique presentation, a low energy trauma, low comminution, medial spine and endosteal thickening. We present a study in which we have collected the data of 8 patients who had taken bisphosphonates for more than 5 years and who suffered an atypical femoral fracture.

Methods: We carried out a retrospective study of the last 5 years where we review patients with atypical subtrochanteric or diaphyseal femoral fractures after a low energy trauma who had taken bisphosphonates for more than 5 years.

Conclusion: Currently, bisphosphonates are one of the treatments of choice for osteoporosis. However, in the last years they have been associated with atypical subtrochanteric or diaphyseal femoral fractures in patients who had taken them

for more than 5 years. Therefore, monitoring must be applied to prevent these complications and to implement an adequate acute treatment if they appear.

P518

ULTRASTRUCTURE OF BIOMINERAL OF HIPBONE IN RATS OF DIFFERENT AGES AFTER 60-DAY EPICHLOROHYDRIN INHALATION AND CORRECTION OF ITS NEGATIVE EFFECTS

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Objective: To examine ultrastructural features of the hipbone in rats after 60 days inhalation of epichlorohydrin (E) and to find ways of correction of its negative effects with thiotriazoline (T) and Echinaceae Tinctura (ET).

Materials and methods: The experiment involved 420 male rats of three age groups (young, mature and old). Each age group was further separated into the following groups: intact animals, animals that received daily E inhalations as a single 5-h exposure to 10 MPC for 60 days and the groups 3 and 4 received 2.5 % intraperitoneal solution of T in dosage 117.4 mg/kg of body weight and per os ET in dosage of 0.1 mg of active component per 100 g of body weight. The animals were withdrawn from the experiment by the 1st, 7th, 15th, 30th and 60th days after discontinuation of 60 days cycle of E inhalations. Burned and powdered bone tissue was taken to X-ray scatter analysis (V.I. Luzin, 2005). The X-ray device employed $K\alpha$ copper radiation with wavelength of 0.1542 nm; anode voltage and amperage were 30 kV and 20 A, respectively. From the data obtained we calculated crystallographic parameters of the bone mineral. The data obtained were analyzed by means of variation statistics using standard applied software.

Results and discussion: By the first day after E discontinuation, crystallites dimensions in young animals increased as compared to the control values by 11.51 % and microtexture coefficient decreased by 11.20 %. In adult animals the same values changed in the same way by 10.25 and 10.03 % and in old animals - by 4.70 and 7.65 %. In readaptation period young animals exhibited restoration of deranged features by the 60th day of observation, in adult animals alterations persisted up to the 30th day of observation and old animals did not exhibit marked restoration. Administration of T or ET reduced negative effects of E during inhalation and after it. After T administration, deranged features of the crystal lattice restored in young animals by the 15th day of observation, adult animals exhibited restoration signs throughout the whole observation period and in old animals signs of restoration were observed by the 30th and the 60th days. After ET

administration, in young animals restoration of the crystal lattice was observed by the 15th and 30th days of observation and in adult and old animals - by the 30th and the 60th days of observation. Generally T appeared to be more effective than ET.

Conclusion: 60-day inhalation of E 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 epichlorohydrin. We proved T to be more effective than ET.

P519

BONE COMPLICATION IN THALASSEMIA PATIENTS IN VIETNAMESE NATIONAL INSTITUTE OF HEMATOLOGY AND BLOOD TRANSFUSION

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Inherited hemoglobin disorders can be divided into two main groups. The first group includes the α - and β -thalassemias which result from the defective synthesis of the α - or β -globin chains. The second group includes structural hemoglobin variants, such as hemoglobin S, C and E. Thalassemia can be associated with other hemoglobin variants like β -thalassemia/HbE. Common symptoms are chronic anemia and jaundice. In the same time, there are many complications caused by chronic anemia and iron overload if patient have not been cared and treated well. Though skeletal complications are not too dangerous or fatal but very popular and affect quality of life. Patients with thalassemia were noted firstly by Cooley with peculiar bone changes of the cranial and facial bones.

Objective: To determine the prevalence of low BMD, the relation between skeletal complications and some related issues in Thalassemia patients.

Method: From October 2012 to December 2013, we collected data from 509 thalassemia patients included β -thalassemia, β -thalassemia/HbE and α -thalassemia (HbH) from 1–65 years old using these criteria: Medical history by interview, reviewing of medical records, physical examinations, peripheral cell blood count, plasma ferritin, X-ray bone, spine and femur BMD by DXA.

Results: 509 subjects, 47.35 % male, mean age 20.3 years (range 1–65 years). 139 β -thalassemia patients with a mean age of 12 years, 273 β -thalassemia/HbE with a mean age of 20.8 years and 97 α -thalassemia with a mean age of 30.8 years. Bone deformity in 68.3 % subjects, 30.7 % patients had a history of fractures. Spine and femur BMD Z-

scores < -2.5 occurred in 59.8 and 26.8 % of participants, respectively. Low BMD is associated with high level of plasma ferritin.

P520

EFFECTS OF BIOLOGIC DRUGS ON BONE MINERAL DENSITY IN RHEUMATOID ARTHRITIS PATIENTS

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Objective: To compare the effects of biological disease-modifying antirheumatic drugs (bDMARDs) to conventional DMARDs (cDMARDs) on BMD in patients with active rheumatoid arthritis (RA).

Patients and methods: A 12-month prospective trial was performed on the cohort of 105 patients with active RA (Disease Activity Score - DAS 28 > 5.1). The cohort was divided into two groups: group 1 ($n=84$, mean age 54 years) treated with bDMARDs (anti-TNF and IL6 blockers) and group 2 ($n=21$, mean age 53 years) treated with non-biological DMARDs (methotrexate). The median duration of the disease was 11 years in both groups. DAS28 at baseline was 6.37 in group 1 and 5.22 in group 2. The mean daily dose of glucocorticoids (GC) was 6.2 mg in group 1 vs. 6.6 mg in group 2 (NS). Patients with bisphosphonates or other antiprotic treatment were not included. All patients were taking calcium (1000 mg) and vitamin D (800 IU) supplementation. The BMD of the lumbar spine and femoral neck was measured at baseline and after 1 year of treatment by DXA (Hologic).

Results: We found in group 1 significant increase in lumbar spine BMD (0.987 g/cm² vs. 0.994 g/cm², $p=0.008$). Change of BMD in femoral neck in whole group 1 was not significant (0.776 g/cm² vs. 0.753 g/cm², NS), but significant increase was observed in subgroup ($n=27$) of premenopausal women ($p<0.001$). In group 2 significant decrease in BMD of lumbar spine (0.993 g/cm² vs. 0.989 g/cm², $p<0.001$) as well as in femoral neck (0.784 g/cm² vs. 0.782 g/cm², $p=0.016$) was observed. DAS 28 after 1 year of treatment was 2.48 ($p<0.001$) in group 1 compared to 3.91 (NS) in group 2. Mean daily dose of GC after 1 year was 4.1 mg ($p<0.001$) in group 1 and 5.4 mg (NS) in group 2.

Conclusion: In contrast to the bone loss observed after cDMARDs (methotrexate), biological treatment had beneficial effect on lumbar and femoral neck BMD. Whether the biologics exert their effects on bone loss through a direct mechanism on bone cell or indirectly by reducing inflammation, decreasing pain and increased physical activity remains to be established. Reduction of GC may contribute to beneficial effect of bDMARDs on BMD.

P521**THE EFFECTS OF SODIUM GLUTAMATE AND IONIZING RADIATION ON GROWTH RATE OF THE MANDIBLE IN RATS**K. T. Simrok¹, V. I. Luzin², G. V. Miakotkina²¹Clinics of Therapeutic Dentistry, LLC Medeurobud, Kiev, Ukraine, ²Department of Human Anatomy, Lugansk State Medical University, Lugansk, Ukraine

Objective: to investigate growth rates of the mandible in rats in readaptation period after 60-day application of sodium glutamate (SG) and exposure to ionizing radiation (IR), and finding possibility of medication with spirulina (Sp).

Materials and methods: The experiment involved 240 rats with 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 SG in dosage of 30 mg/kg daily for 60 days, animals exposed to IR (total 4 Grey in 4 sessions), received Sp in dosage of 250 mg/kg, combined SG and IR, SG and Sp, Sp and IR, 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 SG discontinue, ramus height, alveolar buttress width, and width of lower incisor decreased as compared to the controls by 8.66, 6.22, and 4.94 %; after IR discontinue same values decreased by 12.29, 7.75, and 9.71 %. After combined action of SG and IR those values were lower by 12.63, 10.81, and 12.72 %. Restoration of growth rate also depended on influence: by the 60th day after SG discontinue some differences were still observed, and after cessation of combined action growth rate did not recover. Application of Sp reduced negative effects of experimental conditions on growth rate of mandible. The best recovery outcome was observed in animals that received only SG and the lowest recovery outcome was yielded in rats exposed to combined action of IR radiation and SG.

Conclusion: 60-day application of SG in dosage of 30 mg/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 Sp well satisfies this demand.

P522**BONE TURNOVER IN PATIENTS WITH HETEROTOPIC OSSIFICATION AFTER SPINAL CORD INJURY**V. V. Povoroznyuk¹, M. Bystrytska¹¹Institute of Gerontology NAMS Ukraine, Kyiv, Ukraine

Aim: To determine the bone turnover markers in patients with spinal cord injury (SCI) with and without heterotopic ossification (HO).

Methods: Markers of bone formation (Osteocalcin, serum type 1 procollagen (N-terminal) (tP1NP)) and bone resorption (serum collagen type 1 crosslinked C-telopeptide (β -CTX)) were determined by the electrochemiluminescence immunoassay “ECLIA” for Elecsys user cobas immunoassay analyzer. In the study were included 23 patients with SCI - first group (average age 26.8 \pm 3.9, duration of spinal cord injury from 3 to 12 months) and 23 healthy people’s appropriate age and gender (average age 30.6 \pm 6.0 years). In the first group included 11 patients with SCI with the presence of HO - subgroup I and 12 patients with spinal cord injury without HO - subgroup II.

Results: the results of examination showed that patients of first group had significantly higher bone markers than control group: P1NP (256.7 \pm 48.2 ng/ml vs. 49.3 \pm 5.1 ng/ml, p <0.001), serum β -CTX (1.47 \pm 0.23 ng/ml vs. 0.45 \pm 0.04 ng/ml, p <0.0001), osteocalcin (52.2 \pm 9.8 ng/ml vs. 24.9 \pm 2.08 ng/ml, p <0.001). There were obtained that levels of bone remodeling markers in patients with HO were significantly higher in comparison with patients without HO: P1NP (404.9 \pm 84.9 ng/ml vs. 133.2 \pm 15.7 ng/ml, p <0.001), serum β -CTX (1.75 \pm 0.23 ng/ml vs. 0.28 \pm 0.14 ng/ml, p <0.0001), osteocalcin (87.1 \pm 18.9 ng/ml vs. 29.4 \pm 3.7 ng/ml, p <0.001).

Conclusion: The bone formation and bone resorption markers in patient of first group were significantly higher than in healthy individuals of appropriate age. The rate of bone turnover markers in patient with HO was considerably higher than in patient without HO and the process of formation dominated over the resorption in patient with HO.

P523**THE INFLUENCE OF NUMBER OF PREGNANCIES ON BONE MINERAL DENSITY IN CHINESE POSTMENOPAUSAL WOMEN: A SYSTEMATIC REVIEW**P.-C. Wu¹, D.-H. Liu²¹Division of Chinese Internal Medicine, Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, New Taipei City, Taiwan, Province of China, ²Department of Physical Medicine and Rehabilitation, Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, New Taipei City, Taiwan, Province of China

Objective: Osteoporosis is a highlight in Chinese postmenopausal women. Pregnancy may be a risk factor in bone metabolism, and the number of labors may influence the BMD in Chinese postmenopausal women. We reviewed the Chinese relevant studies and explored the influence of number of labors on BMD in Chinese postmenopausal women.

Material and Methods: Data sources: China Journal Net (CJN), Aititi Library, and National Digital Library of Theses and Dissertations in Taiwan were looked for by keywords “pregnancy”, “postmenopause” and “bone” with no time limitation. We limited our search to original Chinese papers only. All relevant literatures were reviewed and data were also extracted.

Results: A total of 755 healthy postmenopausal women were enrolled in this study. The number of labors were investigated and the BMD were measured (384 cases: lumbar spine (L2~4) BMD; 371 cases: femoral neck BMD). Of the cases with measured lumbar BMD, 195 cases have two or less parities, with mean lumbar BMD=0.797±0.0998 g/cm², and 189 cases have three or more parities, with mean lumbar BMD=0.770±0.116 g/cm². There has significance difference between these two group ($P<0.05$).

Of the cases with measured femoral neck BMD, 189 cases have two or less parities, with mean femoral neck BMD=0.757±0.1278 g/cm², and 182 cases have three or more parities, with mean lumbar BMD=0.697±0.1139 g/cm². There also has significance difference between these two group ($P<0.001$).

Conclusion: Of the study Chinese postmenopausal women, the lumbar spine and femoral neck BMD decreases with increasing numbers of labors, especially over three times. Thus, the previous numbers of labors and pregnancies (over three times) may affect lumbar and femoral neck BMD in Chinese postmenopausal women.

P524

LEVELS OF SERUM CALCIUM AFTER HIP FRACTURE SURGERY

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Hip fracture is the most severe osteoporotic complication. Surgical procedure provides the fastest patient recovery. The aim of this study is to present observed levels of serum calcium in patients who suffered hip fracture and were surgically treated. The research monitored 112 female patients, whose mean age was 77.6 years, who were surgically treated in IOS “Banjica” in 2014. Serum Calcium levels were recorded on the 1st, 3rd and 7th day after surgery. We should note that physiological values for serum calcium are 2.20–2.70. Mean serum calcium on the 1st day after surgery was 1.89, on the 3rd day after surgery 1.94 and on the 7th day, 2.01. Hypocalcemia was observed in the postoperative period.

Insufficient Calcium levels worsen the osteoporosis and it is necessary to supplement Calcium immediately after surgery.

P525

ACCURACY OF THE ECHOGRAPHIC-MEASURED “OSTEOPOROSIS SCORE” IN ESTIMATING SPINE MINERAL DENSITY IN PATIENTS AGED OVER 65 YEARS

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Objective: To test the diagnostic accuracy of a recently introduced ultrasound (US) parameter, called “Osteoporosis Score” (O.S.), in the estimation of spinal BMD in elderly people.

Materials and Methods: A total of 303 female patients (65–80 years, BMI <25 kg/m²) underwent a spinal DXA and an abdominal US scan of lumbar vertebrae. US data, including both echographic images and corresponding “raw” radiofrequency signals, were used to calculate the O.S. value for each considered patient through a statistical comparison with previously built spectral models, following the approach described in [1]. Each patient was classified as osteoporotic, osteopenic or healthy according to both O.S. and DXA-measured BMD. Level of agreement between the two diagnostic methods was assessed by calculating accuracy and Cohen’s k . Correlation between O.S. and BMD was also evaluated as a function of patient age.

Results: For 83.8 % of the patients US diagnosis was the same of the corresponding DXA one ($k=0.752$, $p<0.0001$). Significant correlations were also found between O.S. and BMD values in single age intervals: $r=0.76$ in 65–70 years, $r=0.72$ in 70–75 years, $r=0.75$ in 75–80 years ($p<0.001$ for all). The diagnostic agreement between O.S. and DXA resulted to be very good, although it was slightly inferior to recently published data on O.S. measurements in younger patients [1]: this can be at least partially attributed to degenerative changes in the lumbar spine region, which may affect the accuracy of DXA scan.

Conclusion: The O.S. is a potentially powerful parameter for osteoporosis diagnosis also in elderly people because of its significant correlation with DXA-measured BMD. Future studies, including computed tomography as a gold standard reference, will assess in detail the diagnostic discordance cases.

References: 1. *Ultrasound Med Biol* 2015;41:281.

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P526**IS TBS DIFFERENT IN HEALTHY EUROPEAN CAUCASIAN MEN AND WOMEN? CREATION OF NORMATIVE SPINE TBS DATA FOR MEN**

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Trabecular bone score (TBS, Med-Imaps, France) is an index of bone microarchitectural texture extracted from anteroposterior spine DXA. In this cross-sectional analysis from two facilities in Ukraine and Spain, we have investigated the age-related changes of the lumbar vertebrae microarchitecture assessed by TBS in a cohort of Caucasian men and compare the results to TBS reference data for Caucasian women.

Methods: Subjects in the study were Ukrainian and Spanish men aged 40 and older with a BMD Z-score at spine L1-L4 within $\pm 2SD$. Individuals were excluded if they had fractures, were on any osteoporosis treatment and/or had any illness that would be expected to impact bone metabolism. All data have been obtained from GE-Lunar DXA devices (Prodigy and iDxa, Madison, WI, USA). Cross-calibration between the two centers was performed for TBS. TBS was evaluated at spine L1-L4 but also for all possible vertebrae combinations.

Results: A database of 368 men aged 40–90 years was created. TBS and BMD values at L1-L4 were poorly correlated with BMI ($r=0.16$ and 0.22). TBS was poorly correlated with weight ($r=-0.1$) and height (0.03), whereas higher correlations were obtained for BMD ($r=0.3$ and 0.2). TBS values obtained for all lumbar vertebral combinations decreased significantly with age (see figure below, at L1-L4 for men and women). There was a linear decline of 13.5 % (~ -1.75 T-score) in TBS at L1-L4 between 40 and 90 years of age in men whereas a decline of 16.7 % (~ -2.58 T-score) was observed in women (Dufour et al., OI 2012). Conversely to women, there is no modification of TBS decline rate after 65 years in men.

Conclusion: This study established for the first time TBS age related curve in European men at lumbar spine. The decrease seen in lumbar TBS reflects age-related micro-architecture texture changes at spine. Within 40–65 age range, similar TBS decline was observed in both European Caucasian men and women ($p=0.8$). After 65, TBS decline rate is significantly higher for women than for men ($p<0.01$). This study confirms the need for using gender dedicated reference data.

P527**THE SELF-REPORTED PSYCHOLOGICAL CONSEQUENCES OF FALLS IN ELDERLY WOMEN IN LITHUANIA**

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Objective: Falls are one of the most recognized problems in elderly people, because consequences of the falls have a significant influence on human health, raise their social isolation and change their quality for life to worse. The aim of this study was to examine psychological consequences of the falls in elderly women.

Material and Methods: Women aged 65 years and older were interviewed by phone recording the consequences and healthcare procedures related to every fall sustained during the previous 12 months.

Results: The study population consisted of 310 community-dwelling women (mean age 72.2 ± 4.8 years) who reported one or more fall, one in three of them had fallen twice or more. Of all women who fell, 280 (90.3 %) reported their fall resulted in an injury, and 77 (15.3 %) falls led to bone fractures. More than two thirds (72.9 %) of respondents reported the fear to fall repeatedly and the restricted their everyday activities. The pain was identified as main reason for limitation of everyday activities. Women with fall related fracture more often reported fear of falling (OR=4.94, $p<0.0001$) and everyday activities limitation (OR=5.90, $p<0.0001$). Respondents who reported several falls limited their everyday activities more often than women with single fall ($p=0.033$). Fear of falling was reported by all women with hip or vertebral fractures and by 90.2 % of women with wrist fracture. All the women who experienced hip or vertebral fractures have consequently limited their everyday activities.

Conclusion: Fear of falling was reported by 72.9 % of women who fell during the previous 12 months. All the women who experienced hip or vertebral fractures have consequently limited their everyday activities.

P528**CORRELATIONS BETWEEN 25(OH)D, MARKERS OF BONE TURNOVER AND ANTHROPOMETRIC DATA IN WOMEN OF MIDDLE AND OLD AGE**

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¹Belarusian Medical Academy of Postgraduate Education, Minsk, Belarus, ²City Centre of Osteoporosis, Minsk, Belarus The aim of our study was to evaluate levels of serum 25(OH)D, markers of bone turnover, calcium (Ca), phosphorus (P) and anthropometric data in Belarusian women of middle and old age as well as links between this indicators.

Materials and methods: 384 women aged from 45 to 86 years (mean age 61.4; 8.3 years) were examined. Determination of serum 25(OH)D, β -crosslaps and osteocalcin by the method of electrochemiluminescence (Cobas e411, Roche Diagnostic) and the content of total Ca and inorganic P in biochemical analysis was carried out from November 2011 to December 2012. Levels of vitamin D was considered as normal for the value of 25(OH)D >30 ng/ml, showings of 25(OH)D 20–30 ng/ml was considered as vitamin D insufficiency, <20 ng/ml as vitamin D deficiency, <10 ng/ml as severe deficiency. Medical history was taken using a specially designed questionnaire. Statistical analysis was performed using Statistica 6.0, differences were significant at $p < 0.05$.

Results: Normal levels of vitamin D was detected in 86 (22 %) of the examined women, 129 (34 %) of them had vitamin D insufficiency, 121 (32 %) and 48 (13 %) - deficit and severe deficit of vitamin D. Woman with normal values of vitamin D (group I, n 86) had statistically significant differences from women with varying degrees of failure (group II, n 298) by weight (69.1; 10.8 and 75.3; 15 kg), BMI (26.9; 3.6 and 29.5; 5.8), serum P (1.2; 0.2 and 1.3; 0.3 mmol/l), respectively. Women with severe vitamin D deficiency had statistically significant lower serum Ca (2.52; 0.18 mmol/l) compared to those with normal value of 25(OH)D (2.66; 0.25 mmol/l). There were no differences in the showings of β -crosslaps and osteocalcin in the studied groups. Analysis of questioning revealed that women who took vitamin D supplements at the dose more than 400 IU/day for at least 3 months (n 155) had higher levels of 25(OH)D than those who did not (n 229): 29.8; 8.9 and 20.4; 11.7 ng/ml respectively. There was observed statistically significant correlation between 25(OH)D and duration of vitamin D supplementation: Pearson linear correlation coefficient was 0.48.

Conclusion: Deficiency of vitamin D in Belarusian women of middle and old age is widespread and is associated with higher BMI, lower serum values of P and Ca, women who regularly take vitamin D supplements have higher levels of 25(OH)D which correlates with duration of intake.

P529

JUMPING MECHANOGRAPHY VERSUS OTHER ESTIMATES OF MECHANICAL LOADING IN THE PREDICTION OF BONE GEOMETRY

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Objective: Jumping mechanography has been developed to accurately estimate maximal muscle forces, which is necessary when investigating functional muscle-bone relationships. We aimed to determine whether mechanography derived peak jump power or force have greater explanatory capacity

concerning bone parameters than other estimates of skeletal muscle derived mechanical loading.

Material and Methods: We used data from 181 healthy men (25–45 years) participating in a cross-sectional, population-based sibling study. Estimates of mechanical loading included isokinetic peak torque of the quadriceps muscle, DXA-derived leg lean mass (LLM), mechanography derived peak jump power and force, and pQCT-derived muscle cross-sectional area (CSMA). Midtibial cortical bone parameters were assessed by pQCT. Analyses were adjusted for age, height and weight. Endosteal circumference was additionally adjusted for periosteal circumference (PC) to provide an estimate of endosteal expansion (EC_{PC}).

Results: Jump power and force correlated positively with cortical thickness ($\beta = 0.25$, $p = 0.007$ and $\beta = 0.34$, $p < 0.001$, respectively) and strength strain index (SSI) ($\beta = 0.30$, $p = 0.003$ and $\beta = 0.23$, $p = 0.001$), and inversely with EC_{PC} ($\beta = -0.13$, $p = 0.003$ and $\beta = -0.16$, $p < 0.001$). Force but not power correlated with cortical over total bone area ratio (CrtA/TotA) ($\beta = 0.25$, $p = 0.002$). CSMA correlated positively with PC ($\beta = 0.21$, $p = 0.001$) and SSI ($\beta = 0.26$, $p < 0.001$) and inversely with EC_{PC} ($\beta = -0.09$, $p = 0.016$). LLM correlated with all cortical parameters except CrtA/TotA ($\beta = 0.56$, $p < 0.001$ for PC; $\beta = -0.25$, $p < 0.001$ for EC_{PC}; $\beta = 0.37$, $p = 0.003$ for cortical thickness; $\beta = 0.61$, $p < 0.001$ for SSI). Torque only correlated with PC ($\beta = 0.21$, $p = 0.023$). Based on R^2 statistics, LLM was superior in explaining variation in PC ($R^2 = 0.547$) and SSI ($R^2 = 0.562$) whereas jump force was superior in explaining variation in EC_{PC} ($R^2 = 0.262$), cortical thickness ($R^2 = 0.236$) and CrtA/TotA ($R^2 = 0.215$), compared to other estimates of mechanical loading.

Conclusion: While LLM was the strongest predictor of overall bone size, jump force was the main determinant of cortical bone size, apparently by limiting endosteal expansion. These data indicate that jumping mechanography provides important additional information in the evaluation of muscle-bone relationships.

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ECHOGRAPHIC DENSITOMETRY OF PROXIMAL FEMUR: CLINICAL EVALUATION OF A NOVEL ULTRASOUND APPROACH

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Objective: To evaluate the diagnostic accuracy of a novel ultrasound (US) approach to femoral densitometry in a clinical context.

Materials and Methods: A total of 170 female patients (55–80 years) were enrolled for this study and all of them underwent two different diagnostic investigations: a conventional DXA of the proximal femur and an US scan of the same anatomical region, acquiring both the echographic images and the unfiltered “raw” radiofrequency signals. US data were processed through a novel algorithm that provided the same output parameters of a DXA investigation: BMD, T-score, and Z-score. Assuming DXA as the gold standard reference, diagnostic accuracy of US measurements was assessed by calculating accuracy, Cohen’s k and Pearson correlation coefficient (r).

Results: For 84.7 % of the patients US diagnosis (osteoporotic, osteopenic, healthy) was the same of the corresponding DXA one ($k=0.713$, $p<0.0001$). Significant correlations were also found for single parameters: $r=0.71$ for BMD (r in the range 0.66–0.80 for every 5-year age interval), $r=0.69$ for T-score (0.66–0.81), $r=0.71$ (0.67–0.81) for Z-score ($p<0.001$ for all the r values). There were no appreciable variations in diagnostic agreement as a function of patient’s BMI.

Conclusion: The adopted method for US densitometry of the proximal femur showed a significant diagnostic agreement with the corresponding DXA measurements. Therefore, this approach has the potential to be used for early osteoporosis diagnosis and hip fracture prevention through population screening programs.

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BONE ALKALINE PHOSPHATASE, OSTEOCALCIN AND LUMBAR SPINE BONE MINERAL DENSITY IN PRE- AND POSTMENOPAUSAL WOMEN WHO DEVELOPED BONE METASTASES FROM ADVANCED CANCER

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BMD measurement is a widely accepted quantitative method for diagnosing osteoporosis and predicting fracture risk, while bone alkaline phosphatase (BAP) and osteocalcin assay are of value in estimating bone turnover rates, both in pre- and in postmenopausal women. Low bone mass and

bone metastases (BMs) mostly coexist in patients with BMs, but it is unclear the relationship between markers of bone turnover and bone density. The aim of this study was to investigate the relationship between lumbar spine (LS)-BMD, BAP and osteocalcin serum levels in pre- and postmenopausal women who developed BMs from advanced NSCLC and BC.

Patients & Methods: 26 women (median age 50 years, range 34–74) with advanced cancer and BMs were enrolled in the study. There were 14 premenopausal (Group A) and 12 postmenopausal (Group B) patients, who underwent both DXA and LS-BMD measurement, and serum ALP and osteocalcin assay.

Results: In postmenopausal women, both serum osteocalcin (34.2 ± 12.8 vs. 28.0 ± 6.7 U/L, $p=0.13$) and BAP (29.6 ± 9.1 vs. 29.4 ± 12.0 , $p=0.99$) levels were increased as compared to premenopausal women. As expected, in both groups (A vs. B), there was a strong inverse relationship between age and osteocalcin ($R=0.61$, $p=0.02$ vs. $R=0.92$, $p=0.00002$) or LS-BMD ($R=0.52$, $p=0.056$ vs. $R=0.89$, $p=0.0001$), but no correlation between BAP and age ($R=0.23$, $p=0.42$ vs. $R=0.16$, $p=0.61$) or LS-BMD ($R=0.15$, $p=0.61$ vs. $R=0.12$, $p=0.71$). However, osteocalcin inversely correlated to BMD only among postmenopausal patients ($R=0.73$, $p=0.007$ vs. $R=0.35$, $p=0.22$).

Conclusion: Our results suggest that osteocalcin and BAP are not useful in the early diagnosis of BMs in women with advanced cancer, because there is a significant correlation between these markers and LS-BMD only in postmenopausal women, which can be justified by the fact that bone density in this group are physiologically lower.

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HIGHER SERUM SCLEROSTIN LEVEL IS ASSOCIATED WITH METABOLIC SYNDROME SEVERITY IN OLDER MEN (MINOS STUDY)

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Objective: Bone is an endocrine organ regulating energy metabolism through osteocalcin. Serum sclerostin was associated with type 2 diabetes and abdominal fat. We aimed to examine the association between serum sclerostin and metabolic syndrome (MetS) in older men independently of osteocalcin.

Materials and Methods: We used data from the 694 men, aged 51–85, of the MINOS cohort who had osteocalcin and

sclerostin measurements. We used the harmonized definition of MetS (Alberti Circulation 2009) and defined MetS severity on the number of MetS criteria.

Results: Serum sclerostin level was higher in the 216 men with MetS than in those without MetS (0.66 ± 0.21 vs. 0.61 ± 0.19 ng/ml; $p < 0.005$). After adjustment for osteocalcin, age and other confounders, higher sclerostin was associated with higher odds of MetS (OR=1.28 per 1 SD increase [95 %CI: 1.05–1.57]; $p < 0.05$). Average serum sclerostin level increased across the increasing number of MetS components (p for trend < 0.001). Additional adjustment for whole body bone mineral content, weakened the association with sclerostin but had no impact on the association with osteocalcin. After adjustment, men who were simultaneously in the highest sclerostin quartile and the lowest osteocalcin quartile had higher odds of MetS (OR=2.90 [95 %CI: 1.51–5.55]; $p < 0.001$) vs. men who were in the three lower sclerostin quartiles and three upper osteocalcin quartiles. The group of men with “high sclerostin-low osteocalcin” profile remained with the highest odds of MetS OR=2.40 [95 %CI: 1.33–4.41] $p < 0.005$ even after additional adjustment for whole body bone mineral content.

Conclusion: Higher serum sclerostin was associated with MetS severity independently of osteocalcin. Men with the “high sclerostin-low osteocalcin” profile had the greatest MetS prevalence. This study confirmed the association between osteocalcin and MetS and also raised the issue of an endocrine function of sclerostin on energy metabolism.

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A NOVEL ULTRASOUND PARAMETER TO ASSESS SKELETAL FRAGILITY AND FRACTURE RISK FROM AN ECHOGRAPHIC SCAN OF LUMBAR SPINE

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Objective: To evaluate the effectiveness of a novel ultrasound (US) parameter in the identification of patients with a skeletal structure prone to fragility fractures.

Materials and Methods: 100 female patients [40–80 years; BMI ≤ 30 kg/m²] were enrolled, 50 with a recent nonvertebral osteoporotic fracture (“frail subjects”) and 50 controls without fracture history (“non- frail subjects”). All the patients underwent two examinations: a spinal DXA for BMD assessment and an US scan of lumbar spine. US data were analyzed by an innovative algorithm that processed both the

echographic images and the corresponding unfiltered “raw” radiofrequency (RF) signals, providing as final output the Fragility Score (F.S.) value. F.S. is a new parameter obtained from statistical comparisons between frequency spectra of acquired RF signals and specific models of “frail” and “non-frail” vertebral structures, previously derived from data collected on fractured and non-fractured patients. Accuracy of F.S. in the identification of subjects prone to fractures was compared with DXA-measured BMD through an unpaired two-sided Student’s t-test and by calculating areas under the receiver operating curve (AUC).

Results: Frail subjects were significantly discriminated from non-frail ones by both F.S. (58.0 ± 12.1 vs. 43.8 ± 10.0 , $p < 0.001$) and spinal BMD (0.832 ± 0.129 g/cm² vs. 0.983 ± 0.154 g/cm², $p < 0.001$), although the two groups did not show significant differences in age (64.2 ± 11.4 years vs. 63.9 ± 9.5 years, p n.s.) nor in BMI values (24.22 ± 2.90 kg/m² vs. 24.58 ± 2.76 kg/m², p n.s.). AUC values confirmed that discrimination powers of the two methods were comparable (AUC=0.75 for both).

Conclusion: F.S. identified patients prone to fragility fractures with an accuracy similar to spinal BMD, showing the potential for osteoporotic fracture prevention through extended population screenings.

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VALIDATION OF AN OSTEOPOROSIS SIMPLE TOOL FOR TAIWAN (OSTAI) TO IDENTIFY PRIMARY OSTEOPOROSIS IN TAIWAN POSTMENOPAUSAL WOMEN

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Objective: Validate the effectiveness of the Osteoporosis Simple Tool for Taiwan (OSTAi) in identifying primary osteoporosis in Taiwan postmenopausal women.

Material and Methods: A bus, equipped with DXA, serving for countrywide 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 with a

disorder strongly associated with secondary osteoporosis must be excluded. These include type I DM, osteogenesis imperfecta, hyperthyroidism, premature menopause (<45 years), rheumatoid arthritis, liver cirrhosis and steroid use over 5 mg 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 OSTAi (cutoff value: -2) to determine the sensitivity, specificity, and area under the receiver operating characteristic curve (AUC) for correctly selecting women with primary osteoporosis.

Results: A total of 5972 postmenopausal women (mean age: 66.79 ± 9.558 years) were enrolled in this study. Of the study subjects, 2517 met the definition of osteoporosis (42.1 %). According to the previous Taiwan study, we select -2 as the cutoff value in OSTAi. The AUC of the OSTAi to identify osteoporosis in the femoral neck, total hip, and lumbar spine were 0.781 (95 % confidence interval (CI95): 0.768–0.794), 0.829 (CI95:0.811–0.847), and 0.716 (CI95:0.702–0.729) respectively. The AUC, sensitivity and specificity of the OSTAi index (cutoff = -2) to identify primary osteoporosis in healthy women were 0.747 (CI95:0.735–0.760), 75.2 and 77.0 %, respectively.

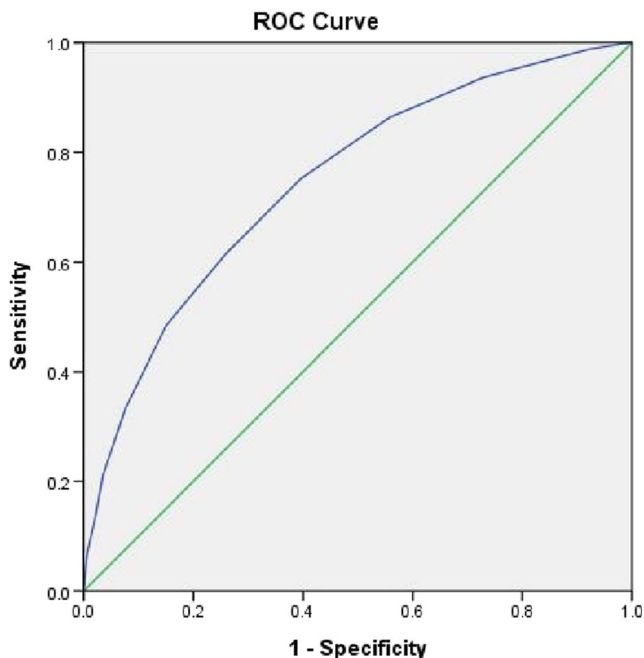


Fig. AUC of the OSTAi, OSTAi index = $0.2 \times [\text{Weight}(\text{Kg}) - \text{Age}(\text{Year})]$

Conclusion: The OSTAi may be a simple and effective pre-screening tool for identifying the risk of primary osteoporosis in Taiwan healthy postmenopausal women.

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PROGNOSTIC RISK FACTORS FOR KNEE OSTEOARTHRITIS

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Objective: to present the main risk factors for the progression and activity of osteoarthritis.

Materials and methods: 102 patients with active osteoarthritis of the knee joints, of which 80 women and 22 men aged 60–87 years. Clinical evaluation of the activity of osteoarthritis is accomplished by: Laboratory parameters - erythrocyte sedimentation rate (ESR), hs- C-reactive protein (hs-CRP), fibrinogen. Clinical functional assessment is done by: VAS scale, Lequesne index, WOMAC index, BMI. Severity of the disease was assessed by: X-rays and ultrasonographic examination.

Results: In all patients, there is activated osteoarthritis with moderately elevated values of hs-CRP 12 ± 2 mg/l, ESR 42 ± 6 mm, fibrinogen 4.7 ± 1.3 g/l. There is a direct correlation between the severity of osteoarthritis of the knee joints, as assessed by ultrasonographic measurements of the amount of cartilage and synovial proliferation, joint space and X-ray stage, corresponding to the increased BMI, VAS, and the values of Lequesne and WOMAC indexes. Female gender, metabolic imbalance, hormonal imbalance, insulin resistance, advanced age, venous insufficiency and genetic predisposition are combining the "constellation" of pathogenetic factors in osteoarthritis.

Conclusion: From our observation, we made the following Conclusion: The main risk factors for the severity and acceleration of the knee osteoarthritis are: advanced age, venous insufficiency of the lower limbs, BMI combined with all forms of insulin resistance and metabolic imbalance in genetically predisposed individuals.

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OSTEOPENIA IN MAN WITH KLINEFELTER'S SYNDROME: A NEED TO DIAGNOSE AND TREAT EARLYY.-L. Chang¹, L.-K. Er¹¹Department of Endocrinology, Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, New Taipei City, Taiwan, Province of China

Objective: The article covers the issue of a substantially under-diagnosed cause of hypogonadism in men to highlight the importance of secondary cause of decrease bone density and osteoporosis.

Material and Methods: Klinefelter's syndrome, with an extra X chromosome, was first described by Harry Klinefelter in 1942 as a clinical constellation of eunuchoid habitus, gynecomastia, small firm testes, hypogonadism and high level of Follicle-stimulating hormone (FSH). As 70 years passed by, Klinefelter's syndrome is staying strange to most health professionals. It was calculated that 64 % of Klinefelter patients were never diagnosed and only 26 % were diagnosed in pre-puberty or adulthood, mostly in their 30s. Osteopenia and osteoporosis with estimated frequency of 5–40 and 10 % respectively were found in Klinefelter's patients. There was a significantly raised mortality from fractured femur in Klinefelter's patients. A significantly lower BMD found in untreated Klinefelter patients was proved to be related to androgen deficiency rather than the chromosome abnormality. Therefore testosterone therapy might be an inevitable necessity to prevent bone mineral deficiency and future risk of fractures in men with Klinefelter's syndrome who also have low serum testosterone levels.

Results: We present a 51-year-old man who interested us with his unusual appearance during admission for cellulitis. He had fine facial skin, absence of facial hair, and a feminine voice. Physical examination revealed outstanding body height with extraordinarily disproportionately long legs (eunuchoid habitus), areolar hypopigmentation, absence of axillary and pubic hair, and bilateral small testicles. He saw an urologist for decreased libido and erectile dysfunction at age 30, but Klinefelter's syndrome was overlooked. Laboratory tests revealed high FSH and low testosterone. Decreased bone density was also found. BMD T-scores indicated osteopenia; lumbar vertebrae total T-score: -1.2 SD and left hip total T-score: -1.2 SD. Gene analysis proved sex chromosome abnormalities, 46XX, 47XXY, and 48XXYY, indicating mosaic Klinefelter's syndrome. The patient received testosterone therapy after diagnosis. He feels well-being and reports improving erectile dysfunction. Bone densitometry and vitamin D, calcium will be followed regularly.

Conclusion: Further studies of testosterone therapy in Klinefelter's syndrome are needed to prove a positive effect on fractures and the development of osteoporosis.

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KNEE OSTEOARTHRITIS COMORBIDITY IN POST-MENOPAUSAL WOMENN. A. Getmanova¹, A. A. Popov¹, N. V. Izmozherova¹¹Ural State Medical Academy, Yekaterinburg, Russian Federation

Objective: To assess comorbidity in postmenopausal women with knee osteoarthritis (KOA).

Methods: A case-control study included 214 female Menopausal Clinic outpatients with KOA, control group consisted of 214 women without KOA referring for scheduled prophylactic visits. Standard interview, anthropometry and general physician examination were performed, Modified Menopausal Index (MMI) was used to assess menopausal symptoms, KOA symptoms were assessed by WOMAC and Lesquene Index

Results: The groups showed no difference in age (median 55; range: 51–60 and 53 (49–58), $p=0.14$) and BMI: median 29.2 kg/m² (25.7–33.13) and 27.3 (24.7–30.28), $p=0.16$). Adjusted by BMI, KOA patients had significantly larger waist circumference (median 93.0; range (83.0–100.0) cm than the controls (median 86.0; range 80.0–95.0), $p<0.001$). Also KOA patients suffered more severe menopausal symptoms. There were no differences in blood chemistry between groups. KOA patients were more likely to have up to 4 comorbidities (50 (23.4 %) had 4 or more, $p<0.001$), while controls were likely to have one (70 (32.7 %), $p=0.004$) or no (40 (18.7 %), $p=0.003$) comorbidity. The groups did not differ in hypertension occurrence, while KOA was associated with chronic heart failure ($p<0.001$), diabetes mellitus ($p=0.006$), cholelithiasis ($p=0.037$) and peptic ulcer ($p=0.003$).

Conclusion: Thus, in symptomatic postmenopausal women KOA was associated with comorbidity.

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MAGNESIUM DEFICIENCY: A RISK FACTOR FOR PSEUDO-GOUTY ARTHROPATHYV. Popova¹, A. Batalov², Z. Vajev³, I. Yakov³, M. Geneva-Popova³, R. Karalilova³, M. Zelyaskova³, S. Tersyiska³, S. Alimanska³, L. Stoyanova³, K. Kraev³, Z. Batalov⁴, P. Selimov⁵, L. Peychev⁵, I. Ronchev⁶¹Clinic of Rheumatology Medical University Plovdiv, UMHAT, Plovdiv, Bulgaria, ²Clinic of Rheumatology, University Hospital, Plovdiv, Bulgaria, ³Medical University Plovdiv, UMHAT, Plovdiv, Bulgaria, ⁴Medical Faculty, Medical University Plovdiv, Plovdiv, Bulgaria, ⁵Medical University Plovdiv, Plovdiv, Bulgaria, ⁶UMHAT“ Kaspela”, Plovdiv, Bulgaria

Pseudogout is a metabolic arthropathy caused by deposition of calcium pyrophosphate dihydrate (CPDD) intra- and extraarticular. The exact mechanism of formation of CPDD

is not yet known, but presumably the role of genetic, metabolic, hormonal and ionic factors for different pathogenetic units of pseudogouty arthropathy are discussed. One of these factors is magnesium as its ions react with phosphate groups, and it is necessary for the functioning of the enzyme system associated with ATP synthesis (for example pyrophosphatase) and the reactions related to the purine metabolism and nucleic acid synthesis, alkaline phosphatase.

Objective: Studying the levels of magnesium in patients with CPPD arthropathy, and looking for a strong bond between its low levels and the severity of the disease activity.

Materials and Methods: 38 patients with the following cyclical forms of pseudogout were examined: acute pseudogout- 18 patients; pseudoosteoarthritis- 10 patients; pseudorheumatoid arthritis- 3 patients; asymptomatic patients- 7; pseudoneuropathic form- 1 patient. We examined the serum levels of calcium, phosphate, magnesium, iron, thyroid stimulating hormone, uric acid, CRP, Leuc. alkaline phosphatase of all patients. Pain evaluation was done by VAS scale.

Results: In 28 patients we found low levels of serum magnesium, 10 of them receiving thiazide diuretics- Hydrochlorothiazide. All patients with clinically overt form of CPPD were treated with 0.5 mg Colchicum dispersa a day, without NSAIDs, and they were divided into two groups- the first group with no supplementation of serum levels of magnesium, and the second group, taking daily dose of 295 mg of magnesium citrate. Assessment is carried out on 15–30–45 days. A quicker response is reported in the group treated with magnesium, as well as a rapid decline of VAS - 25 mm compared to the group without magnesium in their therapeutic scheme. The age limit is 5.2 years higher in patients with referent serum levels of magnesium. Low serum levels were recorded in the groups with acute pseudogout 10/14, and pseudoosteoarthritis 8/10; pseudoneuropathic form 1/1, and in patients treated with Hydrochlorothiazide- 8/10 patients.

Conclusion: Magnesium is an important pathogenetic cofactor for many enzyme systems, a key player in the purine metabolism and has a key role in the course of many enzymatic processes. Its low levels redirect metabolism to abnormal synthesis of extracellular nonorganic pyrophosphate whose level increases in the joint fluid, leading to increased synthesis of CPPD and to earlier clinical manifestation of its various forms. It is associated with more severe destruction, earlier onset and more prolonged therapy in these patients. Supplementation of magnesium levels is an important therapeutic target in the treatment of CPPD arthropathy.

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P539

FUNCTIONAL IMPAIRMENT ASSOCIATED WITH HEALTH RELATED POOR QUALITY OF LIFE OF PATIENTS WITH RA

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Rheumatoid arthritis (RA) is a chronic, systemic inflammatory disorder of autoimmune etiology affecting a big number of joints, with unpredictable course. As the final outcome we have deformation of joints and possible disability. Due to a chronic course of RA, evaluation of functional ability is a fundamental measurement. However, the evaluation of functional ability of the patient with RA does not give a complete insight of the health condition of the patient and it is necessary to evaluate emotional, social and mental status of the patient by use of a questionnaire for quality of life measurement. The most used questionnaires for quality of life measurement and functional ability are as follows: SF36, EQ5D and HAQ.

Objective: Investigate functional disability associated with health related poor quality of life of patients with RA.

Material and method: A perspective study included 109 patients with RA and ACR criteria were employed, random sample method for patients treated in out-patient clinic and hospital at the ward "E" specialized rehabilitation in Niška Banja Institute. The average age of patients was 58.86±9.54 and the average disease duration was 10.74±7.43 godine. Functional disability is represented with HAQ questionnaire filled in by patients themselves. Based on the obtained values they are classified in three groups: I group with HAQ value score of 0.125 to 1.000 indicate modest disability, II group with HAQ value score of 1.125 to 2.000 indicate more severe disability and III group with HAQ value score of 2.125 to 3.000 indicate a complete functional disability. Quality of life was measured by general questionnaires for life quality evaluation SF36 and EQ5D. Questionnaire SF36 contain 8 segments of health condition and has two summary scales: mental one SF36M and physical one SF36F. Comparison of numerical variables classified according to the type of normality was performed by ANOVA test. Statistical significance was at the level of <0.05.

Results: Average value of SF36F, in the group of patients with total functional disability was 12.31±8.24, that was statistically significantly worse than in the group of patients with more severe disease and 26.11±10.21, ($p<0.001$) and in the group with moderate functional disability 36.79±17.27, ($p<0.001$). SF36F was statistically significantly better with the patients with moderate functional disability compared to the patients with more severe disability ($p<0.001$). Average value of SF36M, in the group of patients with complete functional

disability accounted for 21.18 ± 18.26 , that was statistically more significantly worse than in the group of patients with more severe disability 35.32 ± 16.29 , ($p < 0.001$) and in the group of patients that had moderate functional disability 42.53 ± 18.87 . SF36M was statistically much better with the patients with moderate functional disability in regard to patients with more severe disability, ($p < 0.001$). Average value of total life quality evaluated by the questionnaire EQ5D in the group of patients with complete functional disability was 2.49 ± 0.22 , and was statistically much worse compared to the value of patients with more severe disability accounting for 2.11 ± 0.24 , $p < 0.001$ and compared to the values of patients with moderate functional disability 1.75 ± 0.22 , $p < 0.001$. Life quality was statistically much poorer with the patients with more severe disability compared to patients with moderate disability, $p < 0.001$.

Discussion: RA leads to significant changes during its course and these changes are reflected on everyday activities, work ability, need for surgical treatment, increased mortality. Out of these reasons, evaluation of functional investigation by means of HAQ questionnaire is very important and contributes a lot to the physical check of the patient. Life quality includes the quality of all segments of one person living, not just some parts. That is why it is very important to evaluate the mental life quality as well. Results obtained in our investigation have shown that the worse functional status is reflected to worse life quality; that is, the greater level of functional disability is associated with worse mental and physical sphere of life quality as evaluated by means of SF36 questionnaire use and with worse total life quality evaluated by EQ5D questionnaire.

Conclusion: Our results have confirmed the hypothesis that functional disability has adverse impact on life quality. RA causes changes not only in physical, but in mental sphere of life quality. Therefore, it is very important to comprehensively evaluate life quality of the patients from the aspect of patient's view that is enabled by means of questionnaires for life quality evaluation.

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NBHA BONE TURNOVER MARKER STANDARDIZATION PROJECT - 2015 GOALS AND PROGRESS

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Bone turnover markers (BTMs) have been recognized as useful tools in clinical practice, but have some short- and long-term fluctuations related to biology and technical variability that have limited their clinical use to date. Among the contributors to the variation in BTM results include analytical methods (e.g., calibration), sample handling (e.g., sample collection) and laboratory performance (e.g., sample analysis). To address these issues, among the NBHA's major efforts is the implementation

of a number of complementary activities around the harmonization and standardization of the use of these markers that includes the participation of leading academic experts, the diagnostic and pharmaceutical industries, federal government representatives, and a number of both commercial and academic laboratories. These efforts build upon the recommendations of the International Osteoporosis Foundation (IOF)/ International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) Bone Marker Standards Working Group position paper published in late 2011, which identified one bone resorption marker, serum C-terminal telopeptide (s-CTX) and one bone formation marker, type I procollagen N-terminal (s-PINP) as the most applicable reference markers to compare the performance of alternative markers and enlarge the international experience of the application of markers to clinical medicine. NBHA has initiated several U.S. based studies in the areas of sample handling and collection procedures, inter-laboratory variability, inter-method variability, and common reference range establishment. Additionally, NBHA has executed a drug holiday study to measure the clinical utility of bone turnover markers as indicators of when to re-initiate treatment. With these efforts, bone turnover markers may be more fully utilized by clinicians and work in tandem with other available approaches to manage osteoporosis and other bone diseases.

P541

PHYSICAL THERAPY IN THE TREATMENT OF PAINFUL SHOULDER JOINT

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It is believed that more than a third of rheumatic patients suffering from peri-arthritis humeroskapularis (PHS) and this is very common in outpatient work every physiatrist. The shoulder joint is the most mobile, the most complex and often subject to damage. Peri-arthritis humeroskapularis (PHS) joint belongs to a group of non-articular rheumatism. The process covers periarticular formation: muscles, tendons and their sheath, serous pouch, to join the tendons, fascia, connective tissue and joint capsules. Causes of PHS as trauma, degenerative changes impingement. The clinical picture is characterized by present pain and limited movement in all directions (usually abduction and internal rotation).

Objective: To describe the effects of physical therapy on the PHS in the outpatient setting.

Materials and methods: The study was conducted in DZ Niš on a sample of 80 patients aged 30–65 years. There were 28 males (35 %) and 52 women (65 %). They were treated on an outpatient basis in the period from 01.01. to 30.09.2014. After the diagnosis based on history, clinical examination, and ultrasonographic findings, patients were divided into two

groups. The first group of 40 patients, applied therapy is IMP, the individual streams and an exercise program, while the other group was treated IMP, the individual streams and an exercise program, and laser therapy (analgesic effects). Range of motion of the shoulder was measured by goniometer and is expressed in degrees. Rough driving force (GMS) was measured by manual muscle test (MMT). Was performed and the patient assessment of pain VAS from 1 to 10. All measurements were performed at baseline and after 3 weeks of therapy. The results were analyzed using the Student's *t* - test.

Results: After 3 weeks of intensive physical therapy of patients in both groups there was a significant difference in the measured extent of the movement of the shoulder joint. Abduction of the initial 40°, 3 weeks after treatment was increased to 75°. GMS measured MMT in the first group was 3±0.75, while in the second group of 4±0.25. There was a reduction of pain, in both groups of patients, and in the second group, the decrease was statistically significant (VAS 6 before treatment, and after 3 weeks of therapy VAS 3). Control ultrasound findings also showed a reduction of inflammatory processes in the shoulder joint.

Conclusion: Outpatient physical therapy gives good results in the treatment of PHS, reduces the intensity of pain, increases range of motion and strengthen the muscular strength of the shoulder belt.

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IMPROVEMENT OF VITAMIN D STATUS AND BMD IN POSTMENOPAUSAL WOMEN UNDERGOING HIP REPLACEMENT

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Objective: A decade ago, Glowacki and coauthors from Boston (1) reported that osteoporosis and vitamin D deficiency are not uncommon in postmenopausal women undergoing total joint replacement for hip osteoarthritis (OA). Our study of a similar Finnish population showed exactly the same result (2): the majority (73.6 %) of patients had high turnover osteoporosis or osteopenia and the prevalence of vitamin D deficiency (S-25(OH)D ≤50 nmol/l) was high (36 %). We have now examined the current preoperative status of these patients.

Material and Methods: Including the original study (screening period 2003–2004)(2) and two consecutive RCTs (ClinicalTrials.gov NCT01218035, screening period 2007–2009 and ClinicalTrials.gov NCT01926158, screening period 2014-current), we have preoperatively screened a total of 150 postmenopausal female patients (age 60–84 years) for the presence of undiagnosed osteoporosis and/or vitamin D deficiency before hip replacement. Exclusion criteria included RA or any other inflammatory arthritis, ongoing osteoporosis or corticosteroid

therapy or any other medication known to affect bone metabolism.

Results: The original series (2) and the two RCTs did not show significant demographic differences in terms of age (mean ± SD) (64.7±8.4, 68.1±9.1 and 68.7±5.3, respectively), BMI (30.3±5.9, 29.1±5.7 and 28.0±4.4, respectively), serum Ca²⁺ (1.24±0.05, 1.24±0.04 and 1.25±0.05, respectively), and S-PTH (43±20, 59±23 and 41±10, respectively). The latest RCT showed a 64 % higher level of S-25(OH)D (97±29) compared with the two previous trials (59±20 and 58±20)(*p*<0.001 for both, ANOVA with Tukey) and only two patients (4.2 %) had vitamin D deficiency. There was even a significant decrease in the number of patients with osteoporosis (T-score<-2.5) in the three consecutive series (28.3 %, 22.4 % and 6.3 %, respectively), while the number of patients with osteopenia (-1<T-score≤-2.5) has not changed (45.3, 49.0 and 41.7 %).

Conclusion: There is a dramatic improvement in the vitamin D and BMD status of postmenopausal women scheduled to have hip replacement for osteoarthritis.

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CAN MUSCLE AND LIPID PARAMETERS DISCRIMINATE HIP FRACTURES AS WELL AS BMD?

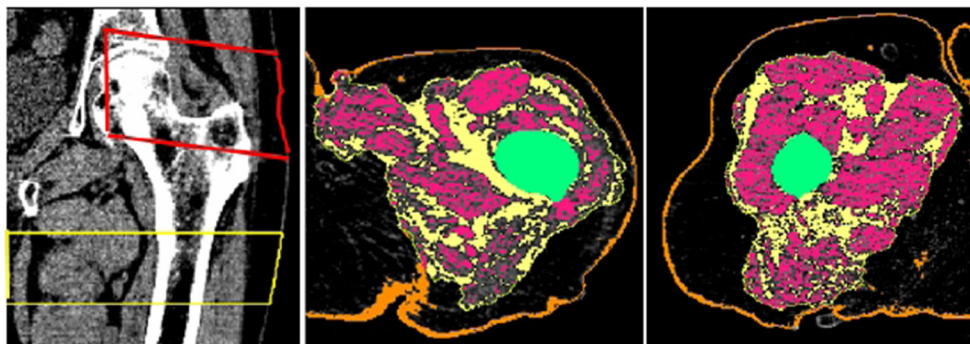
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BMD and propensity to falls are important risk factors for fractures of the proximal femur. Muscle morphology and function may be closely associated with the risk of fall. Therefore we compared the performance of parameters characterizing the spatial muscle-lipid distribution with BMD measures to discriminate hip fractures in a cross-sectional study. All parameters were measured on QCT scans.

Material and Methods: 91 patients of the EFFECT-Study (36 patients with acute proximal femur fractures imaged (73.1±9.3 years) and 55 controls (79.8±11.1 years) were included in the study. QCT scans (120 kV, 170 mAs, slice thickness 1 or 1.25 mm) were performed within 24 h after fracture. In addition to QCT parameters such as BMD and cortical thickness, 3D descriptors such as texture, topology or surface roughness were used to assess the muscle-lipid distribution in addition to standard parameters such as muscle and adipose tissue volumes. Muscle parameters including the posterior muscle groups were measured in two locations: at the level of the proximal femur (head and neck) and in the upper shaft, below the lesser trochanter (Fig). Multivariate analysis using best subsets adjusted for age and BMI was performed to

Model	proximal Hip: AUC	Shaft: AUC [CI]
Bone (BM)	0.80 [0.72; 0.90]	
Soft Tissue (STM)	0.83 [0.74; 0.91]	0.91 [0.80; 0.96]
Combined	0.91 [0.85; 0.97]	0.96 [0.88; 0.99]



Left: The 2 volumes analyzed. Middle fractured subject - high local anisotropy of adipocytes within muscle and high muscle inhomogeneity; Right: control subject.

identify a ‘bone model’ (BM) and a ‘soft tissue model’ (STM) used to discriminate fractures.

Results: Muscle-lipid segmentation results and fracture discrimination results (area-under-curve (AUC) values) are shown below. BM consisted of troch trab BMD & neck cort thickness. Spatial continuity of muscle intensity (\downarrow), estimation of pennation angle (\uparrow) and SD of adipose intensity distribution (\uparrow), contributed to the proximal femur STM. Adipose tissue percentage (\downarrow), local inhomogeneity of muscle (\uparrow) and local anisotropy of adipocytes within muscle (\uparrow) contributed to the shaft STM.

Conclusion: In this relatively small cross-sectional study of patients with acute hip fractures and controls, a combination of soft tissue QCT parameters describing the muscle-lipid distribution, resulted in better hip fracture discrimination than the best BM. Muscle parameters indicate a stronger mixing of muscle and lipids in fractured subjects.

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MONITORING OF ANTIOSTEOPOROTIC TREATMENT IN RURAL AREAS WOMEN WITH OSTEOPOROSIS

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Objective: To evaluate the long term efficacy measured BMD in postmenopausal women with osteoporosis undergoing treatment every 6 month in Vasad village.

Material and Methods: We included in study 20 postmenopausal women with osteoporosis (T-score < -2,5) ages between 50 and 75. All the women took bisphosphonates and were examined on DXA performed at baseline in two areas of interest - lumbar spine and femoral neck.

Results: The reduction in pain score in all patients was significant. Fracture was not found at baseline and end of 6 month.

Conclusion: The antiresorptive treatment have a good adherence because all the patients takes the medication continue.

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THE INFLUENCE OF OBESITY ON BONE MINERAL DENSITY IN CHILDREN

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Obesity had increased dramatically nowadays. The negative associations between obesity and different somatic conditions are well-known in obese patients, especially in children. The influence of obesity on BMD in children’s age are not well recognized since now.

Methods: We examined 259 children in the University Hospital (Minsk) in 2010–2014 years. Obese - 152 children, age - 11.8 ± 0.16 years, BMI - 30.6 ± 0.25 kg/m², normal-weight control - 107, age - 13.2 ± 0.21 year ($p=0.001$), BMI - 17.8 ± 0.13 kg/m² ($p=0.001$). Obese children were divided into

subgroups, according to their BMI: morbid (BMI ≥ 35 kg/m²) and simple obesity (BMI < 35 kg/m²). All children had conducted the DXA with evaluation of BMD, Z-score (BMD), percentage of fat and the levels of adipose tissue. Statistical analyze were made using SPSS.18.0.

Results: We found, that total BMD were higher in obese children compared to normal-weight control Median (Me) [LQ; HQ] BMD obese - 1.1 [0.9; 1.19], BMD control - 0.97 [0.89; 1.04] ($p=0.0001$) as well as separately BMD legs (obese - 1.25 [0.1; 1.35], control - 1.06 [0.93; 1.14] ($p=0.0001$)), BMD arms (obese - 0.85 [0.74; 0.95], control - 0.73 [0.66; 0.79] ($p=0.0001$)), BMD trunk (obese - 0.92 [0.79; 0.98], control - 0.78 [0.71; 0.85] ($p=0.0001$)). Z-score BMD was positive in obese children and higher compared to control (obese - 1.2 [0.6; 2], control - (-0.8) [-1.5; -0.2] ($p=0.0001$)). Total BMD ($p=0.0001$), BMD arms ($p=0.0001$), BMD legs ($p=0.0001$), BMD trunk ($p=0.0001$), Z-score BMD ($p=0.0001$) increased with the increasing of BMI (were higher in children with morbid than simple obesity). We did not find any significant difference between BMD and Z-score in girls compared to boys in obese and normal-weight children. The percentages of fat and free fat were higher in obese children compared to control (fat obese - 32414.4 \pm 1080.2 g, control - 8682.7 \pm 464.4 g ($p=0.0001$); free fat obese - 43169.2 \pm 1263.5 g, control - 36376.3 \pm 1031.5 g ($p=0.0001$)). We found the reliable positive correlation between BMD (including separately BMD arms, BMD legs, BMD trunk) and fat ($r_s=0.75$, $p=0.0001$), free fat ($r_s=0.85$, $p=0.0001$) BMI ($r_s=0.7$, $p=0.0001$) and negative - with ginoid fat ($r_s=-0.16$, $p=0.0001$).

Conclusion: Our findings suggest the importance of further DXA examination of more children with obesity in order to work out the preventive measures of developing of osteoporosis in obese adult.

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EARLY DETECTION OF OSTEOPOROSIS IN WOMEN WITH DIABETES MELLITUS TYPE 2

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Objective: The purpose of this study was to evaluate the BMD at the women with diabetes mellitus type 2 in Vasad village.

Material and Methods: The study included 50 women with diabetes mellitus type 2, middle age 55–70 years, menopause on 45, we demonstrated BMD results of the DXA osteodensitometry. Each subject was interviewed using a standardized questionnaire to collect information about lifestyle and level of physical activity.

Results: 60 % had osteoporosis in spine area and 40 % osteopenia in the spine and the neck of the femur.

Conclusion: A strong association between BMD values with diabetes was found.

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THE DETERMINATION OF VITAMIN D IN GOUT PATIENTS

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Objective: Determining the level of 25-hydroxyvitamin D (25(OH)D) in patients with gout and assessing the degree of disability.

Methods: 110 patients with Gout (according to ACR criteria 1987) were examined. 83 of them were diagnosed with chronic gout, and 27 - with acute gout. Their age varied from 21 to 78 years old. Patients were under survey within the period of 2007–2014. The time frame of Gout affection in patients under survey varied from 1 to 37 years. All patients were examined (using laboratory and instrumental methods).

Results: The level of 25(OH)D in the serum of patients with gout was as follows: the patients aged 30–39 years old 37–44 ng/mL; the patients aged between 40 and 49 years old 32–38 ng/mL; the patients aged 50–59 29–34 ng/mL; the patients aged 60–69 22–28 ng/mL and the patients > 70 20–25 ng/mL. The urate serum was from 417 to 1025 μ mol/l. Patients with lesions of the first MTP joints - 102 (92.7 %) people; tarsal joints - 65 (59 %) patients; knees - 57 (51.8 %) patients; finger distal interphalangeal joints - 54 (49 %) patients, and cubit - 38 (34.5 %) patients. The risk factors for gout included: diuretic use (79 %), renal failure (71 %), hypertension (69 %), obesity (BMI > 30 kg/m²) (58 %), alcoholism (43 %), and a positive family history (disease present in other generations) (17 %) of patients.

Conclusion: The level of 25(OH)D in the serum of patients with gout is different and depends on the patient's age, the duration of the disease, the risk factors and gender.

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EFFECT OF RITUXIMAB ON QUALITY OF LIFE WITH RHEUMATOID ARTHRITIS PATIENTS TO BASELINE BONE MINERAL DENSITY

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Objective: On the results of a prospective 4-year observation to evaluate the effect of rituximab on the quality of life with

rheumatoid arthritis (RA) patients with different BMD to baseline.

Material and Methods: We observed 56 patients with documented diagnosis of RA (ACR, 1987) with the combined therapy of methotrexate (mean dose of 13.22 ± 0.28 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, $n=20$) and with osteoporosis (group 2, $n=36$). To assess BMD was performed DXA. To assess life quality 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 questionnaire EQ-5D a quantitative index for health established that baseline in patients with osteoporosis health index indicator was lower than in patients with osteopenia 0.26 ± 0.03 and 0.34 ± 0.03 ($p=0.043$). After 4 years of therapy there was a statistically significant increase in the index in both groups of patients relatively baseline data 0.52 ± 0.03 and 0.55 ± 0.04 ($p < 0.0001$ 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 1.84 ± 0.09 , in patients with osteoporosis 1.83 ± 0.13 ($p=0.89$), which corresponds to moderate functional impairment in patients of both groups. During therapy HAQ index was significantly decreased in both groups (HAQ Group 1 -1.24 ± 0.11 , HAQ Group 2 -1.36 ± 0.14 , $p=0.0003$ and $p=0.038$)

Conclusion: According to the results of a 4-year observation noted a positive effect of rituximab on the quality of life of patients with osteopenia and with osteoporosis.

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LATERAL SINGLE PLATE OSTEOSYNTHESIS OF TIBIAL PLATEAU FRACTURES SCHATZKER V AND VI IN PATIENTS OLDER THAN 65 YEARS

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Introduction and purpose: Tibial plateau fractures represent 8 % of total fractures in elderly patients. In this age group, fractures are caused by low energy trauma. Operative treatment is generally preferred over conservative treatment in most of the cases. We present a retrospective study of tibia plateau fractures types V and VI of Schatzker classification in patients older than 65 years treated with lateral single plate osteosynthesis in our centre between Jan 2004 and Dec 2012.

Material and Methods: 20 tibial bicondylar fracture (Schatzker V and VI types) were managed with plate and screws on lateral side

of proximal tibia. All the surgeries were done under spinal anaesthesia. Age, gender, injury mechanism, grafting, and complications (infection, secondary displacement, hardware intolerance) were recorded. Pain was evaluated with VAS. Full leg radiographs were also used for measuring AP angles, fracture healing and appearance of new signs of articular degeneration. Patients were followed at 6 weeks, 12 weeks, 6 months and 1 year after the index procedure and yearly from then. The average follow-up time was 16.8 months (range 12–30).

Results: Of the 20 patients, only 2 (10 %) were men. Mean age was 74.9 years (range, 66–86). Most fractures were caused by low energy casual fall (83.3 %). There were 11 Schatzker's type V and 9 type VI. 13 cases (65 %) needed some osseous substitute or allograft during surgery for filling an osseous defect after reduction. In the immediate postoperative period, there were 2 cases (10 %) of infection resolved with debridement and 2 cases (10 %) of secondary displacement (more than 2 mm of depression) well tolerated by the patients. The mean period for full weight bearing was 3.2 months (2.5 to 4). New degenerative signs (not presented at the moment of the traumatism) in X-rays were the most common complication (8 patients, 40 %) at midterm follow-up and all these patients had pain (VAS 3 to 5). Only 3 patients (15 %) needed a new surgery (2 infections, 1 hardware intolerance). Seven (35 %) patients showed occasional pain with daily activities, and in 3 (15 %), the pain was continuous. Although there were some complications, all were adequately resolved. Otherwise, all the fractures consolidated at 4.5 months (2.5 to 6) and all the patients came back to their previous functional status.

Conclusion: Open reduction and internal fixation by plating and screw fixation is a valid treatment for tibial plateau fractures Schatzker's type V and VI in elderly patients. Although the rate of complications is high, mid-term results are relatively satisfactory, all the fractures consolidated and all the patients came back to their previous status.

P550

OSTEOPOROSIS AND COMORBIDITIES IN RHEUMATOID ARTHRITIS (RA)

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Table. Comorbidities.

Group with OP	Group without OP
20 %* EP ¹ (91 % TD ² , 15 % diabetes type 2)	13 %* EP ¹ (89 % TD ² , 21 % diabetes type 2)
52 %* CVD ³ (87 % H ⁴ , 32 % CHD ⁵ , 3 % ⁶ MI, 8 % stroke)	39 %* CVD ³ (91 % of H ⁴ , 21 % CHD ⁵ , 2 % ⁶ MI, 3 % stroke)
16 %* RP ⁷ (39 %** COPD ⁸ , 11 % asthma, 5 % tuberculosis, 3 % sarcoidosis, 16 %* PF ⁹)	10 %* RP ⁷ (60 %** COPD ⁸ , 15 % asthma, 2 % tuberculosis, 2 %* PF ⁹)
30 %* GIP ¹⁰ (38 % SU/DU ¹¹ , 37 % CG ¹² , 3 % GERD ¹³ , 4 % VH ¹⁴ , 4 % GSD ¹⁵ , 1 % gastric adenocarcinoma)	22 %* GIP ¹⁰ (34 % SU/DU ¹¹ , 45 % CG ¹² , 2 % GERD ¹³ , 8 % VH ¹⁴ , 2 % GSD ¹⁵)

¹endocrinological pathology, ²thyroid disease, ³cardiovascular disease, ⁴hypertension, ⁵coronary heart disease, ⁶myocardial infarction, ⁷respiratory pathology, ⁸chronic obstructive pulmonary disease, ⁹pulmonary fibrosis, ¹⁰gastrointestinal pathology, ¹¹stomach/duodenal ulcer, ¹²chronic gastritis, ¹³gastroesophageal-reflux disease, ¹⁴viral hepatitis, ¹⁵gallstone disease.

* $p < 0,05$, ** $p > 0,05$.

Objective: It is known the rate and extent of bone loss in RA can be influenced by various factors associated both with the RA and other diseases. The purpose was to study influence of common comorbidities on prevalence of osteoporosis (OP) and fractures in patients with RA in clinical practice.

Material and Methods: Through of the national program we analyzed data of DXA in lumbar spine, femoral neck and forearm on 691 patients.

Results: Two groups of patients were formed: with the diagnosis of OP according densitometry and/or presence of osteoporotic fractures and without OP - 237 and 454, respectively. In group with OP 196 of patients had T-score < 2.5 SD, and besides 23 % from them had one or more osteoporotic fractures in history. In both groups, the number of women prevailed, the average age of 60.63 ± 12.25 in group 1, 55.76 ± 14.24 in group 2 [$p > 0.05$]. 81 % of women in group 1 and 57 % in group 2 had menopause [$p < 0.05$]. In both groups, the majority of patients had moderate activity of disease and radiographic stages 1 or 2. The average duration of RA was 16.44 ± 10.05 years, 15.37 ± 9.25 , respectively [$p < 0.05$]. 54 and 40 % of patients had one or more comorbidities, respectively [$p < 0.05$].

Conclusion: To select the high risk group of OP and fractures among patients with RA in clinical practice should keep in mind such factors as age, menopause,

duration of RA and comorbidities, especially such as cardiovascular, endocrinological, pulmonological and gastrointestinal pathologies.

P551

RADIOGRAPHIC OSTEOARTHRITIS IS LESS STRONGLY ASSOCIATED WITH PHYSICAL PERFORMANCE THAN CLINICAL OSTEOARTHRITIS IN OLDER INDIVIDUALS

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Objective: Poor physical performance (PP) is associated with disability, lower quality of life and higher mortality rates. Having previously demonstrated relationships between hip and knee osteoarthritis (OA) according to self-report or clinical American College of Rheumatology (ACR) definition and PP, here we studied associations between PP and a radiographic definition of hip and knee OA.

Material and Methods: Data were available for 222 men and 221 women who participated in the UK component of the European Project on Osteoarthritis (EPOSA). Participants completed a nurse administered questionnaire detailing self-reported OA. A clinical diagnosis of OA was defined based on ACR criteria. Hip and knee radiographs were taken and graded for overall Kellgren and Lawrence (K&L) score, with a positive definition reflecting a K&L score of 2 or above. PP was determined from assessments of walking speed, chair stands and balance (tandem stand) to create a composition score (0–12); low PP was defined as ≤ 9 .

Results: The mean (standard deviation (SD)) age of study participants was 75.7 (2.6) years. Low physical performance, according to our definition, was present in 116 (56.9 %) men and 141 (71.2 %) women. Radiographic hip or knee OA was common, and present in 43.5 % and 54 % for hip and knee respectively. 17.8 % participants had either a clinical definition of hip or knee OA, and 2.5 % participants had a clinical diagnosis of OA at both sites. In this population, a radiographic diagnosis of OA at neither the hip (RR 0.95, 95 %CI 0.81, 1.12) nor the knee (RR 1.05, 95 %CI 0.90, 1.23) were significantly associated with low PP, while a clinical diagnosis of OA was significantly associated with poor PP, with relationships strongest for those individuals with a clinical diagnosis at both sites (RR 1.44, 95 %CI 1.14, 1.82 $p = 0.002$, after adjustment for age, sex, education, alcohol and BMI).

Conclusion: Radiographic OA is common in older individuals, but is less strongly associated with PP than a clinical definition of OA.

P552

INFLUENCE OF VERTEBRAL DEFORMATION ON THE VERTEBRAL PAIN SYNDROME

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Aim: To investigate the relation between the intensity of pain in the thoracic and lumbar spine and morphometric parameters of vertebrae in postmenopausal women.

Objective: We have examined 250 postmenopausal women aged 50–79 years divided into two groups: 171 women without vertebral deformations and 79 women with confirmed vertebral fractures. The duration of pain syndrome after fracture was over 6 months.

Methods: The presence and intensity of pain syndrome in the thoracic and lumbar spine were assessed using a VAS. Morphometric analysis of the vertebral parameters was carried out using the VFA software of the DXA densitometer «Prodigy» (GE Medical systems, Lunar, model 8743, 2005).

Results: The intensity of pain syndrome in the lumbar spine significantly correlates with L1 vertebral indices: A/P ($r=-0.37$, $p=0.01$) and M/P ($r=-0.29$, $p=0.03$) in women with normal BMD. The intensity of pain in the thoracic region correlates with Th10 vertebral indices: A/P ($r=-0.45$, $p=0.0004$) and M/P ($r=-0.35$, $p=0.01$) in women with osteopenia. We have not determined any significant relationship between the level of back pain and vertebral body size index in women with osteoporosis and without vertebral fractures. In 11 % patients with confirmed wedge and compression vertebral fractures chronic pain syndrome is absent, and the presence of other fractures does not increase the frequency of back pain syndrome (14 %). The presence of vertebral fractures significantly increases the risk of pain in the thoracic spine (RR=1.32; 95 %CI: 1.09–1.60, $p=0.004$). In patients with vertebral fractures the intensity of pain in the thoracic spine significantly correlates with indices of Th11-Th12 vertebrae, and relates to the number and localization of vertebral fractures. The level of pain in the lumbar region does not depend on the location and number of damaged vertebrae.

Conclusion: In postmenopausal women without osteoporosis and vertebral fractures level of pain may be associated with initial vertebral deformation, limiting the spine transition zone. The presence of vertebral fractures increases the risk of pain syndrome in the thoracic region depending on the location and number of damaged vertebrae.

P553

EFFECT OF RITUXIMAB ON BONE MINERAL DENSITY IN PATIENTS WITH DIFFERENT INITIAL ACTIVITY OF RHEUMATOID ARTHRITIS

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Objective: On the results of a prospective 4-year observation to evaluate the effect of rituximab on BMD of the femoral neck in patients with different initial activity of rheumatoid arthritis (RA).

Material and methods: We observed 56 patients with a documented diagnosis of RA (ACR, 1987.) with the combined therapy of methotrexate (mean dose of 13.22 ± 0.28 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). After 12 weeks of therapy all patients were randomized into two groups, according to the index Δ DAS28 (according to the criteria of treatment efficacy EULAR): Group 1 (Δ DAS28 ≥ 1.2) - “responders” - 26 patients; Group 2 (Δ DAS28 < 1.2) - “nonresponders” - 30 patients. For the assessment of BMD, DXA was performed 1 time per year for 4 years.

Results: The patients group 1 BMD was 0.7529 ± 0.019 g/cm² to a baseline, patients in Group 2— 0.7929 ± 0.021 g/cm², $p=0.23$. After 4 years of follow a statistically significant increase in femoral neck BMD in Group 1 and Group 2 with respect to a baseline. The BMD Group 1 was 0.8072 ± 0.029 g/cm² ($p=0.0076$) in the Group 2— 0.8676 ± 0.032 g/cm² ($p=0.0004$). Similar relationships were observed in the analysis of the dynamics of T-score. Baseline T-score Group 1 was -2.2 ± 0.15 SD, Group 2 was 1.95 ± 0.18 SD ($p=0.57$). During therapy a statistically significant increase in T-score relatively baseline data: Group 1— 1.79 ± 0.25 SD ($p=0.0004$) in Group 2— 1.43 ± 0.21 SD ($p=0.001$).

Conclusion: According to the results of a 4-year observation noted a positive effect of rituximab on BMD in patients independently of the initial activity of RA.

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BENEFITS OF PHYSICAL ACTIVITY IN OSTEOPOROSIS TREATMENT

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Objective: Although people with osteoporosis may believe that exercise increases the risk of injury from broken bones, the truth is quite the opposite. A regular, properly designed exercise program may actually help prevent the falls and fall-related fractures that so often result disability and premature death. The aim of this study was to examine influence of physical activity on BMD in postmenopausal women.

Material and Methods: Two groups of postmenopausal women aged 45–65 years with osteoporosis were studied: I group 29 postmenopausal women and II group 32 postmenopausal women with osteoporosis. All patients were treated with supplemental calcium, vitamin D and intravenous injections of Bonviva 3 mg/3 ml every 3 month. Besides this medication in II group women were getting regular exercise: weight-bearing (walking, hiking, dancing, stair climbing), resistance exercises. BMD measurements were accomplished by quantitative ultrasound technique Sunlight Omnisense 7000S. Results were interpreted in accordance with criteria adopted by the WHO by T-score. In both groups BMD was studied before and after 1 year of medication.

Results: In both groups of women before medication the mean BMD was decreased. I group T-score: distal 1/3 radius -2.9 ± 0.05 ; midshaft tibia -3.2 ± 0.06 ; proximal phalanx- 3.5 ± 0.08 ; II group T-score: -3.3 ± 0.07 ; -3.0 ± 0.05 ; -3.6 ± 0.06 . After 1 year medication in both groups of women BMD was increased: I group T-score: -2.6 ± 0.06 ; -2.8 ± 0.06 ; -3.0 ± 0.08 ; II group T-score: -2.5 ± 0.08 ; -2.4 ± 0.06 ; -2.7 ± 0.07 respectively.

Conclusions: Results of the study show that moderate physical activity has positive influence on BMD. In both groups of women after medication BMD was increased, but this improvement of BMD in the II group of women who were exercised regularly was more significant. It is evident that at any age exercise is essential for maintaining healthy bones, prevent falls and fractures and speed rehabilitation. Exercise carries many benefits, including increased muscle strength, coordination, and overall better health.

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POLYMORPHIC VARIANTS OF LRP5 GENE IN POLISH MEN WITH PRIMARY OSTEOPOROSIS: A PILOT STUDY

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Osteoporosis in men (MO), due to aging of the population is becoming increasingly frequent problem, leading to serious consequences, such as the long-term treatment, rehabilitation and social care. Molecular background of MO is strongly associated with genetic predisposition and current researches focuses on searching of genetic markers of disease. LRP5 gene located in 6q25.1 is potential susceptibility gene. It encodes the LRP-5 transmembrane protein, involved in the proliferation and differentiation of the osteoblasts via Wnt signaling pathway. The aim of this study was to determine whether polymorphic variants of LRP5 gene: c.3989C>T (rs3736228), c.2220C>T (rs2306862) and c.1999G>A>C (rs4988321) are specific for men diagnosed with primary osteoporosis and how frequent are in the Polish patients.

Material and methods: The study material was the DNA isolated from peripheral blood leukocytes from 92 men diagnosed for primary osteoporosis. Patients undergone clinical examination, BMD evaluation by DXA and lab tests, including the level of sex hormones and vitamin 25OHD3. Subjects with secondary osteoporosis were excluded. As the control group we analyzed DNA from 36 men, aged over 60 years with normal T-score. Analyzes were performed also for 191 individuals (96 females, 95 males) randomly selected from Polish population. Due to less numerous control group for comparative analysis we created combined group of control individuals and the male population. Three polymorphic variants of LRP5 gene were analyzed: c.3989C>T (rs3736228), c.2220C>T (rs2306862) and c.1999G>A (rs4988321). For genotyping pyrosequencing technique was used. Hardy-Weinberg equilibrium (HWE) were examined for subjected groups by chi-square distribution and Fisher exact tests. The odds ratios (ORs), 95 %CIs, and p-values were calculated. Statistical significance was set at $p < 0.05$.

Results: We identified statistically significant higher frequency of rare allele T in locus rs2306862 in males with osteoporosis than in combined comparative group, in dominant model (OR=1.75, $p = 0.047$). This trend was observed also in comparison with Polish population (OR=1.609, $p = 0.066$) and isolated control group (OR=2.258, $p = 0.098$). In MO patients higher frequency of rare alleles in both rs3736228 and rs4988321 loci was also noticed, however these results were not statistically significant (OR=1.69, $p = 0.111$ for rs3736228, and OR=1.500, $p = 0.337$ for rs4988321). Our study warrants further study in larger groups.

Conclusion: 1. Polymorphic variants of LRP5 gene: c.2220C>T (rs2306862), c.3989C>T (rs3736228) and c.1999G>A>C (rs4988321) are more frequently observed in men with primary osteoporosis. 2. Carriers of allele T in locus rs2306862 of LRP5 gene are more susceptible to osteoporosis with 1.75-fold higher risk of the disease.

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HYPOVITAMINOSIS D AMONG PATIENTS WITH HIP FRACTURES IN A LEVEL-I TRAUMA CENTER - UPPER EGYPT

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Objective: To determine the prevalence of hypovitaminosis D, its association with bone density and to evaluate related determinants among admitted patients to Trauma Unit in Assiut University Hospitals.

Materials and methods: A cross-sectional study was carried out on patients with proximal femoral fractures aged 50 years and older admitted to Trauma Unit of Assiut University Hospitals, a level-I trauma center in Upper Egypt, from 1st January to end of December 2014. A randomized sample of 133 participants was included. Patients with polytrauma, major accidents and conditions known to affect bone density were excluded. Two well trained nurses filled a structured questionnaire by personal interview. Weight and height measurement, assessment of 25-hydroxyvitamin D (25OHD) serum and BMD measurement by DXA were done for all participants. A formal consent was taken from all participants prior to the study.

Results: Participants aged 50–99 years with mean 69 ± 11.3 years, 48.1 % were males and 51.9 % were females. 50.4 and 22.6 % of them were housewives and farmers respectively. Osteoporosis (T-score of neck femur < -2.5) prevalence was 72.2 %. Prevalence of (25OHD) deficiency (<20 ng/ml) and inadequacy (between 20 and 30 ng/ml) were 60.9 and 15.8 %, respectively, and 23.3 % were normal (>30 ng/ml). Vitamin D level was positively correlated with T-score of greater trochanter, neck femur, L4, L3 and L2 ($r=0.23$ & $p=0.012$, $r=0.28$ & $p=0.001$, $r=0.196$ & $p=0.023$, $r=0.18$ & $p=0.036$ and $r=0.21$ & $p=0.02$). Vitamin D deficiency was significantly associated with age and increase in BMI ($p=0.04$ & 0.012). Lack of milk and yoghurt intake had significant higher prevalence of vitamin D deficiency than others ($p=0.02$ and 0.01 , respectively). No significant relation was found with sex or education level. Multiple regression analysis was done.

Conclusion: Prevalence of vitamin D deficiency is high among hip fracture patients and is associated with low BMD. Vitamin D supplementation is strongly recommended for prevention of hip fractures in those aged >50 years.

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PLASMA RICH IN PLATELETS VERSUS HYALURONIC ACID AND CORTICOSTEROIDS IN THE TREATMENT OF KNEE OSTEOARTHRITIS

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Knee osteoarthritis is the most frequent disease among elder population. The present study aimed to compare and analyze between three methods of the treatment of knee osteoarthritis at Department of Orthopaedics and Traumatology of Locomotory Apparatus University of P. J. Safarik, Faculty of Medicine and University Hospital of L. Pasteur in Kosice in Slovakia and its outpatient clinics for a period of 1 year.

Methods: We performed a randomized double blind study with two control groups. A total of 382 patients with Grade 1, 2 or 3 osteoarthritis according to Kellgren and Lawrence grading scale were enrolled in the study. One group of patients was treated with three intra-articular application of PRP and the second group of patients with three injections of hyaluronic acid and the third group of patients with one intra-articular injection of glucocorticoid. Outcome measured by the WOMAC index, Patient's global impression of change (PGIC) and 11-point pain intensity Numeric Rating Scale (NRS) measured during 1 year.

Results: A comparison of the results between groups was recorded significantly better in the group with PRP applied, and in the evaluation of the scheme of NRS index as well as WOMAC index and PGIC ($p<0.01$). The evaluation of the platelet concentration was found that the average concentration of platelets in the PRP preparation was 4,34 times higher than the concentration of platelets in the peripheral blood of the volume.

Conclusion: Autologous platelet-rich plasma as an effective, simple, relatively low cost, minimally invasive and safe method in treatment of initial stages of knee osteoarthritis in long term, which is based on the body's own concentrate with no additives. Biological potential of PRP in the regeneration of tissues, the relative Easy to prepare and application security in terms of exclusion risk of transmission of infectious diseases and allergic reactions. Intra-articular injections of PRP significantly reduce pain and restore function of the knee joint in patients with knee osteoarthritis. This value is consistent with the literature recommended concentration of platelets in the PRP.

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OVERWEIGHT AND OBESITY AND RISK FRACTURE STUDY IN POSTMENOPAUSAL WOMEN FROM HAVANA AND MADRID

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Obesity and osteoporosis are chronic disorders with increasing prevalence worldwide with a relationship not well established as a risk factor. The aim of this study was to investigate the association between BMI and bone mineral content (BMC) in postmenopausal women from Madrid, and La Habana. A cross-sectional study included 250 women aged ≥ 55 years: 196 from Madrid (Jimenez Diaz Foundation) and 155 from Clinic of menopause and osteoporosis, La Habana. In all women we determined BMI and osteoporosis with DXA study in lumbar column according to diagnostic criteria established by WHO protocol.

Results: According to age group the values of BMI were 26.94 (4.2) and 25.93 (4.3) for women aged between 45 and 59 years and over 60 years, respectively. BMI were 25.9 (5.5) kg/m², respectively. No association were found between BMI and BMC, although, we found tendency to higher values of BMI with lower bone mineral content. Our results support the view that obesity is a risk factor for both cardiovascular disease for fragility fracture.

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STUDY OF THE MEDICAL REHABILITATION SERVICES IN OUTPATIENT SYSTEM

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Health policies at the national level in Romania have implemented the national plan for reducing bed (from 129,524 beds in 2011 to 123,127 in 2013), Romania having in 2013 approximately 5.8 beds per 1000 inhabitants. In this context, one of the objectives of the National Health Strategy 2014–2020 is “Consolidation for increasing the share of solved cases in specialized ambulatory and reducing hospitalization burden”. Medical Rehabilitation Clinical Hospital Baile Felix offers medical services in outpatient recovery and treating functional deficits incurred in some of conditions: posttraumatic conditions, amputations, neurological, musculoskeletal disorders, chronic rheumatism, obesity, metabolic disorders, age-related diseases. In our study, addressability in ambulatory patients is evidenced by the increase in the number of consultations, on average, over the last 4 years 12,000 consultations per year and 600 consultations per physician as well as the number of recommended procedures to ambulatory patients. Larger share is adult patients in urban areas (7282) relative to those in rural areas (4432). Study results strengthens the development strategies of the ambulatory system, both in urban and in rural areas, that through aggregating all therapeutic factors with modern equipment (Lokomat, ReoAmbulator,

ReoGo, Osteodensitometru, Posturograf) and quality medical services, contributes to the socio-economic reintegration of patients with disabilities.

P561

REHABILITATION RESULTS OF THE CERVICAL SPONDYLOSIS BY CHANGING MODE OF LIFE

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To observe the rehabilitation effect of cervical spondylosis at women with osteoporosis by changing mode of life.

Materials and Methods: A total 40 women with osteoporosis and cervical spondylosis of vertebral area and 40 women with osteoporosis and cervical spondylosis of radix nervi were divided into two groups randomly. The patients were treated by changing mode of life, kinetotherapy and drug treatment while those in the control group were treated by kinetotherapy and drug treatment only. The therapeutic duration was 4 weeks in both groups. The clinical effects in the two groups were observed after treatment.

Results: There was statistical significance in effect of the patients with cervical spondylosis after intervention between the two groups.

Conclusion: Changing mode of life can promote rehabilitation for the patients with cervical spondylosis and it is one of the important methods for cervical spondylosis.

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SKELETAL MUSCLE MASS, LIPODYSTROPHY AND BONE MINERAL DENSITY IN HIV- INFECTED MALES

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Despite great general interest about the impact of body composition on BMD, scarce data explores it in HIV-infected patients although they may represent a convenient population for this evaluation as they are known to experience sarcopenia, lipodystrophy and early low BMD. Recently, middle upper arm circumference (MUAC) was found to correlate with lean mass in HIV-infected males (1) and with BMD (2) in the general population.

Aim: To evaluate BMD and its relation with the MUAC and lipodystrophy in HIV-Infected males.

Methods: 118 HIV-infected Caucasian men, on combination antiretroviral therapy, followed in the Endocrinology

outpatient clinic of São João Hospital Centre, were cross-sectionally evaluated. Data regarding gender, age, weight, height, MUAC and femoral neck BMD (Lunar Expert-XL) was collected. Lipodystrophy was classified according to presence of clinical lipoatrophy and abdominal prominence (group 1: no lipodystrophy; group 2: isolated abdominal prominence; group 3: isolated lipoatrophy; group 4: mixed form). Presarcopenia was assumed if MUAC < 25th percentile (general population) (1).

Results: Mean (sd) of BMD was 0.949 (0.168) g/cm² and 106 patients (89.8 %) fulfilled criteria for presarcopenia. BMC and MUAC correlated moderately ($r=0.304$; $p=0.001$) and patients with presarcopenia had lower median BMD (0.915 versus 1.015 g/cm²; $p=0.016$). Patients with isolated abdominal prominence ($n=10$) had the highest median BMD (1.014 g/cm²) followed by those with mixed form ($n=30$; 0.987 g/cm²), no lipodystrophy ($n=11$; 0.959 g/cm²) and isolated lipoatrophy ($n=67$; 0.891 g/cm²), with a statistically significant difference across groups ($p=0.028$).

Conclusion: In HIV-infected males, lower femoral neck BMD is associated with low MUAC and with the presence of isolated lipoatrophy. In daily practice, these data may help clinicians to suspect and test for low BMD.

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TERTIARY HYPERPARATHYROIDISM: CASE REPORT

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Tertiary hyperparathyroidism is due to hyperfunctioning parathyroid tissue that does not respond appropriately to physiological regulation or to medical therapy with oral calcium salts and calcitriol and despite advances in medical therapy the percentage of patients who undergo parathyroidectomy for tertiary hyperparathyroidism remained constant. We presented the case of a 61 years old woman who was admitted in the National Institute of Endocrinology C.I. Parhon Bucharest for the evaluation of metabolic bone disease, the patient being under peritoneal dialysis for 10 years. Her medical history included chronic glomerulonephritis with chronic renal failure, high blood pressure, ischemic heart disease and the patient has antihypertensive drugs and vitamin D (alphacalcidol 1 µg/zi). Calcemia and phosphatemia were raised (calcium: 10.5 mg/dl and phosphorus: 5 mg/dl), 25(OH)VitD was low (12 ng/dl) and we detected high levels of PTH (1231 pg/ml). Despite high level of PTH, the patient was asymptomatic (no refractory pruritus, myopathies, extraskeletal calcification or

calciophylaxis). Ultrasound of the thyroid gland showed three thyroid hypoecogen nodules of 2.5, 1.7 and 1.5 cm with vascular pattern at Doppler but TSH, fT4, fT3 were normal. DXA showed lumbar T-score: -4 SD, left hip T-score: -3.8 SD and T-score of the distal radius: -4.1 SD. We have raised the amount of vitamin D (1000 U Vitamin D3 and 1 µg alphacalcidol) and we have performed scintigraphy with technetium (99 m Tc) sestamibi which showed right inferior parathyroid adenoma. The patient was transferred to the surgery where they performed total thyroidectomy with the excision of the 3 and ¼ parathyroid glands. After surgery the value of PTH decreased at 821 ng/dl, calcemia and phosphatemia were normal, 25(OH)VitD was in the lower normal range. We started hormone replacement therapy (100 µg levothyroxine) and continued therapy with vitamin D. In this patient we consider a new scintigraphy with Technetium (99 m Tc) sestamibi and a new surgery with the excision of the remnant parathyroid glands depending of the results on scintigraphy.

Conclusion: We presented the case of a woman with tertiary hyperparathyroidism associated with multinodular goiter in which we have performed total thyroidectomy and near total parathyroidectomy but the level of PTH did not decreased as we have expected. A new surgery with the excision of the remnant parathyroid gland and reimplantation of ¼ parathyroid gland in the forearm is considered because the potential benefits of parathyroidectomy may include improved survival, fracture risk, nutrition and anemia.

P564

PSYCHOLOGICAL WELL BEING AND QUALITY OF LIFE ASSESSMENT OF WORKING WOMEN WITH OSTEOPOROSIS VERSUS RETIRED WOMEN WITH OSTEOPOROSIS

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Aim: To assess and compare self esteem, anxiety and quality of life among women with osteoporosis.

Material and method: We studied patients women with osteoporosis. First group consisted of 58 working - active women with osteoporosis, second group of 58 retired women with osteoporosis. All the patients were recruited from ambulatory system Bihor county, Romania. The mean age in the first group was 60.31±2.43 and in the second group was 60.97±3.26. Both groups had similar educational level. The main inclusion criteria were: fulfilling the WHO criteria for osteoporosis, complying with the principles of medical ethics.

The exclusion criteria were: chronic severe diseases, noncompliance. All of the patients were assessed by DXA method for osteoporosis. We used Rosenberg Self Esteem Scale for self esteem, Hamilton Anxiety Rating Scale for anxiety and Qualeffo-41 Questionnaire for quality of life for all the subjects in our study.

Results: The mean self esteem value was lower in the group of retired women than in the group of active women with osteoporosis. The mean anxiety value was higher in the group of retired women with osteoporosis than in the group of active women with osteoporosis. Quality of life was lower in the group of retired women with osteoporosis than in the group of active women with osteoporosis. We found also correlations between quality of life self esteem and anxiety in patients in our study.

Conclusion: Our study underline that osteoporosis itself has an impact on patient's psychological well being and quality of life. It seems that working activities play an important role in achieving a better quality of life in women with osteoporosis versus retired women with osteoporosis. By promoting an active life and including healthy habits in everyone's life we could help improving psychological wellbeing and quality of life of patients with osteoporosis.

P565

THE OCCURRENCE OF OSTEOPENIA AND OSTEOPOROSIS IN A RANDOMLY SELECTED POLISH GROUP OF PATIENTS INFECTED WITH HIV AT DIFFERENT STAGES OF INFECTION

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Bone mass loss, which is the cause of an increased incidence of osteopenia/osteoporosis among HIV- infected people compared with those from the general population may be associated with the infection itself and with the medications being used.

Objective: The evaluation of the incidence of metabolic bone tissue disorders in a randomly selected group of Polish HIV-infected patients, at different stages of infection.

Materials and Methods: 156 HIV-infected patients without symptoms of opportunistic infections and AIDS were randomly assigned to the study and were divided into 3 groups. Group 1–50 patients, mean age 34.4 SD±7.02 years, 47 men and 3 women, all with T CD4+ cells >350/μl (mean 554 SD±183.9/μl); group 2–29 patients, mean age 32.5 SD±2.24 years, 28 men and 1 woman, with T CD4+ cells <350/μl (mean 257 SD±81.9/μl); group 3–77 patients, mean age 44.1 SD±9.63 years, 62 men and 15 women, receiving combination antiretroviral therapy (ARV) for at least 5 years (mean 9.8 SD±3.6 years), with T CD4+ cells mean 598 SD±257.4/μl

(mean nadir T CD4+ cells 146 SD±103.6/μl). BMD measured by DXA was determined in all the patients.

Results: 1. The groups were not comparable in terms of age and gender ($p<0.05$) but all the patients met the criteria of healthy individuals with no significant metabolic bone disorders. 2. The groups were comparable in terms of BMI ($p=0.053$). 3. A statistical analysis showed a significantly higher incidence of osteopenia/osteoporosis in group 2 and 3 than in group 1 and in the population of healthy individuals, based on the T-score only in the L1-L4 spine area ($p=0.029$). 4. The lowest BMD values were most frequently observed at the L4 (in 58.3 % of all the patients).

Conclusion: 1. A higher incidence of osteopenia/osteoporosis in HIV-infected individuals may be associated with an advanced HIV infection correlated with the concentration of CD4+ T lymphocytes. 2. A high percentage of low BMD values at L4 level suggests that this may be a place of an increased risk of fragility fractures in HIV-infected patients.

P566

THE DOMINANT ROLE OF SMALL PORES ON ESTIMATED MATRIX STRESS

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Porosity area (total porosity) is the proportion of cortex within the periosteal and endocortical envelopes that is void space. About 80 % intracortical void volume is formed by Haversian and Volkmann canals. Accurate measurement of cortical porosity is important because its porosity accounts for ~70 % of all bone loss. As porosity compromises bone strength we hypothesized that pore size and distribution contribute to strength independently of total porosity.

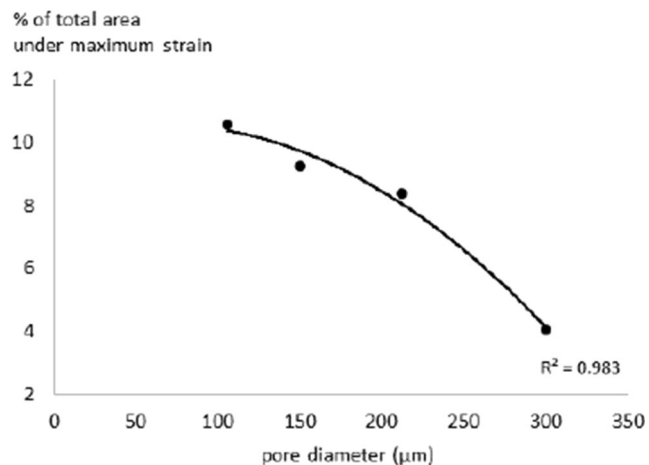
Methods: We assessed porosity using scanning electron microscopic images of a region of interest (ROI) of the anterior subtrochanteric cortex from cadavers (14 Caucasian women, age 67–87 years). Finite element (FE) models of the subtrochanteric cortex were created. To assess how pores contribute to strength independently of total porosity, total porosity was kept constant at 25 %. Pore size was varied from 106 to 300 μm. A bending force of 250 N was applied along one edge of the cortex. Strain distribution was quantified.

Results: Most pores were <120 μm in diameter; total ROI (82.87±9.20 %), compact-appearing cortex (89.98±9.46 %), and transitional zone (64.65±15.03 %). These pores contributed 17.19±6.45 %, 41.66±18.19 % and 6.35±2.56 % to total porosity in the respective regions. For a constant level of porosity, the proportion of total area of bone matrix under

maximum strain was higher for lower pore sizes ($R^2 \pm 0.98$) (Fig). When total porosity was due to pores of 300 μm , 4.06 % of bone was under maximum strain. This increased to 10.6 % when porosity was due to pores of 106 μm .

Conclusion: Pore size and distribution contribute to strength independently of porosity. Failure to quantify porosity <120 μm underestimates bone fragility.

Disclosure: A. Ghasem-Zadeh is one of the inventors of the StrAx1.0 algorithm. E. Seeman and R. Zebaze are inventors of the StrAx1.0 algorithm and Directors of Straxcorp. All other authors state that they have no conflicts of interest.



P567

REDUCTION OF VITAMIN D, THE INCIDENCE OF FRACTURES AND OSTEODENSITOMETRIC FINDING POSTMENOPAUSAL WOMEN AT THE FIRST EXAMINATION

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Reduced bone density is the most frequent cause of fractures with postmenopausal women, then followed by reduction of vitamin D.

Objective: analyse of level of vitamin D in serum, types of fractures and osteodensitometric finding with postmenopausal women at the first examination.

Methods: in order to evaluation of osteoporosis and prospective patient monitoring are analysed, all female patients have had osteodensitometric examination test done on DXA apparatus Hologic, reduced level of vitamin D and fractures have been evaluated based on radiography. Data have been analysed by statistical method of descriptive analysis. Vitamin D is defined as for normal the level of 25(OH)D in the serum between 25 and 75 nmol/l (10–30 ng/ml) and vitamin D insufficiency as a level of 25(OH)D in serum of <25 nmol/l.

Results: 1461 patients were examined, average age of 51–80 years, from 51 to 60 years old 404 (27.6 %), from 61 to 70 years old 541 (37 %), from 71 to 80 years 516 (35.4 %). The most fractures refer to nonvertebral fractures 720 (49.3 %). Fracture of forearm 330 (22.6 %), upper arm 183 (12.5 %), hip 76 (5.2 %), thigh 65 (4.4 %), femoral diaphysis 55 (3.8 %) and ribs 32 (2.2 %). Nonvertebral fractures are present in all age groups and the most often found are in the group from 61 to 70 years old out of total number of fractures in 751 (51.4 %). Vertebral fractures accounted for 302 (20.7 %). Vertebral fractures are localized on LS and TH spine part and most often with patients at the age of 61–70. T-score on LS part was in the zone of osteopenia with 673 (46.1 %) patients, osteoporosis with 539 (36.9 %) patients and with 249 (17 %) patients it was found to be <1SD. T-score on the hip was in the zone of osteopenia, found in 572 (39.2 %), osteoporosis with 695 (47.6 %) and below 1 SD found in 194 patients (13.2 %). The mean value of 25 (OH) D in the study group was 58.3 nmol/l average value of 25(OH)D in the group of women with normal bone density was 62.6 nmol/l, in the group with osteopenia 60.5 nmol/l while the average value of vitamin D in patients with osteoporosis was 51.8 nmol/l. It was found that 1037 (71 %) of subjects had a deficiency of vitamin D and at 160 (11 %) subjects registered a failure vitamins are D.

Conclusion: The analysis of the examination with postmenopausal women indicated the most frequent fractures in the zone of osteopenia at the age of 61–70. High percentage of nonvertebral fractures in regard to vertebral fractures may be explained by the fact that the analysed data were the data taken during the first examination when practically searching for asymptomatic vertebral fractures starts. Our results also show a high prevalence of vitamin D deficiency in the studied population of postmenopausal women (71 %). Vitamin D deficiency is an important factor contributing to reduced BMD in postmenopausal period

P568

SYSTEMIC-ONSET JUVENILE RHEUMATOID ARTHRITIS AT PRIMARY HEALTH CARE

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Systemic-onset juvenile rheumatoid arthritis is a chronic, autoimmune disease that occurs at an early age, i.e., during the first 4 years of life. Symptoms may include: fever, malaise, weakness, faint salmon-colored skin rash, whereas the symmetrical polyarticular arthritis occurs in the advanced phases of the disease. This paper presents a case of 3 year-old patient with reported fever, rash, and enlarged neck lymph nodes, but with no signs of arthritis. During the diagnostic period of 6 months that also included consultations with infectious disease specialist, pulmonologist and hematologist, the

child repeatedly had fever, whereas the laboratory values were normal. As there are no specific parameters when it comes to this disease, final diagnosis was based on the clinical features. After only 7 days of therapy that included the administration of glucocorticoids, fever and subjective symptoms were no longer reported.

P569

REHABILITATION PROGRAM AFTER PATTELO FEMORAL MALALIGNMENT SURGERY

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There is no consensus about the optimal time of return to full weight bearing after patello femoral malalignment surgery. We performed a prospective, randomized, controlled study which compares two rehabilitation protocols with different weight bearing surgery.

Methods and Materials: In this study 20 patients with patello femoral malalignment surgery were divided into two groups (A, B). Both groups underwent the same rehabilitation protocol with the main focus on range of motion (ROM), strengthening and neuromuscular control. Evaluation was performed after 4, 12 and 24 weeks by objective and subjective evaluation scores and high resolution MRI.

Results: In both groups no increased pain, the MRI score showed good results in both groups, however patient of group B show less bone narrow edema.

Conclusion: A rehabilitation protocol allowing an earlier return to full weight bearing shows good objective and subjective results.

P570

THE PROXIMAL FEMUR CORTICAL BONE SPECIMEN TESTING WITH QCT AND REFERENCE POINT INDENTATION: PRELIMINARY RESULTS

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Bone quantity and its mechanical properties may influence the surgical treatment method and implant choice in order to the accurate bone-implant interaction. The aim of the study was to assess differences in the quality of the cortical bone of the proximal femur (femoral neck) obtained during total hip arthroplasty.

Material and Methods: The study sample comprised the specimens of femoral heads with intact cortical bone from elderly women who sustained hip fractures ($n=2$, age: $XX \pm 4.6$ years) and age-matched cases of women suffering osteoarthritis of the hip ($n=2$, age: $XX \pm 9.8$ years). Both groups of patients who donated their femoral heads were Caucasian females from Poland that were subject to hip arthroplasty at the facility. The Bioethical Committee of the Medical University of Warsaw approved the study protocol. QCT was used to assess BMD of the femoral neck cortical bone. The bone scan was individually and manually evaluated using QCT PRO software. Areal BMD was calculated with a standardized procedure, where the ROI probing box was set at three mm². Material properties of the external cortex at the selected spots of the femoral neck were evaluated using a reference point indentation method (RPI). In this study, bone material properties were measured using a BioDent 2 Reference Point Indentation system. Samples were fresh frozen at -20 °C and thawed to room temperature over the course of 24 h prior to measurement. Human femoral head and neck samples were measured 3 times in the medial, anterior, posterior, or lateral side within 5 mm of a) the fracture site, for the samples with hip fracture or b) the osteotomy site, for the samples with osteoarthritis.

Results: Comparison between the THA hip fracture group ($N=2$) and THA osteoarthritis group ($N=2$) showed statistically significant differences for Total Indentation Distance (TID), $p=0.0015$; Indentation Distance Increase (IDI), $p=0.0015$. Mean cortical BMD for lateral and medial sites of femoral neck between the groups was 591.17 g/cm² vs. 763.13 g/cm² (for OA group) and 493.2 g/cm² vs. 719.33 g/cm² (for fracture group) respectively.

Conclusion: The differences in the quality of the cortical bone from femoral neck fracture patients vs. hip osteoarthritis were significant as anticipated.

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P571

USING SYSADOA FOR PREVENTING THE OSTEOARTHRITIS OF KNEE IN WOMEN WITH OSTEOPOROSIS

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Until now there are not well established therapies able to prevent the development of osteoarthritis.

Methods and material: We had in our clinical observations a group of women with osteoporosis, now presenting osteoarthritis symptomatology of the knee. Therapy with analgesics

and nonsteroidal anti-inflammatory drugs were not efficient and physiotherapy was slightly helpful in some patients.

Results: Based on our hypothesis that there is a pre-arthritis state due to micro-lesion of the cartilage. We recommended a combination of chondroitin 1200 mg and glucosamine 1500 mg divided in two doses daily. The osteoarthritis symptomatology (crunches, stiffness, pain) was resolved within 1 month, but the therapy was continued for another month.

Conclusion: An early therapy with SYASDOA might be a solution for the prophylaxis of knee osteoarthritis in women with osteoporosis.

P572

THE SIGNIFICANCE EVALUATION OF MAGNETIC RESONANCE IMAGING FOR TIBIO FEMORAL MODIFICATIONS

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The imaging study usually requested for tibio femoral modification is computed tomography imaging. Regardless, it is possible to use MRI at 20° of flexion for the same purpose, presenting advantages for the patients, such as avoiding radiation exposure and evaluating associated injuries. The objectives of this study is to evaluate the significance of MRI in tibio femoral modification.

Methods and Materials: Twenty MRI s prospectively evaluated in 25 patients with knee clinical diagnose, measuring tibial tuberosity trochlear groove distance. Associated chondral, meniscal and ligamentous injuries were evaluated as well.

Results: All MRI s presented at least one pathological finding requiring tibio femoral modification.

Conclusion: Knee MRI s is a useful diagnostic exam in tibio femoral patients disorders. An advantage of this exam is that evaluation of associated injuries, particularly chondral. This will help in the preoperative planning.

P573

OSTEOCALCIN LEVELS CAN PREDICT SIGNIFICANT INCREASES IN BONE MINERAL DENSITY AFTER TERIPARATIDE TREATMENT

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Objective: To identify the patients that will have significant increases in BMD after teriparatide using OC levels.

Methods: Prospective observational study. BMD at baseline and 18 months was obtained with a LUNAR Expert 1320 R. OC was measured at baseline, 3 and 18 months. The correlation between OC levels and BMD changes was evaluated by Spearman rank correlation analysis. To predict significant BMD changes (defined as 15 %) ROC curve was performed using OC levels (baseline and 3 months changes). Cutoff points that assured a specificity (E) of 90 % were defined. κ coefficient was calculated to identify the agreement between patients identified as good responders by their OC levels.

Results: 57 patients were included. 91.2 % (52) were female with mean age of 67.65±8.8 years. 52.63 % (30) had glucocorticoid-induced osteoporosis. After treatment, median BMD change in lumbar spine (LS) was 0.088 g/cm² (10.65 %). Median baseline OC level was 18.9 ng/mL [4.2–71.3] and median OC change at 3 months was 27.5 ng/mL [0.30–93.50] (155 %). LS BMD gains after treatment correlated significantly with baseline OC ($r=0.324$, $p=0.036$) as well with OC changes at 3 months ($r=0.336$; $p=0.049$). Baseline OC showed a good accuracy in predicting 15 % (or superior) LS BMD change, (AUC 0.694 $p=0.03$) and 26.75 ng/mL was the best cutoff point: S 40 %, E 92.6, PPV 74.84 %, NPV 74 %, positive LR 5.4 and negative LR 0.65. OC change at 3 months also showed a good accuracy in predicting significant BMD increases (AUC 0.748, $p=0.017$). 39.3 ng/mL was the best cutoff point: S 50 %, E 91.3 %, PPV 74.89 %, NVP 41.67 %, positive LR 5.74 and negative LR 0.55. We found a good agreement (κ 0.697, $p=0.01$) between patients that have baseline OC >26.75 ng/mL and OC change >39.3 ng/mL and consequently were identified as good responders.

Conclusion: Baseline OC can be used to select patients to treatment and OC changes at 3 months can provide a positive message as we proved a good agreement between the two measures.

P574

BIOMECHANICAL EVALUATION OF THE KNEE BEFORE AND AFTER LIGAMENT- PLASTY

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Aim of this study is the investigation of lower limbs biomechanics before and after ligament -plasty.

Methods and Materials: Motion analysis of the knee before surgery, 6 months and one year after was performed on ten patients that underwent ligament-plasty. Ten healthy volunteers acted as a control group. **Results:** In gait patterns investigation, joint kinematics does not show significant modifications before and 6 months after surgery, 12 months after surgery hip and knee show a greater flexion. Before surgery the knee flexion moment is reduced.

Conclusion: After ligament plasty, gait and squatting patterns are still altered. Before surgery, the joint mechanical structure is not highly altered and modification are mainly due to pain avoidance schemas, after ligament-plasty the pain disappears.

P575

IDENTIFICATION OF OA PATIENTS WITH JOINT INFLAMMATION USING TWO BIOMARKERS OF CONNECTIVE TISSUE INFLAMMATION

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Purpose: Inflammation and OA is receiving increased attention. This is a need to identify the OA patients with an inflammatory phenotype, who may benefit from an anti-inflammatory intervention. CRP is an acute phase reactant, involved in both acute and chronic inflammatory diseases. CRP is produced mainly by the liver upon elevated levels of cytokines such as IL-6. From the liver CRP is transported to the inflamed tissue where it binds its receptors and thereby accumulated by the tissue. These fragments are released from the tissue as matrix metalloproteinases (MMPs) are upregulated in response to pro-inflammatory induction. We have recently identified the presence of MMPs generated fragments of CRP, and developed specific ELISAs for the quantification of these. C3M is a biomarker of type III collagen remodeling, which is released from the synovial membrane with induced with pro-inflammatory cytokines. The aim of the study was to investigate whether the level of the protein fingerprint CRPM together with the tissue turnover biomarker C3M could segregate OA patients with and without inflammatory arthritis.

Methods: CRPM and C3M were measured in the serum of knee OA patients taking part of the two phase III RCTs (NCT00486434 and NCT00704847). Baseline and 2 year follow-up pain questionnaires and radiography were recorded for each patient. An array of additional biomarkers were measure; C1M, C2M, CTX-II, CTX-I and osteocalcin. The biomarkers were plotted against each other (figure) and cutoffs were set based on reference value and difference between clinical measures and biomarkers in the two patient groups were analyzed by Mann-Whitney.

Results: Patients were separated into 2 groups; 1) patient with low CRPM and low C3M, and 2) patients with either high CRPM or high C3M, or with both high. 16 % of the patients were found group 2. Several of the measures were higher in group 2: Cartilage degradation (C2M) and connective tissue degradation (C1M) were significantly higher ($p=0.0037$, $p<0.0001$, respectively), as well as WOMAC subscale question E ($p=0.0191$). There was no group difference in KL score or JSW nor in CTX-I, CTX-II and osteocalcin. Group 1

patients (low in both CRPM and C3M) progressed structurally more group 1 patients ($p=0.046$).

Conclusion: We found that inflammatory markers could facilitate patient segregation. This may allow identification of OA patients with an inflammatory phenotype, whom may benefit from an anti-inflammatory treatment.

P576

DOES VITAMIN D METABOLISM DIFFER BY RACE? EVALUATION OF VITAMIN D METABOLITES IN AMERICAN INDIANS AND CAUCASIAN AMERICANS PRIOR TO AND FOLLOWING VITAMIN D3 SUPPLEMENTATION

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Objective: Serum 25(OH)D concentrations differ between races. It is often assumed that this reflects cutaneous pigmentation with dark skinned individuals being at greater likelihood of having low 25(OH)D levels. However, whether racial differences exist in circulating vitamin D metabolite levels, e.g., cholecalciferol (D₃) and/or 24, 25(OH)₂D (24,25D), or whether race affects the change in these vitamin D metabolites following supplementation has received little study due to analytical challenges in performing such measurements. Recently, liquid chromatography tandem mass spectrometry (LC-MS/MS) methodology has made measurement of D₃ and 24,25D more available. The purpose of this report is to describe serum levels of these metabolites in American Indian (AI) and Caucasian American (CA) postmenopausal women and to evaluate change in these metabolites following oral vitamin D₃ supplementation.

Materials and Methods: Serum D₃, 25(OH)D and 24,25D were measured using LC-MS/MS in a study of 99 postmenopausal American Indian mean (SD) age 61.2 (7.3) years and a second study of 88 postmenopausal Caucasian American women mean (SD) age 64.2 (8.7) years. Inclusion/exclusion criteria for both studies were similar. The AI volunteers were randomly assigned to receive either 400 IU or 2500 IU of vitamin D₃ daily for 6 months; the Caucasian American women received 2300 IU of daily vitamin D₃ for 4 months. Vitamin D metabolites were measured at baseline and study conclusion.

Results: At baseline, mean serum 25(OH)D did not differ between AI (27.6 ng/mL) and CA (26.2 ng/mL) women. Baseline 24,25D was lower ($p<0.0001$) in AI than CA (2.0 and 2.9 ng/mL, respectively.) Serum 24,25D was positively correlated ($p<0.001$) with 25(OH)D in both AI and CA women. Following supplementation with 2300 or 2500 IU daily, a greater ($p<0.001$) increase in 25(OH)D was observed in AI than CA women (18.1 vs. 11.9 ng/mL). After this supplementation, 24,25D increased similarly in AI and CA women.

Serum D₃ was detectable (≥ 5 ng/mL) in only 9 % of AI and 4 % of CA women at baseline.

Conclusion: When compared to Caucasian postmenopausal women, serum 24,25D is lower, and the response to daily vitamin D₃ supplementation greater, in a cohort of postmenopausal AI women. This differing response suggests that reported racial differences in vitamin D status may reflect not only skin pigmentation, but also differences in vitamin D metabolism. It is possible that vitamin D intake and status recommendations should be race specific. Further study of potential racial differences in vitamin D metabolism is needed.

P577

LINKAGE BETWEEN RADIAL BONE FRACTURE AND OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN AS AN INPUT FOR EARLY BMD ANALYSIS

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Objective: The goal of our biannual research is, in a routine practice of physiatric clinics, establish the links between radial bone fracture in typical site and osteoporosis in postmenopausal women, and to assess the need of osteopenia/osteoporosis diagnostics as early as possible. In addition to before said there is a presentation of our continuing research.

Material and Methods: In between January 2013 till the end of 2014 we have observed the targeted group of 421 female patients aged 55–80 years with radial bone fracture in typical site (flat surface) 151 of these examinees had proven osteopenia, amongst 270 examinees analysis of bone density have not been performed earlier at all

Results: Within the group of 270 patients radiologic densitometry have been performed, within that group the osteoporosis has been verified in 175 cases (65 %), osteopenia with 81 patients (30 %), while in only 14 examinees (5 %) decrease of bone density has not been established. In patients with verified osteoporosis and osteopenia an adequate medicamentous therapy has been introduced on the individual basis. Targeted medical rehabilitation has been introduced to whole group, with stress on medical gymnastics, and education for prevention of falling.

Conclusion: Obtained results pointing out the necessity of performing bones mineral density analysis within

postmenopausal women group, and if needed, commence the adequate treatment in aim of prevention and diminishing the number of further fractures, therefore improvement of life quality.

P578

FEMUR AND VERTEBRA FRACTURES IN A YOUNG MAN CAUSED BY SEVERE HYPOPHOSPHATEMIA

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Thirty-three year old man without injury felt severe pain in the skeleton. Medical examination found vertebral fracture Th12 and L5, spinal stenosis, but it did not explained his pain. Then he suffered in a low-threshold left femur fracture. He had severe pain when walking, and poor muscle strength, so it was referred to an endocrinologist. We found a normal serum and corrected calcium, normal renal function and a normal daily calciuria. PTH, 13.1 ng / L (ref. 12–65) was low normal, a normal vitamin D (90.8 nmol/L; ref. >75) and a reduced active form of vitamin D (14 pmol/L; ref. 15–155), while severe hypophosphatemia 0.4 mmol/L (ref. 0.8–1.4), increased excretion of phosphate in the urine and elevated alkaline phosphatase (AF) 3.05 μ kat / L (ref. to 2.15) and the bone fraction of AF (74 %). Hypophosphatemia is a rare disorder, because the phosphate in the abundance of food available and easily absorbed in the digestive tract. As the cause of hypophosphatemia we exclude malabsorption and starvation as well as a shift of phosphate in the cell. We meant that this was a cause of renal hypophosphatemia that given the low value of PTH and is not dependent on PTH. Therefore, we think of hypophosphatemia mediated FGF-23. The level of FGF-23 was greatly increased. Given the relatively abrupt onset of problems we were of the opinion that it is probably a tumor osteomalacia. PET/CT showed a metabolically active tumor formation on the dorsal side of the thigh. Complete surgical excision removed the revealed 6×7.5×2 cm large mesenchymal tumor. After the operation hypophosphatemia was quickly corrected, reduced the concentration of FGF-23, which confirms that the FGF-23 secreted from the mentioned tumor. In addition, the AF normalized; also the concentration of the active form of vitamin D has increased. Due to these frequent recurrences of the tumor patient should be carefully monitored. So far, tumor relapse or rehypophosphatemia was not found.

P579

CORRELATION BETWEEN INITIAL VITAMIN D STATUS AND OSTEOPOROTIC FRACTURES SUSTAINED DURING BISPHOSPHONATE THERAPYS. Milenkovic¹, I. Aleksic¹, V. Zivkovic¹, B. Stamenkovic¹, S. Stojanovic¹, J. Jovanovic¹¹Institute for Treatment and Rehabilitation Niska Banja, Nis, Serbia

Osteoporosis is a generalized bone disease characterized by disordered bone stiffness increases causing a predisposition to fractures. The primary role of vitamin D is in the metabolism of phosphorus and calcium. Vitamin D status within the organism is determined by measuring the level of 25(OH)D in the serum.

Objective: The purpose of this research was to determine the status of vitamin D in women with newly diagnosed postmenopausal osteoporosis and to determine the significance of the initial level of vitamin D on the incidence of new osteoporotic fractures after 12 months of bisphosphonate therapy.

Material and method: The examinees were prospectively followed for 12 months, during which they were at the following therapies: bisphosphonate (alendronate 70 mg weekly or monthly ibandronate 150 mg), vitamin D 800 IU daily and 500 mg Ca per day. The examined group consisted of 108 patients with postmenopausal osteoporosis and insufficiency and deficiency of vitamin D. The control group consisted of 13 patients with newly diagnosed postmenopausal osteoporosis and normal status of vitamin D. The research was conducted at the Institute "Niska Banja". All the examinees were determined with the level of 25(OH)D (by ELISA method) as well as the level of Ca, P and ALP in serum and also level of Ca and P in 24 h old urine. All of the examinees were defined with their BMD on the lumbar spine and hip, measured with DXA on the Hologic Discovery machine.

Results: Average age of the examinees was 61.55±7.46, average duration of menopause was 12.74±8.39 years. With all examinees the level of Ca, P and ALP in serum and level of Ca and P in 24 h old urine were in reference limits.

A normal vitamin D status was found in 13 examinees (11 %), deficiency of vitamin D in 97 (80 %) and insufficiency of vitamin D in 11 (9 %). Before the start of therapy in the group of 11 examinees with vitamin D insufficiency fractures had 3 of them (27.3 %); in the group of 97 women with vitamin D deficiency fractures had 21 of them (21.8 %); in the group of 13 women with normal vitamin D status fractures had 2 of them (15.4 %). After 12 months of bisphosphonate therapy in the group of examinees with vitamin D insufficiency fractures had 5 of them (45.4 %), in the group with vitamin D deficiency fractures had 23 of them (23.9 %), in the group examinees

with normal vitamin D status representation fractures remained the same. Univariate and multivariate logistic regression analysis showed that the initial level of 25 (OH) D as an important predictor of the presence of new fractures occurred during the 12 months of bisphosphonate therapy and that any initial increase in 25 (OH) D for 1 nmol/l was associated with a reduction in the risk of new fractures by 1.4 %.

Conclusion: The initial vitamin D status was significantly associated with the development of new osteoporotic fractures after 12 months of bisphosphonate therapy. Insufficiency and deficiency of vitamin D in women with postmenopausal osteoporosis represent a significant risk factor for osteoporotic fractures.

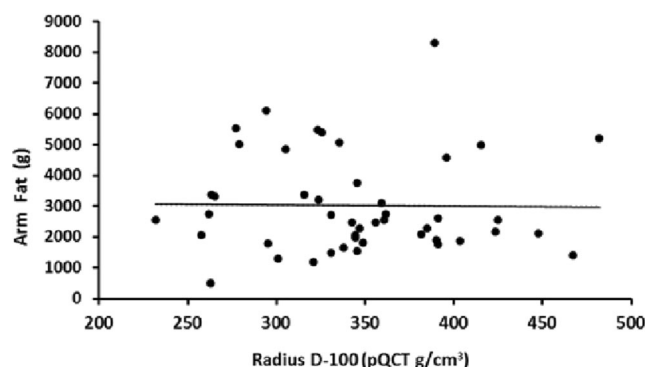
P580

EVALUATION OF DUAL ENERGY PHOTON ABSORPTIOMETRY (DXA) FOR MEASURING BONE MINERAL DENSITY IN SUBJECTS OF DIFFERING FATNESSE. C. Colt¹, M. A. Akram¹, E. G. Guo², B. Z. Zhou²¹Obesity Research Center, St Luke's Roosevelt Hospital, Columbia University, New York, NY, United States, ²Department of Biomedical Engineering, Columbia University, New York, NY, United States

We looked at several parameters measured by DXA and HR-pQCT in 49 premenopausal women aged 18–45 ranging in BMI from 18 to 45. Bone stiffness (S) measured by finite element analysis was correlated with many parameters measured by HR-pQCT, in both radius and tibia; these include SI Ar, trabecular thickness (Tb Th), and average BMD by qCT (D100). S was also correlated with body weight (W), BMI, and parameters measured by DXA, including BMD, skeletal muscle (SM), fat, and BMI (Figs 1–4). We compared the results of BMD measured by DXA with average bone density (D 100) measured by HR- pQCT. The correlation coefficient (r) of BMD measured by DXA with leg fat and arm fat were 0.41 and 0.82, respectively, whereas the r of average bone density (D100) measured by HR-pQCT, of ankles and wrists with leg fat and arm fat were -0.09 and -0.01, respectively. Figs 5 & 6 show these relationships for arm fat & bone density measured by DXA and HR-pQCT. The relationships for leg fat and tibial bone density were similar. These results indicate that fat influences the result of BMD reported by DXA more than that reported by HR-pQCT.

Conclusion: BMD measured by DXA is influenced by fat and BMI to the extent that BMD measured by DXA in fat vs. thin subjects may not be comparable. In patients whose W remains constant, monitoring BMD by

DXA can measure changes which are meaningful. However although the relative contributions of muscle, fat, and bone to the BMD reported by DXA are not known, the reported BMD is a useful surrogate for S.



P581

DXA ASSESSMENT IN A PATIENT WITH TWO NEOPLASM AND BILATERAL ORCHIECTOMY: SECONDARY OSTEOPOROSIS VERSUS BONE METASTASES

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Objective: The osteoporosis in men has various causes and hypogonadism is one of the most important. Nevertheless, the age related bone loss decline might be associated. Moreover, an active neoplasm needs to be considered. We present such case that brings together all these three causes. The local recurrence of a urinary bladder neoplasm after more than a decade from diagnosis is associated with non-responder pattern at bisphosphonates.

Material and Methods: The central DXA was performed (Lunar Prodigy device). The bone status evaluation included 25-hydroxyvitamin D (25OHD, normal levels over 30 ng/mL), bone markers of formation osteocalcin (OC, normal levels between 14 and 46 ng/mL), and resorption markers as serum crosslaps (CL, normal levels between 0.23 and 0.854 ng/mL). Computed tomography (CT) was performed. The written consent of the patient was obtained.

Results: S.G. 80-year old male was referred to the “C.I. Parhon” National Institute of Endocrinology in January 2014 for lack of responsiveness on oral bisphosphonates. He is nonsmoker. The medical history pointed that in 1999 he was diagnosed with a poorly differentiated urinary bladder carcinoma of grade II

(pT1NoMo) and operated. In 2003 a second neoplasm was diagnosed at the prostate level (an adenocarcinoma of grade II) that was operated by laparoscopy. Associated bilateral orchiectomy was performed. In 2004 he accused back pain thus he was evaluated for osteoporosis. A lumbar vertebra fracture was found at the L1 level. Central DXA pointed lumbar BMD of 0.677 g/cm², T-score of -4.7, and Z-score of -3.9; neck BMD of 0.63 g/cm², T-score of 0-3.3, Z-score of -2. He was treated for 9 years with weekly oral alendronate. In 2008 a L2 vertebral fracture was diagnosed. In 2012 the whole body bone scintigram was negative. Also the CT showed no relapse of the tumours. In 2014, he significantly continued to lose bone mass: neck BMD of 0.545 g/cm², T-score of 0-3.7, Z-score of -1.7. On admission, the specific prostatic antigen was undetectable. The 25OHD was 16 ng/mL. The bone markers were suppressed: OC of 10.15 ng/mL, CL of 0.3 ng/mL. Normal parathormone and thyroid stimulating hormone levels were found. CT found the tumour relapse at the urinary bladder wall level (multiple tumours of maximum 1.48 cm), and confirmed the vertebral fractures at the level of L1 and L2, associated with hyperdensity in L5 vertebra and left trochanter (bone metastases). The patient was referred for monthly zoledronic acid therapy under oncologic surveillance, and supplements with vitamin D were added.

Conclusion: The decreased BMD despite antiosteoporosis drugs in a previously known oncologic patient is a warning for tumour relapse, especially bone metastases. Since hypovitaminosis D has been reported in correlation to certain neoplasm, the routine assay might be essential.

P582

RADIOLOGICAL EVALUATION OF PLACEMENT OF FEMORAL FOOTPRINT OF ANTERIOR CRUCIATE LIGAMENT IN TWO DIFFERENT TECHNIQUES OF ACL RECONSTRUCTION: PROSPECTIVE COHORT STUDY

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Anatomic tunnel positioning is important in ACL reconstruction surgery. Recent studies have suggested the limitation of transtibial technique to place graft within the anatomic tunnel position of the ACL on the femur. The purpose of the study is to determine whether anteromedial portal technique can place femoral tunnel to native ACL center when compared with transtibial technique.

Methods: Consecutive 40 patients who underwent single bundle ACL reconstruction using hamstring tendon autograft

were included. Femoral tunnel locations were measured with quadrant methods on medial to lateral view of the lateral femoral condyle visualized on 3D CT scan. These measurements were compared with reference data on anatomical tunnel position.

Results: With quadrant method, femoral tunnel centers of the transtibial technique and anteromedial portal technique were identified. The mean(\pm SD) was 46.62 % \pm 7.74 % and 36.95 % \pm 7.15 %, respectively, from the over the top along the notch roof(parallel to the Blumensaat line) and at 17.63 % \pm 6.29 % and 47.61 % \pm 7.15 %. From the notch roof (perpendicular to the Blumensaat line). The transtibial portal leads to ACL femoral tunnel is often positioned too high and too deep in the intercondylar notch, away from the native ACL femoral attachment site. The anteromedial portal technique used in this study placed femoral tunnel more shallow and deep, closer to anatomical position.

Conclusion: After single bundle ACL reconstruction, three dimensional CT scan confirmed the accurate placement of femoral tunnel, with anteromedial technique closer to anatomical femoral tunnel position.

P583

TBS IS RELATED TO PHYSICAL FUNCTION MEASURES INDEPENDENT OF BONE MINERAL DENSITY ACROSS THE LIFESPAN

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Muscle force application alters bone structure, as such, it is not surprising that physical function and trabecular bone score (TBS; a surrogate for bone microstructure) are related to fracture risk. It has recently been reported that physical performance is positively correlated with TBS in young women. This observation is plausible as greater load placed on the skeletal system should improve bone microarchitecture. As such, we hypothesized that TBS would be positively correlated with measures of physical function across the lifespan. The purpose of this study is to evaluate the relationship of TBS with physical function parameters in adult men and women.

Methods: Subjects ($n=200$, 87 M/113 F) from three studies in which physical function measures and lumbar spine DXA were obtained were utilized for this analysis. The sample was limited to those with a BMI range 15–38 kg/m² to meet TBS recommendations. Functional assessment included grip strength, chair rise, gait speed, jumping mechanography determined jump relative force and power. Univariate and multivariate regressions were performed with each physical function test to determine the correlation of physical function measures with TBS and BMD using XLSTAT (New York, NY).

Results: Mean (\pm SD, range) age, BMI and T-score were 63.3 (\pm 19.0, 27–96.5) years, 26.9 (\pm 4.7, 15.1–37.3) kg/m² and +

0.25 (\pm 1.9, -4.3 to +7.0), respectively. Univariate regression analyses demonstrated a positive correlation ($p<0.01$) between TBS and all functional tests. BMD was positively correlated ($p<0.05$) with grip strength, jump relative force and relative power. In the multivariate model including TBS and BMD, TBS continued to be correlated with all functional tests ($p<0.01$) except grip strength. BMD remained significant only for grip strength ($p<0.01$) and was, inversely correlation with chair rise ($p=0.03$). Evaluation of those ≥ 50 years ($n=148$) demonstrated a TBS correlation with grip strength, chair rise and relative power ($p<0.05$), while a trend was observed in relative force ($p<0.08$).

Conclusion: TBS is positively correlated with physical function tests of leg function. This suggests that muscle performance affects bone microarchitecture and reinforces the evolving paradigm that the musculoskeletal system is vital in fracture prevention. It further demonstrates that TBS measures a bone component independent of BMD. Evaluation of this observation in larger cohorts is needed. If this finding is confirmed, future studies evaluating whether measures to improve physical performance alter TBS are indicated.

P584

OUTCOME OF ANATOMIC RECONSTRUCTION OF MEDIAL PATELLOFEMORAL LIGAMENT IN RECURRENT PATELLA DISLOCATION: A PROSPECTIVE CASE SERIES

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Recurrent patella dislocation is a challenging problem to manage resulting due to imbalance between bony and soft tissue restraints. Medial patellofemoral ligament (MPFL) has been consistently shown to be damaged in patellar dislocation. Reconstruction of MPFL restores the recurrent instability. However, debate continues between isometric and anatomic reconstruction of MPFL. We present a prospective series of 18 patients with anatomic reconstruction of MPFL and its clinical outcome.

Material & methods: 18 patients with recurrent dislocation of patella were included. Plain radiograph of knee and MRI were performed for all the patients. After diagnostic arthroscopy, meniscal and cartilage lesions were managed appropriately. MPFL reconstruction was done using semitendinosus tendon, passing it through dual patellar tunnels. Two loops of tendon were passed between 2nd and 3rd layer of knee. A tunnel was drilled at an anatomic point lying over femur between medial femoral epicondyle and adductor tubercle aiming superolaterally. Two ends of semi-T tendon were fixed inside the tunnel using a bio absorbable interference screw with knee flexion between 30 and 60°. Postoperative, non

weight bearing mobilization of knee was started from very next day in a hinged brace with 30° increase every week. Weight bearing was allowed after 6 weeks. Anatomic point of attachment on the femur was confirmed by post operative CT scan with 3D reconstruction.

Results: Total 18 cases (11 M, 7 F) were included. All cases had patella alta. Seven cases had ligament laxity. Mean post operative Kujala score was 95.66. No patient had extensor lag or flexion deficit. There were no re dislocations or patella fracture.

Conclusion: Our technique of MPFL reconstruction is reproducible, simple, anatomic and free from post operative immobilization. The procedure does not require any complicated instruments, special hardware, provides excellent results.

P585

DISCONTINUATION OF STRONTIUM RANELATE OR SWITCHING TO DENOSUMAB IN OSTEOPOROSIS PATIENTS: EFFECTS ON BMD

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Objective: Changes in osteoporosis medications are common. New restrictions for the administration of strontium ranelate (Sr-ran) resulted in subjects discontinuing Sr-ran or transitioning to other therapies. Since the increase in BMD during the use of Sr-ran is in part due to an incorporation of Sr into bone mineral we studied the course of BMD changes after stopping Sr-ran or switching to denosumab (Dmab).

Methods: We retrospectively identified from our outpatient department patients fulfilling the criteria of one of these three groups: A. Treatment with Dmab over 2 years after Sr-ran for 2–4 years, B. Dmab over 2 years in treatment naïve patients, C. No specific therapy for 2 years after Sr-ran for 2–4 years. We report on the changes in lumbar spine (LS) as well as total hip (TH) BMD by DXA.

Results: We identified 102 patients with a mean age of 62 years, 60 females, 42 males (n: group A 36, B 34, C 32). LS BMD increased with Dmab after Sr-ran by 3.9 and 7.5 % after 12 and 24 months. Dmab administration to untreated patients resulted in significantly higher increases of 6.0 and 9.8 % at 12 and 24 months. In Group C the mean LS BMD decreased by 5.1 and 7.8 % at 12 and 24 months. TH BMD changes in the 3 groups were smaller but showed the same pattern with no significant differences in AEs between groups.

Conclusion: Transition to denosumab prevented the decrease in BMD observed following discontinuation of Sr-ran. BMD increases with Dmab following transition from Sr-ran (A) were smaller than those observed in untreated patients (B). This apparent blunted BMD response may be partly

influenced by decreasing Sr content in bone mineral after Sr-ran discontinuation. An alternative explanation is that Dmab therapy, by slowing down bone turnover, delays Sr release from mineral matrix and thus prevents the rapid decrease in BMD following Sr-ran discontinuation. Therefore, it appears likely that transitioning from Sr-ran to denosumab would be preferable to discontinuation.

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ASSOCIATION OF GOUT AND TOTAL KNEE ARTHROPLASTY FOR OSTEOARTHRITIS IN THE SINGAPORE CHINESE HEALTH STUDY

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Objective: Cross-sectional and case-control studies suggest that gout is associated with osteoarthritis. However, no prospective study has evaluated the risk of total knee arthroplasty (TKA) for severe knee OA (KOA) in association with gout. In this study, we evaluated the association between self-reported gout and the risk of TKA due to severe KOA.

Methods: We analysed the data from the Singapore Chinese Health Study, a prospective cohort with 63,257 Chinese adults aged 45–74 years at recruitment (1993–1998). Self report of gout diagnosed by physician was enquired at follow-up I interview (1999–2004) from 52,322 subjects. TKA cases for severe KOA were identified via linkage with the nationwide hospital discharge database through 31 December 2011, and 464 subjects with TKA done before follow-up I interview were excluded from this analysis. Multivariable Cox proportional hazards regression model was applied with adjustment for demographic, dietary and lifestyle factors, including BMI, physical activity and history of self-reported, non-specified arthritis.

Results: Among the 51,858 subjects (22,180 men and 29,678 women) included in this analysis, after a mean follow-up of 9.7 years from the follow-up I interview, there were 1,435 cases of TKA (250 men and 1,185 women). Self-reported gout was associated with 40 % higher risk of TKA in women [hazard Ratio (HR) 1.40; 95 % CI 1.08–1.80] but not in men (HR 0.76; 95 % CI 0.48–1.22). The positive gout-TKA association in women remained after excluding participants with baseline history of arthritis (HR 1.55; 95 % CI 1.03–2.35) or comorbidities (HR 2.93; 95 % CI 2.01–4.28). The risks of TKA in women with gout were higher in those with BMI < 23 (HR 2.49; 95 % CI 1.49–4.17) and with duration of follow-up > 5 years (HR 1.68; 95 % CI 1.23–2.30).

Conclusion: Our results suggest that gout increases the risk for severe KOA requiring TKA in women and may play a role in the KOA onset and progression.

P587

RHEUMATOID CACHEXIA, OSTEOPOROSIS AND VERTEBRAL FRACTURES

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Objective: To assess the prevalence and risk factors of cachexia and evaluate its relationship with osteoporosis and vertebral fractures (VFs) in patients with rheumatoid arthritis (RA).

Patients and methods: we enrolled in a cross-sectional study 178 consecutive patients with RA (female: 82.6 %), who fulfilled the ACR criteria for the classification of RA with a mean age of 54.1±11.5 (25 to 82) years. Body composition, Lateral VFA images and scans of the lumbar spine and proximal femur were obtained using DXA. Rheumatoid cachexia was defined by a fat free mass (FFM) index below the 10th percentile and a fat mass (FM) index above the 25th percentile compared to a reference population. VFs were defined using Genant semiquantitative approach.

Results: Rheumatoid cachexia was observed in 96 patients (53.9 %) and osteoporosis in 52 patients (29.2 %). Comparison between women with and without cachexia showed that women with cachexia had a longer disease duration, higher disease activity parameters, higher steroid cumulative dose, and higher proportion of patients with erosive arthritis than women without cachexia. They had lower total hip BMD and T-score than women without cachexia while comparison in men found only BMI to be significantly lower in men with cachexia. Regression logistic analysis showed an independent and significant association between rheumatoid cachexia and age and disease activity in women.

Conclusion: Our study showed that half of the patients with RA may have rheumatoid cachexia, a condition that was significantly associated to disease activity and low hip BMD but not to vertebral fractures.

P588

DO FALLS PREDICT POSTMENOPAUSAL FRACTURES?

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Falling tendency and low BMD are risk factors for fractures in the elderly. The purpose of this study was to evaluate if fall history is a predictor of postmenopausal fractures. In addition, we will estimate if fall risk predicts fractures differently according to type of fall and site of fracture.

Method: Falls were asked in the 10-year postal enquiry of the population-based Kuopio Osteoporosis Risk Factor and Prevention (OSTPRE) Study in 1999 with two questions: 1) Have you fallen during the last 12 months and how many times? 2) How did you fall? A total of 10210 women responded to the enquiry and fall questions. Women with falls were classified as single fallers (1 fall/year) and multiple fallers (2+ falls/year).

Design: prospective cohort study. Fractures in 1999–2004 were asked in 2004. Self-reports were confirmed by perusal of patient records. A total of 9759 women responded to fracture questions and 8744/9759 women had information on both falls and fractures. A total of 811/8744 women (9.3 %) had sustained fractures during the 5-year follow-up. Odds ratios (OR) were computed with logistic regression.

Result: Women were 57–66 years old at baseline. Falling history predicted fractures with an OR of 1.41 ($p < 0.001$). Single fall was related to fracture 38 % and multiple falls 45 % more often than no history of fall. Falls did not predict osteoporotic fractures ($n=431$) (OR 1.26 (ns)) but predicted non-osteoporotic fractures ($n=380$) (OR=1.54) ($p < 0.001$). Distal forearm fracture ($n=313$) was the most common fracture (OR=1.26) (ns). Only 24 women reported a hip fracture (OR=1.10) (ns). Ankle was the most common site of nonosteoporotic fracture ($n=146$) (OR=1.17) (ns) followed by rib ($n=39$) (OR=1.46) (ns).

Falls on same level were classified into slip ($n=708$) and non-slip falls ($n=685$). Slip falls predicted fractures slightly more (OR=1.43) ($p=0.002$) than nonslip fractures (OR=1.35) ($p=0.023$). Multiple & slip falls predicted nonosteoporotic fractures more (OR=2.04 (95 %CI 1.34–3.09)) than single and slip falls (OR=1.29). Self-report of falls twice (in the 5-year and 10-year enquiry) increased the risk of future fracture more (OR=1.77 (95 %CI 1.41–2.24)) than self-report only once (5-year or 10-year) (OR=1.29 (95 %CI 1.09–1.53)).

Conclusion: Fall history is a less powerful predictor of postmenopausal fracture than fracture history. However, repeated multiple falls should alert a clinician. Fall history is a candidate risk factor for inclusion in FRAX.

P589

THE SYSTEM STATUS OSTEOCLASTOGENESIS IN MEN WITH ANKYLOSING SPONDYLITIS

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Objective: The development of osteoporosis in ankylosing spondylitis (as) is associated with activation of the immune system, hyperproduction of “pro-inflammatory” and insufficient synthesis “anti-inflammatory” cytokines imbalance in the system of the RANKL/RANK/OPG, leading to activation of osteoclastogenesis and increased bone resorption. The purpose of this study was to assess the status of the system osteoclastogenesis in men with speakers.

Materials and methods: the study included 60 men: 40 patients with a 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. We investigated RANKL and OPG. Determination of OPG and RANKL were performed by ELISA using a kit Biomedica Gruppe Elisa (Austria).

Results: the average concentration of RANKL was not significantly different in patients with AC and men without AC ($p=0.4799$), while the average concentrations of OPG and the ratio of OPG/RANKL in patients with AC were significantly higher than in men without AC. So, in the main group the level of OPG was 4.10±0.15 U/l in control group - 2.75±0.19 U/l (R is 0.001), the ratio of OPG/RANKL in the main group 16.41±2.32, in the control group 10.18±0.83 ($p=0.049$). According to the correlation analysis revealed the following correlations: positive correlation between OPG and stage speakers ($r=0.3$, $p=0.044$), negative correlation between OPG and the BASFI index ($r=-0.24$, $p=0.042$), negative correlation between the ratio of OPG/RANKL and index the basdai ($r=-0.08$, $p=0.05$).

Conclusion: in patients with AU concentration of RANKL were within normal values. The content of OPG and the ratio of OPG/RANKL in patients with AC, significantly higher than in men without AC. Such an imbalance in the regulation system of osteoclastogenesis probably caused by the development of two opposite processes: the paravertebral ossification of the tissues with the formation of bone “bridges” between the vertebral bodies with the development of ankylosis of the intervertebral joints and bone loss leading to osteoporosis in the spine and peripheral skeleton.

P590

EVALUATING THE EFFECT OF BONE STRONTIUM CONTENT ON BONE MINERAL DENSITY DETERMINATIONS USING QUANTITATIVE ULTRASOUND

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Objective: Quantitative ultrasound (QUS) is a clinical modality used to determine the BMD. The aim of this work is to investigate the effect of bone strontium content on the BMD obtained by a clinical QUS system.

Materials and Methods: Two ultrasound systems were used in this study: (1) an in-house transmit-through ultrasound system, and (2) a clinical QUS system (Sahara Bone Sonometer, Hologic Inc., Bedford, MA). Bone-mimicking phantoms containing different concentrations of strontium, ranging from 0 to 3 mol% (as hydroxyapatite), were developed in the laboratory. The broadband ultrasound attenuation (BUA) coefficient and speed of sound (SOS) of a homogeneous bone-mimicking phantom composed of hydroxyapatite dispersed in a gelatin medium were determined in both systems. The ultrasound frequency range of the in-house system was 0.5–1.3 MHz, whereas the frequency range of the Sahara system was 0.2–0.6 MHz.

Results: Measurements using the in-house system showed a strong dependency of the BUA with the BMD ($p<0.001$). On the other hand, dependency between the SOS and the BMD was not statistically significant ($p=0.095$). Increasing bone strontium concentrations up to 3 mol% showed no effect on the BUA ($p=0.749$) or the SOS ($p=0.862$) for the in-house system. Using the clinical QUS system, neither the change in the BMD nor strontium levels seemed to portray changes in the BUA [$p(\text{BMD})=0.603$, $p(\text{Sr})=0.609$] or the SOS [$p(\text{BMD})=0.263$, $p(\text{Sr})=0.481$].

Conclusion: The in-house system shows strong dependency between the BMD and the BUA indicating a potential for the QUS to be used as a means of estimating the BMD. In both systems, there is no correlation between the BUA with increasing bone strontium levels up to 3 mol%. Similarly, no dependency was observed between the SOS and bone strontium levels up to 3 mol%. The results suggest that the clinical QUS is capable of providing the BMD scores independent of the bone strontium content. This could be relevant in the case of individuals being treated for osteoporosis using strontium-based drugs or through self-supplementation with strontium supplements.

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EFFECTIVENESS OF AQUATIC EXERCISE FOR MUSCULOSKELETAL CONDITIONS: A META-ANALYSIS

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Objective(s): To examine the effect of aquatic exercise on pain, physical function and quality of life in people with musculoskeletal conditions.

Material and Methods: A systematic review was conducted using Ovid MEDLINE, CINAHL, EMBASE and The Cochrane Central Register of Controlled Trials from earliest record to May 2013. We searched for randomized controlled trials and quasi-randomized controlled trials evaluating aquatic exercise for adults with musculoskeletal conditions compared to no exercise or land-based exercise. Outcomes of interest were pain, physical function and quality of life. Study quality was assessed using the Physiotherapy Evidence Database (PEDro) scale.

Results: The electronic search identified 1199 potential studies. Of these, 26 studies were included in this review. The PEDro scale identified 20 studies with high methodological quality (PEDro score ≥ 6). Compared to no exercise, aquatic exercise achieved moderate improvements in pain (SMD -0.37 , 95 %CI -0.56 to -0.18), physical function (SMD 0.32 , 95 %CI 0.13 – 0.51) and quality of life (SMD 0.39 , 95 %CI 0.06 – 0.73). No significant differences were observed between the effects of aquatic and land-based exercise on pain (SMD -0.11 , 95 %CI -0.27 to 0.04), physical function (SMD -0.03 , 95 %CI -0.19 to 0.12) or quality of life (SMD -0.10 , 95 %CI -0.29 to 0.09).

Conclusion(s): Overall, the studies included in this review were of high quality and demonstrate that aquatic exercise can have positive effects on pain, physical function and quality of life for adults with musculoskeletal conditions. However, there is further need for large scale trials of sufficient duration and an adequate follow-up period to validate the long-term effects of aquatic exercise. In addition, future trials need to examine different modes, frequency, intensity and participation in aquatic exercise programs so the characteristics of programs that achieve maximum benefits are well understood. Based on these findings, aquatic exercise can be recommended as an effective management strategy to reduce pain, and improve physical function and health-related quality of life in adults with musculoskeletal conditions.

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JUMPING INTO THE DEEP-END: RESULTS FROM A PILOT IMPACT EVALUATION OF A COMMUNITY-BASED AQUATIC EXERCISE PROGRAM

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Objective: To evaluate changes in pain, stiffness, physical function and quality of life in adults with musculoskeletal conditions attending ‘Waves’ aquatic exercise classes.

Material and Methods: A quasi-experimental pilot study with 12-week follow-up was conducted in 109 adults (mean age, 65.2 years; range, 24–93 years) with musculoskeletal conditions. The intervention group ($n=67$) underwent 11 peer-led, 45 min, weekly aquatic exercise classes over the 12 week follow-up period. Control group participants were not participating in Waves or other formal exercise ($n=42$). Main outcome measures included the WOMAC and EuroQoL five dimensions survey (EQ-5D). Satisfaction with Waves classes also measured.

Results: While scores for all WOMAC subscales demonstrated an improvement in the Waves participants, the change did not reach statistical significance. Both groups reported some improvements in EQ-5D domains; however these did not reach statistical significance. There was no change in utility scores over the follow-up period. EQ-5D overall health state scores improved significantly over follow-up for the Waves group (mean change: 5.40 %, 95 %CI: 1.38–9.43 %; $p \leq 0.05$). High levels of satisfaction with classes were reported by Waves participants.

Conclusion: Peer-led aquatic exercise classes may improve overall health and physical function for people with musculoskeletal conditions. The diverse study sample is representative of people accessing services similar to Waves; however the diversity is likely to have limited the power to detect significant changes in outcomes. Larger studies are needed to confirm effects and explore the long term cost benefits.

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POSSIBILITIES WITH JOINT-SAVING PROCEDURES IN ADOLESCENCES WITH DEVELOPING DYSPLASTIC COXARTHROSIS

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The significance of pelvic osteotomies in the condition of developed arthrosis is still disputable. Early osteoarthritis and dis-congruency of the articular surfaces are evaluated by many specialists as contra- indication for the joint preserving operation.

Materials and methods: Treatment outcomes of 20 patients with dysplastic coxarthrosis were analyzed. Mean age at intervention was 14 years (12–20 years). The grade of arthrosis in joints were assessed according to Tonnis: grade I - 10, grade II - 7, grade III - 3. The type of congruence of articular surfaces were assessed according to Coleman: III - 8, IV - 12. Preoperative functional scores according to Merle d’Aubigne-Postel were: Pain 4.3 ± 0.05 points. Range of motion 3.6 ± 0.3 points. Walking ability 4 ± 0.15 points. All subjects underwent extraarticular hip reconstruction with the Ilizarov apparatus included pelvic and femoral osteotomies.

Results: Outcomes were followed from 2 to 10 years. Functional outcomes according to Merle d'Aubigne-Postel were: Pain 4.7 ± 0.1 points. Range of motion 4.1 ± 0.2 points. Walking ability 4.6 ± 0.1 points. Poor functional outcomes were caused by primary severe contracture. In 7 patients congruency improved. Radiographic findings according to Severin were: IIa type - 9, IIb type - 7, III type - 4. The grade of arthritis was unchanged in 14 cases, progressed one grade in 2 joints. The grade of arthrosis reduced in 4 cases. Considering clinical and radiological picture the positive outcomes made up 82 %.

Conclusion: application of reconstructive operations with Ilizarov frame allows to extend fairly the indications for extra-articular reconstructive invasions in dysplastic coxarthrosis. Improved congruency of articular surfaces of arthritic joint does not lead to the rapid progression.

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RISK FACTOR FOR THE FIRST-INCIDENT HIP FRACTURE IN POSTMENOPAUSAL WOMEN

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Objective: To identify the risk factors resulting in the first occurrence of hip fracture in Taiwanese postmenopausal women.

Methods: This project is a prospective cohort study and designed for a period of 1 year to enroll 50 postmenopausal women admitted to Keelung Chang Gung hospital for an accidental first-incident hip fracture as patient group and 50 age-matched postmenopausal (without hip fracture) as control group. The evaluation includes questionnaire and interview to record the risk factors, and examination to test the body height, body weight, and BMD of hip and spine by DXA.

Results: The mean age of patients with an accidental first-incident hip fracture is 79.6 years of old. Compared to the control group, the potential risk factors of the first-incident hip fracture in Taiwanese postmenopausal women include age of menopause, body height, level of education, chronic disease (including coronary heart disease, renal disease, epilepsy, Parkinson's disease, or cancer), eye disease (cataracts or glaucoma), weight-bearing exercise, and BMD of femoral neck. Low bone masses were noted up to 95 % in both of the control and patient groups.

Conclusion: Most of hip fracture occurred in older postmenopausal women. Although low BMD were noted in most of these older women, several modifiable risk factors and decreased BMD of femoral neck increase an older woman's risk of developing a first-incident hip fracture.

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TREATMENT RECOMMENDATIONS GIVEN BY CLINICAL DECISION SUPPORT SYSTEM IN OSTEOPOROSIS IN COMPARISON TO OSTEOLOGY SPECIALIST

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The primary aim of the present project is to create a clinical decision support system (CDSS) in the field of the medical care of osteoporosis (OPAD). In this project we compare the accuracy of clinical treatment recommendations provided by OPAD with the recommendations made by a clinical expert in the field of osteoporosis management.

Methods and data: The project utilizes ready to use software products to capture clinical information from international guidelines and experts in the field of osteoporosis. This CDSS provides diagnostic comments, 10-years risk of fragility fracture and treatment options for the given case, as well as when to offer a follow-up DXA-evaluation. Thus, the medical decision making is standardized according to the best expert knowledge at any given time.

Results: The system was evaluated in a set of 308 consecutive cases attending the out-patient osteoporosis clinic, University Hospital, Iceland. The 10-years fracture risk computation given by OPAD was nearly identical to those given by FRAX ($r=0.988$). In the 308 cases, the OPAD system recommended reassurance for 156 cases (51 %), active treatment for 95 cases (31 %) and further investigations in 57 cases (19 %). A similar distribution was noticed from the expert physician who recommended reassurance in 201 cases (66 %), active treatment for 96 cases (31 %) and further investigations in 9 cases (3 %). In those cases where the OPAD system concluded that only preventive measures were indicated, the expert agreed in 89 % of cases. When OPAD suggested active treatment the expert agreed in 62 % of cases. In the instances where the OPAD system proposes that further investigations or expert advice, the human physician advises preventive measures for 58 % and active treatment for 37 % of patients, recommending further studies to be done for 5 %. Overall inter-rater reliability between OPAD and expert physician was calculated to be $\kappa=0.379$ ($p=0.001$; 95%CI: 0.295–0.457) signifying fair agreement among raters. In 52 % of these cases the OPAD system recommended DXA evaluation at the present time. Following a DXA measurement in all individuals; 71 % of those that were recommended to have DXA at the present time received

a recommendation for further investigation or specific treatment by the OPAD. In only six cases (5.9 %) in which DXA was not recommended at the present time, did the result of the BMD measurement change the recommendations given by OPAD.

Conclusion: The OPAD is a CDSS tool in the diagnosis and management of osteoporosis. Furthermore, through its use it is possible to identify those in need of further clinical evaluation and avoid unnecessary costly expert referrals and laboratory investigation. Recommendations given by OPAD are fairly consistent with expert opinion. Further cost-benefit studies are needed.

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APPLICATION OF THE WHO FRACTURE RISK ASSESSMENT TOOL TO PREDICT NEED FOR DXA SCANNING IN POSTMENOPAUSAL WOMEN

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Objective: To assess the accuracy of the WHO fracture risk assessment tool (FRAX) excluding BMD (pre-BMD FRAX) in identifying those patients needing BMD measurement for further treatment.

Methods: Pre-BMD FRAX was calculated for 231 postmenopausal women, who participated public health education in the local community of Keelung, Taiwan. If the pre-BMD FRAX fracture probability was intermediate (10–20 % for major osteoporotic fracture or 1.5–3 % for hip fracture) or high (≥ 20 % for major osteoporotic fracture or ≥ 3 % for hip fracture), DXA scanning and vertebral fracture assessment (VFA) were arranged for patients.

Results: Pre-BMD FRAX probability revealed 26 women as intermediate and 37 women as high. DXA scans showed that 36 were osteoporotic, 17 were osteopenic, and 10 were normal for bone density. VFA study identified 25 patients with spinal fractures, in which 14 patients were osteoporotic, 7 were osteopenic, and 4 were normal by DXA. The efficacy of BMD study in identifying these patients with osteoporosis ($n=36$) or osteopenia ($n=19$) was 87.3 % (55/63). The efficacy of BMD including BMD combined with VFA in identifying these patients with spine fracture, osteoporosis or osteopenia was 93.7 % (59/63). Compared to BMD alone in these patients, significantly increasing efficacy of identifying those needing treatment was noted by BMD plus VFA or FRAX with BMD, and more

significant effects by FRAX with BMD plus VFA. The positive predictive value by pre-BMD FRAX was 97.3 % in predicting treatment assignment by DXA results. Alternatively, the negative predictive value was 100 %.

Conclusion: The pre-BMD FRAX score alone can accurately predict those patients needing treatment, so that it can reduce unnecessary DXA used. DXA combined VFA can increase the accurate estimation of an individual's fracture risk and provide the most appropriate therapeutic recommendation.

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SUBCLINICAL TOPHI IN GOUT USING DUAL ENERGY COMPUTED TOMOGRAPHY

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Objective: The presence of tophi is associated with impairment of health-related quality of life as well as increase in prevalence of comorbidities in patients with gout. The purpose of our study was to evaluate the utility of dual-energy CT (DECT) in detecting subclinical tophi in patients with gouty arthritis.

Methods: Paired plain radiographs and DECT scans of foot joints in 19 patients with gout who had prior history of acute gouty arthritis in joints of foot without clinical tophi were evaluated for the presence of subclinical tophi. Foot joints included 22 metatarsophalangeal (MTP), interphalangeal, tarsometatarsal, cuboid metatarsal, talonavicular, calcaneocuboid, and subtalar joints on each foot. If present, total volumes of tophi in both feet were quantified using an automated software program of DECT.

Results: The mean age of gout patients was 52.5 years (range 21–84), and the mean serum urate level was 8.3 ± 2.5 mg/dL. Of 418 ft joint areas examined, tophi were detected in 69 joints (16.5 %) by DECT, whereas no tophi were detected by plain radiographs. The mean total volume of tophi per patient was 0.73 ± 0.63 (0.14–2.26) cm³, and mean 3.6 (1–12) joint areas per patient were positive for tophi detected by DECT. The most common sites for tophi were 1st MTP (37.7 %) and ankle (14.5 %). Nine patients had tophi detected in asymptomatic joints, and five patients had bone erosions identified by DECT but not plain radiograph.

Conclusions: DECT has excellent detection of subclinical tophi in gout patients who had no apparent tophi on physical examination. DECT is a promising tool for accurate and early detection of tophi in a noninvasive manner.

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IS HANDGRIP STRENGTH IN COMBINATION WITH DXA A VALID PREDICTOR FOR FUTURE FRAGILITY FRACTURE RISK?U. Björck¹, K. Önnby¹, A. Holmberg¹, K. Akesson¹¹Center for Osteoporosis and Fracture Prevention, Department of Orthopaedics, Skane University Hospital, Malmö, Lund University, Sweden, Malmö, Sweden

Objective: Handgrip strength (HGS) is an indicator of general muscle strength and is associated with fragility and propensity to fall. This study investigates associations between HGS and BMD among patients in a standard clinical DXA referral service. Can HGS, combined with BMD, enhance fracture risk prediction and identification of those in need of osteoporosis treatment?

Material and Methods: All data was collected at an outpatient clinic, in connection with an already planned DXA. The handgrip strength was measured with Jamar hydraulic hand dynamometer in 184 consecutive individuals (29 men, 155 women, age >45 years). The dominant hand was tested and the best value of three attempts was recorded. Lumbar spine and femoral BMD was measured by DXA. Pearson correlation coefficients were used to evaluate relationship between HGS and BMD.

Results: The mean age of men and women in the study cohort was 65.2±9.4 years (range 49–82) and 65.9±9.2 years (range 45–87), respectively. Mean HSG in the cohort was 26.5±7.1 kg (range 10–62), in men 36.7±8.1 kg, in women 24.6±4.9 kg, and dependent on age. 84 individuals (46 %) had prevalent fractures, but no significant difference in HGS between patients with or without previous fracture was found, ($p=0.78$). Mean lumbar spine BMD in the cohort was 1.029±0.177 g/cm², with osteoporosis (T- score±-2.5) in 21 % of the men and 18 % of the women. Mean femoral BMD in the cohort was 0.869±0.131 g/cm², with 17 % osteoporosis in men and 7 % in women. HGS was significantly correlated only with BMD lumbar spine ($r=0.146$, $p<0.05$).

Conclusion: This study could not confirm our hypothesis that HGS in combination with DXA enhances the prediction of future fragility fracture risk. This may be due to a limited number of participants with a wide age range. The study is ongoing and with a larger number of participants the data will yield more information.

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ALENDRONATE PIVOTAL TRIAL FIT AND REAL WORLD PATIENTS: ONE TRIAL DOES NOT FIT ALLC. Reyes¹, A. Pottgård², P. Schwarz³, K. Javaid⁴, C. Cooper⁵, T. Van Staa⁶, A. Díez-Pérez⁷, B. Abrahamsen⁸, D. Prieto-Alhambra⁴¹GREMPAL Research Group, Institut Universitari d'Investigació en Atenció Primària Jordi Gol (IDIAP Jordi Gol), Universitat Autònoma de Barcelona, Barcelona, Spain,²Clinical Pharmacology, Department of Public Health, University of Southern Denmark, Odense, Denmark,³Research Centre for Ageing and Osteoporosis, Dept of Medicine, Glostrup Hospital, Copenhagen, Denmark,⁴Oxford NIHR Musculoskeletal Biomedical Research Unit, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, Oxford, United Kingdom,⁵MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, United Kingdom,⁶Farr Institute, University of Manchester, Manchester, United Kingdom,⁷Musculoskeletal Research Unit and RETICEF, IMIM Research Foundation, Parc de Salut Mar and Instituto de Salud Carlos III, Barcelona, Spain, ⁸Odense Patient Data Explorative Network, Institute of Clinical Research, University of Southern Denmark, Odense, Denmark

Objective: To compare clinical characteristics of real-life users of alendronate with inclusion criteria in the pivotal alendronate trial FIT.

Material and methods: Multinational cross-sectional study using data obtained from the SIDIAP database (Sistema d'Informació per al Desenvolupament de l'Investigació en Atenció Primària) and the Danish Health Registries (DHR), which contain prescriptions, diagnosis codes, and treatments of 5.2 and 5.6 million subjects from Catalonia (Spain) and Denmark respectively. Inclusion criteria: incident user of alendronate (1 year wash-out), ≥40 years old. Exclusion criteria: Paget disease, use of any antiosteoporosis drug in the previous year.

Results: 14,316 (SIDIAP) and 21,221 (DHR) subjects were analyzed. The population of SIDIAP and DHR had 2,347 (16.4 %) and 5,275 (24.9 %) subjects >80 years old, reported 9 (0.1 %) and 91 (0.4 %) diagnoses of myocardial infarction, 423 (3 %) and 368 (1.7 %) of erosive gastrointestinal disease, 200 (1.4 %) and 1,109 (5.2 %) of dyspepsia and 349 (2.4 %) and 149 (0.7 %) of metabolic bone disease, all of which were FIT exclusion criteria. Men and glucocorticoid consumption were excluded from the FIT trial (included in subsequent RCT), representing 3,818 (26.7 %) and 3,885 (18.3 %) men and 1,229 (8.6 %) and 4,716 (22.2 %) glucocorticoid users in the SIDIAP and DHR database respectively. A total of 5,172 (36.1 %) and 8646 (40.7 %) subjects in the SIDIAP and DHR respectively, had at least one of the previously mentioned exclusion criteria (except sex/glucocorticoid consumption) and would have been excluded from the FIT trial.

Conclusion: Patient characteristics used as exclusion criteria in FIT were commonly found among real-life users of alendronate. This severely limits the external validity of this trial. While subsequent RCTs have established the efficacy of alendronate in men and glucocorticoid users, efficacy data is

needed for octogenarians, as well as for patients with other common comorbidities.

Conflict of interests: D.P.A: Unrestricted research grants from Amgen and Bioiberica; A.D.P: speaker or advisor for Lilly, Amgen, Pfizer, Active Life Sci; C.C: personal fees from consultancy, lecture fees and honoraria from Amgen, GSK, Alliance for Better Bone Health, MSD, Eli Lilly, Pfizer, Novartis, Servier, Medtronic and Roche outside the submitted work; K.J: personal fees from consultancy, lecture fees and/or honoraria from Amgen, GSK, Eli Lilly, Novartis, Servier, Medtronic and Roche outside the submitted work; B.A: research grants from or served as an investigator in studies for Novartis, Takeda, NPS Pharmaceuticals and Amgen; T.V.S: advisory boards for GSK and Boehringer and advice to Laser Rx on epidemiological and pragmatic trial methods.

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DISTRIBUTION OF LEAN MASS IN YOUNG TYPE 1 DIABETIC PATIENTS

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Background and aims: According to modern concepts, the health of muscle tissue consists of its sufficient quantity, quality and function. Violation of the status of each component worsens the condition of the muscle tissue in general. The aim of the study was to examine body composition lean distribution parameters in type 1 diabetes mellitus (T1DM) patients.

Materials and methods: 96 patients with T1DM (59 women, 37 males) (mean age: 32.52±10.71 year, duration of DM: 12 (7.5–20) years, age of manifestation: 18 (13–23.5) yrs, BMI: 23.47±3.16, HbA1c: 8.45±1.2 %) and 54 (30 women, 24 men) controls matched for age, sex and BMI were examined. The research involved anthropometry of patients, general clinic examination, glycated hemoglobin test, DXA. A lean mass index (LMI) was measured of the form appendicular lean mass (lean mass arms+lean mass legs)/height².

Results: Lean mass parameters in T1DM males and controls males were: Total Body: 55738+7985 g vs. 58950+6718 g ($p=0.111$); Android: 3784+642 g vs. 3783+446 ($p=0.998$); Gynoid: 8063+1167 g vs. 8695+1080 g ($p=0.039$); Trunk: 26387+4951 g vs. 26828+3107 g ($p=0.700$); Arms: 6921+1485 g vs. 7571+1266 g ($p=0.085$); Legs: 18462+2567 g vs. 20456+2689 g ($p=0.005$); LMI: 7.67+2.07 vs. 8.71+1.11 ($p=0.028$). Similar features in T1DM women and controls women were: Total Body: 41333+4698 g vs. 39839+4698 ($p=0.136$); Android: 2786+385 g vs. 2594+258 ($p=0.015$);

Gynoid: 5952+759 g vs. 5816+639 g ($p=0.401$); Trunk: 19884+2273 g vs. 19089+1850 g ($p=0.102$); Arms: 4379+708 g vs. 4108+661 g ($p=0.086$); Legs: 13878+2107 g vs. 13446+1664 g ($p=0.331$); LMI: 6.46+1.17 vs. 6.28+0.60 ($p=0.415$).

Conclusion: T1DM males are characterized by a significant decrease in appendicular muscle mass compared with healthy males. The obtained data indicate gender differences in the distribution of muscle mass in T1DM patients.

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LEVELS OF SERUM OSTEOCALCIN IN TYPE 1 DIABETIC PATIENTS ASSOCIATED WITH BONE DISORDER

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Background and aims: Low BMD and fracture risk are associated with type 1 diabetes (T1DM). Serum levels of osteocalcin have been suggested to be associated with the diabetic complications. Therefore, the aim of study was to assess the association between osteocalcin and low BMD and asymptomatic vertebral fracture (VFX) in T1DM.

Materials and methods: 96 T1DM patients (59 women, 37 males) (mean age: 32.52±10.71 year, duration of DM: 12 (7.5–20) years, age of manifestation: 18 (13–23.5) years, BMI: 23.47±3.16, HbA1c: 8.45±1.2 %) and 54 (30 women, 24 men) controls matched for age, sex and BMI were examined. The research involved anthropometry of patients (height, weight, BMI, waist circumference), general clinic examination, glycated hemoglobin test, levels of osteocalcin (OC), DXA: BMD, as Z-score, at lumbar spine (LS) and femoral neck (FN); asymptomatic morphometric vertebral fracture (VFX) by software LVA.

Results: BMD (Z-score) was statistically lower in T1DM both at lumbar spine (−1.098+1.152 vs. (−0.282)±1.005, $p<0.001$) and at femoral neck (−0.815+1.169 vs. 0.185+0.848 $p<0.001$) in comparison with controls. There were significant differences in the levels of serum OC in T1DM and controls (11.86+5.57 vs. 20.23+19.48, $p<0.001$). There was slight negative correlation between serum levels of osteocalcin and low BMD ($r=-0.26+0.08$, $p<0.05$) and between serum levels of OC and VFX ($r=-0.19+0.067$, $p<0.05$) in T1DM patients.

Conclusion: The level of osteocalcin can be regarded as a marker of low bone density in T1DM patients. Influence of the level of osteocalcin on morphometric VFX in T1DM patients need further study.

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HEALTH CARE COSTS IN PATIENTS WHO BECAME NONADHERENT DURING LONG-TERM ORAL BISPHOSPHONATE USE

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Bisphosphonates (BP) are effective in preventing fractures in osteoporosis, and BP costs are generally declining. However, adherence to the treatment is low, and the economic consequences of non-adherence may be significant as fractures are frequent and the costs associated with fractures may be high. The consequences of stopping treatment after extended duration of use in terms of costs have not been extensively studied. **Aim:** To study the effects of non-adherence to oral BP (alendronate, risedronate or ibandronate) in subjects who had hitherto been adherent for 3–4 years.

Subjects and methods: Retrospective Cohort study among users of oral alendronate, risedronate or ibandronate (≥ 1 claim) in Denmark in the period January 1, 2006 to December 31, 2008 ($n=78,686$). Inclusion criteria were age ≥ 50 years at first claim, and an observation period of at least 12 month before and at least 48 months after the first claim. Exclusion criteria were use of oral BP within the prior 12 month before first claim in the time window of interest or a diagnosis of malignant disease or Paget's disease of bone. A total of 28,507 patients met these criteria. The primary exposure groups were 1) Patients adherent (medication possession rate [MPR] ≥ 70 %) to alendronate, risedronate or ibandronate for at least 36 month 2) Patients adherent to alendronate, risedronate or ibandronate for at least 48 months. The main outcome were costs among 1) Those nonadherent to alendronate, risedronate or ibandronate in month 37–48 ($n=1,241$) vs. those continuing the treatment ($n=17,261$), 2) Those nonadherent to alendronate, risedronate or ibandronate in month 49–60 ($n=1,023$) vs. those continuing the treatment ($n=16,199$). Regression analyses were conducted to predict OP-related cost and adherence, adjusting were made for age, Deyo-Charlson comorbidity score, anorexia nervosa, celiac disease, inflammatory bowel disease, lactose intolerance, lupus erythematosus, rheumatoid arthritis, asthma, stroke, hyperparathyroidism, and prior fracture. Costs were divided between OP-related costs (inpatient admissions and costs of drugs for osteoporosis) and All Cause HealthCare costs (Inpatient Admissions, Emergency Room Visits, outpatient care in hospitals, physician office visits and costs of any drug bought)

Results: Around 30 % of the patients adherent to alendronate, risedronate or ibandronate for 36 months discontinued during

the next 12 months roughly equally distributed among the three drugs. Among those adherent for 48 months, 22.7 % discontinued during the next 12 months with a higher proportion among those on risedronate ($n=91$, 33 % discontinuing) than on alendronate ($n=3,504$, 23 % discontinuing) or ibandronate ($n=321$, 22 % discontinuing). In general OP-related costs and All Cause HealthCare costs were higher among those discontinuing their medication or nonadherent to the drugs (MPR < 70 %) than among those adherent to the drugs. In a multiple linear regression model, main predictors of osteoporosis related costs were nonadherence. For total medical costs, age above 65 years was the main determinant in a logistic regression model. Regression models indicated nonadherence as the main predictor for osteoporosis-related costs and age above 65 years as the main determinant for total medical costs. In a logistic regression model, the main determinant of non-adherence was Deyo-Charlson comorbidity score. Model results were consistent for alendronate, risedronate, and ibandronate users.

Conclusion: Nonadherence to oral BP after long-term use is associated with excess costs. Reasons for treatment discontinuation and potential need for treatment alternatives following long-term use should be further understood, particularly for patients with comorbid conditions.

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BONE MINERAL DENSITY AND DISEASE PROGRESSION IN PATIENTS WITH CROHN DISEASE

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Crohn disease is a chronic disorder which may lead to low BMD. **Aim:** Assessment of BMD and disease progression in CD patients.

Material and Methods: CD patients ($n=87$). DXA of the lumbar spine and hip and Montreal classification of disease were evaluated in all patients.

Results: Patients with different age of onset A1-A3 differs in neck BMD ($H=12.66$, $p<0.01$) - BMD was significantly higher in patients with early onset of the disease (A1, A2) than in patients with late onset (A3) $p<0.01$. Patients with different disease location differs in neck BMD ($H=7.53$; $p<0.05$) - BMD was significantly higher in patients with colon

involvement (L2) than in patients with ileocolon involvement (L3) ($p < 0.05$).

Conclusion: Low bone density is frequent in CD patients. Decrease in BMD correlate with the disease progression. Study financed from the project of the Ministry of Science and Higher Education: NN 401 481 737.

P604

VITAMIN D IN PATIENTS WITH CROHN'S DISEASE

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Vitamin D is associated with bone metabolism. The immunological effects of vitamin D are important. **Aim:** To assess the impairment of vitamin D in patients with Crohn's disease.

Material and Methods: CD patients ($n=87$). Serum concentrations of vitamin 25(OH)D and Montreal classification of disease were determined in all patients.

Results: Test results were analysed using the Statistica 10 software. The mean concentration of 25(OH)D was 21.41 ng/ml (SD=12.25), 76.86 % of patients was vit D deficient. Patients without strictures and fistulae (B1) had significantly higher levels of 25(OH)D levels than patients with the presence of fistulas (B3) ($p < 0.05$). In other cases, the differences did not show statistical significance level of 0.05.

Conclusion: There is evidence in influence of vitamin D on disease activity. It needs some further investigation. Study financed from the project of the Ministry of Science and Higher Education: NN402481737.

P605

SCREENING FOR OSTEOPOROSIS POST BONE MARROW TRANSPLANTATION

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Objective: Bone marrow transplantation (BMT) is a treatment for several haematological disorders often in younger adults. Post-BMT patients are known to have an increased risk of osteoporosis. Studies have demonstrated risk factors including steroid use, high-dose chemotherapy and hypogonadism. We

aimed to investigate the prevalence of osteoporosis and fractures in post-BMT patients and the age at which these occurred.

Material and Methods: We reviewed all post-BMT patients of the National Bone Marrow Transplant Unit assessed at our specialist Bone Health Unit over a 10 year period. Cases were identified through our electronic bone health database.

Results: We identified 51 patients, 51 % were female ($n=26$). Haematological disorders involved included leukemia in 60 % ($n=31$) and lymphoma in 17 % ($n=9$). Mean age at time of BMD measurement was 36.3 years (range 19–64). Median time between BMT and post-BMT DXA was 2.7 years. On initial post-BMT DXA, mean BMD of lumbar spine was 0.91 ± 0.016 g/cm³ with 53 % of subjects having osteoporosis ($n=27$) and 37 % ($n=19$) osteopenia. Just 10 % ($n=5$) had normal BMD. The median age of those with osteoporosis was 35 years. At the time of BMD measurement 43 % of patients had experienced at least one fracture and 68 % of those had confirmed osteoporosis. Further analysis showed 36 % of patients had suboptimal vitamin D levels. In a subset of patients in whom follow-up DXA had been performed 40 % had osteoporosis ($n=17$) while 51 % had osteopenia ($n=22$).

Conclusion: Our study shows a high prevalence of osteoporosis at a young age in subjects treated with BMT. As a consequence we demonstrated a significant increased risk of fracture. This highlights the need for a proactive and multidisciplinary approach to the prevention and treatment of osteoporosis in patients undergoing BMT.

P606

PRECLINICAL EVIDENCE OF A NEW SMALL INTERFERING RNA BASED THERAPY FOR THE TREATMENT OF AUTOSOMAL DOMINANT OSTEOPETROSIS TYPE 2

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Objective: Autosomal dominant osteopetrosis type 2 (ADO2) causes high morbidity, including frequent fractures, osteomyelitis, hematological and neurological impairments. In 70 % of cases, ADO2 is due to heterozygous dominant negative mutations of the CLCN7 gene, encoding the Cl⁻/H⁺ antiporter type 7. We hypothesized that silencing the mutant CLCN7 transcript by small interfering (si)RNA could rescue the normal phenotype, and tested this hypothesis in vivo, in mice harboring the heterozygous Clcn7^{G213R} mutation (ADO2 mice).

Material and Methods: Using a systematic mutation-driven approach, we designed and tested in vitro different siRNAs against the ADO2 mutation, Clcn7^{G213R}, and found one

Clcn7^{G213R}-siRNA that silenced specifically the mutant transcript (85 % decrease, $p=0.02$ vs. WT) without affecting the WT. This Clcn7^{G213R}-siRNA was then conjugated with the delivery system in vivo-JetPEI® and used in vivo.

Results: Time- and dose-dependent experiments evidenced 4 mg/kg every 48 h to be the most effective treatment regimen, decreasing by 80 % ($p=0.01$) the mutant mRNA in tibia. Treatment of ADO2-mice, 3 times/week for 2 and 4 weeks induced an overall improvement of the osteopetrotic phenotype. In particular, after 2 weeks a significant increase of the serum bone resorption marker CTX ($p=0.001$) was observed, together with a mild decrease of BV/TV ($p=0.05$ vs scrambled-siRNA treated ADO2-mice). After 4 weeks of treatment a further decrease of the BV/TV ($p=0.02$) and modulation of associated parameters vs. scrambled-siRNA treated ADO2-mice were observed. These modulations correlated with an increase of osteoclast function, as evidenced by the higher erosion surface/bone surface ($p=0.03$) and serum CTX/TRAcP ($p=0.02$). Treatment was well tolerated, with no adverse histopathological or biochemical effects. Similar specific silencing was obtained, in vitro, with siRNAs against mutations causing Clcn7^{R767W} and Clcn7^{R286W}.

Conclusion: These results demonstrate that a siRNA-based treatment of ADO2 is feasible and effective, underscoring a translational impact for future strategies to cure this therapeutically neglected form of osteopetrosis.

P607

CALCIUM AND PHOSPHATE METABOLISM IN POLISH PATIENTS WITH INFLAMMATORY BOWEL DISEASES

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There is an impairment of calcium and phosphate metabolism in the course of inflammatory bowel diseases (IBD), which is due to vitamin D deficiency.

Aim: Assessment of the impairment of calcium and phosphate metabolism and its main regulators such as vitamin D and PTH in patients with non-specific inflammatory bowel diseases.

Material and Methods: IBD patients ($n=177$), including CD patients ($n=88$) and UC patients ($n=89$), healthy volunteers ($n=39$). Serum level of calcium, phosphorus, vitamin 25(OH)D and PTH were determined in all patients.

Results: The mean concentration of Ca in patients with UC was 2.36 mmol/L (SD 0.11), 2.32 mmol/L (SD 0.2) in patients with UC and 2.37 mmol/L (SD 0.12) in CG patients. The mean concentration of P was 1.11 mmol/L (SD 0.29) (UC), 1.13 mmol/L (SD 0.26) (CD) and 1.21 mmol/L (SD 20) for CG respectively. The mean concentration of PTH was 53.05 pg/mL (SD 20.96) in patients with UC, 61.08 pg/mL (SD 24.40) in patients with CD and 63.60 pg/mL (SD 12.39) in CG patients. The mean concentration of 25(OH)D was 22.01 ng/mL (SD 9.16) in patients with UC, 21.33 ng/mL (SD 12.20) in patients with CD and 21.56 ng/mL (SD 9.11) in CG patients. Difference in the PTH level between patients with UC and the healthy volunteers ($H=12.29$, $p=0.0023$). Significant negative correlation between PTH and Ca levels in CD patients ($R=0.25$ ($p<0.05$)). Correlation between PTH and P levels in CD patients ($R=0.23$ ($p<0.05$)). Significant correlation between vitamin D and Ca levels in CD patients ($R=0.40$ ($p<0.01$)).

Conclusion: Calcium and phosphate metabolism disorders constitute a crucial clinical problem in patients with inflammatory bowel diseases.

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P608

OSTEOBLASTS SMARTLY DELIVER BIOACTIVE MOLECULES THROUGH EXTRACELLULAR VESICLES (EVS)

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Various molecules are exchanged in the bone microenvironment to ensure tissue homeostasis. EVs are a new mechanism of intercellular communication. They are complex biphospholipidic structures, sized 50–1000 nm, released by cells in the surrounding extracellular matrix. EVs shuttle to target cells bioactive molecules, including mRNAs, miRNAs and proteins, and are involved both in physiological and pathological processes. To investigate the EV-mediated communication between bone cells, we isolated EV pellets from mouse calvaria primary osteoblast conditioned media (3.03 ± 0.79 mg), increasing their yield by treatment with 10^{-8} M hrPTH(1–34) (4.05 ± 1.19 mg, $p=0.0405$). By FACS, we sorted 16.67 ± 1.93 % events showing, by transmission electron microscopy, membrane integrity, and size and structure typical of EVs. Similarly, osteoblast-like cells MC3T3, released EVs in the conditioned medium (2.45 ± 1.12 mg), yielding 11.23 ± 1.99 % FACS-isolated events compatible with

EVs. Osteoblast EVs targeted into primary osteoblasts, primary monocytes and endothelial cell line transferring membrane-bound and cytosolic fluorochromes. EV-targeted osteoblasts retained the shuttled fluorochrome after trypsin procedure, confirming a stable integration of EV components in the cells. Furthermore, FACS analysis showed that 97.1±0.26 % EVs contained RNAs and that these RNAs were transferred to target osteoblasts. Ex vivo mouse calvaria in organ culture, incubated with fluorochrome-loaded EVs, showed fluorochrome integration in bone cells with a vesicular pattern. Furthermore, osteoblast EVs were integrated in osteosarcoma cell lines, suggesting their contribution to the pathological environment determined by bone tumours. Finally, in vivo delivery of osteoblast EVs in Rankl-null mice induced osteoclastogenesis, suggesting that EVs are also a means to deliver RANKL to osteoclast precursors. Our data demonstrate that EVs are involved in the communication between cells resident in the bone microenvironment, both in physiologic and pathologic conditions.

P609

THE ASSOCIATION BETWEEN CALCIUM ±VITAMIN D SUPPLEMENTATION AND FRACTURE RISK AMONG INCIDENT USERS OF ORAL BISPHOSPHONATES: A POPULATION-BASED COHORT STUDY

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Objective: To analyze the association between Calcium±D supplements and fracture risk among incident users of oral bisphosphonates (BP).

Material and Methods: Design: retrospective cohort study using primary/secondary care records linked to pharmacy dispensation data from the SIDIAP database (covers >5.5 million subjects from Catalonia, Spain). Eligibility: All incident users of oral BP (2006–2007). Exclusion criteria: Paget disease, age <40, previous use of BP and/or supplements or <12-month BP therapy or calcium supplementation. Persistent users of ≥12 months of Calcium or Calcium+D supplements were respectively compared to supplement nonusers after matching

on baseline characteristics using propensity scores (PS). Follow-up: from 12 months after supplement initiation to the earliest of BP or supplement cessation, death, loss of follow-up or incident fracture (except skull/face or digits). PS were calculated using logistic regression. Fine&Gray models were fitted to study the effect of supplements on fracture, accounting for competing risk of death.

Results: Study population: 297/395 Calcium only and 998/4,061 Calcium+D users were matched to 825 and 998 nonusers, respectively. No relevant differences in baseline characteristics remained between matched subjects. Rates of fracture while on treatment were similar between matched groups; incidence rates per 100 PYs: 3.6 (95 %CI 2.2–6.0) and 2.8 (95 %CI 2.1–3.8) for calcium users and matched nonusers and 3.7 (95 %CI 2.5–5.5) and 2.8 (95 %CI 2.1–3.7) for Calcium+D users and matched nonusers, respectively. No association was found between supplement use and fracture risk; adjusted SHR 1.27 (95 %CI 0.70–2.30) and 1.15 (95 %CI 0.69–1.91) for Calcium and Calcium+D use respectively.

Conclusion: Calcium±D supplement use does not influence fracture risk among incident users of BP. Further randomized trials are needed to inform Calcium±D prescription for these patients.

Conflict of interest: DPA: Unrestricted research grants from Amgen and Bioiberica; ADP: speaker or advisor for Lilly, Amgen, Pfizer, Active Life Sci; MKJ: unrestricted research grants/ speaker/ advisor for Lilly, Amgen, Internis, Consilient; C.C: personal fees from consultancy, lecture fees and honoraria from Amgen, GSK, Alliance for Better Bone Health, MSD, Eli Lilly, Pfizer, Novartis, Servier, Medtronic and Roche outside the submitted work.

P610

POTENTIAL OSTEOPOROSIS MRNA BIOMARKERS DISCOVERED IN TRANSCRIPTOME STUDY OF ESTONIAN POSTMENOPAUSAL FEMALE PATIENTS

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Osteoporosis is a disorder, associated to bone tissue reorganization and negative influence on bone mass and mineral density. More severely osteoporosis affects postmenopausal women, causing bone fragility and osteoporotic fractures. Due to fast aging of European population osteoporosis becomes more challenging. Early disease diagnosis might prevent the disorder and significantly improve treatment of bone fragility.

Objective: The aim of the current study was to compare blood mRNA in postmenopausal osteoporosis women with females without previous history of fractures and osteoporosis in order to find possible new biomarkers for future studies.

Material and Methods: Our study represents transcriptome analysis of whole blood serum of twelve Estonian elderly female osteoporotic patients, with average age of 70.58. The selected patients had T-score lower -2.5 SD in lumbar spine L1-L4 or in total hip. Age matching selection with control group was performed and only postmenopausal osteoporosis females were selected for current study. The transcriptome analysis was performed with RNA-seq technology, bioinformatics and R Bioconductor.

Results: Statistical analysis revealed 20 differently expressed genes with $FDR < 1.47 \times 10^{-4}$. Out of them expression of 10 genes was upregulated and other 10 genes were downregulated in osteoporotic patients. Further statistical analysis in patient's subgroups identified the potential mRNA biomarker pattern consisting of six genes: CACNA1G, ALG13, SBK1, GGT7, MBNL3, RIOK3. Functional IPA analysis revealed connection of differentially expressed genes to connective tissue disorders and "RNA Post- Transcriptional Modification, Molecular Transport, RNA Trafficking" network.

Conclusion: We suppose that the discovered blood mRNA biomarker pattern might be a new potential noninvasive way of sensitive diagnosis of osteoporosis, which requires further investigation.

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P611

POOR BONE HEALTH IN CHILDREN WITH TRANSFUSION DEPENDENT BETA THALASSEMIA MAJOR IN PAKISTAN

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Objective: Assessing bone health in Pakistani children with transfusion dependent β -thalassemia major patients.

Material and method: This was an observational descriptive study funded by University Research council of Aga Khan University. A total of 380 patients were recruited. Questionnaires were administered to gather demographic, anthropometric, clinical and medical history. Each enrolled participant was assessed for lifestyle, dietary intake of calcium, vitamin D and phosphorus. Severity of bone pain was assessed by Wong-

Baker Faces Pain rating and fracture risk assessment questionnaire was filled. Biochemical parameters of bone health including vitamin D, iPTH, calcium, creatinine, SGPT, albumin, magnesium, zinc, and phosphorus were evaluated for each patient.

Results: Mean age and BMI of the children was 10.63 ± 3.32 (years) and 14.6 ± 1.9 kg/m² respectively. Mean age at the time of presentation was 0.9 ± 1.1 years. 63.4 % children were on bimonthly red cell transfusion regime. However, regular chelation therapy was given in 32.8 % patients only. 57.8 and 50.2 % patient were taking regular calcium and vitamin D supplement respectively since 2 years. Eighty-two percent patients reported bone pains frequently involving lower limbs in 67 %. Out of 82 % patient with bone pain 67 % were taking mild analgesics. 48 patients had fractured in last 2 year. Mean vitamin D (14.5 ± 10.9), calcium (8.5 ± 1.14) and hemoglobin (7.6 ± 1.3) was low and high mean ferritin (5403 ± 2648) levels were found. Seventy-eight percent patients were vitamin D deficient and 42 % had hypocalcaemia. Multivariate regression showed significant association of bone pain and fractures with low hemoglobin and high ferritin level and with low calcium and zinc respectively.

Conclusion: Findings indicate severe bone pains and presence of fractures in transfusion dependent thalassemics in Pakistan. Low calcium, zinc, hemoglobin and high ferritin are associated with poor bone health which predispose to osteopenia and osteoporosis later. Monitoring for bone health should be performed to improve the quality of bone health.

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P612

ROLE OF ANTIRETROVIRAL THERAPY (ART) ON BONE MASS AND BONE TEXTURE

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Rational: Antiretroviral therapy (ART) has been associated with bone loss in human immunodeficiency virus (HIV) infected patients. However, sparse data exist concerning bone microarchitecture. The aim of the study is to evaluate effects of different ART on areal BMD (aBMD) and bone microarchitectural texture (TBS) of HIV infected patients.

Methods: 245 men and 80 women aged 45 and older were analyzed. 44 patients had never been exposed to ART (Naive group), while the rest had stable (≥ 12 months) and successful (plasma HIV-1 < 37 copies/mL) ART. For the purpose of this analysis, patients on ART were further classified in four

groups: Tenofovir plus Ritonavir-boosted Protease inhibitor (TeRiPi, $n=35$); Ritonavir-boosted Protease inhibitor without Tenofovir (RiPi, $n=51$); Tenofovir without Ritonavir-boosted Protease inhibitor (Te, $n=141$); or therapy not containing Tenofovir and Ritonavir-boosted Protease inhibitor (NoTeRiPi, $n=54$). Lumbar aBMD were measured by DXA using a QDR 4500 device (Hologic, Madison, USA). TBS was computed using TBS iNsight® (v2.1, Med-Imaps, France).

Results: Mean age and BMI were 54.2 ± 6.4 years and 23.9 ± 3.1 kg/m², respectively, without significant differences between groups (all $p>0.08$). Mean plasma in the Naïve group was 5.1 ± 5.3 HIV-1 RNA copies/mL. In addition, subjects in the Naïve group had significant lower number of CD4 (303 ± 159 cells/mm³) in comparison with subjects on ART (all $p<0.001$). Those on Ritonavir-boosted Protease inhibitor (TeRiPi and RiPi) had significant decreases in both TBS (all $p<0.0001$) and aBMD (all $p<0.03$) relative to the Naïve group but more marked on TBS. Interestingly, those not on Ritonavir-boosted Protease inhibitor (Te and NoTeRiPi) therapies exhibited a significant decrease on TBS (all $p<0.02$) while aBMD seemed to be similar (all $p>0.33$). We observed a trend to the TeRiPi therapy be the most impacting TBS when compared to other therapies ($0.001<p<0.07$). When considering subjects with a low bone mass (T-score ≤ -1 ; $n=176$), those under TeRiPi, RiPi and NoTeRiPi had a significant lower TBS than the naïve group ($p=0.002$, 0.02 and 0.01 respectively) while no differences were observed in BMD (all $p>0.3$) and thus without differences in terms of age or BMI between groups. Finally, in multivariate analysis, a low TBS value (lowest tertile) was best explained ($r^2=31\%$) by a model combining age, CD4 cell count, BMI (negative association, all $p<0.02$) and aBMD and CD8 cell count (positive association, all $p<0.05$).

Conclusion: For the first time we observed impairment on bone microarchitectural texture at spine linked to ART. While impairment on aBMD was observed only for Ritonavir-boosted Protease inhibitor irrespective of Tenofovir, it seems that ART including both Tenofovir plus Ritonavir-boosted Protease exhibited the worse effect on TBS. Further studies are needed to confirm our observations and to determine their clinical relevance. TBS and aBMD may offer further information than standard bone DXA to monitor the effect of ART on bone in HIV infected patients.

P613

BILATERAL FEMORAL HEAD AVASCULAR NECROSIS WITH REPLACEMENT DOSE OF ORAL CORTICOSTEROIDS FOR PANYHYPOTUITARISM

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Avascular necrosis (AVN) of femoral head is a well recognized complication related to glucocorticoid administration, traditionally been associated with high doses and/or prolonged therapy. There has been isolated reports of AVN with short course of high dose steroids, single intraarticular or intravenous injection. Here, we report a 38 year male patient with non-secreting pituitary adenoma who developed bilateral AVN while on replacement doses of oral prednisolone. This report intends to highlight the occurrence of AVN of femur even with physiologic replacement dose of hydrocortisone used for treatment of panhypopituitarism. Glucocorticoids may have to be continued in the lowest possible dose using the most physiologic preparation in clinical settings where stoppage is not possible. Any patient with hip pain even on replacement dose of glucocorticoid should be evaluated to rule out AVN. To the best of our knowledge, this is the first case of bilateral AVN as a complication of oral replacement dose of corticosteroid.

P614

ANDROGEN STATUS, BONE MINERAL DENSITY AND MARKERS OF BONE METABOLISM IN MALE PATIENTS WITH PSORIATIC ARTHRITIS

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Study of key factors leading to the reduction of BMD in male patients with psoriatic arthritis (PA) will let to determine the differentiated approaches to management and care of male patients with chronic autoimmune inflammation focused on the prevention of secondary osteoporosis.

Objective: To study the relationship of testosterone levels, markers of bone turnover and BMD in patients with PA.

Materials and methods: 31 male patients with documented PA according to CASPAR criteria were enrolled in the study. Mean age of the patients was 48.8 ± 11.83 years, mean BMI 27.6 ± 4.9 g/cm², mean duration of the disease 10.0 ± 10.04 years. Investigation of BMD (g/cm²) was performed in the lumbar spine (L₁-L₄) and proximal femurs by DXA (Lunar Prodigy Advance, USA). Levels of total testosterone (TS) and sex hormone binding globulin (SHBG), total vitamin D, osteocalcin and β -crosslaps were determined by electrochemiluminescence assay (Cobas e411, Roche Diagnostic, reagents Roche Diagnostics GmbH, Germany). The level of free TS was calculated based on the levels of albumin, total TS, SHBG using the electronic calculator, available on the website www.issam.ch/freetesto.htm.

Results: Reduction in BMD corresponding to osteopenia / osteoporosis was observed in 59 % of patients, among them 10 (33 %) subjects had osteoporosis, and 8 (26 %) osteopenia. There was found statistical significant correlation between BMD at the lumbar spine and proximal femurs and disease

duration ($r=0.459$, $p=0.018$). Total testosterone in the examined patients matched reference values and amounted to 395.65 ± 54.65 ng/dL. Free testosterone values obtained by calculation, consistent with 5.11 ± 0.75 ng/dL. Correlation analysis revealed no statistically significant relationship between the levels of total and free testosterone and osteocalcin ($r=0.180$), β -crosslaps ($r=-0.016$) and vitamin D ($r=0.165$), $p>0.05$.

Conclusion: Systemic osteoporosis/osteopenia, related to the duration of the disease, were observed in majority of men with PA, there were no revealed correlations between testosterone levels and BMD in this group of patients. This findings show that chronic autoimmune inflammation is a key factor in reducing BMD in male patients with PA.

P615

SECONDARY OSTEOPOROSIS IN A MAN WITH PARANEOPLASTIC CUSHING SYNDROME DUE TO A NEUROENDOCRINE TUMOR OF THE MECKEL DIVERTICULUM

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Cushing's syndrome due to ectopic ACTH secretion, associated with a neuroendocrine tumor of the small intestine is a very rare finding. It is difficult to diagnose and treat. Osteoporosis is an important component of Cushing's syndrome, together with hypokalemia, hypertension and diabetes.

Case presentation: We report the clinical case of a 44-year-old man, presenting a bilateral adrenal hyperplasia and elevated levels of ACTH, plasma and free urinary cortisol, insuppressible under low dose overnight dexamethasone. The patient associated hypertension, hypokalemia, secondary diabetes and osteoporosis. The clinical examination revealed bilateral exophthalmos, plethoric facies, proximal muscle weakness, malaise, petechiae and ecchymosis, persistent pain at the lumbar spine level. Blood tests revealed trombocytosis, hyperglycemia, hypokalemia, hypocalcemia, vitamin D deficiency and normal PTH levels. DXA of the lumbar spine L1-L4 revealed a BMD=0.731 g/cm², T-score=-2.9DS, Z core=-2.6 SSD, total hip scan revealed a BMD=0.821 g/cm², T-score=-1.5 SD, Z-score=1.4 SD. The conventional X-ray and thoracic CT scan revealed old rib fractures and compression fractures of the dorsal-lumbar spine. The high values and insuppressible cortisol levels after the 8mgx2 dexamethasone suppression test, high levels of ACTH, bilateral adrenal hyperplasia, increased levels of Cg A and of the NSE

suggest the paraneoplastic Cushing syndrome and the neuroendocrine nature of the primary tumor. The 99mTc Octreotide Scintigraphy localised the tumor in the right lower quadrant of the abdomen. The ACTH and cortisol levels lowered significantly under ketoconazole and s.c. octreotide acetate. A surgery was performed and a tumor of 1.5 cm of the Meckel diverticulum was resected. After surgery, biochemical and hormonal changes normalised. The patient received calcium, a vitamin D supplement and bisphosphonate. IHC was positive for CgA, NSE and synaptophysin.

Conclusion: In Cushing's syndrome caused by ectopic ACTH secretion, the identification of the primary tumor can be particularly difficult. The severe consequences of hypercortisolemia require the excision of the primary tumor, when possible.

P616

CLINICAL OUTCOME AFTER THREE YEARS OF TREATMENT WITH ZOLENDRONATE IN AN ELDERLY URBAN POPULATION

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Objective: Due to gastrointestinal side effects from oral bisphosphonates, yearly zoledronate (zol) intravenous infusions are commonly used. The aim of this study was to evaluate individual tolerance, side effects, persistence and clinical outcome in a 3 year treatment regime with yearly zoledronate infusions in an elderly urban population.

Subjects and Methods: During the 5-year period (2008–2012) 184 participants were consecutively recruited from the Centre of Osteoporosis and Fracture Prevention Unit, Skåne university hospital, Malmö, Sweden, where DXA measurement, treatment and follow-up also took place. 68 women (mean age 76y) and six men (mean age 74y) completed the full 3-year programme; 41 % of the study cohort. The most common reason for noncompletion was a nonresponse when offered new treatment. Others included treatment elsewhere, change of treatment regime, old age, frailty, fear of side effects or a feeling of not benefiting from the treatment.

Results: At recruitment the women had mean BMI 24.5 and T-scores of -2.76 (spine) and -2.33 (hip). Men had mean BMI 25.7 kg/m², and T-scores of -3.02 (spine) and -2.61 (hip). 26 (35 %) of participants had no comorbidities. The most common comorbidities were CVD (19 %) and respiratory diseases (16 %). Peripheral or vertebral fractures were prevalent in the majority of participants (61/75 (81 %)). After the first and third zol infusion, 46 (61 %) and 16 (21 %) individuals had side effects, the most common being chills (24 %) and muscle pain (20 %), with the latter persisting (15 % at third infusion).

During follow-up 13 individuals (17 %) lost height and 12 (16 %) suffered new fractures. In women, significant increases in T-scores were observed at the spine (1.06, 95 %CI 0.74–1.38, paired t-test $p < 0.001$) and the hip (0.65, 95 %CI 0.35–0.95, paired t-test $p < 0.001$).

Conclusion: Seventy four men and women completed the programme and in women zol treatment induced significant increases in T-scores of the spine and hip. Almost two thirds of all participants suffered side effects at first infusion and these were tolerable. Interestingly, the majority with no side effects at first infusion had none or only one prevalent comorbidity, suggesting that good health may increase tolerance of zol.

P617

BALANCE TESTS AND THE LEVEL OF 25-HYDROXYVITAMIN D IN THE EVALUATION OF FALL RISK

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Balance is an important factor in the fall risk. In order to determine the fall risk, along with the clinical evaluations, Tetrax and the falling index obtained with Tetrax have been used. In many studies, it has been observed that vitamin deficiency has a negative effect on balance. Our goal was to study the correlation between balance tests and the level of vitamin D.

Methods-Patients: The patients who have not received replacement for at last 3 months and had vitamin D level measurement in our clinic have been evaluated by Berg balance scale, timed up and go test and Tetrax. In the statistical evaluation Mann–Whitney test and chi-square test have been used.

Results: 52 female patients whose average ages were 50.42 have been evaluated. The average level of vitamin D was 13.97 µg/ml and the average BMI was 28.9 kg/m². The number of the patients who had a level of vitamin D under 20 µg/ml was 43 (82.6 %), the number of patients who had a high risk of falling index was 32 (61 %), the number of patients who have not completed the timed up and go test on time was 26 (50 %). The number of patients who had vitamin D deficiency and a high risk in the falling index was 25 (48 %). The number of patients who had vitamin D deficiency and had not completed the timed up and go test on time was 22 (42.3 %). The number of patients who had a high risk in the falling index and had not completed the timed up and go test on time was 19 (36.5 %). A statistically significant correlation could not be found between BMI and falling index.

Conclusion: The falling index obtained with Tetrax and other clinical tests are useful in the determination of the fall risk. After the evaluation of balance, it will be possible to reduce the risk of falling with the help of the regulation of high-risk

patients' daily lives and teaching their exercises.

P618

BMD AND TBS USE IN ADULT PATIENTS SUFFERING POLIO

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Objective: Assess TBS to categorize skeletal status in adult subject which history of poliomyelitis sequels in limbs.

Method: We scan total body, lumbar spine (L1-L4) and both hips (total femur and femoral neck ROI's) in 58 patients with history of poliomyelitis infection and limb paralysis (men: 14–57.5 years; women: 48–57±8.5 years). A DXA device GE-iDXA model was used. The difference between affected extremity and the opposite in BMD T-score and trabecular microarchitecture assessed by TBS (TBS[®] Insight v2.0; Medimaps) were used. The results were stratified as normal, low bone density or osteoporosis taking the lower T-score of the scanned regions of interest. TBS results were categorized as normal (TBS N) ≥ 1.350 ; partially deteriorated-(TBS-PD) between: 1.250 and 1.349, and significantly deteriorated (TBS-SD): < 1.250 .

Results: Three patients had hip fracture history. The left limb was the extremity most affected in this group (32 vs. 20). Five patients had both extremities affected, with more severe affection on the right side (4/5). Only 7 patients had normal BMD of the hip, which contrasts with the 43.1 % of patients with normal lumbar BMD. The TBS was normal in 16 patients (27.6 %). Stratification (BMD or TBS) was more similar in patients who had a low bone density (48.3 % in the hip and 50 % in lumbar spine) and TBS-PD (50 %). In patients categorized as osteoporotic, the lowest BMD T-score was found in proximal femur (39.7 %, mostly at the affected limb), and with a prevalence of 6.9 % at the lumbar spine while TBS-SD was found in 22.4 % of patients. The DXA spine images showed a spondyloarthritis and scoliosis signs in 25 patients. 16.7 % of these patients had an osteoporotic T-score at affected femoral side although a normal BMD at the lumbar spine and the opposite femur. Interestingly, all of these subjects had a deteriorated TBS (TBS-PPD and TB SSD).

Conclusion: A degradation TBS allow identify a greater number of patients who had polio with low bone status than assess BMD of lumbar spine and femur. Postural instability could increase irregular mechanical charges to lumbar spine and femur unaffected that may decrease the sensitivity of DXA when only the BMD is used to classify patients.

P619

DECREASED CIRCULATING 25-HYDROXYVITAMIN D LEVELS ARE NOT ASSOCIATED WITH HIGHER BONE TURNOVER OR LOWER INTESTINAL CALCIUM ABSORPTION OR BONE MINERAL DENSITY: A CROSS-SECTIONAL STUDYM. S. M. Ardawi¹, M. H. Qari², T. M. Bahksh³, A. M. Al-Sibiani³, A. Y. Ahmad⁴, O. T. Ali⁴, M. A. Hani⁴

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Several studies showed that obese subjects exhibit low circulating levels of total-25 hydroxyvitamin D [25(OH)D]. We have previously demonstrated that this is likely to be related to increased volume of distribution of vitamin D in obesity with decreased values of serum 25(OH)D and 1,25 hydroxyvitamin D in both men and women.

Objective: To determine if decreased 25(OH)D levels in obesity is associated with changes in PTH, calcium absorption, bone turnover markers (BTMs) or BMD.

Materials and Methods: A total of 320 healthy subjects (age: 30–65 years) living in the city of Jeddah, Saudi Arabia were studied. Subjects were divided into 3 groups according to BMI (kg/m²): lean (18.5–24.9), overweight (25.0–29.9) and obese (>29.9). Serum 25(OH)D, PTH, BTMs (namely: serum CTx, serum PINP, serum bone-specific ALP and urinary NTx) were determined. Calcium absorption was assessed by double-isotope method and BMD values at different sites were determined by DXA. Results were adjusted for age, gender and other confounders.

Results: Serum 25(OH)D levels were lower in overweight and obese subjects. Calcium absorption and serum PTH did not differ by BMI category. s-CTx and u-NTx were lower in obese subjects, but PINP and s-bone specific-ALP did not differ by BMI category. BMD values at lumbar spine (L₁-L₄) and total hip were higher in obese subjects (all $P < 0.001$). Using regression analysis, serum 25(OH)D was not a significant predictor of BMD even after adjustment for confounding factors.

Conclusion: Decreased circulating 25(OH)D in obesity is not associated with increased PTH, decreased intestinal calcium absorption and higher BTMs or lower BMD values. Thus, it is not clear whether there would be skeletal benefits from

treating obese subjects to the same vitamin D status targets as lean (or normal weight) subjects.

P620

PREDICTORS OF MORTALITY FOLLOWING TOTAL KNEE ARTHROPLASTY: A POPULATION-BASED COHORT STUDYL. E. Bayliss¹, A. J. Price^{1,5}, N. K. Arden², A. Roso³, C. Tebe⁴, A. Judge¹, E. Castellet³, M. K. Javaid¹, C. Cooper⁶, M. Espallargues³, D. Prieto-Alhambra¹

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Table 1: Key predictors of 1-year post-TKR mortality

Predictor	Value	Adjusted Odds Ratio [95 %CI]
Age	Per year (older)	1.10 [1.07–1.13]
Sex	Female	0.50 [0.35–0.73]
Anti-convulsant usage	≥1 month use	2.18 [1.23–3.85]
Oral corticosteroids (previous year)	≥3 months of ≥5 mg/day prednisolone or equivalent	1.50 [0.88–2.57]
Oral anticoagulants (previous year)	≥1 month use	2.24 [1.16–4.29]
Charlson Comorbidity Index	0	REF
	1	0.99 [0.49–2.00]
	2	1.12 [0.66–1.90]
	3+	1.47 [0.95–2.29]
GP visits previous year	0	[REF]
	2	1.04 [0.56–1.90]
	3	1.01 [0.50–2.03]
	4	1.29 [0.72–2.31]
	≥5	1.77 [1.00–3.13]

Over 80,000 total knee arthroplasty procedures (TKA) were carried out in the UK last year with many more worldwide; previous authors (including the national joint registry) have reported on post-operative mortality, but have not produced predictive models.

Aim: Develop and validate a predictive model for all-cause, early (1-year) post-TKA mortality using clinical (primary and hospital care records) and drug use data linked to the Catalan Arthroplasty registry (RACat).

Method: RACat collects information on patient, centre, and implant-related variables for patients undergoing TKA in Catalonia (Spain). Primary care and hospital records together with pharmacy-dispensation data were extracted for the linked population from SIDIAP, a large representative database including >80 % of the population of Catalonia. Patients aged over 40, undergoing primary TKA between 2005 and 2012 recorded on RACat were included; those in RACat but not present in SIDIAP, and those undergoing arthroplasty for malignancy were excluded. Potential pre-operative risk factors were predefined as: age, sex, BMI, smoking, alcohol drinking, Charlson comorbidity index (CCI), healthcare resource use (number of GP visits), hospital volume (TKAs per hospital per annum), prescription drug usage in the previous year, and indication. All-cause 1-year mortality was the study outcome. Backwards logistic regression was used to identify key predictors, and the obtained coefficients combined to derive a predictive tool. Area under the ROC curve (AUC-ROC) and Hosmer-Lemeshow test (HL) were used to estimate discrimination and calibration.

Results: 1 year mortality following TKA was 0.52 % (116 deaths in a population of 22,457). Key predictors of mortality are outlined in table 1.

A predictive tool based on these variables shows good discrimination (AUC-ROC 73.2 %) and calibration (HL $p > 0.75$).

Conclusion: Pre-operative assessment of these factors in patients undergoing TKA can be used to highlight groups at risk of early mortality and aid both in decision-making and resource planning.

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P621

CLINICAL AND PARACLINICAL FEATURES IN MEN WITH OSTEOPOROSIS

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Objective: To study the clinical and evolutive features, DXA parameters and FRAX score in male patients with osteoporosis.

Materials and methods: The study group was composed of 40 male patients aged >50 years and certain diagnosis of osteoporosis and osteopenia based on the osteoporosis criteria developed by WHO and confirmed by DXA investigations.

Results: After data analysis, it was estimated that 55 % of the patients presented with osteopenia and 45 %, conversely, with

osteoporosis. Pain in the spinal column was reported in 47.5 % of the cases; pain in the upper and lower extremities in 30 % of the cases. Weather sensibility was discovered in 45 % patients; worsening of symptoms during moderate and intense physical exercise in 55 % and 62.5 of cases. The study showed that men taking corticosteroids have a lower mean BMD (T-score=-3.1) than those not on current steroid medication (T-score=-1.7). In men with a Ca⁺⁺ intake >950 mg/day, the T-score was - 1.75, whereas in those with 850–950 mg/day calcium intake the T-score was - 2.05. A third group, with the lowest calcium intake (750–850 mg/day), are predisposed to fragility fractures (T-score=-3.1). Smoking men had a lower mean T-score compared to non-smokers (T-scores - 2.64 and -2.36, $p < 0.05$). The frequency of hip fractures in men doesn't vary significantly in the 50–70 years age group.

Conclusion: In men, significant risk factors for developing osteoporosis and fragility fractures are smoking, corticosteroid intake, reduced calcium intake.

P622

PLASMA FLUORESCENT OXIDATION PRODUCT-320 LEVELS AND THE RISK OF OSTEOPOROTIC FRACTURES: THE CEOR STUDY

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Several human and experimental studies suggest that oxidative stress is a risk factor for osteoporosis, but its relationship to fracture risk is poorly understood. Plasma fluorescent oxidation products (FIOPs)-320 is generated when oxidation products (e.g., lipid hydroperoxides, aldehyde, and ketones) react with and in the presence of metals. FIOPs are produced from different pathways (protein, DNA and lipid oxidation) reflecting a global oxidation status; and is considered to be a more sensitive novel biomarker than other oxidative stress markers. We hypothesized that postmenopausal women with elevated plasma FIOP-320 levels might be related to greater risk for osteoporosis-related fractures (ORFs).

Materials and Methods: We studied, the association between plasma FIOP-320 and ORF risk in 707 postmenopausal women (age ≥ 50 year), in a population-based study with a mean follow-up period of 5.2 ± 1.3 years. Multivariate Cox proportional-hazards regression models were used to analyze fracture risk, adjusted for age, BMI, and other confounding risk factors.

Results: High plasma FIOP-320 levels were strongly associated with increased fracture risk. After adjustment for age and other confounders, the relative risk was >3.4 -fold among postmenopausal women for each 1-SD increment increase in plasma FIOP-320 level. Women in the highest quartile of plasma FIOP-320 levels had a 2.8-fold increase in fracture risk. Fracture risk attributable to plasma FIOP-320 levels was 30.6 % in the highest quartile. Associations between plasma FIOP-320 levels and fracture risk were independent of BMD and other confounding risk factors.

Conclusion: High plasma FIOP-320 level appears to be a strong and independent risk factor for ORFs among postmenopausal women and could be a useful novel biomarker to improve fracture risk assessment.

P623

LONG-TERM PERSISTENCE WITH ANTI-OSTEOPOROSIS DRUGS FOR THE PREVENTION OF SUBSEQUENT FRACTURES

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Objective: The risk of osteoporotic fracture can effectively be reduced with use of anti-osteoporosis drugs. However, little is known about persistence with these drugs after fracture where subsequent fracture risk is high. The aims were to determine long-term persistence with anti-osteoporosis drugs among fracture patients, including its determinants, and to describe restart and subsequent persistence.

Methods: A cohort study was conducted within the Dutch PHARMO Database Network. Patients aged ≥ 50 years ($n = 961$) who received anti-osteoporosis drugs within 1 year after fracture, but not in the preceding year, were included (2002–2011). Persistence (defined as the proportion on treatment) and the proportion restarting after discontinuation were

estimated using Kaplan-Meier analyses. Time-dependent Cox regression was used to identify determinants of nonpersistence including age, sex, initial dosage- regimen, fracture type, comorbidities, and drug use.

Results: Persistence with anti-osteoporosis drugs was 75.0 % (95 %CI: 72.0–77.7) and 45.3 % (95 %CI: 40.4–50.0) after 1 and 5 years, respectively. A significant determinant of nonpersistence was age ≥ 80 years (reference 50–59 years: adjusted Hazard Ratio [aHR] 1.63; 95 %CI: 1.13–2.35). This effect was not constant over time (≤ 360 days following initiation: aHR 2.08; 95 %CI: 1.27–3.38, >360 days: aHR 1.08; 95 %CI: 0.62–1.88). Within 1 year after discontinuation, 24.3 % (95 %CI: 20.1–29.2) restarted therapy, yet 47.0 % persisted for 1 year.

Conclusion: This study identified suboptimal persistence with anti-osteoporosis drugs among fracture patients. Major target groups for measures aimed to improve persistence may be those aged 80+ years and those restarting therapy.

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P624

GLYCEMIC CONTROL IN RELATION TO BONE MINERAL DENSITY AND FRACTURE RISK AMONG POSTMENOPAUSAL WOMEN WITH TYPE 2 DIABETES: THE CEOR STUDY

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Subjects with type 2 diabetes (T2DM) exhibit higher fracture risk despite increased BMD. The objective of the present study was to examine the effect of glycemic control on BMD values and the risk of fractures among postmenopausal women with T2DM followed-up longitudinally.

Materials and Methods: Data of 3015 postmenopausal women of the Center of Excellence for Osteoporosis Research (CEOR) Study, a prospective population-based cohort, were available (mean follow-up 7.2 ± 1.4 years). At baseline, 412 women with T2DM were classified by glycemic control (according to HbA1c%), resulting in three comparison groups:

well-controlled diabetes (WCD; $n=201$; HbA1c <7.5 %), poorly-controlled diabetes (PCD; $n=211$; HbA1c ≥ 7.5 %) and no diabetes ($n=2603$). Cox proportional hazard regression analysis adjusted for age, BMI, and BMD [lumbar spine (L₁-L₄), neck femur or total hip] were used to test for differences in bone variables and fracture risk (hazard ratio [HR] [95 %CI]).

Results: Women in the PCD group had elevated fracture risk compared with WCD group (HR 1.81 [1.37–2.40]) and those without diabetes (1.94 [1.31–2.87]); whereas those with WCD had an HR of (0.84 [0.61–1.12]) as compared with women without diabetes. PCD group showed 1.2–5.8 % higher BMD, 4.9–6.2 % thicker cortices, and –1.3 to 2.1 % narrower neck femur than WCD and women without diabetes, respectively.

Conclusion: Poor glycemic control in postmenopausal women with T2DM is associated with fracture risk, high BMD, and thicker femoral cortices in narrower bones. We suggest that bone fractures in apparently “healthy” bones in PCD can result from micro-fragility accumulation and/or cortical porosity, reflecting impaired bone repair processes.

P625

OSTEOPOROSIS IN WOMEN WITH BREAST CANCER IN SIBIU COUNTY

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Women who have had breast cancer diagnosis have an increased risk of developing osteoporosis compared with healthy women. Chemotherapy induced ovarian failure. Chemotherapy agents used in the treatment of breast cancer have adverse effects on BMD, trabecular bone volume reduction and reducing the rate of bone formation and increase bone resorption methotrexate (in vivo). Breast cancer itself can accelerate the activity of osteoclasts. Addressing Osteoporosis in women with breast cancer is affected by the wide use of tamoxifen.

Material and methods: The purpose of this study was to evaluate the efficacy of alendronate, raloxifene ibandronic acid in patients with breast cancer. We followed 60 women (45–76 years) included in the National Programme for Prevention and treatment of osteoporosis, are out of Endocrinology and Oncology Department of Emergency County Hospital - Sibiu, treated with antiresorptive drugs and having a previous diagnosis of cancer breast: alendronate (Ale), risedronate (RIS), ibandronate (Iba), SERM, raloxifene (RAL) and strontium ranelate (RAN). The main criteria for evaluating the effectiveness of therapy was changing antiresorptive BMD (DXA) before and after 2 years of treatment.

Results: In our study 41 % of patients were treated with Iba. Greater efficiency was recorded for Ale+D3 and the lowest at 0.2 DS RIS (6.4 %). The best results were recorded T-score for patients with DS 0.8 Ale+D3 (36.3 %), while the worst results were for DS 0.3 Ale (13.6 %). The best results in the evolution

of BMD were recorded for patients treated with Ale+D3 - 0.113 g/cm² (16.2 %) and the lowest for therapy RAN - 0.008 g/cm² (1 %). The best results were recorded for patients treated with Ale+D3 - 0.113 g/cm² (16.2 %) and lowest for therapy RAN - 0.008 g/cm² (1 %). Ale+D3 get the best results with 42.5 % RR reduction and the lowest recorded monotherapy results - 18.7 %.

Conclusion: Ale has the largest positive effect on BMD and reduces the incidence of vertebral and nonvertebral fractures. The combination of Ale with cholecalciferol obtained the best results. The efficacy of treatment was significantly higher in combination with cholecalciferol in our study. 16.6 % of patients had no positive response to therapy. RAL and calcitonin appears to reduce the incidence of vertebral, nonvertebral fractures their impact is not yet proven. If you are risk factors for osteopenia, consideration should be given preventive therapy with Ale or RAL. RAL and calcitonin are alternatives when Ale is contraindicated. Further studies are needed to assess the optimum time of initial bone mineral analysis premenopausal women after breast cancer diagnosis and to determine the value of preventive treatment in women scheduled to undergo chemotherapy.

P626

THE EFFECT OF IV ZOLEDRONIC ACID ON RENAL FUNCTION AND SERUM CALCIUM IN AN OSTEOPOROTIC POPULATION

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IV zoledronic acid is frequently used to treat severe osteoporosis in patients attending our bone health clinic. The frequency of administration is either once or twice yearly dependant on the patient's renal function, which is checked before and 2 weeks after treatment. Calcium levels are also measured due to the known effect of zoledronic acid on calcium.

Method: In this retrospective study we used the electronic patient record system and our bone health database to collect pre- and post-treatment blood results. We analysed the results of 302 patients chosen at random from the database, of which 130 had both pre- and post-treatment values available. Renal function was assessed by examining creatinine, urea and eGFR, which is calculated by the system using 4v-MDRD formula. We also analysed calcium levels.

Results: 130 patients, mean age 75.99 years (SD10.28). 89.3 % female. Mean predose creatinine 71.8 μ mol/l (SD 19.0); mean postdose creatinine μ mol/l 71.23 (SD 19.14). Mean predose eGFR 75.54 ml/min (SD 12.06); mean postdose eGFR 75.72 ml/min (SD 11.07). Mean predose serum calcium mmol/l 2.33 (SD 0.11); mean postdose serum calcium 2.28 mmol/l (SD 0.16).

Conclusion: IV zoledronic acid did not adversely affect the renal function of our patients. Nor was there significant hypocalcaemia following infusions. This reaffirms the safety of this valuable therapy.

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RELATIONSHIP BETWEEN BONE TURNOVER MARKER, BONE DENSITY AND SERUM ESTROGEN LEVELS IN RECENTLY MENOPAUSAL WOMEN

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Osteoporosis is the most common nontraumatic skeletal disorder, which weakens bone and increases the fracture risk. Hypoestrogenic status of menopause accelerates the age-related bone loss, leading to increased risk of osteoporosis development, but the responsibility of each variable in conditioning bone mass alteration is unclear. The aim of this study was to investigate the relationship between some bone turnover markers, such as alkaline phosphatase (ALP), osteocalcin and PTH, BMD and circulating 17- β - estradiol (e2) in recently menopausal women.

Patients & Methods: A group of 21 postmenopausal women (median age 52 years, range 49–54 years) were enrolled in the study. All patients underwent lumbar spine (LS) BMD measurement by DXA.

The coefficient of variation was <1 %. ALP, osteocalcin, PTH, and e2 serum levels were also measured. Patients with severe renal or hepatic impairment or major cardiovascular diseases were excluded from this study.

Results: The mean ALP, osteocalcin, PTH, and e2 serum levels were 141.1 \pm 13.8 U/L, 4.2 \pm 1.3 ng/mL, 67.1 \pm 1.3 ng/mL, and 99.7 \pm 15.8 pmol/L, respectively. As expected, an inverse correlation between age and both LS-BMD ($R=0.50$, $p=0.021$) and e2 ($R=0.89$, $p=0.00001$) was found. No correlation between ALP and age ($R=0.40$, $p=0.06$), e2 ($R=0.35$, $p=0.12$), LS-BMD ($R=0.30$, $p=0.19$), PTH ($R=0.13$, $p=0.54$) and osteocalcin ($R=0.05$, $p=0.99$). There was a weak inverse relationship between LS-BMD and osteocalcin ($R=0.40$, $p=0.07$), but a significant relationship between e2 and both BMD ($R=0.52$, $p=0.014$) and osteocalcin ($R=0.46$, $p=0.038$). At multivariate analysis, only age and e2 were independent predictors of LS-BMD changes.

Conclusion: Our study suggests that, in recently menopausal women, hormonal status as defined by e2 and partially by osteocalcin represents useful predictors of bone loss.

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SERUM OSTEOPROTEGERIN IN THE CARDIOVASCULAR RISK EVALUATION

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Osteoprotegerin, a well known regulator protein of the bone resorption, was found in the late years to have an important role in extraskeletal calcifications, correlated to atherosclerotic plaque.

Aim: to evaluate the relationship between osteoprotegerin serum levels and cardiovascular and metabolic risk in women with osteoporosis.

Materials and methods: 71 women (48 postmenopausal and 23 premenopausal, median age 65.5 years and median BMI 26.47 kg/m²) were randomly selected for the serum Osteoprotegerin levels analyze, from the whole group of patients diagnosed with osteoporosis referred to the endocrine department of Elias Hospital. Analyzed data were: clinical evaluation (weight and height, waist), routine biochemical blood tests, serum PTH, osteocalcin, 25 OH vitamin D, crosslaps and osteoprotegerin. Subjects were segregated into two study groups according to the presence of metabolic syndrome (Mets) used as a standard for cardiovascular risk.

Results: PTH serum levels did correlate with blood glucose ($r=0.491$, $p<0.01$) and serum triglycerides ($r=0.268$, $p<0.01$). Serum osteocalcin levels were found to be directly correlated to HDL-cholesterol ($r=0.344$, $p<0.01$). The osteoprotegerin serum levels were found to be directly and significantly correlated to HDL cholesterol ($r=0.333$, $p<0.01$), total ALP (0.78 , $p<0.01$) and serum PTH ($r=0.332$, $p<0.01$). Serum 25 OH vitamin D levels were found to be lower in the Mets study subgroup (17.4 vs. 30 ng/ml, $P<0.01$), while serum osteoprotegerin levels were higher (5.6 vs. 5.15, $p<0.05$).

Conclusion: Significant correlations of classic biochemical bone and calcium parameters like osteocalcin and PTH with lipid and glucose metabolism were found in our subjects, sustaining the crosstalk between calcium and bone parameters and cardiovascular risk. Osteoprotegerin serum level was proved to have a significant and independent predictive value for the metabolic syndrome as a cardiovascular risk standard in osteoporotic patients. 25 OH vitamin D serum levels has significant and independent predictive value for the cardiovascular and metabolic risk in our subjects sustaining the wide role of the vitamin D outside the bone metabolism.

P629

THE EFFECTS OF DENOSUMAB TREATMENT ON BONE MINERAL DENSITY, STRUCTURAL DAMAGE IN PATIENTS WITH OSTEOPOROSIS AND RHEUMATOID ARTHRITIS

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Objective: To evaluate the effects of denosumab (monoclonal antibody that binds RANKL) on BMD, structural damage in patients with rheumatoid arthritis (RA) and osteoporosis (OP).

Material and Methods: 46 postmenopausal women with RA and OP received s/c denosumab 60 mg every 6 months pro 1 year. The primary endpoint was the change from baseline in the Sharp/van der Heijde (SVH) score, X-ray morphometric analysis of deformations in vertebrae (Genant method) and BMD (by DXA at 3 sites: lumbar spine (L1-L4), hip neck (HN) and distal forearm (DF)). The pain severity in spine was assessed using VAS. The Statistica 6.0 was used.

Results: The mean age was 58.4±6.7, the mean duration of RA 19.5±11.3 years. Twenty-nine patients (63.04 %) continued glucocorticoids (GC). According to X-ray 12 (26.08 %) patients had the 2nd, 16 (34.78 %) the 3rd and 18 (39.13 %) the 4th stage of RA. Mean BMD (L1-L4) before/after the treatment was 0.812±0.100 g/cm² and 0.846±0.104 g/cm² ($p<0.001$), at HN was 0.625±0.092 g/cm² and 0.632±0.087 g/cm² ($p>0.05$), respectively. At DF without changes: 0.492±0.093 g/cm² ($p=0.063$). The significant increase of BMD was noted both in groups, receiving GC or not. The index of vertebral deformations at lumbar site of spine did not change -0.78±0.04, at thoracic site: 0.77±0.07 and 0.76±0.07 ($p>0.05$), respectively. The erosion score, the amount of narrowed cracks and total SVH score were increased after treatment: 50.08±49.01 and 50.86±49.28 ($p=0.027$), 101.47±38.18 and 101.89±38.29 ($p=0.037$), 151.56±81.18 and 152.76±81.74, ($p=0.014$), respectively. Interesting to note, that after separation on groups, taking or not GC, the increase of erosion score and total SVH score was only in patients with GC. At baseline 17(36.9 %) patients had pain in thoracic site, after treatment - 6(13.0 %) (mean VAS 42.6±18.4 and 33.3±10.8 mm, respectively), at lumbar spine in 26(56.5 %) and 20 (43.4 %) (49.2±22.2 and 37.2±14.4 mm, respectively).

Conclusion: After 12 months of therapy with denosumab it was shown the significant increase of BMD in (L1-L4), the stabilization in forearm. The erosion score, the amount of narrowed cracks and total SVH score were

increased after treatment, mainly in GC group. The index of vertebral deformations remained stable. The frequency and severity of spine pain were decreased.

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CORRELATION BETWEEN QUALITY OF LIFE AND PSYCHOLOGICAL FACTORS IN PATIENTS WITH GLENOHUMERAL OSTEOARTHRITIS

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Aim: To assess the impact on quality of life of a group of patients with chronic glenohumeral osteoarthritis.

Material and method: Our study consisted in a group of 112 patients with glenohumeral osteoarthritis. We divided the patients in two subgroups. First subgroup consisted in 56 patients who underwent a physical rehabilitation program three times per week for 12 months and the second subgroup of 56 sedentary patients. All the patients were assessed with Short Form 36 for quality of life, Hamilton Anxiety Rating Scale for anxiety, and Levenstein Index for stress at baseline, at 6 months and at 12 months. The Short Form 36 is a complex questionnaire that measures 8 domains of health which include physical functioning, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional problems and mental health. The Hamilton Anxiety Rating Scale for anxiety is widely used instruments for measuring the severity of anxiety in adults. Levenstein Index for stress is a well known instrument, actually used in clinical studies for stress assessment.

Results: In the subgroup of patients who underwent rehabilitation program both Physical Component Summary (PCS) and Mental Component Summary (MCS) improved at 6 months and the improvement in quality of life was greater at 12 months than in the second subgroup of sedentary patients which showed no improvement in quality of life. Anxiety values diminished in the group with rehabilitation therapy after 6 and 12 months. In the sedentary group we noticed a mild increase in values at 6 and 12 months. Stress values diminished in the active group at 6, 12 months and in the sedentary group the mean values of stress were a little higher at the end of the study. We found also correlations between quality of life, anxiety and stress.

Conclusion: Regular physical exercises and an active life play an important role in elevating patient's quality of life and also psychological well being. We found also correlations between quality of life and some

psychological factors like anxiety and stress in patients with glenohumeral osteoarthritis. It proved also the need for developing plans for coping with stress and anxiety as a part of mental well being and health related quality of life in patients with osteoarthritis.

P631

DOSE CHRONIC KNEE PAIN AND LOW BACK PAIN DECREASE THE WALKING SPEED OF THE RURAL ELDERLY?

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Aim: To assess the influence of chronic knee pain and chronic low-back pain on walking speed.

Subjects and Methods: This study was a cross-sectional study conducted in Japan. We recruited 566 subjects. They participated voluntarily in “Nagaoka healthy survey of resident elderly” in Niigata Prefecture. 71 % of the participants were female. Age ranged from 64 to 99 years. The average age of the participants was 79.8 years (SD 5.1) for male and 78.4 years (SD5.1) for female.

Results: The items resulted in significant differences between the male and female were age (M;79.8, F;78.4), height (M;1.60 m, F;1.47 m), weight (M;57.8 kg, F;48.6), maximum walking speed (M;125 m/min, F;115 m/min) and step length(M;0.75 m, F;0.67 m).In participants with chronic knee pain, the maximum walking speed and step length were affected by the intensity of pain in male and female. However, cadence was not affected. Lower back pain showed the same.

Conclusion: In men and women, chronic musculoskeletal pain affects the walking speed and step length. However, cadence was not affected by the lever of pain.

Variable	Sex	Pain level			p value
		No	Minor	Moderate/severe	
Chronic knee pain					
Maximum speed	Male	129	130	111	**
	Famale	122	114	109	***
Step lenght	Male	0.77	0.79	0.67	***
	Famale	0.68	0.67	0.65	n.s.
Cadence	Male	167	165	164	n.s.
	Famale	178	170	175	n.s.
Low-back pain					
Maximum speed	Male	131	126	107	**
	Famale	120	115	106	***
Step lenght	Male	0.77	0.76	0.68	**
	Famale	0.68	0.68	0.63	**
Cadence	Male	168	166	157	n.s.
	Famale	176	179	168	n.s.

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INTERIM DATA ON THE EFFECTS OF BAZEDOXIFENE ON BONE MINERAL MASS, VOLUMETRIC BONE MINERAL DENSITY, BONE ARCHITECTURE AND DERIVED STRENGTH IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS: A TIBIA PQCT STUDY

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Objective: We present interim data on the effects of bazedoxifene 20 mg per os daily for 12 months on bone mineral mass, volumetric BMD and architectural parameters related to bone strength as assessed with pQCT of the tibia.

Material and Methods: We are currently performing a prospective, phase 4, single arm clinical study in women with postmenopausal osteoporosis treated with bazedoxifene 20 mg daily plus calcium and vitamin D supplementation (1000 mg and 800 IU, respectively). Inclusion Criteria: 1) Age 50–70 years; 2) postmenopausal status >2 years; 3) osteoporosis as defined by DXA T-score < -2.5 SD; 4) available pQCT measurement of the tibia at baseline and 12 months after therapy. Exclusion criteria: 1) Secondary causes of osteoporosis; 2) other bone metabolic disorders or chronic renal disease; 3) previous use of any medication for osteoporosis 1 year prior of enrolment; 4) previous use of bisphosphonates per os >1 year; 5) previous use of zoledronate, denosumab, teriparatide, raloxifene or strontium ranelate; 6) malignancies; 7) history of deep venous thrombosis, cerebrovascular events or pulmonary embolism; 8) history of hot flushes or cramps post menopause. All patients underwent tibia pQCT (Stratec XCT-2000 scanner, Stratec Medizintechnik, Pforzheim, Germany) and 3 slices are obtained at the 4 % (trabecular bone), 14 % (subcortical and cortical bone) and 38 % (cortical bone) of tibia length sites. For the 4 % site we assess total and trabecular bone mineral mass (BMC, mg) and volumetric density (BMD, mg/cm³), and for the 14 and 38 % site cortical and subcortical BMC and BMD, total and cortical cross-sectional area (CSA), mean cortical thickness (CRT_THK, mm), periosteal circumference (Peri-C, mm), endosteal circumference (Endo-C, mm) and stress strain index (SSI). We performed power analysis prior to initiation and a sample size of 72 patients was predefined in order to assess 5±2 % change in trabecular BMC (primary endpoint) with significance <5 % (p=0.05).

Results: We report interim results for 24 patients (mean age 59.5 years). After 12 m of therapy we report increases of trabecular BMC (81.14±16.52 vs. 82.95±16.46, +1.82 %, p=0.09), and no significant differences of total mass and area (4 % site). Cortical BMC at the 38 % site was maintained (268.4±32.2 vs. 269.1±31.8, p=0.18), and no statistically

significant differences were observed concerning cortical CSA, Peri_C, Endo_C, CRT_THK or SSI after 12 months of treatment.

Conclusion: Our interim results indicate a tendency towards increases of trabecular BMC of the tibia after 12 months of therapy with bazedoxifene. The study will be terminated at the end of 2015 and full detailed analysis of results is to be performed and subsequently reported.

Disclosure: The study is supported by a research grant from Pfizer; KD Stathopoulos has received lecturing fees/honoraria/advisory board fees/travel grants from Amgen, Lilly, Pfizer, Servier, Pharmanel.

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BINDEX[®] TECHNOLOGY FOR OSTEOPOROSIS DIAGNOSTICS IN PRIMARY CARE

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A new ultrasound based point of care device (Bindex[®]) has been recently introduced for osteoporosis (OP) screening and diagnostics at primary healthcare (1). Bindex measures cortical thickness and determines parameter called density index (DI). Thresholds for DI in OP assessment have been determined in Finnish Caucasian population along the International Society of Clinical Densitometry (ISCD) guidelines (2). In this multicentral study, these thresholds are tested in 9 research sites in US and Finland. A total of 1316 Caucasian females participated the study (age 68.0±9.5 years). Subjects were measured with DXA to determine BMD at proximal femur. Further, the cortical thickness was measured at three locations (distal radius, distal and proximal tibia) with Bindex. Subjects were diagnosed with OP when T-score at femoral neck or total proximal femur was below -2.5 (NHANES III reference database). A subgroup of 865 subjects was formed in which the subjects with T-score -2.1 to -2.9 were removed due to the precision error in T-score values and uncertainty of osteoporosis/healthy status (3). In this subgroup, OP was diagnosed when T-score was below -2.9. The subjects were healthy when T-score was over -2.1. DI was calculated either by using measurement at one location (DI₁, proximal tibia) or all three locations (DI₃). By using the diagnostic thresholds, subjects were classified as healthy, osteoporotic or in need of DXA examination to verify diagnosis. A total of 70 and 72 % of the subjects could be directly diagnosed by using Bindex measurement, with DI₁ and DI₃, respectively. Sensitivity in OP diagnostics was 81 and 85 % for DI₁ and DI₃, respectively. Specificity was 86 % for both DI₁ and DI₃. In the subgroup, sensitivity in OP diagnostics was 89 and 93 % for DI₁ and DI₃, respectively. Specificity was 90 % for both DI₁ and DI₃.

In this study, smaller number of subjects would have needed additional DXA examination to verify diagnosis when compared to previous findings. These results suggest that Bindex is suitable for osteoporosis screening and diagnostics in primary healthcare.

References: Karjalainen JP, ASBMR, Baltimore, 2013. Hans, J Clin Densitom, 2008. Kiebzak, J Clin Densitom, 2007

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BINDEX[®] MEASUREMENT FOR DETECTION OF HIP OSTEOPOROSIS

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Currently, majority of the osteoporotic patients are not diagnosed (1). Efficient osteoporosis diagnostics would require novel approaches at primary healthcare. An ultrasound based device (Bindex[®]) has been recently introduced for osteoporosis screening and diagnostics. Bindex measures cortical thickness and determines parameter called density index (DI). Thresholds for DI in osteoporosis assessment have been determined in Finnish Caucasian population ($n=448$) along the International Society of Clinical Densitometry (ISCD) guidelines (2,3). In this study, these thresholds are tested in Finnish Caucasian female population. A total of 336 females were recruited from private primary healthcare centers (Suomen Terveystalo Ltd., Finland) to the study (age 64.0±7.22 years). Subjects were measured with DXA to determine BMD at proximal femur. Further, the cortical thickness was measured at three locations (distal radius, distal and proximal tibia) with Bindex. Subjects were diagnosed with osteoporosis when T-score at femoral neck or total proximal femur was below -2.5. DI was calculated either by using measurement at one location (DI₁, proximal tibia) or all three locations (DI₃). By using the diagnostic thresholds, subjects were classified as healthy, osteoporotic or in need of DXA examination to verify diagnosis. An average of 28 % of the patients would require additional axial DXA examination when using thresholds and triage approach with DI₁ and DI₃. The sensitivity and specificity for DI₃ was 91.4 and 85.4 %, respectively. For the DI₁, the sensitivity and specificity was 77.1 and 86.7 %, respectively. Osteoporosis at the hip was diagnosed in 35 subjects by DXA. In this study, preliminary findings suggest good performance of previously determined thresholds in the current population. More data is needed to verify findings, especially more osteoporotic patients need to be included in the study.

References: Nguyen TV, Med J Aust, 2004. Karjalainen JP, ASBMR, Baltimore, 2013. Hans, J Clin Densitom, 2008.

P635

FRACTURE LIAISON SERVICES IN THE UK: A SNAPSHOT OF SERVICE PROVISION AND THE DEVELOPMENT OF NATIONAL FLS STANDARDS

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Objective: Data on Fracture Liaison Services (FLS) is not centrally coordinated in the UK and national audits have not been carried out for several years^{i,ii}. An up to date snapshot of UK FLS provision was needed to inform the National Osteoporosis Society's (NOS) work planning; and to provide baseline data to evaluate the NOS's impact against its objective to have an FLS linked to every UK hospital that treats fragility fractures.

Method: Each member of the NOS's regional development team were interviewed about the services in their area and their responses were recorded for each hospital. Additional information was gained through desk based research and discussion with local health professionals where the regional team were unclear about services provided.

Results: A total of 174 localities were included in the analysis (13 specialist Trusts in England were identified as "not relevant" and were excluded). 44 % (76) of localities were recorded as having an FLS, compared with 42 % in published national auditsⁱⁱⁱ. A further 9 % (15) of localities were considered to have a 'partial' FLS.

Conclusions: The availability of FLS in the UK continues a very slow upward trend. However, there remain unanswered questions about characteristics and quality of services. This highlighted the urgent need for a clear definition of FLS against which services could be evaluated. In response, the NOS lead an authoring group to publish 'Effective Secondary Prevention of Fragility Fractures: Clinical Standards for Fracture Liaison Services' (available at www.nos.org.uk/our-publications) laying down the 10 standards that all UK FLS should meet. By adopting these standards, evidence-based best practice can be replicated effectively across the UK to reduce the burden of fractures.

Falling Standards, Broken Promises: Report of the national audit of falls and bones health in older people 2010. 2011 London: RCP ⁱⁱ Up and about or falling short: A report of the findings of a mapping of services for falls prevention and management and fracture prevention in older people in Scotland. 2012. Edinburgh: Scottish Gov

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PROXIMAL FEMORAL RESECTION-ARTHROPLASTY IN SEVERE CEREBRAL PALSY

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Objective: Our purpose is to present our experience as a single center about the treatment of painful hip in severe cerebral palsy.

Materials & Methods: We reviewed 7 patients (3 males, 4 females) with cerebral palsy and painful hip surgically treated in our hospital. The patients were operated on between 2003 and 2014, mean age was 35.5 years. In all cases a resection interposition arthroplasty, as previously described by Castle, was performed. Preoperative and postoperative evaluation, consisted in the analysis of data obtained from the evaluation of hip pain, perineal hygiene, hip range of motion. Postoperatively in all but one patient, a skin traction was performed. Patients were followed up through a clinical and radiographic evaluation. During the follow-up we searched for the presence of pain (described as the use and the frequency of analgesic pills per day and subjective assessments by the patients' families) and the presence of heterotopic ossification.

Results: All patients/caregivers noted an improvement in subjective assessment of pain. Hip range of motion and perineal hygiene consistently improved.

Conclusion: We believe that surgical decision is a critical factor. Resection should be as wide as possible, considering that a shorter one may lead to additional surgical procedure that could be dangerous and in any case ineffective.

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DEVELOPMENT OF A CLOUD-BASED APPLICATION FOR THE FRACTURE LIAISON SERVICE MODEL OF CARE

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The proven Fracture Liaison Service (FLS) model of care provides a unique opportunity to address the nearly 80 % post-fracture care gap while helping providers, practices and organizations transition to the new pay-for-performance models and federal mandates that tie payment and reimbursement more closely to the health of their patients. CECity, National Osteoporosis Foundation (NOF), and the National Bone Health Alliance (NBHA) are partnering with UPMC, MedStar Georgetown University and Creighton Alegant to launch a 15 month, Fracture Liaison Service (FLS) Demonstration Study through funding support by Merck & Co. to

implement the proven FLS model of post-fracture care coordination in the open system utilize CECity cloud-based MedConcert platform that will create a means for sites to automate, benchmark and improve their performance around selected osteoporosis/post-fracture quality measures and patient care and create a registry that can collect and report on each site. The MedConcert FLS platform, participating providers, practices and organizations will be able to utilize a secure social network to share best practices and connect in meaningful ways to address a variety of critical needs, including pay for performance, population health management, performance improvement, professional certification, patient experience and outcome surveys, care coordination, and much more. The suite of MedConcert FLS platform tools built with input from the sites includes:

Patient registry

Patient task tracker

Quality measure performance dashboard (which allows for real-time tracking of performance by site or in comparison with other sites and national averages)

Quality improvement tools, resources and interventions to drive performance change

Coordination of care application that allows all members of the care team, regardless of institution, to coordinate patient care and follow-up

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GREATER ACCESS TO FAST FOOD OUTLETS IS ASSOCIATED WITH POORER BONE HEALTH IN YOUNG CHILDREN

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Objective: Identifying factors that contribute to less optimal childhood bone health could lead to the development of strategies to improve long term bone health. An adequate intake of protein, calcium, vitamin D, fruits and vegetables, has a positive influence on bone health from before birth and during childhood. This study aimed to address a gap in the literature by examining the relationship between residential neighbourhood food environment and bone mass in infants and children.

Materials and methods: A total of 1107 children participating in the Southampton Women's Survey underwent measurement of bone mineral content (BMC) and BMD at birth, four and/or 6 years by DXA. Cross-sectional observational data collection of food outlets within Hampshire, United Kingdom was completed. There were three measures of the food environment: the count of supermarkets, healthy specialty stores and fast food outlets within the boundary of each participant's neighbourhood.

Results: Neighbourhood exposure to fast food outlets was significantly inversely associated with BMC at birth after adjustment for confounding variables ($\beta = -0.16$ (z-score): 95 %CI $-0.31, -0.01$), and remained robust after adjustment for bone area ($\beta = -0.17$ (z-score): 95 %CI $-0.32, -0.02$). Associations between fast food outlet exposure and bone measures at 4 or 6 years of age were not significant. However, increasing neighbourhood exposure to healthy specialty stores such as greengrocers was associated with higher BMC after adjustment for bone area at 4 and 6 years of age ($\beta = 0.17$ (z-score): 95 %CI 0.00, 0.33 and $\beta = 0.12$ (z-score): 95 %CI $-0.02, 0.25$ respectively).

Conclusion: These findings suggest that the exposure of mothers and children to less healthy food environments is negatively associated with bone development during early childhood. If confirmed in further populations and in different settings, action to improve food environment could have benefits for childhood health and development.

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SYMPTOMATIC EFFECT CRYSTALLINE GLUCOSAMINE SULFATE OSTEOARTHRITIS OF THE KNEE

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Treatment osteoarthritis of the knee means the application of slow acting drugs for osteoarthritis.

Aim: To evaluate the effectiveness of CGS (crystalline glucosamine sulfate).

Material and method: Open study was followed 111 patients with osteoarthritis of the knee. I group ($N=52$) used CKS (1, 5 g /day); II group were used Nonsteroidal anti-inflammatory drugs (ibuprofen 1.2 g/day or diclofenac-Na 75 mg/day). With increased pain in patients of the first groups was allowed to use acetaminophen (max. 3 g/day). Used analgesics were not allowed 1 week before control. Control was after 1 month. Efficacy was estimated by Lequesne index. Exclusion criteria: trauma, inflammatory joint disease, used of corticosteroid drugs at least 3 months prior the initiation of therapy.

Results: Age were similar (59.4 ± 6.71 ; 61.44 ± 5.07); frequent women. Only 30 % patients of I group used acetaminophen. After treatment in all patients we registered reduction of symptoms, followed by Lequesne index ($p < 0.01$) with no statistically difference between groups ($U = 1699, p > 0.05$)

Conclusion: CGS reduce symptoms osteoarthritis of the knee.

Reference: 1. Filipović K et al., Osteoporosis Int 2014;5:265.

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THE EVALUATION OF TRUNK MUSCLE STRENGTH AND QUALITY OF LIFE AFTER TWO DIFFERENT INGUINAL HERNIA REPAIR TECHNIQUES: CONTROLLED TRIAL

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Inguinal hernia repair is one of the most common surgical procedures in the world and a kind of successful surgery with a minimum of postoperative sequel, followed by a few weeks convalescence and no long-term complications. Choice of repair method for inguinal hernia remains controversial. The decision of which technique to use in a surgical application lies with the surgeon based on patient profile and previous surgical history. The Lichtenstein tension-free hernioplasty is currently one of the most popular techniques for repair of inguinal hernias. Also Kugel described a pre-peritoneal tension-free technique that aimed to combine the utility of the open operation with advantages of minimal access procedures. Lichtenstein and Kugel methods were compared in immediate and long-term outcomes in previous studies. Recurrence rates and chronic groin pain currently represents the most important endpoint in those two different hernia surgeries. But weakened trunk muscle strength and reduced quality of life are the important parameters which closely related patient satisfaction. The aim of the present study is to compare of trunk muscle strength and quality of life after Lichtenstein and Kugel methods.

Material and Methods: From 2013 to 2014, 40 consecutive patients underwent inguinal hernia repair, 20 using a standard Lichtenstein repair and 20 with a Kugel patch included to the study. Forty healthy voluntary participants constituted the control group, and this group was similar to other study groups in terms of gender, age, and BMI. Inclusion criteria: Signed written informed consent; Male gender; Patients aged 18–65 years old; Had surgery only once; Patients within 6 months to postoperative first year; Ability to speak, read, and write Turkish. Exclusion criteria: Infections or tumors of the spine; Systemic bone or joint disorders (e.g., rheumatoid arthritis); Unstable cardiovascular and pulmonary diseases; Polyneuropathies and musculoskeletal system diseases; Presence of a diagnosed serious psychiatric disorder; Presence of severe pain; Regular exercise habit; Recurrent operation for hernia; If the calculated BMI is lower than 20 kg/cm² or over than 35 kg/cm². Procedure: One physician (AYK) conducted the evaluation. He was blinded to the method of surgery. The

patients were evaluated with the following parameters: Trunk muscle strength measurement using the Biodex System 3Pro Multi-joint System Isokinetic (Biodex Medical Inc., Shirley, NY, USA) dynamometer was performed by the physician (AYK). Isokinetic outcome parameters: Peak torque (PT) and PT-based agonist/antagonist ratios were used to reveal strength imbalances. Short Form 36; The most frequently used quality of life scale in the medical field is composed of 8 subscales including 36 items which evaluate the physical and mental health.

Results: The mean peak torques (Nm) for trunk flexion and flexion/extension ratios were significantly lower in the both of Lichtenstein group and Kugel group were compared to the control group. There were no significant differences in the trunk muscle strength and quality of life parameters between the two surgery groups ($p < 0.05$).

Conclusion: According to our results there are no significant differences in terms of trunk muscle strength and quality of life parameters between Lichtenstein and Kugel methods. Although trunk flexion strength and agonist/antagonist ratios were significantly lower in both surgery groups. After recovery from surgery, it is important to strengthen your abdominal muscles with exercises. Otherwise, the relationship between reduced trunk flexion strength and recurrence ratios after surgery must be investigated in further studies.

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PHYSICAL THERAPY REDUCES PAIN IN PATIENTS WITH PATELLOFEMORAL ARTHRITIS

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Patellofemoral arthritis (PFA) is relatively common condition. Main symptom is knee pain during prolonged sitting, squatting, ascending or descending stairs.

Objective: The objective of this study was to evaluate the effect of 3 weeks of intensive kinesitherapy in combination with interferential current (IC) and pulse electromagnetic field (PEMF) therapy on pain in patients with PFA.

Methods: The study included 30 patients with unilateral PFA, 19 women and 11 men, with mean age of 51.35±6.72 years and mean body mass index of 26.2 kg/m². Each patient was treated with intensive stretching and strengthening exercises of all the musculature of the affected leg in combination with IC and PEMF therapy for 3 weeks at outpatient department of our clinic between 2011 and 2012. Patients were not allowed to use acetaminophen or NSAIDs, or intraarticular injection of glucocorticoids or during these 3 weeks. In each patient pain was evaluated before and after treatment as the worst pain during last week. Intensity of pain was recorded by use of VAS.

Results: After 3 weeks of treatment we noted significant improvement in knee pain. The mean pain improved from 6.33 ± 1.07 to 4.43 ± 0.5 ($p < 0.05$).

Conclusion: Intensive exercises in combination with IC and PEMF therapy significantly reduced pain in PFA patients.

References: Hunter DJ et al., *Osteoarthritis Cartilage* 2011;19:792.

P642

SCLEROSTIN ANTIBODY IMPROVES VERTEBRAE PARAMETERS IN MURINE MODEL OF SEVERE OSTEOGENESIS IMPERFECTA

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Objective: In children with severe type III osteogenesis imperfecta (OI), the poor bone quality is associated with a high rate of fractures at cortical and trabecular sites. A sclerostin neutralizing monoclonal antibody (Scl-Ab) markedly reduced the rate of long bone fractures by improving cortical bone mass and strength in oim/oim mice, a well established model of type III OI. Therefore, we used the same murine model to assess the effects of Scl-Ab on of trabecular bone parameters of the axial skeleton, namely fracture rate, BMD and microarchitecture.

Material and Methods: Wildtype (WT) and OI mice (4-week-old) received either Scl-Ab at 25 mg/kg or vehicle (PBS) twice a week for 10 weeks. Mammography X-ray detected fractures. pQCT measured BMD and cross-sectional area (CSA) of lumbar vertebral bodies (LVB). μ CT (Skyscan 1172) assessed parameters trabecular bone architecture of LVB. These parameters included BMD, bone volume (BV/TV), trabecular (Tb) thickness (Tb Th), Tb number (Tb. N) and Tb bone pattern factor (Tb.Pf; the lower values, the better connection).

Results: We only detected fractures in the pelvis of OI mice. Scl-Ab reduced the number of pelvic fractures by 65 % (0.4 ± 0.5 vs. 1.1 ± 0.8 per mouse; $p < 0.02$). This effect corresponded with significant improvements ($p < 0.01$) in LVB trabecular bone parameters after Scl-Ab treatment including: BMD (+55 %; 541 ± 23 vs. 350 ± 41 in PBS group), BV/TV (+111 %; 20.9 ± 2.5 vs. 9.9 ± 4.9 in PBS group), Tb Th (+40 %; 0.07 ± 0.003 vs. 0.05 ± 0.005 in PBS group), Tb N (+48 %; 3.1 ± 0.3 vs. 2.1 ± 0.9 in PBS group) and Tb Pf (-43 %; 2.6 ± 2.2 vs. 22.2 ± 6.1 in PBS group). In WT mice Scl-Ab therapy was also associated with significant improvements in BMD (+74 %; 789 ± 59 vs. 454 ± 68 in PBS group), BV/TV (+160 %;

38.7 ± 8.8 vs. 14.9 ± 3.6 in PBS group), Tb.Th (+33 %; 0.08 ± 0.007 vs. 0.06 ± 0.002 in PBS group), Tb.N (+96 %; 5.1 ± 0.8 vs. 2.6 ± 0.6 in PBS group) and Tb.Pf (-94 %; 0.7 ± 5.7 vs. 12.8 ± 2.9 in PBS group). Scl-Ab therapy significantly decreased the structure model index in WT mice (0.5 ± 0.5 vs. 1.5 ± 2 in PBS group) but not OI mice (1.6 ± 0.1 vs. 1.8 ± 0.3 in PBS group).

Conclusion: The increased bone mass and connectivity of the lumbar vertebral trabecular network with Scl-Ab treatment might contribute to the reduction in the rate of fractures of the axial skeleton in OI mice. Therefore, Scl-Ab might be a promising therapy for human type III OI.

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NATIONAL BONE HEALTH ALLIANCE: A MULTISECTOR PUBLIC-PRIVATE PARTNERSHIP WORKING TOGETHER TO IMPROVE AMERICA'S BONE HEALTH

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The National Bone Health Alliance (www.nbha.org) is a public-private partnership launched in late 2010 that brings together the expertise and resources of its members to collectively promote bone health and prevent disease; improve diagnosis and treatment of bone disease; and enhance bone research, surveillance and evaluation. NBHA currently includes 56 participating organizations (35 nonprofit member organizations, 17 member companies and liaisons representing CDC, FDA, NASA and NIH). The concept for NBHA stems from the 2004 Bone Health and Osteoporosis: A Report of the Surgeon General and the June 2008 Summit for a National Action Plan for Bone Health. NBHA's "20/20 vision" is to reduce the incidence of hip and other bone breaks 20 % by the year 2020. NBHA provides a platform for its collective voice to weigh in on subjects important to bone health, particularly vitamin D, calcium, BMD reimbursement and utilization and the risks and benefits of the use of bone health therapies; communication among organizations interested in bone health; shared priorities to become reality through pooled funding; and working together towards the goals and recommendations of the National Action Plan. Activities for 2015 include: Fracture Prevention CENTRAL (www.FracturePreventionCENTRAL.org) provides tools to health professionals, health insurers, hospitals and other sites interested in implementing this model of care. Bone Turnover Marker Standardization Project: NBHA is leading the effort to standardize U.S. bone marker sample collection procedures, establish a U.S. reference range for one bone formation and one bone resorption marker and standardize bone turnover marker

assays. FLS Demonstration Study: The Bone Health Collaborative has launched a cloud-based study that will provide study sites with the FLS model of care and a cloud-based platform, to assess adoption and implementation of a Fracture Liaison Service. 2Million2Many Public and Health Professional Awareness Campaign educates about the 2 million bone breaks in the U.S. each year that are not accidents but signs of osteoporosis.

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CORRELATION OF BONE MASS VARIATION WITH PHYSICAL THERAPY IN PATIENTS WITH QUADRIPLEGIA

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Decreased bone density is a common complication in patients with spinal cord injury is caused by prolonged bed rest after trauma, lack of muscle activity on muscles, impaired calcium absorption and increased calcium excretion.

Aim: To track the correlation between time of onset of the disease and bone loss, benefits of physical therapy association with mobilization performed using standard web Lokomat (robotic orthosis, which makes correct physiological movement, repeated).

Material and Methods: We have introduced a batch of 40 study patients with quadriplegia, respectively spastic paraplegia, which were divided into 2 groups, namely a group of 18 patients who received standard treatment and a group of 22 patients who received associate Lokomat therapy. Bone density was determined by DXA method and functional score, FIM scale. Patients were assessed at study entry and at 1 year.

Results: The mean age of patients included in the study is 32.28 years, 70 % of them aged between 21 and 40 years. One fifth of these lesions showed complete clinical quadriplegia, the rest paraplegics patients with different lesion levels. Duration of the appearance of the lesion was between 2 and 4 years, with an average duration of 2.62 years. TVM etiology in patients evaluated was 65 % accident, falling 17.5 and 12.5 % jump in the water. Of the two groups of patients evaluated, BDM was decreased in 1 patient, as T-score of -2.5 and 7 patients had T-score of between -1.1 and -2.5, and so the first review and to a year.

Conclusion: Being young patients, decreased muscle activity by prolonged rest and hereby functional deficit will promote

decreased BMD, but standard therapy therapist and the robotic orthoses will slow bone loss.

P645

SEVERITY AND PATTERN OF BONE MINERAL LOSS IN ENDOCRINE CAUSES OF SECONDARY OSTEOPOROSIS (GRAVE'S DISEASE, TURNER'S SYNDROME, HYPOGONADOTROPIC HYPOGONADISM AND TYPE-1 DIABETES) AS COMPARED TO POSTMENOPAUSAL OSTEOPOROSIS: EXPERIENCE FROM A TERTIARY CARE CENTER

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Bone health assessment is neglected in endocrine causes of bone mineral loss, with scant data available. This study aimed to evaluate severity and pattern of bone mineral loss in endocrine causes of secondary osteoporosis [Grave's disease (GD), Turner's syndrome (TS), hypogonadotropic hypogonadism (HH) and type 1 diabetes (T1D)] as compared to postmenopausal osteoporosis (PMO), in adult females >30 years age.

Methods: Review of records of Bone and Metabolism Clinic of the department was done till September 2014. Data on anthropometry, calcium metabolism and BMD were collected.

Results: Data from adult females with complete records [GD ($n=25$), TS ($n=6$), HH ($n=12$) and T1D ($n=15$)] were analyzed and compared with data from 47 females with PMO. Mean age of patients in different groups were 46.77 ± 11.73 (GD), 36.1 ± 3.22 (TS), 32.83 ± 3.06 (HH), 33.0 ± 3.30 (T1D) and 61.56 ± 9.59 (PMO) years respectively. Total radius Z-scores were significantly lower in GD (-2.12 ± 0.76 ; BMD: 0.50 ± 0.11 g/cm²), TS (-2.34 ± 0.47 ; BMD: 0.45 ± 0.12 g/cm²), HH (-2 ± 1.23 ; BMD: 0.52 ± 0.09 g/cm²), and T1D (-2.29 ± 1.05 ; BMD: 0.45 ± 0.09 g/cm²) as compared to PMO (-1.71 ± 1.6 ; BMD: 0.45 ± 0.21 kg/m²). Lumbar spine (L₁-L₄) Z-scores were significantly lower in GD (-1.6 ± 1.84 ; BMD: 0.81 ± 0.26 g/cm²), TS (-2.65 ± 0.98 ; BMD: 0.74 ± 0.11 g/cm²), HH (-2.7 ± 0.73 ; BMD: 0.75 ± 0.14 g/cm²), and T1D (-3.0 ± 0.89 ; BMD: 0.73 ± 0.14 g/cm²;) as compared to PMO (-1.13 ± 1.27 ; BMD: 0.80 ± 0.15 g/cm²). Total hip Z-scores were significantly lower in GD (-0.72 ± 0.39 ; BMD: 0.80 ± 0.20 g/cm²), TS (-1.6 ± 0.38 ; BMD: 0.79 ± 0.13 g/cm²), HH (-1.06 ± 0.92 ; BMD: 0.84 ± 0.11 g/cm²), and T1D (-2.41 ± 1.01 ; BMD: 0.75 ± 0.14 g/cm²) as compared to PMO (-0.39 ± 0.48 ; BMD: 0.79 ± 0.19 kg/m²). Vitamin D and PTH levels were comparable across groups.

Conclusion: GD, TS, HH and T1DM in adult females were associated with significant bone loss when compared with PMO. Bone loss was most severe at wrist

followed by spine and hip across groups and may contribute to significant morbidity.

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RELATIVE CONTRIBUTION OF OSTEOARTHRITIS (OA) AND OSTEOPOROSIS ON NEED FOR MAJOR HIP AND KNEE SURGERY IN RHEUMATOID ARTHRITIS (RA): RESULTS FROM TWO UK INCEPTION COHORTS COVERING 1986–2012

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Objective: The inflammatory process is known to cause structural joint damage in RA and can eventually result in major surgery, a common and significant burden to both patients and health services. This prospective study examined clinical features and comorbidity in patients undergoing major hip and knee joint surgery to determine the extent to which primary and/or secondary degenerative pathology and osteoporosis contribute to this complication of RA.

Materials & Methods: Two UK inception cohorts recruited 2701 DMARD naïve patients from 1986 to 2012; the Early RA Study (ERAS, 9 centres, 1986–1998, $n=1465$), and the Early RA Network (ERAN, 23 centres, 2002–2012, $n=1236$). Standard clinical, laboratory and radiological measures were performed yearly (maximum 25 and 10 years, median 10 and 4 years, respectively). Treatment followed guidelines of the era, mainly conventional DMARDs±steroids, latterly biologics. Major comorbidities were recorded (ICD10 classification), diagnosis of OA based on standard clinical judgment and x-rays. The National Joint Registry and Hospital Episode Statistics (HES) provided data matched on NHS number on 1602 orthopaedic procedures in 711 patients (25-year cumulative incidence 26 %).

Results: 230 patients had major hip surgery; 13 total hip replacements (THR) ascertained for primary OA, 5 THR, 49 dynamic hip screw (DHS) for osteoporotic hip fracture, 163 THR for RA (4 with preoperative secondary OA hip, 38 diagnosed with OA elsewhere). 195 had major knee surgery; 18 total knee replacements

(TKR) for primary OA, 177 TKR for RA (19 with secondary OA knee, 47 diagnosed with OA elsewhere). There were no significant differences in baseline clinical features (rheumatoid factor, erosions, ESR, haemoglobin, DAS, HAQ, BMI) between surgery for RA compared to any OA and fracture groups. Including/excluding these did not affect predictive analyses. However, THR and TKR for OA was related to older age (mean age 64 vs. 58 and 64 vs. 56, $p<0.01$) & men (M:F 9 %:5 %, 12 %:8 %, respectively). DHS was seen more in older women (mean 77 years, $p<0.001$).

Conclusion: Assessing primary or secondary OA on need for surgery in RA is not always possible. A small proportion have major surgery mainly for OA and hip fracture, but this has little effect on overall predictive analyses.

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THE USE OF NECK BMD IN THE FRAX[®] ALGORITHMS DOES NOT ENHANCE THE PREDICTION ON THE 10-YEAR OF ABSOLUTE RISK IN MEXICAN POPULATION

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Purpose: FRAX[®] algorithm was designed to identify subjects at high risk of fracture for any skeletal site with or without BMD. This last measurement can be used to enhance precision in the calculations.

Methods: 405 men 413 women and women 50 years and over from the Latin American Vertebral Fracture Study (LAVOS) and the Mexican Vertebral Fracture Study in men were included in this analysis. Clinical history with conventional risk factors, plain x rays from thoracic and lumbar spine from hip and spine, and DXA scan and were obtained in all cases. Probabilities of mayor fractures and hip fractures were estimated with and without the femoral neck DMO with FRAX models for Mexican population. Medians scores were used for each category, and Mann–Whitney U were used to test statistical significance. The analysis was blinded to the presence of vertebral fractures in the sample.

Results: A total of 818 subjects were included in the analysis, mean age for men were 68.99 ± 11.64 and

69.55±11.87 for women. A total of 40 morphometric vertebral fractures were accounted in men and 78 in women. Probabilities for mayor and hip fractures with or without neck BMD were higher women. In men, probabilities for mayor and hip fractures were higher in the group with vertebral fractures and without the femoral neck DMO (5.60 vs. 4.10 and 3.10 vs. 1.40, respectively, p 0.001) When femoral neck DMO was added, significance were lost and probabilities dropped down. In women, probabilities for mayor and hip fracture were significantly different in the group of vertebral fractures vs. nonvertebral fractures without femoral neck DMO (11 vs. 7 and 4.70 vs. 1.70, p 0.001) when femoral neck DMO was added the estimates remained significant.

Conclusion: FRAX calculations in the sample were higher in women than in men for both, for mayor and hip fractures (p 0.001). FRAX calculations were higher in the groups of vertebral fractures in men and women using clinical risk factors. In women adding neck BMD resulted in statistical differences between the groups, however when neck BMD was added in the group of men, difference dropout and significance disappear. Apparently, adding neck DMO in men calculations, does not seem to offer a better precision in men.

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EVOLUTION OF COMPLICATIONS IN PATIENTS PARAPLEGICS

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Paraplegia occurs after the intervention of an injury to the spinal cord below the level of T2. It is manifested by motor deficit in the lower limbs, but also by a number of complications associated underlying disease.

Aim: To trace the evolution of complications in patients with spastic paraplegia occurred over a period of a year, the benefits of physical therapy association with mobilization performed using standard Lokomat's.

Material and methods: We have introduced a batch of 32 study patients spastic paraplegia, evaluate Rehabilitation Hospital Felix, which I divided into two groups. Group I followed the standard treatment, and the second followed therapy with robotic orthosis. Complications

were assessed: disreflexia vegetative bedsores, fracture, orthostatic hypotension, urinary infection, osteoporosis, spasticity, thrombophlebitis.

Results: The mean age of patients included in the study is 32.28 years, 70 % of them aged between 21 and 40 years. In both groups disappeared complications in 10.0 % of patients without complications increased from 22.5 to 32.5 % in group 25.0 % BFT and 35.0 % in group BFT + Lokomat. Spasticity was present at baseline in 32.5 % of patients and 37.5 % BFT lot to those of group BFT + Lokomat. In the final evaluation, spasticity disappeared from 5.0 % of patients in group BFT and 7.5 % of patients lot BFT + Lokomat. Pressure disappeared in 7.5 % of patients in group BFT and 5.0 % of patients in group BFT + Lokomat.

Conclusion: No significant differences in terms of development of complications between the two groups ($p=0.541$).

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THE IMPACT OF ARTHRITIS ON QUALITY OF LIFE IN PATIENTS WITH OSTEOARTHRITIS AND COXITA

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Aim: To assess the impact of arthritis on quality of life in patients with osteoarthritis and coxita.

Material and method: We evaluated two groups of patients, recruited from ambulatory specialty, divided as follows: group I patients with osteoarthritis and 144 s group of 42 patients with coxita the period of 1 year. We evaluated the impact of arthritis on quality of life using the AIMS score areas: physical (Sections: mobility, walking and bending, hand and finger function, arm function, everyday life, housework), functional (sections: social life and support of the family), pain, and mental work, at baseline and 1 year. Data processing was performed with ANOVA. If F calculated is greater than the critical F (or confidence threshold calculated, $P\leq 0.05$), we reject the null hypothesis, we accept the alternative hypothesis, and say that the two groups are statistically significant difference.

Results: We find no differences between the two groups on functional areas and work, but differ significantly on the pain, physically and mentally, results that are maintained and the second evaluation after 1 year.

Conclusion: Coxarthrosis affects less than coxita patient quality of life.

P650**OSTEOPOROSIS IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS**

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Systemic lupus erythematosus (SLE) is a chronic autoimmune disease, associated with inflammation and multi-systemic organ damage, including osteoporosis. The increase risk of low BMD in these patients is, in part, due to disease related factors and therapy.

Objective: to assess BMD in a cohort of SLE patients and establish the factors related to the presence of osteoporosis.

Material and methods: We included 25 patients with SLE and a group of 21 controls with similar demographic characteristics. Osteoporosis was assessed measuring BMD both in lumbar spine and total hip, by DXA. Disease activity was evaluated using SLEDAI score.

Results: We included 25 patients with SLE, 5 men and 20 women, with a mean age of 43.41+11.04 years, a mean disease duration of 8.364+6.21 years and a mean SLEDAI 7.560+3.48. All patients receive different doses of glucocorticoids, daily. The mean BMD in lumbar spine was -1.282+1.31 and for the total hip -1.21+1.34. In the control group, we measured a mean BMD of 1.09+0.91 for lumbar site and 0.98+1.03 for total hip. Osteoporosis was present in 9 (36 %) of the SLE patients, osteopenia in 10 (40 %) and normal BMD in 24 % (6) of the cases. In the control group osteoporosis was found in 7 (33.3 %) patients, osteopenia in 5 (23.80 %) and normal BMI in 9 (42.85 %). Analysis of the risk for SLE patients to develop osteoporosis, showed a relative risk of 5.5. In the SLE group, for the 9 patients with osteoporosis, the mean SLEDAI was 8.222+2.58 vs. 7.67+2.21 in the group with osteopenia, $p=0.004$, the mean disease duration 9.21+5.91 vs. 8.23+4.55, $p=0.01$, the mean age 44.21+10.02 vs. 43.09+10.01, $p=0.001$. Analysis of correlation between BMI and variables of the patients, found a negative, moderate correlation between lumbar BMD and SLEDAI ($r=-0.5068$, $p=0.0097$) and between total hip BMD and SLEDAI ($r=-0.4864$, $p=0.013$). The dose of glucocorticoids correlated negative both with lumbar BMI ($r=-0.483$, $p=0.014$) and total hip BMI ($r=-0.463$, $p=0.029$). **Conclusion:** Osteoporosis was present in a high percentage in our SLE cohort, related to disease activity, glucocorticoid use and disease duration. Therefore, assessing BMD in SLE patients should be done periodically, in order to apply early the specific treatment and prevent the fragility fractures.

P651**AGE-RELATED CHANGES OF THIGH MUSCLE FAT INFILTRATION IN SUBJECTS OF THE OAI MRI COHORT WITH AND WITHOUT RADIOGRAPHIC OSTEOARTHRITIS**

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Objective: Similar to age-related sarcopenia, increasing age is a known risk factor for knee osteoarthritis (OA), which results in increased muscle weakness and decreased mobility. Inter- (inter-MAT) and intra- muscular adipose tissue (intra-MAT) and thigh reflect adverse metabolic effects and muscle function.

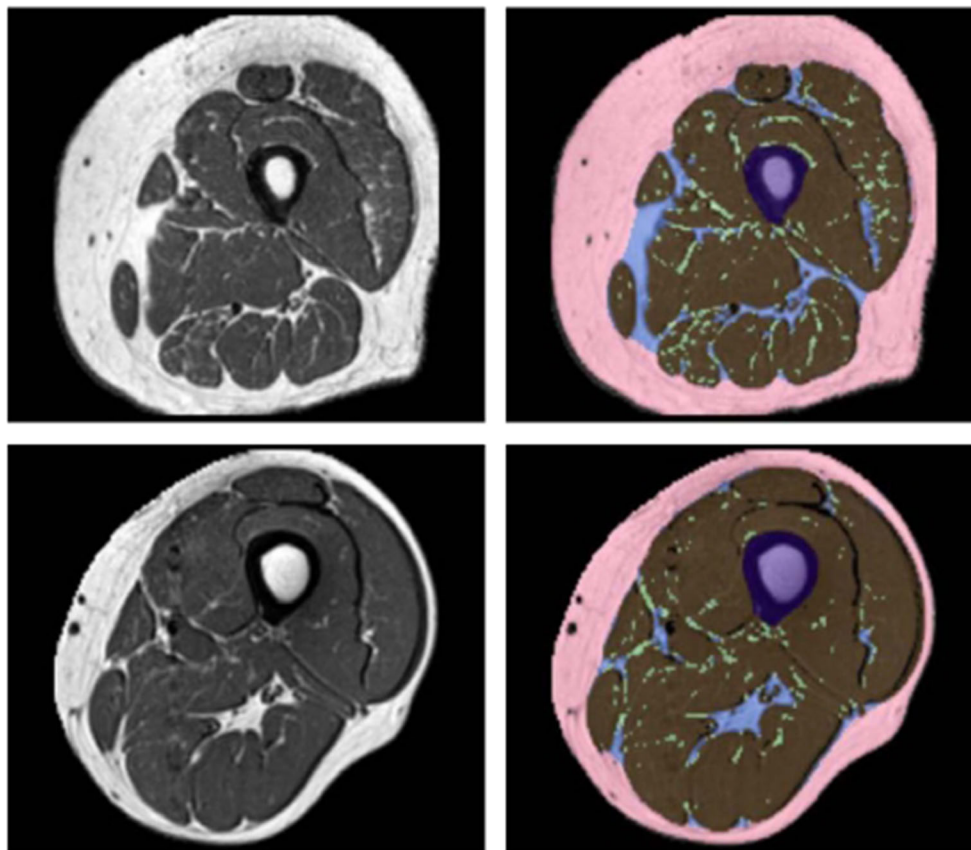
Materials and Methods: Midthigh axial T1-weighted MRIs (15 contiguous slices, 5 mm slice thickness) of control (CN) and OA subjects with the bilateral KLG scores (CN: $KLG \leq 1$; OA: $KLG \geq 2$) were extracted from the OAI database at baseline. Out of 4,796 participants, 165 CN subjects (55 male, 110 female; age: 45–77) and 126 OA subjects (52 male, 74 female; age: 45–78) were identified. The left leg of each subject was analyzed with an automatic quantification technique including 5 major steps: intensity inhomogeneity correction; subcutaneous adipose tissue (SAT) removal; tissue labeling of bone, marrow, fat and muscle; inter- and intra-MAT classification; tissue assessment. All results were visually inspected for segmentation errors. Volume was calculated for total thigh muscle, and inter- and intra-MAT. Each variable was normalized to subject's BMI. Correlations with age and age-related gender differences were examined.

Results: The inverse correlation between age and normalized total muscle volume was statistically significant in all subjects (CN: $r=0.27$, $p=0.0017$; OA: $r=0.32$, $p=0.00068$). The decrease of total muscle volume per age decade (CN: 5.91 %; OA: 6.47 %), was accompanied by per decade increase of muscle fatty infiltration (total of inter and intra-MAT normalized by total muscle and MAT) of 6.90 % (CN) and 8.35 % (OA). Normalized muscle fatty infiltration was more pronounced in women (CN: 15–17 %, OA: 16–19 %) than in men (CN: 11–15 %, OA: 14–17 %), with similar age-related changes for both gender.

Conclusion: The proposed framework provides an automated approach for quantitative thigh tissue assessment in T1 weighted MRI images. Age-related muscle volume decrease were observed in all subjects with larger muscular fatty infiltration in OA subjects and in women. Ongoing development efforts include comparison to manual segmentation, enhancement of clustering and contouring accuracy and precision for fatty infiltration. It will also be of interest to assess individual muscles separately.

Fig: Examples of Tissue Classification. Original T1 weighted MRI (left) and multilabeled segmentation results (right) of subcutaneous fat (red), muscle (brown),

inter-MAT (blue), intra-MAT (green) and bone and marrow (purple). Top: axial slice from female, age: 71; bottom: male, Age: 48.



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COMPARISON BETWEEN NORMATIVE SPINE TBS WOMEN DATA IN MEXICO (LAVOS MEXICAN COHORT) AND IN FRANCE

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Analyzing the Mexican part of the LAVOS Cohort and the Mexican men vertebral fracture study, we have investigated the difference between age related changes of the lumbar vertebrae micro-architecture in women and men assessed by TBS and compared them with French reference data.

Methods: Subjects in the study were Mexican women (LAVOS, Mexican centers) aged 50 and older with a BMD Z-score at spine L1-L4 within $\pm 2SD$. Individuals were excluded if they had fractures or were on any osteoporosis treatment and/or had any illness that would be expected to impact bone metabolism. All data have been obtained from Prodigy DXA devices (GE-Lunar, Madison, WI, USA). aBMD and TBS (TBS iNsight v2.1, Med-Imaps, France) were evaluated at spine L1-L4 and at for all vertebrae combination including at least 2 vertebrae. European reference data used for the comparison are those included in TBS iNsight v2.1 (Dufour et al., OI 2013).

Results: A database of 339 women aged 50 to 90 years was created. TBS values at lumbar spine were not correlated with BMI ($r^2 < 0.1$). TBS values obtained for at lumbar spine decreased significantly with age. There was a linear decline of 17 % ($-2.7 SD$) in the microarchitectural texture at L1-L4 between 50 and 90 years of age in women. Similar results were obtained for other ROIs of the lumbar spine. When compared to European data, similar decrease were obtained

considering the same age range 16 % ($-2.3SD$) vs. 17 % ($-2.7SD$) without significant differences between trends ($p=0.3$). At 50 years, Mexican women have slightly higher TBS value than European women (1.391 vs. 1.363, respectively). However, this difference (0.028) can be considered as nonsignificant because it is of the same order as the precision usually observed in Prodigy device ($RMS-SD\sim 0.02$).

Conclusion: A TBS bone microarchitectural texture impairment with ageing has been observed in Mexican women which is similar to the one observed in French women. This result suggests that it might be possible to use a unique TBS reference dataset for women. These assumption has to be confirmed considering results in multiple ethnicity data sets.

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FIBROMYALGIA IN PATIENTS WITH THYROID DYSFUNCTION AND RELATIONSHIP WITH DISEASE ACTIVITY

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Aim: Fibromyalgia (FM) is a syndrome characterized by chronic widespread musculoskeletal pain and generalized tender points. We aim to investigate the frequency of FM in patients with autoimmune thyroiditis and Hashimoto thyroiditis. Also, we evaluated clinical differences between groups.

Methods: 79 patients with autoimmune thyroiditis, 114 patients with Hashimoto thyroiditis and 35 controls were recruited to our study. We recorded the demographic parameters, clinic parameters and laboratory findings. We assessed the disease activity with fibromyalgia impact questionnaire (FIQ).

Results: 49 patients with autoimmune thyroiditis were met the FM criteria (62 %). The positivity of thyroid peroxidase (TPO) was high in group with FM ($P=0.002$). The patients with FM in group with autoimmune thyroiditis had low level of education degree ($p=0.004$). Headache, balance problems, dyspeptic close to fatigue, paresthesia and morning stiffness was statistically significantly higher in this group. 84 patients with Hashimoto thyroiditis met the FM criteria (73.6 %). The positivity of TPO was high

in group with FM ($P<0.001$). Headache, arthralgia, paresthesia and morning stiffness was statistically significantly higher in this group.

Conclusion: In our study, we investigate the FM more frequent in patients with autoimmune thyroiditis and Hashimoto thyroiditis compared to the controls. Also, we found that FM more frequent in patients with Hashimoto Thyroiditis than group with autoimmune thyroiditis. We observed that FM was more severe in group autoimmune thyroiditis because of high levels of FIQ. Somatic complaints were frequent inpatients with FM in either Hashimoto thyroiditis or autoimmune thyroiditis group. it was remarkable that TPO positivity was more frequently in patients with fibromyalgia. Further controlled studies were needed to investigate the thyroid dysfunction and relationship with FM.

P654

FEAR OF FALLING AND ASSOCIATED FACTORS: CAN A CNS LED CARE PACKAGE REDUCE FEAR OF FALLING POST HIP FRACTURE IN OLDER ADULTS?

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Objective: To assess if a Nurse-led care package, incorporating early access to a bone health clinic at 3 months and involving a multidisciplinary approach to falls risk and bone health, improved hip fracture outcomes in elderly persons over the course of 1 year including fear of falling (FoF).

Method: A RCT was carried out on hip fractures patients attending the study site between 2008 and 2010. FoF was measured by the Falls Efficacy Scale-International (FES-I) and a comparison between Intervention group (IG) and control group (CG) at 15 months.

Results: $n=226$ patients. At 3 months post fracture 50 %, of IG reported severe and 27 % moderate FoF. This reduced to 17 and 27 % respectively at 15 months ($p=0.025$). A significant difference was identified at 15 months between the IG and CG, with CG reporting greater FoF, ($p=0.002$). FoF was associated with increased age ($p=0.001$); female gender ($p=0.047$); reduced mobility ($p=0.005$); reduced Amended Barthel Score ($p=0.001$); increased anxiety ($p=0.001$) and increased depression ($p=0.001$). It was also associated with reduced ability to self care in each of the domains of the Nottingham Activities of Daily Living, Kitchen ($p=0.025$); Domestic Tasks ($p=0.028$) and Leisure activities ($p=0.025$).

Conclusion: FoF is common after a hip fracture and is detrimental to rehabilitation outcomes resulting in reduced mobility, increased dependency, institutionalisation and increased mortality. The intervention group had less FoF than controls at 15 months indicating that a nurse-led care package for hip fracture patients can improve FoF.

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P655

EFFECT OF LIFESTYLE INTERVENTION ON BONE MINERAL DENSITY AND BODY COMPOSITION IN WOMEN WITH POLYCYSTIC OVARIAN SYNDROME

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Polycystic ovary syndrome (PCOS) is one of the most common disorders in reproductive-aged women and is characterized by oligo- or anovulation, clinical or biochemical hyperandrogenism and polycystic ovarian morphology. Obesity is frequently present in patients with PCOS and plays an important role in the pathogenesis of the metabolic, endocrine, and reproductive abnormalities associated with this syndrome. PCOS is a complex disorder and various features of this disorder may have an influence on bone metabolism. Lifestyle changes, including diet, exercise, and behavioural modification, appear to improve the metabolic and reproductive abnormalities of overweight and obese patients with PCOS. Therefore, lifestyle changes appear to represent the first-line management for all overweight and obese patients with PCOS.

Materials and methods: Ten women with PCOS were age- and weight-matched to 10 controls. All women had DXA for lean, fat and bone mass, and BMD. Serum testosterone, sex hormone-binding globulin, LH, FSH, TSH, insulin, and glucose determined, free testosterone was calculated baseline and after 2 years of lifestyle (diet and exercise) intervention (LSM). Differences between the groups were analysed by Student's t-test. Correlation analysis was also performed between the measured parameters in both groups.

Results: In PCOS, trunk and arms fat mass were higher than in controls (6544 vs. 5956 g, $p=0.04$; 22 124 vs. 17 786 g, $p=0.04$). Both trunk ($r=0.505$, $p<0.05$) and arms fat mass ($r=0.478$, $p<0.01$) correlated with serum free testosterone in the PCOS patients, but not among controls. Control women had higher BMD in the lumbar spine (L2-L4) than patients with PCOS (1.12 g/cm² vs. 0.956 g/cm², $p=0.05$), but we found no statistically significant differences in the femoral neck density (0.984 g/cm² vs. 0.945 g/cm²). In the patients with PCOS, BMD were negatively correlated with insulin concentration ($R=-0.478$, $p<0.01$). In this study LSM therapy resulted in significant decrease in BMI, insulin, LH and testosterone in the PCOS group. There was a significant decrease

trunk and arms fat mass, but BMD parameters did not change significantly in the PCOS patients and among controls. Conclusion: Lifestyle changes exert beneficial effects on the endocrine abnormalities of obese patients with PCOS and improve metabolic parameters.

P656

A CASE REPORT OF TRADITIONAL CHINESE MEDICINE IN TREATING SARCOPENIA

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Objective: Sarcopenia is the degenerative loss of muscle mass, quality and strength. This disease decrease the life quality of aging and still no medicines are approved in treating sarcopenia currently. However, in traditional Chinese medicine, some supplementing and blood-quickening stasis-transforming formula could treat sarcopenia. We will therefore present a case with sarcopenia getting effective report by using this treatment.

Material and Methods: The case to be reported here involved a 84 year-old man who was left femoral neck fracture in May 27, 2013. Due to leg weakness, pain during walking, and low gait speed, he visited our traditional Chinese medicine clinic and received supplementing and blood-quickening stasis-transforming formula 5 g three times a day since August 23, 2014.

The concept of this treatment is that skeletal muscle could be increase mass, quality and strength by adjusting the meridian system through supplementing and blood-quickening stasis-transforming formula.

Results: After 1 weeks of receiving traditional Chinese Medicine treatment, the follow-up result of the patient in August 30, 2014 revealed that the pain improvement and the patient feel more power to stand up and walking. After 3 months of receiving this treatment, the patient can walk for 30 min without pain or low gait speed. Besides, no obvious side effect was found after these 3 months of treatment.

Conclusion: Through the positive report in this case, we suggest supplementing and blood-quickening stasis-transforming formula may be a safer and more effective treatment for aging with sarcopenia.

P657

MEAN PLATELET VOLUME LEVELS IN PATIENTS WITH SYNOVITIS ASSOCIATED WITH KNEE OSTEOARTHRITIS

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Objective: Erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) and neutrophil counting are inflammatory markers and also increased in active phase of inflammatory diseases. The mean platelet volume (MPV) is a parameter to measure platelet function and activation. It is a cheap method as a part of the routine blood test that requested by the physician. The relation of MPV with thrombosis, recurrent aphthous stomatitis and ocular involvement were been studied in recent years. In other several studies shown that MPV may be a marker of inflammation in many chronic diseases. We aimed to investigate the levels of MPV in patients with synovitis of knee osteoarthritis in this trial.

Material methods: 50 patients with synovitis associated to osteoarthritis, 117 patients with knee osteoarthritis, and 50 healthy controls were included to our study. MPV results of these groups were compared.

Results: The MPV value of patients with synovitis associated to osteoarthritis were 8.02 ± 0.9 (mean \pm SD) FL. In knee osteoarthritis, MPV values were 8.03 ± 0.8 (mean \pm SD) FL. In control group, we found the MPV value 7.4 ± 0.6 (mean \pm SD) FL. We found a significant difference between the patient group with synovitis associated with osteoarthritis of knee and controls in MPV levels ($p < 0.006$), similarly a significant difference was found between the patient group with osteoarthritis of knee and the control group ($p = 0.001$). However, there was no significant difference between the knee osteoarthritis patient group and synovitis associated with osteoarthritis of knee according to MPV. Although, there were differences with age and gender in controls and knee osteoarthritis group, MPV was found high in multiple regression analyze regardless with the age, gender and BMI.

Conclusion: MPV levels may be beneficial in both synovitis osteoarthritis and nonsynovitis osteoarthritis. MPV levels may be considered as a marker of inflammation but further comprehensive prospective trials are needed in osteoarthritis.

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P658

RELATIONSHIP BETWEEN VITAMIN D STATUS, PHYSICAL ACTIVITY AND PHYSICAL PERFORMANCE IN COMMUNITY-DWELLING ELDERLY WOMEN

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Objective: To investigate the relationship between vitamin D status, physical activity and physical performance in community-dwelling elderly women.

Material and methods: This cross-sectional study was performed on community dwelling women aged 60 years and older who visited National Osteoporosis Center in Vilnius, Lithuania. Inclusion criteria were age 60 or more years and the ability to walk 4 m with or without a walking aid. Exclusion criteria were musculoskeletal or nervous system diseases or conditions that restricted movements in the upper or lower extremities. Subjects who fractured during the last 12 month were also excluded from study. Previous vitamin D supplementation was not an exclusion criterion. Written informed consent was obtained from all participants. The data of medical history were obtained and physical activity was assessed using Physical Activity Scale of Elderly (PASE). Serum vitamin D, PTH was measured by automated immunoassay (Cobas E411, Roche Diagnostic). Physical performance was measured by using the Short Physical Performance Battery (SPPB). Participants were divided into two groups by vitamin D concentration level: deficient (<20 ng/ml) and sufficient (>20 ng/ml). Data were analyzed using SPSS 18.0 for Windows program.

Results: The study was performed on 85 women whose mean age was 73.7 ± 6.3 years, the youngest women was 60.1 years old, oldest 89.5 years old. It was found that in 58 (68.2 %) women vitamin D concentration level was sufficient and 27 (31.8 %) deficient. Significant differences of PASE score and PTH concentration in sufficient and deficient vitamin D level groups were established ($p < 0.05$). Participants with deficient vitamin D concentration were less physically active (86.24 ± 43.46 , score) and had higher PTH concentration (60.2 ± 24.8 , pg/ml) comparing to sufficient vitamin D participants. The analysis study data revealed statistically significant week correlation between vitamin D concentration and PASE score ($r = 0.21$, $p = 0.03$), negative week correlation between vitamin D and PTH concentrations ($r = -0.33$, $p = 0.005$) was also found. There was no significant correlation between vitamin D concentration and components of physical performance. Statistically significant negative correlation was found between PASE score and 4-m walk test ($r = -0.4$, $p = 0.005$).

Conclusion: Physical activity is greater in women with sufficient vitamin D level comparing to deficient group. Vitamin D level positively weakly correlated with PASE score.

P659

MEAN PLATELET VOLUME LEVELS, METABOLIC SYNDROME AND DIABETES MELLITUS IN PATIENTS WITH GOUT DISEASE

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Objective: Gout is an inflammatory arthritis characterized by the presence of monosodium urate crystals in joints and other tissues. The purpose of the study was to investigate mean platelet volume (MPV) levels, diabetes mellitus (DM) and metabolic syndrome in patients with Gout disease.

Material and Methods: 64 patients with Gout disease mean age 56.87 ± 15.24 and healthy control mean age 37.7 ± 12.12 were included in the study. It was used the IDF criteria (2005) for diagnosis of metabolic syndrome, and the ADA criteria (2007) for diagnosis of impaired fasting glucose. All the study subjects were evaluated by biochemical and platelet parameters.

Results: The MPV levels were also significantly higher in Gout patients than controls (8.13 ± 1.17 and 7.39 ± 0.54 fL, respectively; $P=0.001$). To assess the correlation with MPV, a Pearson correlation analysis was performed on each variable. MPV had a positive correlation between metabolic syndrome ($r=0.299$, $P=0.002$), diabetes mellitus ($r=0.334$, $p=0.001$), arthritis ($r=0.231$, $P=0.020$), arthralgia ($r=0.264$, $P=0.008$), and diuretic use ($r=0.233$, $P=0.033$). The multiple regression analysis of MPV and other risk factors was performed. MPV values were higher, regardless of the age, BMI and gender.

Conclusion: These results suggest those gout patients are susceptible to increased platelet activation and increased MPV values which contribute to increased risk of cardiovascular complications. From this study it has been observed that gout disease may be a feature of the metabolic syndrome, impaired fasting glucose, increased MPV levels, and cardiovascular risk.

P660

VERTEBRAL COMPRESSION FRACTURE IN A PATIENT WITH HYPERTHYROIDISM: A CASE REPORT

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Recently hyperthyroidism is diagnosed earlier and treated more effectively. Although severe skeletal complications are rarely seen, there is evidence for reduced BMD in patients with thyrotoxicosis (1). Case Report: A 68-year-old male patient with a complaint of a backache continued 3 months was applied to our FTR clinic. The clinical initial examination revealed that the pain increases with movement, but decreases during resting. No pain was reported during night times. The patient has been reported severe nervous for 20 years, rare cardiac pulses for 3 years and weight loss up to 10 kg during last 6 months. He has been complaint from severe transpiration and weakness in both legs during last 3 months. His anamnestic examination revealed that no systemic disease was preset, but he has been undergone proton pump inhibitor treatment for 2 years. Patients reported that no corticosteroid treatment was applied previously. He used to smoking a package/day, but no alcohol habits. Physical examination revealed stabilized vital findings, except presence of paravertebral muscle spasm and sensitivity at interspinous area. Systemic examination also revealed normal systemic and neurological findings. Vertebral compression fractures at lumbar vertebrae 4 and 5 were detected by conventional radiography and MRI. Thus, mineral density was measured in total lumbar vertebrae (L1-L4) and column of and total of the femur by using DXA. T-scores for total lumbar vertebrae, column of the femur, and total of the femur are measured -4.7 , -3.3 , and -3.2 , respectively. The age and gender of the case prompted us to investigate causes of the osteoporosis of the case. Laboratory test revealed normal ranges in total blood counts, erythrocyte sedimentation rate, C-reactive protein, serum electrolyte levels, glucose, creatine, blood urine nitrogen, calcium, phosphor, alkaline phosphatase, parathormone, rheumatoid factor, sex hormone binding globulin, osteocalcin, testosterone, cortisol levels and urine tests. Anti-thyroglobulin and anti-microsomal antibodies were negative. Serum 25-hydroxivitamin D level showed insufficiency (16.88 ng/ml), whereas deoxypyridinoline levels in urine were higher than normal. Free thyroid hormone (T3) levels in serum were in normal ranges while free thyroid hormone levels (T4) were higher than normal levels and TSH levels were lower than normal levels. Thyroid ultrasonography revealed presence of multinodular goiter. Intravenous injection of zoledronic acid and calcium D vitamin treatment was applied simultaneously for treatment of the osteoporosis. The patients were referred to endocrinology department for possible treatment of multinodular goiter.

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P661

VOLUMETRIC BONE MINERAL DENSITY (vBMD) AT THE RADIUS SITE IN PREMENOPAUSAL CAUCASIAN, SOUTH ASIAN, AND ARAB FEMALES LIVING IN ENGLAND

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Current studies assessing the bone health of different population subgroups indicate Middle Eastern females are at high risk of low bone density among premenopausal groups¹, however, limited data is available to compare these young females to other ethnic groups. This is a secondary analysis where pQCT scans of Arab females have been measured to be compared with older pQCT scans to investigate the differences in volumetric BMD (vBMD) between Caucasian (C), South Asian (SA), and Arab (A) women. 57 healthy premenopausal women (22 C, 19 SA and 16 A), age range 18–55 years, were studied. pQCT measurements were taken at the radius (nondominant) using a Stratec XCT 2000 pQCT scanner. C women were significantly taller ($p<0.01$) than SA and A women groups, with lower weights and BMIs. The table below shows the vBMD at 4 and 66 % radius in C, SA and A women.

		Caucasian (n=22)	South Asians (n=19)	Arab (n=16)
pQCT 4 % radius	Mass (g/cm)	1.17(0.1) ^a	1.06(0.1)	0.97(0.1) ^b
	Total area (mm ²)	374.8(43.2) ^a	340.9(36.9) ^b	323.7(47.8) ^b
	Total density (mg/cm ³)	315.6(45.3)	312.1(45.6)	303.1(50.3)
	Trabecular area (mm ²)	168.5(19.4) ^a	153.3(16.6) ^b	145.5(21.5) ^b
	Trabecular density (mg/cm ³)	178.9(35.5)	175.3(37.2)	171.6(31.6)
pQCT 66 % radius	Mass (g/cm)	1.19(0.4)	1.0(0.2)	0.97(0.1)
	Total area (mm ²)	165.3(88.2)	130.7(22.5)	137.2(17.6)
	Total density (mg/cm ³)	746.6(86.3)	768.8(85.9)	709.7(65.4)
	Cortical thickness (mm ²)	83.42(29.4) ^a	72.6(16.8)	65.1(12.2) ^b
	Cortical thickness (mm)	2.20(0.3) ^b	2.16(0.4) ^b	1.83(0.3) ^a
	Cortical density (mg/cm ³)	1134.7(38.4)	1126.3(42.5)	1111.6(47.0)

Cells within a row with different superscript letters are significantly different ($p<0.05$). Data expressed as the mean (SD). C had significantly higher total area at 4 %, trabecular area at 4 % and cortical area at 66 % radius than SA and A women. C

women also had higher 4 % bone mass than A women. A women had significantly lower cortical bone thickness at 66 % compared to both C and SA groups. There were no other significance differences in vBMD observed between the ethnic groups at the two radial sites. The significant differences identified between the ethnic groups were in relation to bone area and length which may be due to the differences in height reported. As this is the first study to report on the comparative radial bone characteristics of C, SA, and A premenopausal women further investigation is required to understand the physiology underlying these differences and the consequence for health.

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P662

KNEE ARTHROPLASTY RESULTS IN RHEUMATOID ARTHRITIS IN 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 antirheumatic 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. Six 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.

P663

DENSITOMETRY OF THE OLECRANON PROCESS: SOME INFORMATION FOR SYNTHESIS

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Olecranon fractures are very common, understanding the bone architecture may be of some help to improve reduction and osteosynthesis. Aim: To study the microarchitecture focusing on the areas of fragility.

Material and methods: 20 fresh elbows without any surgery or arthritis were included (10 men, 10 women) mean age 75 years. The olecranon was analyzed with a μ CT (HR-pQCT Scanco) with slice of 80 μ m. Scanco Software provided osseous volume, trabecula thickness, trabecula space, trabecula number and bone density (BV/TV)

Results: Coronoid process and olecranon beak have the highest density. We measured a low bone density under the bare-zone. Cortical bone is decreasing from metaphysis to olecranon beak.

Discussion: We found similarities between microarchitecture of superior femoral bone and superior ulnar bone. Micro-architecture explain the schema of fractures as the classification of Morrey. Technique of “hauban” with pins fixations in the cortical bone and not in the medullar is confirmed. The stress fractures in the bare-zone are easily understood.

Conclusion: These information help us to understand the classification of fractures, and the difficulties to obtain good bone stability.

P664

OSTEOPOROSIS, SARCOPENIA AND FRACTURES IN CHILEAN OLDER PEOPLE

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Osteoporosis is often associated with sarcopenia thus increasing the risk of falls and fractures.

Objective: To study the prevalence of osteoporosis and sarcopenia and its association with falls and fractures in community-living Chilean elders.

Methods: Cross-sectional study in 991 community living subjects 60–99 years (mean age 71.1 years; SD 6.4), 67.9 % women residing in Santiago, Chile. Self-reported functional limitations, falls, postmenopausal fractures, osteoarthritis, depression and other chronic diseases were registered. Anthropometry and DXA scan were performed. WHO standards for BMD classified them in normal, osteopenia and osteoporosis. Participants were classified as Sarcopenic using the skeletal muscle mass index (SMI) calculated as appendicular skeletal muscle mass/height² based on sex-specific lowest 20 %. Logistic regression was performed to adjust the association of osteoporosis and sarcopenia with falls and fractures.

Results: The prevalence of sarcopenia was 19.2 % similar in both sexes. The prevalence of osteoporosis was 22.6 % higher in women than in men (28.8 vs. 9.5 %; $p < 0.01$), increasing with advancing age. Sarcopenia was present in 34.9 % of osteoporotic subjects. Fractures were reported by 17.0 % of subjects higher in women than in men (18.9 % vs. 12.9 % $p < 0.025$) and falls were reported by 33.1 % of individuals (men 22.9 %, women 37.8 %, $p < 0.01$). After adjusting by age and gender, fractures were associated with osteoporosis (OR=1.9, 95%CI 1.08–3.38, $p = 0.024$) and the association was stronger for the condition osteoporosis plus sarcopenia (OR=2.2, 95 %CI 1.19–4.09, $p = 0.012$). Osteoporosis was also associated with falls (OR=2.0, 95 %CI 1.02–3.90, $p = 0.042$) but sarcopenia without osteoporosis were not associated with fractures neither with falls.

Conclusion: High prevalence of osteoporosis was observed mainly in women. Osteoporosis was the main risk for falls and fractures, with increased risk in the presence of both osteoporosis and sarcopenia.

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RELATIONSHIP BETWEEN FUNCTIONAL STATUS, RISK AND FEAR OF FALLING IN INSTITUTIONALIZED OLDER ADULTS

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Objective: To determine the relationship between functional status, risk and fear of falling in institutionalized older adults.

Subjects and methods: This cross-sectional study was conducted on nursing home residents (Vilnius, Lithuania) aged 65 years and older. Exclusion criteria were musculoskeletal or nervous system diseases or conditions that restricted mobility. Functional status was evaluated using the Barthel Index (BI). Risk of falling was measured using Morse Fall Scale (MFS) and fear of falling was measured using and Falls Efficacy Scale-International (FES-I). Participants were divided into categories by BI score: total dependence (0–20), severe (21–60), moderate (61–90), slight dependence (91–99), and independence (100). Risk of falling categories was established by MFS score results: no risk (MFS=0), low risk (MFS<25), moderate risk (MFS 25–45), and high risk (MFS>45). Participants were divided into categories by FES-I score: no fear of falling (1–16), felt fear (17–64). Data were analyzed using SPSS 18.0 for Windows program.

Results: The study involved 87 older adults - 32 (36.8 %) men and 55 (63.2 %) women. The youngest participant was 66 years old, the oldest 95 years old. It was found that 51 (58.4 %) participants were moderately dependent, 18 (20.4 %) severely dependent, 9 (10.6 %) slightly dependent and 9 (10.6 %) were independent. 39 (44.8 %) participants were assigned to high risk of falling category, 31 (35.6 %) to moderate risk, 12 (13.8 %) to low risk category, and 5 (5.8 %) had no risk of falling. Fear of falling was reported by 73.6 % of study participants. Our findings show that BI statistically significantly negatively correlated with MFS score in men and women ($r=-0.57$ and -0.53 , respectively; $p<0.05$), with FES-I score in men ($r=-0.65$, $p=0.01$) and in women ($r=-0.37$, $p=0.01$).

Conclusion: Our study showed that the functional status negatively correlated with risk of falling and with fear of falling in institutionalized older men and women.

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SKIN ADVANCED GLYCATION ENDPRODUCT ACCUMULATION IS NEGATIVELY ASSOCIATED WITH BONE MINERAL DENSITY IN MORBID OBESE PATIENTS

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Although BMD is in normal range risk of fracture increased in both diabetic and obese patients. Accumulating evidence suggest that advanced glycation end products (AGEs) could adversely affect the fracture resistance of bone in type 2 diabetic patients it is unclear whether a relationship between increased AGE levels and bone density in obesity. This study aims to determine the relationship between advanced glycation endproduct (AGE) accumulation in skin tissue and BMD in morbid obese patients.

Methods: This case control study was performed 435 obese patients (F/M: 363/74, 38.6±10 years), age and sex matched 100 controls (F/M: 58/42, 38.6±11 years). Skin autofluorescence (SAF) is a method used to detect the accumulation of AGEs in skin collagen using AGE Reader (DiagnOptics B.V., Groningen, The Netherlands). BMD was measured with DXA (Hologic), HbA1c was measured by HPLC method, serum calcium, phosphate, intact PTH, 25OH vitamin D levels were measured with chemiluminescence based method.

Results: BMI was significantly higher in obese patients (47 ± 4 kg/m²) compared to controls (27 ± 2 kg/m²) ($p<0.001$). SAF was higher in obese patients (1.81 ± 0.01 arbitrary units (AU) compared with controls (1.7 ± 0.053 AU) ($p=0.001$). In obese group SAF was higher in diabetic obese patients ($n=150$, 2.03 ± 0.1 AU) compared with non-diabetic group (1.75 ± 0.03 AU) ($p<0.01$). BMD of femur neck was not different between study and control the groups. (1.07 ± 0.15 g/cm² vs. 1.06 ± 0.17 g/cm²). SAF measure were higher in obese women (1.83 ± 0.3 AU) compared with obese men (1.7 ± 0.41 AU) ($p=0.03$). Serum Ca, P, PTH levels were not different between groups, while serum 25OH vitamin D significantly lower in obese group than controls (14.1 ± 9 ng/dl vs. 24 ± 6 ng/dl $p<0.01$). Correlation analysis showed a negative correlation between SAF and femur neck BMD ($r=-0.20$, $p<0.0001$), 25OH vitamin D level ($r=-0.21$, $p<0.01$) and L1-4 BMD ($r=-0.11$, nqs). A positive correlation between SAF and HbA1c ($r=0.34$, $p=0.001$) was observed. Adjusted for age, smoking status, BMI, skin AF had a negative association femur neck BMD ($\beta=-0.14$, $P=0.04$).

Conclusion: The results of this preliminary study suggest that with increased AGE accumulation in skin tissue associated with lower BMD in morbid obese patients. A long-term prospective study on AGE accumulate in bone collagen in obesity and diabetes required to clarify the causality.

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3D MODELLING OF CLAVICLE, MEASURES OF STRESS ZONES AND COMPARISON TO BONE DENSITY

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Fractures of clavicles account for 5–10 % off all fractures with injuries of the middle third of clavicle accounting for 80 % of these case. Osteosynthesis of the clavicle remains a challenge and there is no consensus for the best positioning of the plates.

Objective: The aim of this study was to compare one 3D finite element model of clavicle with μ CT analysis. One finite element model of a normal clavicle was created. Six paired clavicles were analyzed with normal CT and with μ CT. Changes in stress distribution were visualized in the bone in order to

quantify the stress shielding effect compared to real bone quality.

Methods: 1) CT-images of a normal clavicle were processed in order to build the clavicle geometry and to get bone properties with Mimics (Materialise, BE). In ABAQUS-Pre software (HKS, Inc., Pawtucket, RI, USA), the 3D finite element model of the bone (including cortical and cancellous bone) was generated. The model consisted of 113'135 hexahedral elements. Axial loads of 800 N and boundary conditions reproduced the main forces acting on the shoulder with the arm at 90° of abduction. The transverse isotropic mechanical properties of bone were integrated into the model. 2) μ CT (X tremCt from Scanco) with HR-pQCT resolution of 41–246 μ m nominal isotropic (pixel size) and slices of 80 μ m was performed on the clavicles. The results were obtained with Scanco software. Bone volume, trabecular space, trabecular number, trabecular thickness and the structure model index were calculated. 3) Both CT scans methods and results were compared to the 3D finite element model.

Results: Stresses visualization showed the load transmission through the bone. Clavicle is like a bow with the two edges as fixed points. Tension and compression were shown on the clavicle. Respectively, the lateral part worked in traction and the medial part in compression. Distal translation of the load transfer was observed at the larger part of the clavicle. The medial sterna part was a rigid block fixed by the ligaments. Maximum stress compression occurs in this area. Lateral-posterior part was more sensitive to fracture and underwent maximum stresses in traction according with the finite elements results. These results were supported by the microdensitometric analysis. The most constrained areas of the 3D model were these where the bone density was the highest. The centre of the clavicle receives a lot of stresses and has the highest density with large trabeculae.

Conclusion: This study revealed the changes in bone density in the clavicle due to different stress distribution. Potential fractures problems seemed to occur in the external part. Superior and posterior cortical bone had the best quality as they had much more trabeculae with very few space between them. These information may help to understand fractures and to conceive new material. Design of plate implants may indeed improve stress distribution and acts as a load “absorber-distributor” between cortical shell and cancellous bone. The best place for the plate could be posterior and superior according to the results of finite element and bone density. Thus, there is a good correlation between finite element and bone density and architecture in clavicle. Maximum stress traction occurs in the posterior and superior part with thick cortical bone. It looks to be the best place to put the plate.

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P668

COMPARATIVE EFFECTIVENESS OF LOCAL TRANSDERMAL THERAPY WITH GLYUKOZAMINOSULFATIS (HONDROKSID MAXIMUM) AND INJECTABLE FORM OF GLYUKOZAMINOSULFATIS (DONA) IN PATIENTS WITH KNEE OA

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Objective: To compare the effectiveness of topical application of glyukozaminosulfatis (Maximum Hondroksid® cream for external use) and intramuscular glyukozaminosulfatis injection (Dona) in the treatment of the knee osteoarthritis.

Materials and methods: 40 patients (38 women and 2 men) with knee OA (criteria Altman RD, 1995) and severe pain, the average age - 56.7±8.2 years, mean duration of the disease 6.7 ±2.9 years, X-ray gonarthrosis stage on Kellgren-Lawrence II - 30 (75 %) patients, III - in 10 (25 %) patients. At the time of inspection 40 (100 %) patients received NSAIDs. Identified 2 groups of patients for 20 people, comparable in basic parameters: the first group- received locally hondroksid 3 cm of cream on the affected joint area 3 times a day; the second group - Dona IM once a day, 3 times a week for a month. Were evaluated: the intensity of joint pain at rest and during movement on index WOMAC, the need for NSAIDs (ibuprofen), the effectiveness of treatment according to the patient.

Results: The decrease of joint pain in patients receiving intramuscular glyukozaminosulfatis was registered on 5–6 days, on skin - 7–10 days of therapy. After 1 month treatment both groups was effective in all patients. There was a significant ($p<0.05$) reduction in pain when walking, palpation, decreased WOMAC index comparable in both groups. There was more significant ($p=0.06$) decrease in pain on palpation of local therapy background compared to intramuscular injection. The treatment in each group showed a clear decrease in the average needs of NSAIDs for more than 15 times. Overall improvement in most indicators WOMAC index was more than 50 % (54–70 %) from baseline, which corresponds to good effect of therapy in the two groups. Effectiveness of local therapy was rated by patients as good - 8 (40 %), satisfactory - 12 (60 %), which compares with an estimate of the patient an effective intramuscular injection “Don”: 9 (45 %) and 11 (55 %) people noted the good and satisfactory action accordingly. Tolerability in the two treatment groups was good. Serious adverse events, worsening of comorbidities during therapy are not registered.

Conclusion: Local cutaneous glyukozaminosulfatis therapy is effective in the symptomatic treatment of OA of the knee. In exchange treatment is comparable to such therapy compared with glyukozaminosulfatis injections on indicators such

as WOMAC score and the intensity of pain during walking and palpation.

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SUBCHONDRAL TIBIAL BONE TEXTURE ANALYSIS PREDICTS KNEE OSTEOARTHRITIS PROGRESSION: DATA FROM THE OSTEOARTHRITIS INITIATIVE

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Objective: To examine whether trabecular bone texture (TBT) parameters assessed on digitized radiographs predict radiographic progression in knee osteoarthritis (OA).

Material & methods: We used the data from the OsteoArthritis Initiative (OAI) which is an OA observational study of men and women. From the 4796 OAI participants we used a progression subcohort of 475 patients with a pre-existing OA (defined as Kellgren-Lawrence grade 2 at baseline) for whom we have access to the digitized knee radiographs plus standardized measurements and interpretations at baseline and 48-month follow-up. We determined medial and lateral compartments tibial TBT parameters using a semi-automated region selection method (with a reproducibility of 89 % inter-observer and 91 % intra-observer). Three TBT parameters were measured: H_{0° , H_{90° , H_{str} respectively corresponding to the roughness in the horizontal, vertical directions and the anisotropy of the image. We examined the differences in these TBT parameters between patients exhibiting or not an increase in the medial compartment joint space narrowing (JSN) score on the OARSI grading scale. We further assessed the OA progression predictive capacity of the TBT parameters using logistic regression. Five different models were used including the following covariates: age, BMI, sex, JSN, H_{0° , H_{90° , H_{str} (Fig. 1).

The area under the receiver operating characteristic curves (AUC) was used as a performance index of these models.

Results: Compared with non progressors, TBT parameters were significantly lower in progressors group ($0.0001 < p < 0.003$). TBT parameters of the tibial plateau at baseline were predictive of medial knee JSN progression (AUC=0.77). The predictive model with maximum effectiveness combined TBT parameters with clinical covariates (Fig. 1).

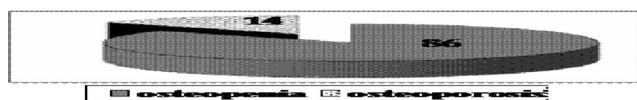


Fig. 1: ROC curves describing the strength of the predictive models of medial JSN

Conclusion: This data indicates that: there is a link between subchondral tibial bone texture and progression of knee OA; TBT parameters may predict JSN decrease in the medial compartment

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DOES DELAY DIAGNOSIS IN ANKYLOSING SPONDYLITIS AFFECT CLINICAL PARAMETERS AND RADIOLOGIC PROGRESSION?

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Objective: Ankylosing spondylitis (AS) is an inflammatory disease of spine and sacroiliac joints. Early diagnosis and treatment before irreversible changes occur are decisive for managing patients with AS. However, the diagnosis of AS is typically delayed. In the present study we aimed to investigate whether delay diagnosis affects clinical findings and radiologic progression in the patients with AS.

Material and Methods: Eighty-five AS patients (M/F=63/22) (36.70 ± 10.99 years) were enrolled in the study. Patient demographics and disease characteristics such as age at disease onset, disease duration, and age at diagnosis of AS were recorded. BASDAI (Bath Ankylosing Spondylitis Disease Activity Index) was used for disease activity, BASFI (Bath Ankylosing Spondylitis Functional Index) for functionality, BASMI (Bath Ankylosing Spondylitis Metrology Index) for spinal movement and mSASSS (Modified Stoke Ankylosing Spondylitis Score System) for radiological damage.

Results: Disease duration was 11.89 ± 10.22 years. The age at disease onset was 24.81 ± 8.77 years and the age at diagnosis was 29.91 ± 9.91 years. Delay from symptom onset to the diagnosis of AS was 5.10 ± 7.23 years. BASDAI, BASFI, BASMI, and mSASSS scores were 2.87 ± 2.08 , 2.21 ± 2.56 , 3.63 ± 4.11 , 24.48 ± 2.07 , respectively. While there was a positive correlation between delay duration and BASFI, BASMI and mSASSS, there was no correlation with BASDAI.

Conclusion: Patients with delayed diagnosis showed worse outcomes in BASFI score and radiographic damage. Early diagnosis and therapy may increase functional capacity and slow radiographic progression of the disease.

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QUALITY OF LIFE AFTER OSTEOPOROTIC HIP FRACTURES REGARDING PSYCHIATRIC COMORBIDITY

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Hip fractures present emerging problem in modern societies. Multidisciplinary post acute rehabilitation after hip fractures in population over 65 years leads to better recovery, functional improvement, quality of life and social functioning even in present with serious co morbidities. The aim of this study is to analyze the effectiveness of inpatient rehabilitation program on quality of life in population of elderly patients with psychiatric impairment after hip fracture. The study included 203 eligible participants age above 65 years that were admitted for rehabilitation program after hip fracture. They were analyzed on admission (G1), at discharge (G2), 3 months post discharge (G3) and 6 months post discharge (G4). For the evaluation of psychiatric impairment we used psychiatric illness component of Cumulative Illness Rating Scale for Geriatrics (CIR-G) score scores 0-no illness to 4-severe mental illness. Quality of life was evaluated by using SF-36 questionnaire. Our rehabilitation program show significant improvement in quality of life for patients of all categories: without psychiatric impairment, and for those with degree 1–4 ($p < 0.05$). In patients from groups G1-G4, there is significant decrease in social functioning as psychiatric impairment increases according to CIRS-G ($p < 0.01$). Further, for CIRS-G 0–4 there is high correlation between two evaluated parameters. Before inclusion into rehabilitation program variability between observed parameters was lower ($\eta^2(\%) = 6.35$), after discharge increased ($\eta^2(\%) = 8.15$), while 6 months post discharge it was higher ($\eta^2(\%) = 12.97$). Our results show great benefit of multidisciplinary post acute rehabilitation program on quality of life for all elderly patients with hip fractures. Degree of psychiatric impairment highly correlates with quality of life. The results from our study suggest positive influence of rehabilitation on quality of life with regards to the degree of psychiatric impairment.

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TRABECULAR BONE SCORE, BONE MINERAL DENSITY AND LATE-ONSET HYPOGONADISM IN UKRAINIAN MEN OF VARIOUS AGES

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The aim of the study was to evaluate the BMD, TBS in men of various ages suffering from a late-onset hypogonadism (LOH).

Materials and methods: We examined 46 men aged 50–85 years (mean age 64.5 ± 1.3 years; mean height 1.73 ± 0.09 m; mean weight 82.7 ± 2.1 kg). The patients were divided into such age-dependent groups: 50–59 years ($n = 16$), 60–69 years ($n = 14$), 70 years and older ($n = 16$). The BMD of total body, PA lumbar spine (L₁-L₄) and proximal femur were measured by the DXA method (Prodigy, GEHC Lunar, Madison, WI, USA), and PA spine TBS was assessed by the TBS iNsite[®] software package installed on our DXA machine (Med-Imaps, Pessac, France). Total testosterone was measured in all the subjects using an enzyme immunoassay method (mean level - 14.8 ± 0.9 nmol/l). Depending on the total testosterone level, all the subjects were divided into 2 groups: GI with a testosterone level > 12 nmol/l (normal), and GII with a testosterone level < 12 nmol/l (LOH).

Results: Frequency of hypogonadism in the study group was 34.8 %, in the group of 50–59 years - 18 %, 60–69 years - 42.9 %, 70 years and older - 56.2 %. TBS in men of 50–59 years was 1.064 ± 0.04 ; 60–69 years - 1.065 ± 0.05 ; 70 years and older - 1.016 ± 0.04 . TBS in men with LOH was significantly lower in the age group of 70 years and older, compared with healthy men of the same age (0.947 ± 0.05 vs. 1.106 ± 0.05 , $F = 4.6$; $p < 0.05$). Significant differences between the groups of patients with hypogonadism and normal testosterone level as for the BMD L₁-L₄ and femoral neck were not found.

Conclusion: TBS in men with a late-onset hypogonadism was significantly lower in the age group of 70 years and older, compared with the healthy men. We didn't observe any significant differences as for the BMD L₁-L₄ and femoral neck.

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SELF-REPORTED CHANGES OF THE BODY APPEARANCE AND BACK PAIN DEPEND ON NUMBER OF FRACTURES IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

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Objective: Osteoporotic vertebral fractures (VFX) lead to the spine deformation and cause the back pain. The aim of this study was evaluate the self-reported changes in the body appearance and the back pain depending on number of fractures among respondents with postmenopausal osteoporosis.

Material and Methods: Postmenopausal women who came for consultation to the National osteoporosis centre were included in this study. Non-clinical VFX were identified by

standardized lateral radiographs. The participants were divided into three study groups according to BMD and incident fracture status: group I - women with non-clinical vertebral fracture(s), group II - women with postmenopausal osteoporosis (OP) without fracture, and group III - women without OP. The changes in quality of life were evaluated using the disease specific Quality of Life Questionnaire of the European Foundation for Osteoporosis (QUALEFFO-41) was used.

Results: A total of 120 women were examined, 40 persons were in each group. Among respondents with osteoporosis, statistically significant difference was found when the changes in body appearance depending on number of fractures were evaluated. Body appearance changed quite a bit or very much in 43.2 % of women with multiple VFX, and only in 8.3 % it remained unchanged ($p < 0.001$, comparing to patients without fracture). The results of this study also revealed that almost a half of respondents with one VFX and each fifth with 2–7 vertebral fractures complain about moderate back pain each day. Upon dividing the respondents with OP into groups according to the number of fractured vertebrae, statistically significant ($p < 0.05$) differences were found between women with one VFX and control group in the dimension A (pain) of QUALEFFO-41 questionnaire.

Conclusion: The data of our study confirm that women with multiple vertebral fractures evaluated their appearance significantly worse than women with one fracture or without vertebral fractures.

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ROLE OF SIDE EFFECTS, PHYSICIAN INVOLVEMENT AND PATIENT PERCEPTION IN DISCONTINUING OR SWITCHING OF ORAL BIPHOSPHONATES

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Objective: To assess reasons for noncompliance with oral bisphosphonates among osteoporotic women.

Material and Methods: This is a cross-sectional patient survey of osteoporotic women who were at least 55 years old, initiated treatment (index) between 2010 and 2012 and were non-compliant with first therapy (defined as medication possession ratio < 70 %) or switched therapy within the first year. Survey participants were identified using Maccabi Health Services computerized database. Patients who gave informed consent completed a 20 min telephonic survey, assessing reasons for discontinuation and switching including physician

involvement, side effects, inconvenience and patient perceptions of bone health and bone medications efficacy.

Results: A total of 493 osteoporotic women completed the survey. At the time of the survey (average 3.3 years following therapy initiation) 40 % of the patients had discontinued all antiosteoporotic therapy (mean MPR at interview = 19 %), 9 % remained on initial therapy (continuers, mean MPR at interview = 47 %) and 51 % were using a switched therapy (switchers, mean MPR at interview = 62 %). Family history, fracture history, socioeconomic status and index drug class and frequency were similar in all groups, but continuers were more likely to be older (mean age of 67 ± 8 vs. 65 ± 8 among switchers and 64 ± 7 among discontinuers) and initiated therapy closer to survey as compared with switchers and discontinuers. The most common reasons for switch or discontinuation of first medication were side effects such as heartburn, acid reflux or other gastrointestinal problems (cited by 26.1 %) and physician recommendation (19.4 %), whereas inconvenience-related reasons and disbelief in the drug's importance to their health played a smaller role (each reported by less than 5 % as major reasons). The most common reasons for complete discontinuation of anti-osteoporotic therapy were side effects (cited by 26.9 % as a major reason) and physician recommendation (20.0 %).

Conclusion: Our findings emphasize the need for new medications with better tolerability profile to improve treatment compliance among osteoporotic patients. Moreover, it seems that physician involvement in such important therapeutic decisions as drug discontinuation might be sub-optimal.

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VOLUMETRIC BONE MINERAL CONTENT CHANGES ASSESSED BY 3D-DXA AFTER TWO YEARS OF DENOSUMAB TREATMENT

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Objective: To analyze the bone mineral content changes in proximal femur trabecular and cortical regions after a 24-months treatment with denosumab.

Method: 27 women with osteoporosis treated with Denosumab were included in this study (CETIR Grup Mèdic). 3D-DXA reconstructions were obtained from DXA scans (iDXA, GE Healthcare) taken at baseline and 24-month follow-up visit. 3D-DXA relies on the registration of a 3D appearance model of the femoral shape and density onto the 2D DXA image and allows for the quantification of the volumetric BMD (vBMD), volume (for trabecular and cortical regions) and cortical thickness distribution. The differences

between follow-up and baseline analyses were assessed using the student's t-test.

Results: A 4 % and a 2 % increase of the vBMD respectively at the trabecular and cortical regions was observed ($p=0.08$ and $p=0.001$). A statistically significant increase of the cortical thickness was found. Mean cortical thickness over the 27 patients was 1.9 mm at baseline and 2.0 mm after treatment ($p<0.001$).

Conclusion: This study demonstrates that Denosumab induces an increase in the density of trabecular and cortical bone as well as cortical thickness in upper femur. 3D-DXA presents a high potential for the assessment of the individual response to antifracture therapy using clinical routine DXA modality.

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GENETIC RISK FACTORS FOR KNEE OSTEOARTHRITIS IN POSTMENOPAUSAL UKRAINIAN WOMEN

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Osteoarthritis is a degenerative articular disease with a complex pathogenesis because diverse factors interact causing a process of deterioration of the cartilage and the subchondral bone. Despite the multifactorial nature of the knee osteoarthritis, it is related to a strong genetic component. Determination of molecular genetic causes of osteoarthritis is an actual problem. There are several approaches to assess the contribution of a candidate gene in the pathogenesis of osteoarthritis. One of them consists in determining the correlation between allelic polymorphism and candidate factors which cause the disease, which in comparison estimates allele frequencies of candidate genes in osteoarthritis patients with individuals not having the disease.

Aim: To determine the alleles frequency of genes - regulators of cartilage metabolism in postmenopausal women with knee osteoarthritis in Ukrainian population, and to assess the contribution of different polymorphisms in the risk of developing the disease.

Material and Methods: DNA extraction was performed using the phenol-chloroform method from whole blood. Using PCR followed by restriction digestion and visualization of the reaction products in polyacrylamide gel have been studied 77 patients with knee osteoarthritis and 125 healthy people of the same age.

Results: We did not found association of polymorphism -234 T/G polymorphism of collagen type I $\alpha 1$ (OR=1.55 (CI 95 % 0.86–2.79)) with the risk of knee osteoarthritis developing. We have not found association of polymorphism -764 T/G of ER α gene (OR=0.91 (CI 95 % 0.26–3.23)).

Conclusion: Knowing association between pathogenic alleles, candidate genes and osteoporosis in Ukrainian population will allow using genetic testing to identify predisposition to the disease. The results of this study are important for a more rational organization of the prevention and treatment of the illness in the early stages of disease development.

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REDUCED BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WHO HAVE RECEIVED A FRACTURE OF THE DISTAL FOREARM

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Aim: To estimate the prevalence of osteopenic syndrome in postmenopausal women with fractures of the distal forearm with minimal trauma.

Methods: Measurement of BMD was conducted in 32 women over 50 years (mean age 63 ± 8.5 years), postmenopausal for more than 1 year, received a fracture of the distal forearm with minimal trauma. DXA performed on the lumbar spine, proximal femur and "healthy" forearm.

Results: Osteoporosis was diagnosed in 18 (56.25 %) patients, osteopenia in 12 (37.5 %), the rate was found in 2 (6.25 %) women. In this case the spine osteoporosis was found in 15 (46.88 %) patients, hip in 5 (15.63 %), forearm in 9 (28.13 %) women. Osteopenia of the spine was revealed in 11 patients (34.38 %) in the hip in 10 cases (31.25 %) and forearm 13 (40.63 %) patients. Normal values are noted in 3 (9.38 %) cases in the spine, 7 (21.88 %) in the thigh and 9 (28.13 %) - in the forearm.

Conclusion: The majority of fractures occurred against the backdrop of osteopenic syndrome (in 93.75 %), the rate found in only 2 (6.25 %) women. Osteoporosis and osteopenia in the forearm were found in 22 (68.75 %) patients. It is interesting to study the causes of fractures in women with normal BMD.

P678

EFFECTS OF BORON NITRIDE AND/OR HYDROXYAPATITE COMPOUNDS ON BONE FORMATION IN RAT CALVARIAL DEFECT MODEL

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Objective: The current study was designed to investigate poly(lactic-coglycolic acid) (PLGA) scaffolds combined with different concentrations of boron nitride (BN) and/or hydroxyapatite (HA) compounds on calvarial bone defect healing in rats.

Methods: This study was performed in 10 male rats groups, that nine of groups surgically received critical size calvarial defects (diameter, 8 mm) in parietal bone. The defects were treated by one of the following procedures: 1. PLGA, 2. PLGA/10 %HA, 3. PLGA/10 %HA/2,5 %BN, 4. PLGA/10 %HA/5 %BN, 5. PLGA/10 %HA/10 %BN, 6. PLGA/2,5 %BN, 7. PLGA/5 %BN, 8. PLGA/10 %BN, 9. no implantation as a control. μ CT imaging was performed repeatedly from 2 to 8 weeks after surgery. The animals were euthanized at 8 weeks after the surgery for histological and molecular evaluation.

Results: The PLGA/HA and PLGA/2.5 % BN composite was remarkably resorbed at 8 weeks after the surgery. In 8th week after operation any healing could not be recognized in defected area with no implantation. However at the 8th week after calvarial defect induction a good healing was observed in groups treated with PLGA scaffolds containing BN-HA. Also in Real Time PCR analyses, some bone markers were investigated such as osteopontin, bone specific alkaline phosphatase and collagen type 10A1. PLGA scaffolds containing BN exerted better results than only PLGA groups.

Conclusion: This study demonstrated that PLGA scaffolds containing BN and/or HA significantly accelerated bone regeneration on calvarial defect area. This study suggested BN as a new graft material.

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BISPHOSPHONATE NONADHERENCE AND EXPERIENCE OF OSTEOPOROTIC FRACTURE AND HEALTHCARE COSTS IN AN ISRAELI POPULATION

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Objective: To examine the association between bisphosphonate medication adherence and fracture risk and/or healthcare resource utilization and costs.

Methods: This was a retrospective analysis of electronic medical records of women aged 55 years or above who started a bisphosphonate between the years 2005–2011 in a large health maintenance organization in Israel. Adherence with bisphosphonate treatment was measured by the medication possession ratio (MPR) during first year from therapy initiation. Patients with MPR of 70 % or higher were considered adherent. Outcomes of interest included healthcare resource utilization, direct medical cost, and risk of fracture during the second year post-index. First osteoporotic fracture (mainly including hip, shoulder, spine, wrist, foot and ribs) after the age of 50 was identified from medical records. Multivariable logistic regression was conducted to identify the association between adherence and patients' demographic and clinical characteristics. Generalized linear models (GLM) were used to examine the association between adherence and all-cause healthcare costs.

Results: Among the 17,770 women included in the analysis, aged 66.5±8.3 years at therapy initiation, 80 % were treated with alendronate and 20 % were treated with risedronate as first line of therapy. During the first year of treatment, 48.9 % of study patients were not adherent to therapy. Fracture rate during the second year was 2.3 % for all patients, and differed by age group (3.9 % for age 75 and above vs. 2.1 % for younger group, $p<0.001$) but not by adherence groups (2.1 % for adherent patients vs. 2.6 % for nonadherent patients, $p=0.1$). Among patients aged 75 or over, those that were not adherent to bisphosphonates had a 41.7 % higher risk of fracture compared to adherent patients ($P=0.018$) after adjusting for covariates. Nonadherent patients had 11.9 % higher medical costs than their adherent counterparts among patients aged 75 and above ($P=0.002$), but not among younger patients.

Conclusion: Nonadherence with bisphosphonates among elderly new users was associated with higher fracture risk and higher medical cost. The results underline the importance of improving the relatively low adherence with osteoporosis treatment especially among older patients.

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EFFECTS OF BORON NITRIDE AND/OR HYDROXYAPATITE COMPOUNDS ON BONE DEFECT IN OSTEOPOROTIC RATS

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Objective: To investigate poly(lactic-coglycolic acid) (PLGA) scaffolds including different concentrations of boron nitride (BN) and/or hydroxyapatite (HA) on bone defect in osteoporotic rats. Thus to investigate effects of BN as a new target for osteoporosis related bone defects.

Methods: This study was performed in 10 female rats groups, that nine of them underwent ovariectomy operation to induce osteoporosis. Healthy ones were used as control rats (Group 1). Twelve weeks after ovariectomy operation a standard non-critical size defect (3 mm diameter) was induced in all osteoporotic rats' femurs. PLGA scaffolds containing different concentrations of BN-HA was located in defected area and surgical area closed. In one group with osteoporosis defect induced but no PLGA treatment applied (Group 2). At the 1st, 2nd and 4th week after operation, computed tomography (CT) images were obtained for all groups and tissue samples were collected. PLGA scaffolds were classified as the ones with no BN-HA (Group 3), with only 10 %HA (Group 4), with 2.5 %BN+10 %HA, 5 %BN+10 %HA or 10 %BN+10 %HA (Groups 5, 6 and 7) and with only 2.5 %, 5 % or 10 % BN (Groups 8, 9 and 10).

Results: In 1st and 2nd weeks after operation any healing could not recognized in defected area. However at the 4th week after defect induction a good healing was observed in groups treated with PLGA scaffolds containing 10 %HA, 2.5 %BN+10 %HA, 2.5 %BN and 5 %BN. Also in Real Time PCR analyses, some bone markers were investigated such as osteopontin, bone specific alkaline phosphatase and collagen type 10A1. PLGA scaffolds containing BN exerted better results that only PLGA groups.

Conclusion: This study showed that PLGA scaffolds containing BN and/or HA significantly increased bone healing in osteoporotic rats. HA is already known as one of the main material of bone structure and being used by biomedical engineers. This study suggested BN as a new target for treating osteoporotic bone defects for medics and engineers.

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POLYMORPHISM OF VITAMIN D RECEPTOR GENE, ESTROGEN RECEPTOR GENE AND COLLAGEN TYPE I A1 GENE FOR OSTEOPOROSIS IN UKRAINIAN WOMEN

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Osteoporosis has a complex etiology and is considered a multifactorial polygenic disease in which genetic determinants are

modulated by hormonal, environmental, and nutritional factors. Polymorphism of the vitamin D receptor (VDR) gene has been reported to play a major role in variations for genetic regulation of bone mass but its role within various ethnic populations is not clear. Estrogens are known to play an important role in regulating bone homeostasis, they act through binding to two different estrogen receptors (ER) and different polymorphisms of these receptors were described. A polymorphism in the collagen type I $\alpha 1$ (COL1A1) gene also has been associated with low bone mass and fracture incidence. The aim of the study was to determine the alleles frequency of genes - regulators of bone metabolism in patients with osteoporosis in Ukrainian postmenopausal women, and to assess the contribution of different polymorphisms in the risk of developing the disease.

Material and Methods: DNA extraction was performed using the phenol-chloroform method from whole blood. Using PCR followed by restriction digestion and visualization of the reaction products in polyacrylamide gel have been studied 180 patients with osteoporosis and 160 healthy people of the same age.

Results: We have found association of polymorphism 60890 A/G of VDR receptor gene (OR=3.2 (CI 95 % 2.2–4.6)) and –234 T/G polymorphism of collagen type I $\alpha 1$ (OR=2.8 (CI 95 % 2.1–4.1)) with the risk of osteoporosis developing. We have not found association of polymorphism –764 T/G of ER gene (OR=1.2 (CI 95 % 0.6–2.3)).

Conclusion: Knowing association between pathogenic alleles, candidate genes and osteoporosis in Ukrainian population will allow to use genetic testing to identify predisposition to the disease. The results of this study are important for a more rational organization of the prevention and treatment of the illness in the early stages of disease development.

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CHANGES IN BONE QUALITY AFTER TREATMENT OF EXPERIMENTAL OSTEOPOROSIS WITH MAGNETOTHERAPY

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Electric and magnetic fields could modify the behavior of bone cells. Aim: To evaluate the effects of pulsed magnetic field on bone in model of estrogen-deficient osteoporosis.

Material and Methods: 14-week-old bilaterally ovariectomized female Wistar rats ($n=14$) were randomly assigned to: OVX PEMF group ($n=7$) and OVX control ($n=7$). The accommodation condition (temperature 22°–24 °C) and feeding were the same for both groups. After 6 weeks rats from OVX PEMF group were exposed to PEMF Kosmag 60 (40 Hz, 10 mT, 45 min) during 4 weeks, 5 day/week. After 4 weeks

animals were sacrificed. At the end of 4-week period biochemical analyzes: osteocalcin (OC), alkaline phosphatase (AP), calcium (Ca) and phosphorus (P) were evaluated. The histological analyzes of left tibia were studied by routine light microscope. Biomechanical properties were studied on TOMI 2001.

Results: Statistically significant increase of OC ($p < 0.05$) and statistically significant decrease of Ca and AP ($p < 0.01$) was obtained in OVX-PEMF compared to OVX-control group. Histological observation in OVX-PEMF showed growth of young chondrocytes in the central zone and cartilage on peripheral parts. The trabeculae were thicker, still disconnected, with bone marrow in between. Biomechanical analyses of left femur on bending and torsion in experimental group showed better quality of bone.

Conclusion: 1. PEMF (40 Hz, 10 mT, 45 min/day) during 5 weeks significantly decreased the loosening of bone tissue in experimental osteoporosis caused by estrogen deficiency. 2. Biomechanical measurements showed that the quality of bone was improved at statistical significance in OVX + PEMF group (close to normal bone). 3. Alkaline phosphatase (AP) and osteocalcin (OC) correlate with positive effect of PEMF on bone formation. 4. The biomechanical testing of bone has important role in analyzing PEMF effects and correlates with quality of bone. This study shows that treatment with PEMF decreased bone fragility.

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EFFECTS OF BORON NITRIDE AND/OR HYDROXYAPATITE PLAQUES ON BONE HEALING IN RATS WITH FEMORAL FRACTURE

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Objective: To investigate graft plaques including different concentrations of boron nitride (BN) and/or hydroxyapatite (HA) on bone healing in rats with femoral fracture. Thus to investigate effects of BN as a new target for fracture healing.

Methods: This study was performed in six male rats groups. Only fracture induced ones were used as control rats (Group 1). For treatment groups one group was selected as allograft group (Group 2) in which standard procedure applied and the other four groups were implanted with BH-HA plaques in different concentrations: Group 3: 100 %HA; Group 4: 2.5 %BN+97.5 %HA; Group 5: 5 %BN+95 %HA and Group 6: 100 %BN. Eight weeks after operation, computed tomography (CT) images were obtained for all groups and tissue samples were collected. Real Time PCR studies were performed in tissue samples.

Results: According to CT results a complete bone union was present in 2.5 %BN+97.5 %HA group. There was also a partial bone formation in 5 %BN+95 %HA group while bone formation was not evident in other groups. In Real Time PCR analyses, bone markers such as osteopontin, osteocalcin, RUNx, bone specific alkaline phosphatase and collagen type 1A1 were investigated. 2.5 %BN+97.5 %HA plaques significantly increased mRNA expression of these bone healing markers.

Conclusion: This study showed that a combination ratio of 2.5 %BN+97.5 %HA was optimally increased bone formation in fractured femur tissue. Our study can suggest low dose BN supplementation in any graft material or bone constituent such as HA to improve present surgical techniques in orthopedics.

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OSTEOPOROSIS AND OSTEOPENIA IN RHEUMATIC DISEASES

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Objective: To evaluate changes in BMD in patients with rheumatic diseases.

Materials and methods: A retrospective analysis of X-ray densitometry protocols produced patients who are under medical supervision in the City rheumatology center of Kazan in the period from January 2013 to January 2014. The analysis included 347 patients with the following rheumatic diseases: rheumatoid arthritis (RA) - 231, ankylosing spondylitis (AS) - 63 and osteoarthritis (OA) - 53 people. Densitometry was performed in the axial x-ray densitometer Hologic. Take account of changes in BMD at two points: the lumbar spine and proximal femur. T-test was evaluated in postmenopausal women and men over 50 years, Z-criterion in women before

menopause and men younger than 50 years. Patients who determined to densitograms artifacts (calcification of the aorta, osteophytes, and others.) were excluded from the analysis.

Results: According to the world criteria the diagnosis of “osteoporosis” was exhibited in 85 (24.5 %) of 347 patients (women 74, men 11), “osteopenia” - 145 (41.8 %) (women 121, men 21). Distribution by nosology was as follows. Among 231 patients with RA in 55 (23.8 %) were identified osteoporosis, in 89 (38.5 %) osteopenia. Of the 63 patients with AS 13 (20.6 %) was identified as osteoporosis, in 32 (50.8 %) osteopenia. Among the 53 OA patients in 17 (32.1 %) osteoporosis was diagnosed, 24 (45.3 %) osteopenia.

Conclusion: Osteoporosis often occurs in rheumatic diseases, especially in RA and AS. However, the prevalence of osteopenia was even higher, which requires actions aimed at the prevention of osteoporosis and fractures. In addition, in OA osteoporosis and osteopenia were observed much more frequently than previously thought.

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VITAMIN D DEFICIENCY IN UKRAINE AND THE WAYS OF ITS CORRECTION

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Aim: To determine the frequency of vitamin D deficiency and insufficiency in a representative sample of the population of Ukraine; to develop the system of prophylactics and treatment of vitamin D deficiency and to study its safety and efficacy.

Materials and methods: 1575 people aged 20–95 years. residing in various regions of Ukraine were examined. 25(OH)D and iPTH levels were evaluated using electrochemiluminescence method (Elecsys 2010, Roche). For correction and prophylactics of vitamin D deficiency and insufficiency in base of Ukrainian National University of Food Technologies it was developed high-fiber baked bread with a cholecalciferol concentration of 25 µg per 277 g. To study fortified bread safety and efficacy 30 postmenopausal women aged 45–80 years old were included to the study. The duration of the study lasts 21 days. For correction of vitamin D deficiency and insufficiency it was developed the individual targeted therapy of vitamin D deficiency. To study the efficacy and safety of the individual targeted therapy it was involved 70 postmenopausal women aged 46–87 years with skeletal diseases (systemic osteoporosis and osteoarthritis). The duration of the treatment consists of 3 months.

Results: Only 4.6 % of the Ukrainian citizens were found to have normal 25(OH)D values, whereas 13.6 % were diagnosed with a vitamin D insufficiency, and 81.8 % with vitamin D deficiency. Intake of fortified bread has facilitated a significant increase in 25(OH)D levels. In women with vitamin D deficiency the mean level of blood 25(OH)D increased from

14.20±2.60 to 20.05±2.74 ng/ml ($p<0.001$). Three months individual targeted therapy of vitamin D deficiency leads to significant ($p<0.001$) increasing in 25(OH)D levels: 35.60±8.21 nmol/L as compared to baseline levels of 25.20±9.76 nmol/l.

Conclusion: In base of results of studies it was developed the algorithm of prophylactics and treatment of vitamin D deficiency for patients with bone and joint diseases.

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CORTICAL AND TRABECULAR BONE MINERAL CONTENT CHANGES AT THE PROXIMAL FEMUR ASSESSED BY 3D-DXA AFTER PTH (1–84) TREATMENT

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Objective: To measure the bone mineral content changes in trabecular and cortical regions of the proximal femur after a 24 months treatment with PTH (1–84). The 3D ECCO substudy.

Method: A group of 25 women with osteoporosis were included in this study. All the patients had PTH (1–84) treatment during 24 months. 3D-DXA reconstructions were obtained from proximal femur DXA scans (Discovery W, Hologic) taken at baseline and the 24-month follow-up visit. 3D-DXA relies on the registration of a 3D appearance model of the femoral shape and density onto the 2D DXA image and allows for the quantification of the volumetric BMD (vBMD), volume (for trabecular and cortical regions) and cortical thickness distribution. The student's t-test was used to assess the differences between follow-up analyses and baseline.

Results: A 10 % increase of the vBMD at the trabecular region was observed (vBMD_{baseline}=0.102 g/cm³ and vBMD_{follow-up}=0.113 g/cm³, $p=0.006$). No statistically significant difference was found for the vBMD at the cortical region ($p=0.23$) and for the cortical thickness ($p=0.16$).

Conclusion: This study confirms that PTH(1–84) induces mainly an increase in trabecular density. 3D-DXA presents a high potential for clinical routine use for the assessment of the individual response to bone forming therapy.

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EPIDEMIOLOGY OF LOWER LIMB FRACTURES IN UKRAINIAN POPULATION OF DIFFERENT AGE

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Lower limb fractures 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 lower limb fractures. Fractures are a considerable public health burden but information on their epidemiology in Ukraine is limited. We identified 665 subjects from 76765 citizens, living in Vinnitsa region, who had a first time (incident) diagnosis of lower limb fractures recorded in the regional Hospital database from 1.01.2011 to 31.12.2011.

Results: Frequency the lower limb fractures of was 42.4 % from the total fractures in all patients and 44.4 % from the total fractures in patient aged 50 years and older. The most common anatomic site of lower limb fractures was the tibia and/or fibula (48.9 % of all incident lower limb fractures), followed by the hip (29.5 %), and the tarsal/metatarsal bones (21.6 %). Incidence of fracture in patient 50 years and old was 519.8 per 10000 patient for lower limb fractures, 212.3 per 10000 patient for tibia and/or fibula fractures and 226.9 per 10000 patient for hip fracture. Lower limb fractures were more common among males than among females in the younger age groups (up to 39 years old). Among subjects 50 years and older the incidence of lower limb fractures was higher in women than in men, and the difference increased with increasing age. Incidence of the tibia and/or fibula fractures was 340.7 per 10000 patient in the age group 60–69 years old, 44.9 per 10000 patient in age group 70–79 years old, and 102.4 per 10000 patient in age group 80–89 years old.

Conclusion: Our study provided the new information about the epidemiology of lower limb fractures in Ukrainian population according the age. This information is important for planning of the prevention and treatment strategy in patients of different ages.

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FORTIFIED BREAD IN CORRECTION OF VITAMIN D STATUS IN POSTMENOPAUSAL WOMEN

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Objective(s): To study the safety and efficacy of fortified bread in correction of vitamin D status in postmenopausal women.

Materials and methods: It was developed high-fiber baked bread with a cholecalciferol concentration of 25 µg per 277 g. 30 postmenopausal women aged 45–80 years old were included to the study. Patients with malignant disease; with renal, hepatic, or gastrointestinal disorders; with endocrine disease associated with abnormal calcium metabolism that required

therapy; who had used estrogen, progesterone, glucocorticoids, anticonvulsants, vitamin D supplements were not permitted for inclusion. 25(OH)D total and iPTH levels were assessed by electrochemiluminescent method using Elecsys 2010 analytical system (Roche Diagnostics, Germany) and test-systems cobas. The serum levels of calcium, phosphor, alkaline phosphatase, and lipids levels were evaluated for safety reasons. All subjects were subdivided into two groups: first one included 20 women (60.9±8.97 years. old, BMI - 29.21±5.42 kg/m²) who took fortified bread and second, control group, consists of 10 women (68.12±7.70 years old, BMI - 30.64±4.89 kg/m²) which took bread without cholecalciferol. The duration of the study lasts 21 days.

Results: Intake of fortified bread has facilitated a significant increase in 25(OH)D levels. In women with vitamin D deficiency the mean level of blood 25(OH)D increased from 14.20±2.60 to 20.05±2.74 ng/ml ($p<0.001$). In subjects with vitamin D insufficiency consumption of fortified bread leads to rising of blood 25(OH)D level from 22.50±1.6 to 26.03±1.90 ng/ml ($p<0.01$). In control group it was not significant increasing of blood 25(OH)D level (17.12±8.08 at baseline and 17.44±8.33 ng/ml in 3 weeks). Fortified bread leads to ionized calcium increase ($p=0,03$) in blood serum (from 1.23±0.04 to 1.25±0.04 mmol/L), but we did not see anyone with hypercalcemia. Also, it was not registered any adverse events in examined subjects.

Conclusion: The fortified bread has adequate taste, triggers significant 25(OH)D level increase in serum and is not associated with adverse events development.

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BONE DENSITY IN POSTMENOPAUSAL WOMEN WITH PRIMARY HYPERPARATHYROIDISM AFTER PARATHYROIDECTOMY

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Low BMD and osteoporosis in postmenopausal women with primary hyperparathyroidism (PHPT) is the result of combined lesions of postmenopausal changes of skeleton and the acceleration of bone metabolism with overproduction of PTH. Progressive decrease in BMD with microarchitectonics deterioration increased bone fragility and risk of fracture.

Objective: studying BMD in postmenopausal women with PHPT before parathyroidectomy and 1 year after surgery.

Materials and Methods: We studied 47 postmenopausal women with PGPT before parathyroidectomy and 1 year after surgery, the average age of which was 57±11.2, a general medical examination were made. Indicators of calcium-

phosphorus metabolism (PTH, Ca, Ca²⁺, P), BMD were examined before parathyroidectomy and 1 year after surgery. Zone BMD: LI-LIV, neck, upper neck, trochanter, total hip.

Results: Low bone mass in postmenopausal women (T-score $-1 \div -4.5$) before surgery was detected in 83 % (39/47) -L1-L4, in 51 % (24/47) right femur, in 49 % (23/47) left femur. Low bone mass 1 year after surgery was detected in 65 % (17/26) L1-L4 ($R=0.76$, $p<0.001$), in 42 % (11/26) right femur ($R=0.81$, $p<0.001$), in 42 % (11/26) left femur ($R=0.85$, $p<0.001$).

Conclusion: The findings suggest the combined lesions of the axial skeleton in PHPT, preferentially localized low bone mass in the lumbar spine in postmenopausal women and the high efficiency of surgical treatment.

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INFLUENCE OF BONE MINERAL DENSITY AT THE FEMORAL NECK ON THE PROBABILITY OF OSTEOPOROTIC FRACTURES

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Aim: To rate 10-year probability of osteoporotic fractures based on BMD at the femoral neck.

Materials and methods: The study included 70 patients (35 men and 35 women), aged 40–90 years, who applied to the largest clinics in Kazan for various reasons during the period from January to September 2014. In each of the clinics 7 (number locales) were randomly selected 10 patients (5 men and 5 women). All patients were invited for a visit to a rheumatologist for risk assessment and calculation of the 10-year probability of osteoporotic fractures (general and hip) through the FRAX validated for these purposes. Calculated on the basis taken epidemiological prevalence of risk factors in the Russian population. All the patients underwent DXA at Hologic densitometer with the definition of BMD at the femoral neck. Next was calculated the 10-year probability of fracture-adjusted BMD at the femoral neck. Threshold intervention (beginning antiosteoporotic therapy) was considered the 10-year probability of fracture over 20 % for all sites of fractures and/or more than 3 % for hip fractures.

Results: The average age of the patients was 61.8 ± 21.3 years (women - 59.2 ± 23.5 years, men - 63.5 ± 18.1 years). The probability of fracture in all locations in the next 10 years, more than 20 % was observed in 15 (21.4 %) patients: 11 (31.4 %) women and 4 (11.4 %) men. The probability of hip fracture within 10 years more than 3 % was detected in 13 (18.5 %) patients (10 (28.6 %) women and 3 (8.6 %) men). After adding in the program FRAX values at the femoral neck BMD increased number of patients with a 10-year probability

of fracture in all locations more than 20 % (19 (27.1 %) patients: 13 (37.1 %) women and 6 (17.1 %) men) and the femoral neck over 3 % (20 (28.6 %) patients: 13 (34.3 %) and 7 women (20 %) men).

Conclusion: The program allows to estimate the FRAX 10-year probability of osteoporotic fractures and to determine the threshold of intervention in individuals at risk. The advantage of this program is the ability to determine the likelihood of fractures in the absence of information about the BMD at the femoral neck. However, knowing the value of BMD significantly increases the sensitivity of the method.

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INDIVIDUAL TARGETED THERAPY OF VITAMIN D DEFICIENCY IN POSTMENOPAUSAL WOMEN WITH SOME SKELETAL DISEASES

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Objective: To assess the efficacy and safety of individual targeted vitamin D therapy in postmenopausal women with skeletal diseases (systemic osteoporosis and osteoarthritis).

Materials and methods: Due to high prevalence of vitamin D deficiency in Ukraine it was developed the individual targeted therapy of vitamin D deficiency. The individual targeted therapy consists of two periods - saturation period and maintenance therapy period, during which patients take it constantly. Duration of saturation therapy is calculated by the formula: Saturation therapy duration (days) = $(100 - \text{VDL}) \times \text{BW} / 100$, where: VDL is blood 25(OH)D level (ng/mL), BW is body weight (kg). The therapy for saturation includes combined calcium (1000 mg of calcium and 800 IU of vitamin D) and 3000 IU of vitamin D per day. Maintenance therapy includes 2000 IU of vitamin D per day. The study involved 70 postmenopausal women aged 46–87 years with skeletal diseases (systemic osteoporosis and osteoarthritis). All subjects were subdivided into two groups: main - 50 women who took individual targeted vitamin D therapy (50 subjects, 65.1 ± 8.8 years old, BMI 27.22 ± 4.51 kg/m²) and control (20 subjects, 64.5 ± 11.1 years old, BMI 26.68 ± 4.95 kg/m²). The duration of the treatment consists of 3 months starting on the 1st Oct 2013. 25(OH)D total and iPTH levels were assessed by electrochemiluminescent method using Elecsys 2010 analytical system (Roche Diagnostics, Germany) and test-systems cobas. The serum levels of calcium, phosphor, alkaline phosphatase levels were evaluated for safety reasons.

Results: In 3 months after the start of the treatment there was a significant ($p<0.001$) increase in 25(OH)D levels in the treatment group: 35.60 ± 8.21 nmol/L as compared to baseline levels of 25.20 ± 9.76 nmol/l. Remarkably, the treatment was most effective in the oldest subgroup (>70 years), as well as in

subjects with the BMI 25–28,99 kg/m². After the treatment, there were no changes in calcium levels.

Conclusion: The suggested individual targeted vitamin D therapy was proven to be effective in postmenopausal women. As the treatment turned out to be effective, relatively quick, and had a reasonable safety profile it may be beneficial for all vitamin D deficient postmenopausal women.

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LUMBAR PAIN IN A FIFTH DECADE MALE WITH DWARFISM: PLATYSPONDYLISIS VERSUS VERTEBRAL FRACTURES?

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Objective: Platyspondylisis represents a part of spondyloepiphyseal dysplasia. Different patterns are described but the major clinical clue is the dwarfism. In many low income countries such cases might not be diagnosed since normal skeletal functions might be preserved up to the adult life. We introduce a 43 years old male case who has never been previously investigated for his very short stature presenting with lumbar pain after a low trauma event (he is a constructions worker) associated with high blood pressure. At first vertebral fractures were suspected but finally platyspondylia was confirmed.

Material and Methods: We assessed 25-hydroxyvitamin D (or 25OHD with normal levels over 30 ng/mL), osteocalcin as bone formation marker (normal levels between 14 and 46 ng/mL), and crosslaps as resorption marker (normal levels between 0.23 and 0.854 ng/mL).

Results: 43-year male is referred to “C.I. Parhon” National Institute of Endocrinology from Bucharest, Romania for suspected vertebral fractures secondary to a low trauma working accident. At that moment the systolic blood pressure increased to 170 mmHg and he remained hypertensive so chronic medication was added in order to control the blood pressure levels. He is 138 cm tall. He had normal weight and height at birth, and mid parental height is 160 cm. The personal medical history is irrelevant except for progressive dwarfism since early childhood. Normal plasma testosterone and thyroid stimulating hormone were found, as well as intact adrenal function. The renal function is normal, so essential arterial hypertension is diagnosed. The karyotype was 46 XY. The X-Ray detected flatness of the bodies of the vertebrae while the hand and feet were normal; incipient bilateral coxarthrosis was

detected. DXA (Lunar Prodigy) found a Lumbar BMD of 1.234 g/cm², T-score of 0.1, Z-score of 1.2, mean total hip BMD was 0.84 g/cm², T-score of -1.8, and Z-score of -0.9, neck BMD of 0.747 g/cm², T-score of -2.5, Z-score of -1.3, distal nondominant forearm BMD of 0.623 g/cm², T-score of -2.3, and Z-score of -2.3. 25OHD was 44 ng/ml, osteocalcin was 17.01 ng/mL, serum crosslaps were 0.518 ng/mL. The spine magnetic resonance imagery detected a part from vertebra plana, hypersignal in T2 and T1 sequences.

Conclusion: The diagnosis of osteoporosis in an adult male with dwarfism is challenging, and the platyspondylisis associated bone loss might be involved.

P693

EFFECTS OF BORON NITRIDE AND/OR HYDROXYAPATITE COMPOUNDS ON BONE DEFECT MODEL OF RATS

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Objective: To investigate effects of graft plaques including different concentrations of boron nitride (BN) and/or hydroxyapatite (HA) on bone defect in rats. Thus to investigate effects of BN as a new target for bone defects.

Methods: This study was performed in 8 male rats groups. Heathy ones were used as control rats (Group 1). For experimental groups a standard noncritical size defect (3 mm diameter) was induced in all rat femurs. Graft plaques consist of different concentrations of BN-HA was located in defected area and surgical area closed. No graft implantation applied in control group (Group 2). For treatment groups one group was selected as allograft group (Group 3) in which standard procedure applied and the other five groups were implanted with BH-HA plaques in different concentrations: Group 4: 100 %HA; Group 5: 2.5 %BN+97.5 %HA; Group 6: 5 %BN+95 %HA; Group 7: 10 %BN+90 %HA and Group 8: 100 %BN. At the 1st, 2nd 3rd and 4th week after operation, computed tomography (CT) images were obtained for all groups and tissue samples were collected.

Results: At the 4th week after defect induction a good healing was observed in groups treated with plaques containing 2.5

%BN+97.5 %HA; 5 %BN+95 %HA and 10 %BN+90 %HA. Also in real time PCR analyses, some bone markers were investigated such as osteonectin and collagen 1A1. BN containing plaques exerted better results than standard allograft group.

Conclusion: This study showed that graft plaques containing BN and/or HA significantly increased bone healing in rats. HA is already known as one of the main material of bone structure and being used by biomedical engineers. This study suggested BN as a new target for treating bone defects in orthopedic surgery.

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P694

TOTAL ELBOW ARTHROPLASTY IN OSTEOPOROTIC SUPRACONDYLAR FRACTURES: FUNCTIONAL OUTCOMES

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Supracondylar humerus fractures are infrequent (2 %). These fractures pose a challenge to the surgeon because they often are intraarticular and irregular strokes, implying technical difficulty. In addition, these type of fractures have complicated rehabilitation.

Total elbow arthroplasty can be an option in elderly patients with poor bone quality, they usually have intraarticular comminuted fractures.

Objective: To show our experience using total elbow arthroplasty for osteoporotic supracondylar fractures and perform a functional evaluation of these patients.

Methods: Case series in which 10 patients with osteoporotic supracondylar fracture C (AO classification) in our hospital during the last 2 years. All of them underwent total elbow arthroplasty using Coonrad- Morrey III (Zimmer). These cases were reviewed clinical and radiologically at first and third months. We carry out a functional evaluation with Quick-Dash test at 6 months.

Results: 10 cases of osteoporotic supracondylar fracture were reviewed with a mean age of 82 years old (all of them women). Functional outcomes were satisfactory reaching range of flexion >100° without pain. Only one of these cases presented a wound dehiscence complication. In the Quick-Dash test, the average percentage was 29.5 %.

Conclusion: Total elbow arthroplasty in osteoporotic supracondylar fracture C is a valid option in elderly patients with low bone quality, since the double plate osteosynthesis requires important rehabilitation to achieve wide ranges of

mobility. In literature, there are few articles comparing the two methods of treatment, they seem to indicate better functional outcomes for total elbow arthroplasty.

P695

OSTEOPOROSIS ASSESSMENT IN PATIENTS WITH ADVANCED ANKYLOSING SPONDYLITIS

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Objective: To evaluate BMD in patients with advanced ankylosing spondylitis and its correlation with acute phase reactants of inflammation and disease duration.

Material and methods: We studied 43 late stage ankylosing spondylitis (AS) patients (according to the modified New York criteria), 37 men and 6 women. The exclusion criteria was no history of bisphosphonates, psoriasis and inflammatory bowel disease. BMD was assessed by DXA. We evaluated all patients by DXA at the femoral neck and the inflammatory acute phase reactants and also we evaluated the relationship between disease duration and osteoporosis. The new bone formation, that is characteristic of AS, causes an overestimation of the total BMD and values can be normal or high, even when osteoporosis is present, so we assessed patients only on femoral neck.

Results: Mean age of the study group was 51.86 years, 50.56 years in men and 47.32 years in women. We found that BMD was consistently lower in patients with disease duration of more than 15 years and in patients with a long history of NSAIDs administration. Among patients under 50 years of age ($n=7$), 5 (71.42 %) had a BMD T-score < -1 at the hip and 2 (28.57 %) had BMD T-score < -2.5. Among patients 50 years age or older ($n=36$), 12 (33.33 %) had osteopenia (T-score between -1.7, -2.2) and 6 (16.66 %) had osteoporosis (T-score - 2.5, -3), the remaining 18 (50 %) showing a normal BMD value. Among women 3 (50 %) had osteoporosis, 1 (16.66 %) had osteopenia and 2 (33.33 %) had a normal BMD. Among men, 30 patients >50 years, 16 (53.33 %) had a normal BMD value, 3 patients (10 %) had osteoporosis and 11 patients (36.66 %) had osteopenia. Also, low BMD was correlated significantly with demographic variables (female sex, older age), as well as disease-related variables (long disease duration, high lifetime use of NSAIDs, elevated inflammatory parameters, high mean ESR, C-reactive protein).

Conclusion: Osteoporosis and osteopenia are common complications of ankylosing spondylitis, can occur in early stage of the disease and is often undiagnosed and untreated, particularly in male patients with AS. Older age and long disease duration, syndesmophytes formation and elevated inflammatory parameters, indicate increased risk of osteoporosis.

P696

THE ILLNESS PERCEPTION AND ADHERENCE OF OSTEOPOROSIS PATIENTS

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Objective: To assess the illness perception as well as the patients' adherence to osteoporosis therapy.

Methods: The cross-sectional study was conducted from 2013 to 2014 year at the Institute of Rheumatology, University of Belgrade, School of Medicine (Serbia). Postmenopausal women with diagnosis of primary osteoporosis were recruited in the study. Patients' adherence to osteoporosis therapy was evaluated using the 10-item Medication adherence scale (MARS). Patients' perception about osteoporosis therapy was assessed by Brief Illness Perception Questionnaire (BIPQ). BIPQ items' average scores were presented on the scale from 1 to 10. The final score of the BIPQ questionnaire had reversed order, therefore higher score reflected a more threatening view of the illness.

Results: The study included 29 patients with average 66.55±8.16 years of age. The average number of medications and duration of osteoporosis by patient was 3.31±2.09, and 4.12±3.46, respectively. The average scores of MARS questionnaire was 38.68±2.39 out of maximum score of 50 and of BIPQ questionnaire 37.54±2.77 out of maximum score of 80. The correlation between MARS and BIPQ scores was negative but not statistically significant ($r=-0.12$, $p>0.05$). Patients perceived the duration (timeline) of the osteoporosis with the highest average grade (8.93±0.40) and their understanding of osteoporosis with the lowest average grade (2.07±0.59). The identity with the osteoporosis was perceived with the average grade of 5.57±3.38 and illness' concern with average grade of 5.64±4.08. Other items had grades below of 5. Correlation between duration of osteoporosis as well the number of medication and BIPQ score was negative and not statistically significant.

Conclusion: According to the results patients perceive and know their illness well. Patients' perception of illness is an important predictor for patients' adherence and therefore their measurement might be a part of the routine clinical practice.

P697

EFFECTIVENESS OF LOCOMOTOR THERAPY USING ROBOTIC-ASSISTED GAIT TRAINING IN PATIENTS WITH STROKE

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Objective: The purpose of this study was to determine the effectiveness of robotic therapy on motor deficit, spasticity and functional independence in patients with stroke.

Materials and methods: We studied a total of 30 stroke patients who received 20 sessions of robotic training combined with balneophysiotherapy. The evaluation parameters included modified Ashworth Spasticity Scale (MASS), Evolution motor deficit assessed by Barthel index, Functional Independence Measure (FIM), and Short Form-36 (SF-36) Health Survey.

Results: The results showed significant improvements for all monitored parameters. Assessment of motor deficit. After 6 months the percentage of patients with severe and very severe deficit was reduced to 10.11 % with moderate deficit. Assessment of spasticity. At 12 months the percentage score two patients in the study group decreased by 16.68 %. Assessment of functional independence. The evolution of patients evaluated by FIM score was good. Effect size at 12 months from baseline was higher in the study group, both at the motor (ES=2.43) and the cognitive-behavioral (ES=1.73).

Conclusion: Pair robotic training (Lokomat) with classical techniques of medical rehabilitation, improvement on motor deficit, measured by Barthel index, spasticity development, functional independence and quality of life. All these indices were improved in the study group.

P698

BONE BIOSENSORS: KNOWING THE PRESENT AND PREDICTING THE FUTURE

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BMD, currently used as the gold standard to assess bone health and its continuous remodeling capacity, suffers from various setbacks. As a result, researchers are looking for alternatives in this regard. Recent studies show that bone turnover markers have several advantages over BMD: they can provide a more representative index of the overall bone loss than that obtained by BMD values measured at specific skeletal sites and less time is needed for the changes in these markers to become apparent. However, the routine use of these markers in the clinical practice is not recommended, mainly because of the variability reported in measuring and interpreting these results. Over the past few decades, research has been conducted in the field of biosensors to study bone-cell

mechanosensation and detect the concentration of BTMs in biological samples for robust diagnosis. Technological developments have greatly enhanced assay performance producing reliable, rapid, noninvasive cost effective biosensors with improved sensitivity and specificity which can help to improve Point-of-care (POC) through real-time and remote health monitoring; the use of these devices is still limited to research and cannot be deployed in clinical practice because of their limitations and setbacks. The present review seeks to provide an insight into the current state-of-the-art in the bone biosensor field. Based on the existing literature, bone biosensors can be classified in three main categories: Biomechanical Sensors, Multiplex Automated Assays, and Label - free biosensors. Each of these techniques has their pros and cons, but they all support that future studies should be directed towards the development of a biosensor capable of assessing several BTMs at the same time noninvasively, rapidly and accurately. At the same time new strategies must be considered to bring this important technology into clinical practice.

P699

EFFICACY OF TREATMENT WITH TERIPARATIDE IN COMMON POPULATION

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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.

Objective: To confirm effect of treatment with teriparatide in common population.

Methods: Patients with postmenopausal osteoporosis, glucocorticoid induced osteoporosis and male osteoporosis who fulfil ACR criteria for these subgroups of osteoporosis and were treated with teriparatide for 2 years, underwent DXA examination and laboratory examination (serum level of Ca, 25-OH- vitamin D, P1NP, β 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 Lunar machine.

Results:

All patients in registry N=130

Patients with started therapy N=85

GIOP (N=74) ; 60,8 %

Postmenopausal osteoporosis (N=47); 36,2 %

Male osteoporosis (N=4) ; 3,1 %

Demography

Men (N=8) ; 9,4 %

Women (N=77) ; 90,6 %

Age (year)		Median	69.2		
		5 % percentile	27.3		
		95th percentile	82.2		
		Number	5th percentile	median	95th percentile
BMD Femur Neck (g/cm ²)					
basal value		81	0.530	0.690	0.860
6 months	p=0.273	4	0.619	0.813	0.823
12 months		41	0.526	0.698	0.846
18 months	p=0.180	4	0.643	0.762	0.894
24 months	p=0.285	30	0.540	0.724	0.897
BMD Femur Neck (g/cm ²)					
basal value		81	0.530	0.690	0.860
6 months	p=0.273	4	0.619	0.813	0.823
12 months		41	0.526	0.698	0.846
18 months	p=0.180	4	0.643	0.762	0.894
24 months	p=0.285	30	0.540	0.724	0.897
Vitamine D (ng/ml)					
basal value		72	17.0	64.6	101.2
6 months	p=0.933	47	19.0	55.4	102.0
12 months	p=0.877	42	24.9	51.5	97.2
18 months	p=0.206	32	14.3	61.7	97.2
24 months	p=0.447	38	25.3	55.0	103.0
BMD Vertebral (g/cm ²)					
basal value		74	0.630	0.780	1.100
6 months	p=0.068	4	0.806	0.898	1.093
12 months		39	0.702	0.865	1.211
18 months	p=0.317	5	0.868	0.998	1.175
24 months	p=0.273	32	0.709	0.868	1.130
s-Ca (mmol/l)					
basal value		83	2.22	2.41	2.63
6 months	p<0.001*	59	2.23	2.56	2.82
12 months	p=0.006*	46	2.14	2.47	2.74
18 months	p=0.636	37	2.25	2.48	2.73
24 months	p=0.407	38	2.25	2.47	2.65
u-Ca (mmol/l)					
basal value		35	0.84	2.50	7.03
6 months	p=0.080	8	0.48	2.50	7.03
12 months	p=0.180	8	0.93	2.53	5.63
18 months		6	0.41	2.32	4.65
24 months		6	0.90	1.24	4.24
P1NP (ug/l)					
basal value		75	9.9	39.0	116.4
6 months	p<0.001*	48	36.8	129.4	305.4
12 months	p=0.043*	37	28.7	127.3	300.3
18 months	p=0.079	32	25.5	94.2	310.3
24 months	p=0.016*	37	20.2	75.5	206.2

There are 5 patients with osteoporotic fractures during follow up.

4 patients have 1 fracture and one patient has 4 fractures during follow up.

Conclusion: These results of common population of patients suffering from the postmenopausal osteoporosis, glucocorticoid induced osteoporosis and male osteoporosis confirm BMD gain in all regions especially after the first year of treatment and reduction of fracture risk.

P700

MEASURING FOREARM BONE MINERAL DENSITY (BMD) IN ELDERLY FEMALE PATIENTS (PTS): DOES IT ADD VALUE FOR THE DIAGNOSIS OF OSTEOPOROSIS?

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Purpose: Osteoporosis is conventionally diagnosed using BMD spine and hip sites. However, elderly PTs often have degenerative changes at these sites that falsely elevate measurements in DXA scans. In these PTs, higher BMD will not diagnose osteoporosis when the diagnosis would be appropriate. We evaluated data from elderly female PTs whose BMD measurements in the forearm bone were consistent with osteoporosis and whose status would be normal or osteopenia if only spine and hip data were considered.

Method: 2000 consecutive records of PTs referred between March and November 2014 for evaluation for osteoporosis were reviewed. BMD from three sites (spine, hip and 1/3 radius of forearm) were obtained on the same day, with the same equipment settings and calibration. Female PTs (60 black, 55 white) with osteoporotic BMD in the forearm were further evaluated. We counted the number of cases in which the measurements from spine and hip failed to meet criteria for osteoporosis when the forearm data were consistent with it. We correlated bone morphology with available CT, spine, hip x-rays, VFA and DXA images.

Result: 23 of 55 white female PTs and 24 of 60 black female PTs whose forearm BMD measurements were consistent with a diagnosis of osteoporosis, would be classified as normal or osteopenia if only spine and hip data were taken into consideration. Further, 32 black females with forearm measurements consistent with osteoporosis would be classified as nonosteoporotic on the basis of spine and hip measurements alone when compared to the standard white female normal database. In the total cohort, 16 PTs had demonstrable vertebral fractures and all of them had degenerative changes when bone imaging were reviewed.

Conclusion: In the sample studied, a sizable fraction of individuals showed a lack of agreement in diagnostic status based on

BMD measurements from the forearm versus spine/hip. Furthermore, degenerative changes in the spine and hip showed higher BMD in AP spine and hip/femoral neck sites than in the forearm site. In diagnosing osteoporosis in the elderly female, forearm BMD may be a significant determining factor. This may prove particularly relevant if comparing all PTs against the white female normal BMD data. We conclude that forearm assessment may be useful in the evaluation of osteoporosis in the elderly female.

P701

BONE WITH OSTEOPOROSIS: CLINICAL, FUNCTIONAL AND MORPHOLOGICAL CORRELATIONS

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Objective: to show how a multidisciplinary team can be effective in treating and preventing osteoporotic fractures.

Patients and Methods: The study involved 37 patients who suffered femoral neck fractures. All the patients had replacement arthroplasty and then they needed a complex rehabilitation programme. Starting from the fact that cellular injuries and tissue changes vary from one part of the bone system to another and that these changes are more severe in the neck and head of the femur, we analyzed fragments of bone tissue.

Results: Hip fractures are more frequent in old patients (65 years old) and especially in advanced stages and after the age of 70. We also established that most of the fractures took place after falling from very low heights (in 93 % of cases) and the trauma intensity was appreciated as being small in most of cases. 29 of the patients considered for this study had been diagnosed with osteoporosis, but only 22 were on antiosteoporotic medication. The macroscopic aspect of the femoral neck and head architecture varied from one patient to another: in older patients the cortical bone was a lot thinner and the trabecular bone rods were more attenuated compared younger patients.

Conclusion: Analysing the bone structure, the factors or previous conditions that lead to the current state and designing an appropriate rehabilitation and pharmacological program, may be very important in reducing the risk for new fractures.

P702

INFLUENCE OF URBAN AND RURAL RESIDENCY ON FRAX VALUES

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Aim: To evaluate the possible influence of urban and rural residency on 10-year fracture probabilities (FRAX).

Methods: We analyzed data from a cohort of 760 Romanian urban and rural females, 45–80 years, who completed risk factor questionnaires over a 10-year osteoporosis-screening period. We calculated FRAX values using the WHO FRAX tool for Romania.

Results: Overall FRAX values show a slightly higher risk for urban compared with rural residency women. However, if excluding women with hysterectomy, there are no significant differences between the two groups.

Conclusion: The impact of settlement on fracture risk factors seem to be neutral, however osteoporosis risk profile significantly differs if each factor separately analyzed.

P703

RHEUMATOID ARTHRITIS: PREDICTIVE FACTORS FOR DISABILITY IN PATIENTS WITH REMISSIVE TREATMENT

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Objective: To determine predictive factors of disability in rheumatoid arthritis patients in order to assess the functional status course of the disease.

Patients and Methods: A total of 53 patients diagnosed with RA (according to American College of Rheumatology criteria) were followed prospectively for 12 months. At baseline and at endpoint, the value of pain (VAS 0–100 mm), tender joint count, the Stanford Health Assessment Questionnaire (HAQ) scores, Short Form-36 (SF-36), the activity of disease (DAS28) was performed.

Results: Correlations between numerous baseline data and HAQ and also SF-36 scores at endpoint were analyzed, using nonparametric tests. A multilinear regression model was performed to select independent prognostic factors of disability. During the study period, mean HAQ decreased from 1.7 (± 0.3) to 0.6 (± 0.4). More than 30 % of the patients had an improvement of the disability score. Final HAQ score was well associated with baseline values of pain and tender joint count, DAS28.

Conclusion: The complex evaluation of patients with RA can be considered “the cornerstone” of their monitoring in various drug therapies.

P704

CARDIOVASCULAR RISK IN PERSISTENT JOINT INFLAMMATIONS IN PATIENTS WITH PSORIATIC ARTHRITIS

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It is known that psoriatic arthritis have joint and skin manifestations, where the high cellular turnover generate the presence of uric acid in crescent level which determinate the modification of the protein metabolic line.

Objective: To evaluate the cardiovascular risk to this category of patients who have clinical and biological inflammation and high level of uric acid.

Material and method: In our study we have taken 72 patients divided in two equal groups. Group A presented high level of inflammation tests and uric acid, in treatment with leflunomidum and nonsteroidal drugs, or in a few particularly cases low doses of metil prednisolonum for a short period of time. Group B, a witness group, presented a low level of inflammation and uric acid, and was in biological therapy with adalimumabum, infliximabum and etanerceptum. All the patients have monitoring by PASI score, inflammations tests: ESR (erythrocytes sedimentation rate), CRP (C Reactive Protein), metabolic line: uric acid, and cardiovascular tests: the value of blood pressure, electrocardiography and effort test heart where was necessary. Was not possible to determinate the high resolution for cardiovascular CRP.

Results: Group A obtained the high cardiovascular risk scores: modification of ST segment, negative T wave: irregular heart rhythm: supra ventricular and ventricular extra systoles, atrial fibrillation, hypertension in 25 patients, modifications of effort test heart, and a PASI score was maintained at the same level. In three cases was necessary coronarography and interventions for stent in one case. Group B obtained a good PASI score, and the evaluation of inflammations and cardiovascular risk, was convenient.

Conclusion: The patients who develop persistent inflammations, extensive skin lesions and high level of uric acid, which have not biological therapy, presented more cardiovascular modifications. They needed cardiovascular therapy added for possible complications, situation not existent in patients without inflammation for long period of time.

P705

OSTEOPOROSIS AND ANKYLOSING SPONDYLITIS

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Ankylosing spondylitis (AS) is a systemic autoimmune inflammatory connective tissue disease affecting entheses and causing new bone formation in the spine. It is well known that

the disease decreases bone mass in parallel with the appearance of new bone tissue in the area of the spine. Aim: To assess BMD in patients with AS.

Methods: In a group of 81 patients with AS, 61 males and 20 females, aged 28–78 (mean±SEM) 51.83±1.25 years, with a disease duration of 2–40 (mean±SEM) 16.35±1.09 years, BMD was measured at 3 bone areas, the lumbar spine, left and right hip. The AS disease activity index BASDAI was 2.0–9.0 (mean±SEM) 4.8±0.55. The disease index BASDAI was 4.97±0.6 and 4.1±1.6 in male and female patients, respectively. BMD was measured by DXA. Statistical evaluation of the results was performed with the statistical package SPSS19.

Results: BMD of the AS patients in the lumbar spine, as evaluated by T-score, was -2.13 ± 0.18 (mean±SEM) and in the left hip -1.96 ± 0.12 . BMD in male patients was -2.29 ± 0.23 in the lumbar spine and -2.12 ± 0.15 in the left hip and in female -1.67 ± 0.24 and -1.88 ± 0.23 in the lumbar spine and the left hip, respectively. Within the group of male patients 30 had osteoporosis, 16 had osteopenia and 15 had normal BMD. Within the group of female patients 10 had osteoporosis, 4 had osteopenia and 6 had normal BMD.

Conclusion: AS appears to affect the bone and seems to be related with a decrease in bone mass and the development of osteoporosis and osteopenia in male and female patients. This study shows that AS affects more male patients and disease severity is higher in male patients as is shown by the number of affected patients and the disease activity index. AS seems to affect BMD more severely in men causing osteoporosis primarily affecting the lumbar spine. The disease is related to de novo bone formation, despite that, being an inflammatory autoimmune disease affects bone quality causing osteoporosis.

P706

OSTEOCALCIN AND SEX STEROIDS AND TBS IN MEN

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Osteocalcin is produced in very large quantities by osteoblasts. Osteocalcin may influence the insulin secretion and the β -cell proliferation and energy costs. More recent studies

in experimental animals have shown that this hormone could also control the production and secretion of testosterone by the testis and so could have an impact in fertility and in sexual function. The trabecular bone score (TBS) may allow to evaluate the microarchitectural configuration of the bone.

Objective: To study the relationship between the osteocalcin and the sex steroids blood levels and the TBS in men.

Material and methods: A group of 46 men, mean age 55.9 years (ranging from 31.9 to 83.8), fasting blood samples were collected to evaluate osteocalcin (ng/ml), total testosterone (ng/ml), estradiol (pg/ml), SHBG (nmol/l), free testosterone (pg/ml) and bone alkaline phosphatase (μ g/l) levels. The BMD (g/cm²) at the L1-L4 was evaluated by DXA and the TBS was derived from each spine DXA scan. These men had no diseases nor treatments influencing the bone mass. The total fat and lean body masses (kg) were measured by DXA. BMI (kg/m²) was also estimated. Statistics: The obtained data were analyzed using descriptive analysis and the Spearman test. Statistical significance was set for $P < 0.05$.

Results: Osteocalcin levels correlated significantly and negatively with the weight, the BMI and the total body fat mass, but no significant relationship between this hormone and the lean body mass was detected. The osteocalcin was significantly related to bone alkaline phosphatase and significant relationships between total testosterone and estradiol blood levels, but not with SHBG. A significant correlation was also found between TBS and osteocalcin, but not with BMD.

Conclusion: The osteocalcin was correlated with bone quality as accessed by TBS. The results of this study may also suggest that circulating osteocalcin can be an important factor mediating the sex steroids secretion in men, but more studies are needed to validate these data.

P707

EVALUATION OF THE EFFECTS OF PHYSICAL REHABILITATION TREATMENT OF PATIENTS WITH SPINAL CORD INJURY

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Objective: Assessment of the effects of physical therapy recovery in patients according to diagnosis (vs paraplegia quadriplegia)

Materials and Methods: To determine the effects of physical therapy paraplegia and quadriplegia recovery, we performed a comparative study between the two subgroups, which included 53 patients with paraplegia and 27 patients with quadriplegia. The evaluation parameters included: VAS for pain. Functional Independence Measure (FIM).

Results: In both groups the majority were men with a mean age of 31.04 years the majority of cases were from urban areas 52.83 %. In the group with incomplete paraplegia patients with lesions accounted for 75.47 and 81.48 % at the tetraplegia ($p=0.122$). Size effect on pain score in patients with paraplegia and quadriplegia was moderate ($ES=0.66$, $SE=0.59$, respectively). Comparing the scores obtained from patients with paraplegia FIM and those with quadriplegia, significant differences in terms of motor score in both assessments (58.27 vs. 46.95; $p=0.023$, respectively, 64.22 vs. 49.20; $p=0.003$), while the differences are insignificant in cognition score (33.93 vs. 33.17; $p=0.871$, respectively, 35.02 vs. 34.13; $p=0.868$).

Conclusion: The treatment effect on the evolution of patients with paraplegia when the pain was moderate ($ES=0.66$) and FIM motor score ($ES=0.64$), and lower the FIM cognition ($ES=0.33$). In quadriplegia, the treatment if pain was moderate ($ES=0.59$), and lower on the FIM motor score ($ES=0.35$).

P708

MUSCULOSKELETAL ULTRASOUND VERSUS CONVENTIONAL RADIOGRAPHY FOR OSTEOARTHRITIC KNEE PAIN DIAGNOSIS

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Osteoarthritis represents the most frequent rheumatic disease affecting peripheral joints. Although the gold standard for knee joint osteoarthritis in clinical practice is still represented by conventional radiography, musculoskeletal ultrasound is an emerging tool of increasing interest able to detect both structural and inflammatory lesions and facilitate disease diagnosis and monitoring.

Objective: To demonstrate, assess and quantify the pathological findings associated with osteoarthritis in patients referred with knee pain through musculoskeletal ultrasound in comparison with conventional radiography.

Methods: We evaluated 124 consecutive patients over 50 years of age referred for knee pain without a previous diagnosis of knee osteoarthritis or any other inflammatory joint disease. Ultrasound evaluation was performed by a trained rheumatologist unaware of the clinical data using a Prosound $\alpha 6$ equipment with a multifrequency linear probe and using the standardized scanning technique. The following pathological findings were recorded on ultrasound: degenerative cartilage lesions defined as focal or diffuse thinning of the cartilage layer, loss of homogeneity, irregularities of the osteochondral and chondrosynovial margins, osteophytes defined as step-up bony protrusions of the margin of the joint

confirmed in two perpendicular planes, joint effusion, synovial hypertrophy and bursitis. Conventional radiographs of anteroposterior and lateral view of the knee joint were assessed by a trained rheumatologist in the absence of the clinical and ultrasonographic data considering femorotibial joint space narrowing and osteophytes as pathological findings suggestive for osteoarthritis. Both methods evaluated in a qualitative manner the abnormal findings (presence or absence)

Results: We assessed 124 patients (78 females and 46 males) with a mean age of 60.56 ± 8.68 years. The total number of knee joints evaluated was 193 as 69 patients experienced pain in both knees at clinical evaluation. Compared to conventional radiography musculoskeletal ultrasound detected significantly more osteophytes ($p < 0.005$) and/or degenerative cartilage lesions ($p < 0.005$). In addition to structural lesions ultrasound was able to detect inflammatory changes associated with osteoarthritis. Joint effusion was detected in 45 % of patients, synovial hypertrophy in 31 % patients, only 9.67 % had signs of hypervascularisation expressing power Doppler signal, while in 22.5 % patients was detected a semimembranosus-gastrocnemius bursitis. Knee ultrasound evaluation offered valuable supplementary information. In 7 patients double contour sign suggested further investigations and subsequent diagnosis of gout while in 9 patients detection of meniscal calcification and intracartilage linear deposits made possible the diagnosis of calcium pyrophosphate dihydrate crystal deposition disease after fluid analysis.

Conclusion: Musculoskeletal ultrasound is an extremely valuable tool for knee pain assessment being able to set up an early osteoarthritis diagnosis in patients with normal radiographic evaluation and the only easily available, noninvasive and low-cost technique capable of detecting associated inflammatory lesions and crystal deposition disease.

P709

MENISCAL LESIONS AS PROMOTING FACTORS FOR CARTILAGE LOSS

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Knee osteoarthritis (kOA) is one of the most frequent degenerative joint disease and its etiology is complex, the meniscal lesions, being cited as promoting factors for cartilage loss.

Objective: To determine if there is a relation between meniscal lesions and meniscal extrusion and the cartilage damage, using musculoskeletal ultrasonography (US).

Methods: We enrolled 25 consecutive patients (mean age 59.9 ± 5.6 years) with kOA, stratified based on the presence/absence of the meniscal lesions and/or meniscal extrusions. Besides usual clinical and paraclinical data, we included the information regarding the past conventional pharmacological OA treatment. US was done using an Esaote MyLab 25 machine, with a high frequency linear probe and we noted the presence/absence of meniscal changes and the width of the femoral cartilage, obtained with the knee fully flexed.

Results: we found more frequently meniscal lesions/extrusions in the medial compartment ($p < 0.05$) and associated with more severe changes in the femoral cartilage ($p < 0.001$). Patients with conventional OA treatment, including glucosamine and chondroitin sulfate, had less severe changes in the femoral cartilage.

Conclusion: The severity of kOA was increased in patients with meniscal changes, but in the same time, conventional pharmacological treatment could be taken into consideration.

P710

EPIDEMIOLOGY AND MANAGEMENT OF POST-MENOPAUSAL OSTEOPOROSIS IN THE MIDDLE EAST AND AFRICA

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Postmenopausal osteoporosis (PMO) is an under recognized disease and its characteristics vary among regions. Genetic and environmental factors play a major role. Objective: To gather data on epidemiology of PMO and fragility fractures (fx) and to study their management in countries in the Middle East and Africa (ME&A) as well as to study the particularities of this disease in this region in order to deliver policy for health care improvement.

Methods: The resources of our research included Personal communication and a review of PubMed electronic database using the following terms: “Fractures, postmenopausal Osteoporosis, BMD, Middle East and Africa ” up to September 2014.

Results: The prevalence of PMO based on BMD is quite comparable across ME&A countries, and was close to 30 % in several studies. Hip fx incidence ranged between 100 and 295 per 100,000 person/year. Radiographic vertebral fractures VF were detected in 1/4 of asymptomatic women with low BMD. A large number of women are unaware of osteoporosis (OP) risk factors: 60 % of women identified low calcium intake, 39 % lack of exercise and 22 % a family history of OP as risk factors of OP. The prevalence of hypovitaminosis D in the ME&A has been estimated to range between 50 and 90 %. The availability of DXA machines is estimated to be less than 5/million population. National OP guidelines are

available in five countries, Only 4 countries in ME&A have an online FRAX[®] calculator. Most approved antiresorptive drugs were available in the majority of countries, whereas PTH analogs were in only half. Reimbursement for diagnostics and therapeutics varied widely. Information on social costs and quality of life are rare. Discussion: The health burden of PMO in the ME&A is significant. The prevalence of PMO, fragility fx incidence and risk factors should be more widely and rigorously evaluated. Multiparity, skin pigmentation, clothing style are possible predictors of hypovitaminosis D. Access to care and the availability of equipment are variable depending on economic conditions.

Conclusion: Considerable support for research is required to face the explosive growth in osteoporotic fracture due to the steady growth of the ageing population in the ME&A.

P711

EFFECTIVENESS OF PREOPERATIVE TELEREHABILITATION IMMEDIATELY BEFORE TOTAL HIP REPLACEMENT FOR PATIENTS SUFFERING SEVERE HIP OSTEOARTHRITIS

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Preoperative rehabilitation may significantly improve clinical status of patients suffering hip osteoarthritis. However, it is rarely prescribed immediately prior scheduled THR surgery. Physiotherapy is recommended for management of OA, in the preoperative period, as one of the treatments options. Physiotherapy is recommended by Osteoarthritis Research Society International (OARSI) among twelve other modalities. The effectiveness of the preoperative physiotherapy at this stage of disease is rarely described in the literature.

Purpose: To assess patient-reported outcomes and musculoskeletal condition patients who received preoperative telerehabilitation immediately before scheduled total hip replacement (THR) surgery for end-stage of hip osteoarthritis.

Material and Methods: 91 patients awaiting for primary total hip arthroplasty were recruited to by invitation sent to patients scheduled for surgery. 53 patients received home telerehabilitation using the internet based platform and unified preoperative exercises protocol for 1 month before admission. 38 patients served as the control with no physiotherapy or another treatment. Patient-reported outcome and parametric physical examination measures were collected preoperatively before and after telerehabilitation. The Harris Hip Score (HHS), WOMAC, 36-Item Short-Form Health Survey (SF-

36), and Hip disability and Osteoarthritis Outcome Score (HOOS) and VAS score were used.

Results: Among patients who received preoperative telerehabilitation a significant improvement was found for: HOOS pain ($p=0.0008$), HOOS daily living ($p=0.0043$), HOOS quality of life ($p=0.0028$), WOMAC pain ($p=0.0006$), WOMAC stiffness ($p=0.0166$) and VAS ($p=0.0043$). In physical examination significant differences were found in hip adduction passive range of motion ($p=0.028$). No treatment in the control group led to no significant differences between two examinations ($p>0.05$).

Discussion: Patients receive no physiotherapy routinely immediately before THR. This study confirms that late preoperative telerehabilitation may improve musculoskeletal system status indicators and quality of life in hip osteoarthritis patients awaiting surgery. It is anticipated that more fit patient prior surgery may be better prepared for the fast track postoperative rehabilitation after THR.

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P712

EFFECT OF ANGIOTENSIN II RECEPTOR BLOCKER TELMISARTAN ON BONE FRACTURE HEALING IN RATS: RELATIONSHIP BETWEEN VEGF AND TELMISARTAN

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Objective: Bone tissue is the main element of the roof required for the proper functioning of organs and systems in the human body. Although it has been determined that telmisartan decreases fracture risk and increases bone density telmisartan (1, 2), it is not completely clear how such medications work. The purpose of this study is to research the effects of chronic telmisartan application in rats with experimental fractures on bone healing and evaluate possible mechanisms

Methods: The rats were randomly divided into three groups ($n=6$ per group): femoral fracture control (Group 1), femoral fracture+10 mg/kg Telmisartan (Group 2), and femoral fracture+20 mg/kg Telmisartan (Group 3). General anesthesia for all operative procedures was achieved. Postoperative pain was controlled using a peritoneal injection of 150 mg/kg metamizole sodium initially.

Results: The fracture healing scores of both doses of telmisartan groups were significantly better when compared to the fracture control group. Also X-Ray, computed tomography and biomechanical testing results at 4 week after fracture induction demonstrated that telmisartan has fastened bone healing. In immunohistochemical staining hypertrophic chondrocytes were immunopositive for vascular endothelial growth factor (VEGF). Remarkably, the semiquantitative analysis shown higher VEGF positive cells in treatment group compared with control animals. Mild to severe immunopositivity for VEGF observed in treatment groups. Control group animals immunohistochemistry for osteocalcin showed mild positivity.

Conclusion: We demonstrated positive effects of telmisartan on bone healing with radiomorphometric and histomorphometric data. Relationship of telmisartan with VEGF and osteocalcin during bone healing has also shown by immunohistochemical methods. Bone fracture healing can be boosted by telmisartan.

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P713

OSTEOPOROSIS IN SYSTEMIC SCLEROSIS

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Systemic sclerosis is a systemic connective tissue disease characterized by involvement of the skin, the lungs and other organs. The relationship of systemic sclerosis with osteoporosis is not known, recent publications, however, are found related to the matter (Omair et al., Clin Exp Rheumatol 2013).

Aim: To assess the relationship of systemic sclerosis with osteoporosis in a group of patients being cared for in a single rheumatic diseases center - single center experience.

Methods: A group of 39 patients with systemic sclerosis, 36 women and 3 men, aged 21–78 (mean±SEM) 55.64±2.31 years. Disease duration was 3–34 (mean±SEM)

11.35±1.52 years. The patients underwent a complete clinical and laboratory evaluation. BMD was measured in the lumbar spine, left and right hip. Within the group of 39 patients with systemic sclerosis 20 had digital ulcers and 26 pulmonary involvement.

Results: In the group of patients with systemic sclerosis, BMD in the lumbar spine, as assessed by T-score, was -2.42 ± 0.30 (mean±SEM), being -2.29 ± 0.20 and -2.34 ± 0.19 , in the left and right hip, respectively. Within the group of patients with systemic sclerosis 10 had osteoporosis and 9 had osteopenia.

Conclusion: Osteoporosis seems to be a main extraarticular manifestation of autoimmune connective tissue diseases. As shown, from the results of this study and from recent publications, osteoporosis may be observed in patients with systemic sclerosis (Atteritano et al., PLoS One 2013). The aetiology of osteoporosis in patients with systemic sclerosis is not known. It may be drug related, may be related to the disease itself, which affects the connective tissue, hence affecting the bone or, alternatively, to vitamin D deficiency.

P714

BONE MARKERS AND PERIPHERAL SEROTONIN IN MENOPAUSAL WOMEN WITH AND WITHOUT TYPE 2 DIABETES MELLITUS: HOW FAR?

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Menopause related bone loss has an increasing frequency, thus new patterns of resorption markers are useful, connecting the basal and preclinical data with the everyday patients' reality. Serotonin is a challenging marker in the field of osteoporosis because its antagonist actions on skeleton regarding the central and peripheral levels. We focus on serotonin ranges in menopausal women related to the presence of type 2 diabetes mellitus (DM).

Material and Methods: This is a cross-sectional study in women within at least 1 year of menopause. The exclusion criteria were previous or current anti-osteoporotic drugs, neuroendocrine tumours or active psychosis. The assays were serum β -crosslaps, and serum osteocalcin as bone turnover markers (Elecys, COBAS 601), peripheral serotonin (ELISA kit). Central DXA (Lunar Prodigy) was evaluated at L1-4 lumbar spine. The database was created in Excel. Statistical significance is considered at $p < 0.005$. The subjects had written consent for the study.

Results: The group DM free included 79 patients, and 20 patients had previous diagnosis of DM. The mean age was 56.3 ± 7.53 years in patients DM free and 59.85 ± 7.04 years in subjects with DM. In the first group 37 women had osteopenia and 12 with osteoporosis; in the second group 11 had osteopenia and one osteoporosis. The serum serotonin levels were within normal ranges (40 and 400 ng/mL), except for one patient who was DM free. The median serotonin was 167, respective 136 ng/ml in women with, respective without DM. No statistical difference was registered between serotonin levels ($p = 0.68$), but also the bone markers: crosslaps ($p = 0.6$), and osteocalcin ($p = 0.15$).

Conclusion: Larger database would be useful for adequate placing the serum serotonin in clinical bone assessment, perhaps in selected groups of patients. The bone turnover markers embrace a large area of values, thus a general model cannot be yet used.

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P715

LINK BETWEEN ENDOTHELIAL DYSFUNCTION AND OSTEOPOROSIS IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Aim: To investigate the role of biomarkers of endothelial dysfunction in formation of osteoporosis in the patients with chronic obstructive pulmonary disease (COPD).

Materials and methods: Soluble E-selectin, endotheline 1 (ET-1), vitamin D, VEGF, MMP-9, vascular cell adhesion molecule (VCAM-1), OPG, RANKL and bone biomarkers were determined in 63 patients with COPD. BMD was measured by DXA at the lumbar spine (LS) and left femur neck (FN).

Results: Circulating bone formation markers (procollagen type 1 amino-terminal propeptide PINP), N-terminal midmolecule fragment osteocalcin (N-MID OC) and bone specific alkaline phosphatase was lower in COPD than in the controls. Type 1 collagen C-telopeptide (CTX-bone resorption marker) was higher in lung group and was inversely related to FN ($r = -0.43$, $p < 0.05$) and had a direct relationship with PINP ($r = 0.63$, $p < 0.01$). The E-selectin, endotheline 1 (ET-1), TNF α , IL-6, VEGF, RANKL, MMP-9 and VCAM-1 were higher; vitamin D, OPG were low in lung pathology than in controls. Compared to the lung group with osteopenia, levels of E-selectin, TNF α , ET-1, MMP-9 and VEGF were the highest in COPD with osteoporosis. There was positive correlation between vitamin D, OPG ($r = 0.51$,

$p < 0.001$; $r = 0.57$, $p < 0.001$) and negative one between $\text{TNF}\alpha$ ($r = -0.44$, $p < 0.01$), MMP-9 ($r = -0.46$, $p < 0.01$) and BMD in FN and LS; inverse correlation between ET-1 ($r = -0.56$, $p < 0.01$), VEGF ($r = -0.64$, $p < 0.001$) in L2-L4 only; negative correlation of VCAM-1 and $\text{TNF}\alpha$ with BMD in FN only. OPG was correlated with N-MID OC ($r = 0.53$, $p < 0.001$), RANKL ($r = -0.44$, $p < 0.01$) and $\text{TNF}\alpha$ in lung patients. No correlations were found between VCAM-1, IL-6 and markers of bone metabolism. ET-1, MMP-9 and VEGF significantly positively correlated with parameters of bone resorption and negatively associated with PINP and N-MID OC.

Conclusion: a significant association between parameters of bone metabolism and endothelial dysfunction markers in COPD patients with osteoporosis, which suggests possible role of endothelial dysfunction in the increasing of bone loss in COPD.

P716

PHYSICAL EFFECTS OF EXERCISE ASSOCIATED LOKOMAT THERAPY REHABILITATION IN PATIENTS WITH SPINAL CORD INJURY

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Objective: Assessment of the effects associated Lokomat training physical rehabilitation treatment according to diagnosis (vs. paraplegia quadriplegia)

Materials and Methods: To determine the physical effects of Lokomat training associated with paraplegia and quadriplegia in rehabilitation therapy (RT), we performed a comparative study between the two groups, which included 53 patients with paraplegia and 27 patients with quadriplegia. The evaluation parameters included: VAS for pain. Functional Independence Measure (FIM).

Results: As observed with paraplegia and quadriplegia at the most 69.23 % of cases were male with a mean age of 32.92 years, the majority of patients from urban areas 57.69 %. In both groups (with and without Lokomat training) treatment effect on pain score was moderate (ES=0.58 in group RT or RT+0.66 in group Lokomat). Between RT and RT + Lokomat group no significant differences in terms of the evolution of its independence functional moderate effect size indicating a change in motor score (ES=0.61, SE=0.63, respectively) and low cognition score (ES=0.33, ES=0.36, respectively).

Conclusion: Lokomat training effect associated recovery treatment on the evolution of patients with paraplegia when the pain was moderate (ES=0.69) and FIM motor score (ES=

0.79), and lower the FIM cognition (ES=0.33). In quadriplegia, the treatment if pain was moderate (ES=0.65), self-esteem (ES=0.65) and depression (ES=0.59), and lower on the FIM motor score (ES=0.37) and FIM cognition (ES=0.38) and quality of life (ES=0.42).

P717

3 P'S POWER IN ASTHMA MANAGEMENT: A PHARMACISTS FOCUS!

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The healthcare services in community pharmacies, currently undergo reforms to meet the changing needs of modern medicines users. Pharmacists play a key role in many healthcare systems by helping patients manage chronic diseases. The pharmacist's role in patient care is expected to grow as professional and educational standards develop. Although pharmacists' contributions to health care are not yet recognized, there is every reason to be optimistic toward making patient care in community pharmacy setting a success.

Method: A questionnaire was mailed to a sample of community pharmacists, focusing on pharmacists' perceptions of their role in osteoporosis management, barriers to pharmacy osteoporosis management services and inter-professional contact.

Results: Data support the potential role for pharmacists to help reduce gaps in osteoporosis management through improved identification of high-risk patients. On the other hand pharmacists interventions would help in osteoporosis treatment adherence.

Conclusion: Community pharmacists perceived role in osteoporosis management is more likely to embrace a broader role in the upcoming future, a separate research should explore barriers and facilitators to expansion of the pharmacist's role in osteoporosis management in a holistic way.

P718

THE IMPORTANCE OF REHABILITATION IN PATIENTS WITH GONARTHROSIS

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Osteoarthritis is a common, chronic, degenerative disease. The main clinical manifestations of osteoarthritis are pain, limitation of motion of the joint and the weakening of muscle strength. Goal: Evaluation of functional status in patients with osteoarthritis of the knee.

Materials and Methods: The study included 62 patients diagnosed with osteoarthritis knee, mean age 59±6 years. The

diagnosis was based on X-ray, and changes in all patients were stage II according to Kellgren-Lawrence scale. The subjects were divided into two groups. The first group consisted of 34 patients, another 28 in both groups of patients was present edema of the knee. In the first drupe were applied peloid applications with individual kinetic therapy in order to increase the range of motion in the knee while strengthening GMS clinical characteristics (resistance exercises). The other two groups with applications peloids and individual kinetic therapy were applied interferential currents along the clinical characteristics. In both groups the same level of load. The mobility of the knee was measured with a goniometer and expressed in degrees. GMS clinical characteristics was measured by manual muscle test. The extent of the knee was measured gauge and expressed in centimeters. The measurement was done at baseline and after 3 weeks. Reziltati obtained were analyzed using the Pearson (Pearson) χ^2 test, Student's t-test.

Results: After 3 weeks of intensive rehabilitation treatment in both groups there was a statistically significant disparities in increasing the range of motion knee 90 ± 5 degrees ($p < 0.05$). GMS clinical characteristics of subjects in the first group for the evaluation of 3 ± 0.75 per MMT-in ($p < 0.05$), the second group 4 ± 0.25 per MMT-in ($p < 0.05$). In both groups there was a reduction of edema in 5 ± 1.7 cm ($p < 0.05$).

Conclusion: An intensive rehabilitation treatment has a beneficial effect on the functional status of patients with osteoarthritis of the knee.

P719

CORRELATIONS BETWEEN THE PARAMETERS PHYSICAL AND PSYCHOLOGICAL RECOVERY AFTER TREATMENT IN PATIENTS WITH SPINAL CORD INJURY

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We tried to determine the factors that influence self-esteem, depression score and the score of quality of life. We determined the correlation between physical parameters pain and motor deficit, and psychological parameters self-esteem, depression and quality of life. We determined an inverse correlation between pain score and the score for self-esteem ($r = -0.36$), the more pain score is higher self-esteem score decreases. It was determined a direct correlation between motor FIM score and the score for self-esteem ($r = 0.44$) as the FIM motor score increase self-esteem improves. It was determined a direct correlation between pain score and the score for depression (Beck) ($r = 0.44$), with higher pain scores as the score

increases depression, pain had a significant psychological impact. We determined an inverse correlation between FIM motor score and the score for depression (Beck) ($r = -0.38$), as the FIM motor score increases, decreases depression score. It was determined a direct correlation between pain score and quality of life score ($r = 0.41$), with higher pain scores as the score increases life quality of life and quality of life is lower. We determined an inverse correlation between the score and FIM motor score for quality of life ($r = -0.53$), as the increase FIM score, quality of life score decreases, resulting in improved quality of life with the degree of functional independence is higher. We determined an inverse correlation between self-esteem and quality of life score ($r = -0.48$), quality of life increases as higher self-esteem. It was determined a direct correlation between Beck depression score and the score for quality of life ($r = 0.47$), quality of life is getting worse with the degree of depression is higher.

P720

SPECIALIZED RHEUMATOLOGIC ASSESSMENT IN AN ACCIDENT AND EMERGENCY ENVIRONMENT: ONE YEAR EXPERIENCE OF THE URMES INITIATIVE

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The specialized rheumatologic assessment of patients who demand urgent attention in our A&E department is conducted by three rheumatologists since October 2013. Its official designation is Clinic of urgency rheumatologic and musculoskeletal consultation (URMES by its initials in Spanish). There is no clinic or unit with this characteristics in Madrid and as far as we know, neither in Spain. Rheumatologists assess patients according to their main complaint, with the exception of those related to direct or indirect trauma, into a specific office located inside the A&E area of our institution, a high complexity university hospital. Also it gives support to any other clinician who considers necessary a rheumatology assessment for any specific patient. URMES counts with an office, a portable ultrasonographic unit and material required to perform joint punctures. Also, URMES have access to lab and radiological auxiliary tests with the same priority of any other A&E instances. Objective: To describe the gathered experience along the first year of the URMES.

Method: Observational study. Source: Electronic attending registries of the A&E department, records of teaching activities and scientific production from 2013 to 2014.

Results: 1788 patients were assessed along the period of observation. 1490 (83.3 %) of them were assessed in the morning and 298 (16.7 %) in afternoons or night (out of the regular

URMES schedules). 56.3 % of patients were female. Average age was 67.3 SD 7.3 years. 85.6 % of patients proceeded from our Hospital healthcare area. 1022 patients consulted spontaneously (57.2 %) while 294 were derived from their General Practitioner (16.4 %), 69 were reassessed by instruction of the rheumatologist (3.9 %), 69 were instructed to come to the A&E a day with URMES consult scheduled (3.9 %) and finally 45 patients consulted spontaneously demanding a new assessment due to a worsening of their condition after been assessed by URMES, previously. 435 patients consulted by complaints related to the knee (24.3 %), 362 related to the axis skeleton (20.3 %) and 336 related to the shoulder (18.8 %). 1155 patients were diagnosed by mechanical issues (p.e. osteoarthritis) (64.6 %) and 633 were diagnosed by inflammatory conditions (35.4 %). In this last group, distribution of diagnostics was: autoimmune 18.2 %, septic 39.2 % and microcrystalline 42.7 %. 390 joint punctures with injection of corticoids, 292 joint aspirations and 381 ultrasonographic studies were performed. URMES developed 9 lectures to residents and faculties with 110 h which were attended by 366 students. During this 2 years the scientific production of URMES was: 54 congress communications and 14 journal papers.

Conclusion: There are no previous experiences with a specialized rheumatology clinic into the A&E so it is not possible to establish comparisons. We consider that a better positioning of our specialty highly depends on how closer become the rheumatologist to the community and the response we could provide to the urgent needs of patients or other clinicians. In this way, we are convinced that the URMES initiative has an important role and its instauration in many other A&E should be considered.

P721

CLINICAL AND RADIOLOGICAL EFFICIENCY OF THE INTRA-ARTICULAR PLATELET- RICH PLASMA INJECTIONS FOR THE TREATMENT OF TEMPOROMANDIBULAR JOINT (TMJ) OSTEOARTHRITIS

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Objective: To evaluate the long-term clinical and radiological efficiency of intra-articular platelet-rich plasma (PRP) injection into the temporomandibular joints with osteoarthritis and to compare the outcomes with arthrocentesis.

Material and Methods: 30 adult patients for a total of 47 joints with osteoarthritis, diagnosed according to the Research

Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD axis I group IIIb), were randomly divided into two groups (15 joints of 12 subjects with mean ages 35.08±14.84 years for control group, 32 joints of 18 subjects with mean ages of 32.22±14.32 years for study group). One session arthrocentesis was used for the control group, and four session PRP injections on a monthly basis (initially arthrocentesis plus PRP injection) were performed in the study group. Clinical and radiological evaluations were conducted at initially and at 12 months follow-up after the last session in both groups.

Results: There was a statistically significant a reduction in the joint sound and general pain complaint in both groups and an increase in masticatory efficiency, painless interincisal opening, and lateral motion in study group. However, only the mean of the changes in masticatory efficiency showed statistically significant increase in the study group when compared to control group. CBCT evaluations showed that progression of the osseous abnormalities occurred at the rate of 86.7 and 42.9 % in the study and control groups, respectively.

Conclusion: Our findings suggested that arthrocentesis and four session PRP injections are safe and promising method for the treatment of TMJ osteoarthritis, and PRP injection into TMJ is a more effective method than arthrocentesis.

P722

LONG-TERM COMPARATIVE CLINICAL AND CBCT EVALUATION OF INTRA-ARTICULAR PLATELET RICH PLASMA (PRP) AND HYALURONIC ACID (HA) INJECTIONS FOR THE TEMPOROMANDIBULAR JOINTS WITH OSTEOARTHRITIS TREATMENT

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Objective: To make a long-term assessment whether the intra-articular PRP injection into the temporomandibular joints with osteoarthritis helps to minimize the clinical symptoms, and to assess how these results compared with HA injections.

Material and Methods: 64 TMJ joints with osteoarthritis of 43 adult patients, diagnosed according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD axis I group IIIb), were randomly divided into three groups (15 joints of 12 subjects for control group, 32 joints of 18 subjects for PRP group, and 17 joints of 13 subjects for HA group). One session arthrocentesis was used for the control group. Four session PRP injections on a monthly basis

(arthrocentesis plus PRP injection in first session) were performed in the PRP group. Only one session hyaluronic acid injection was performed followed arthrocentesis in the hyaluronic acid group. Clinical and CBCT evaluations were conducted at initially and at 12 months follow-up after the last sessions in all groups.

Results: Masticatory efficiency was increased significantly more in PRP group than control group, but this increase was insignificant between PRP and HA groups. No statistically significant different change was observed between groups in other clinical parameters included joint sound, general pain complaint, interincisal opening with and without pain, and lateral and protrusive motion of mandibular jaw. But, joint sound and general pain complaint were decreased and interincisal opening was increased significantly in all groups. CBCT evaluations showed that progression of the osseous abnormalities occurred at the rate of 86.7, 58.8, and 42.9 % in the PRP, HA, and control groups, respectively. The progression of osseous abnormalities showed statistically significant difference between PRP and HA groups, and between PRP and control groups.

Conclusion: Our findings suggested that PRP is not superior to HA in clinical parameters, but PRP injection into TMJ is more effective than HA or arthrocentesis regarding radiological recovery of osseous structures.

P723

DECISION FOR ANTIPOROTIC INTERVENTION BASED ON FRAX OR ON BMD: IS IT DEPENDENT ON AGE?

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Objective: In a previous study we found that measuring BMD or calculating FRAX give equal success in detecting osteoporosis in patients with t-score below -2.5 . However, FRAX was found to detect elevated fracture probability in 25 % of patients having T-score >-2.5 . The current study aimed to clear if there is an age-dependent difference between the BMD-based or FRAX-based decision-making.

Material and Methods: BMD measurement by DXA on spine, hip and forearm (Prology, GE-Lunar) was done in 2805 women referred for osteoporosis testing. FRAX probabilities has been calculated by the Hungarian FRAX model for hip and major osteoporotic fractures (MOP). Osteoporosis was decided if T- score of any bone was less than -2.5 . Cutoff values of 3 % for hip and/or 20 % for major osteoporotic

fracture probability were used. Young (<55 years, Y), middle-aged (55–75 years, M) and old women (>75 years, O) have been evaluated separately and a comparison of the age-groups was done.

Results: In patients with osteoporosis (T-score below -2.5), the percent of FRAX-positive cases was found as 15.2, 40.3 and 87.7 % in Y, M and O groups, respectively, while the same percents in non-osteoporotic patients (T >-2.5) were 4.9, 21.5 and 68.6 %. If the age as cofactor was excluded from the statistic evaluation, the odds to have an elevated FRAX probability of osteoporotic patients were found as 0.8, 2.9 and 30 in Y, M and O groups ($p<0.001$). Cofactoring the age too, the respective odds were 5.4, 3.1 and 6.8 ($p<0.001$), showing an U-shaped relationship.

Conclusion: 1. An osteoporotic value of BMD in the young or old women inform about a higher fracture risk than in the middle-aged period of life. The reason for it is not the larger frequency of secondary osteoporosis in the young because this frequency has been found to equal in all age-groups. More pathology of non-mass factors in the old patients can be another explanation. 2. In middle-aged women the BMD alone seems to be less effective than in younger or older ladies and the contribution of FRAX to the diagnostic effectivity could be maximal in this age period.

P724

LONG-TERM COMPARATIVE CLINICAL AND CBCT EVALUATION OF INTRA-ARTICULAR PLATELET RICH PLASMA (PRP) AND CORTICOSTEROID INJECTIONS FOR THE TEMPOROMANDIBULAR JOINTS OSTEOARTHRITIS TREATMENT

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Objective: Prospective study to make a long-term assessment whether the intra-articular PRP injection into the temporomandibular joints with osteoarthritis helps to minimize the clinical symptoms, and to assess how these results compared with corticosteroid injections.

Material and Methods: 57 TMJ joints with osteoarthritis of 38 adult patients, diagnosed according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD axis I group IIIb), were randomly divided into three groups (15 joints of 12 subjects for control group, 32 joints of 18 subjects for PRP group, and 10 joints of 8 subjects for corticosteroid group). One session arthrocentesis was used for the control group. Four session PRP injections on a monthly basis

(arthrocentesis plus PRP injection in first session) were performed in the PRP group. Only one session corticosteroid injection was performed followed arthrocentesis in the corticosteroid group. Clinical and CBCT evaluations were conducted at initially and at 12 months follow-up after the last sessions in all groups.

Results: Masticatory efficiency was increased significantly more in PRP group than in other two groups. No statistically significant different change was observed between groups in other clinical parameters included joint sound, general pain complaint, interincisal opening with and without pain, and lateral and protrusive motion of mandibular jaw. But, joint sound and general pain complaint were decreased and interincisal opening was increased significantly in all groups. CBCT evaluations showed that progression of the osseous abnormalities occurred at the rate of 86.7, 70 and 42.9 % in the PRP, corticosteroid, and control groups, respectively. Statistically significant more progression of osseous abnormalities found in PRP group than only in control group, but insignificant progression between PRP and corticosteroid groups. **Conclusion:** Our findings suggested that PRP is not superior to corticosteroid in radiological and all clinical parameters, except masticatory efficiency. PRP can be an alternative to corticosteroid for treatment of TMJ-OA.

P725

PRECLINICAL EVALUATION OF THE LINK MODULE FROM THE HUMAN TSG-6 PROTEIN: A POTENTIAL NEW THERAPEUTIC FOR BONE LOSS AND CARTILAGE DAMAGE IN MUSCULOSKELETAL DISORDERS

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Objective: We have shown that TSG-6 is a potent inhibitor of bone resorption in vitro [1,2] and it is known to be chondroprotective in inflammatory arthritis [3]. Our aim here was to evaluate the potential of the recombinant Link module from human TSG-6 (Link_TSG6) as a treatment for bone and cartilage loss. The objectives were to investigate the efficacy of Link_TSG6 in vivo in a model of osteoporosis and determine the mechanisms via which it modulates osteoclast and chondrocyte function.

Methods: Ovariectomised (OVX) mice were treated with Link_TSG6 for 4 weeks prior to quantification of CTX-I/PINP in sera, μ CT and histomorphometry. Osteoclast precursors were cultured on dentine with M-CSF/RANKL \pm Link_TSG6, followed by quantification of lacunar resorption/F-actin ring formation. Chondrocytes in 3D pellets were treated with IL-1 or TNF \pm Link_TSG6; expression of

cartilage degrading enzymes (MMP13, ADAMTS4, ADAMTS5) was quantified by qPCR and matrix breakdown by Safranin- O staining.

Results: Link_TSG6-treated OVX mice had significantly reduced CTX-I levels compared to controls, but (unlike Zoledronate) Link_TSG6 caused no reduction in PINP. Micro-CT and histomorphometry revealed suppression of osteoclast-mediated trabecular bone loss in Link_TSG6-treated animals. In vitro, Link_TSG6 potently inhibited osteoclastic resorption and F-actin ring formation with little effect on osteoclast numbers. It also significantly suppressed cytokine-induced catabolic enzyme expression and matrix degradation by chondrocytes.

Conclusion: Inhibition of bone resorption, but not formation, by Link_TSG6 in vivo suggests potential advantages over existing antiresorptive treatments for osteoporosis. Our in vitro data provide important insights into the mechanisms of Link_TSG6's protective effects in bone and cartilage.

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P726

TEMPOROMANDIBULAR JOINT OSTEOARTHRITIS: CBCT FINDINGS, CLINICAL FEATURES AND CORRELATIONS

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Objective: To identify prevalence of and associations between clinical signs and symptoms and CBCT findings of temporomandibular joint osteoarthritis (TMJ-OA).

Material and Methods: 117 TMJ of 76 patients (65 female (85.5 %) and 11 male (14.5 %) diagnosed osteoarthritis according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD axis I group IIIb) were included in this study. All patients were examined according to clinical sign and symptoms and CBCT findings.

Results: Amounts of mandibular motions included maximal interincisal opening (MIO) with and without pain, lateral motion and protrusive motion were 29.66 \pm 9.81, 40.90 \pm 8.13, 7.5 \pm 2.86 and 7.76 \pm 2.69 mm, respectively. Joint sound, mastication efficiency and general pain complaint were recorded as 5.62 \pm 3.37, 6.43 \pm 2.7 and 5.94 \pm 2.39, respectively. Of the 76 patients, 37 (48.7 %) had pain during rest, 105 (84.2 %)

mastication, 88 (61.8 %) phonation and 103 (81.6 %) yawning. Pain during lateral palpation of TMJ was observed on 62 (53 %) patients, whereas pain at posterior palpation on 27 (23.1 %) of them. Of the 117 joint with osteoarthritis, 108 (92.3 %) showed condylar flattening, 100 (94.1 %) condylar erosion, 93 (78.9 %) condylar osteophyte, 14 (12 %) condylar sclerosis, 22 (18.8 %) condylar hypoplasia, and 4 (3.4 %) subcortical cyst. One joint for each parameter had sclerosis of articular fossa and bifid condyle. Flattening of articular eminence and pneumatization were observed 5 (4.3 %) joint. Condylar hyperplasia and erosion or resorption of articular fossa weren't observed any joint. 41 (53.9 %) joint had bilateral degenerations, as well as hypermobility was detected in 47 (40.2 %) degenerative joint. Masticatory efficiency negatively correlated with both condylar flattening and sclerosis, and lateral motion with condylar sclerosis. General pain complaints positively correlated with both condylar flattening and degeneration grade.

Conclusion: Present study showed that prevalence of erosion, flattening and osteophytes are higher than other radiological parameters according to CBCT findings. Patients with TMJ osteoarthritis have considerable pain and joint sounds during in functional activities and on lateral and posterior palpation of TMJ, whereas reduced jaw movements and worsened mastication. Poor correlations found between almost all parameters included CBCT osseous findings and clinical signs and symptoms of TMJ OA.

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PATIENT CHARACTERISTICS ASSOCIATED WITH SHORT (1 YEAR) AND MID-TERM (5 YEARS) TOTAL HIP ARTHROPLASTY IMPLANT SURVIVAL: A POPULATION-BASED COHORT STUDY

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Objective: Total hip arthroplasty (THA) is one of the most cost-effective procedures available, with only 1 % failure (revision surgery) at 3 years [1]. Data is however needed on patient characteristics associated with an increased risk of failure. We used an enriched dataset linking primary care and hospital records to the Catalan Arthroplasty Registry (RACat) to study clinical predictors of 1-year and 5-year THA implant survival.

Methods: Setting and participants: data from primary care and pharmacy dispensations (www.sidiap.org) were linked to RACat, which collects information on patient, centre, and implant-related variables for patients undergoing THA in Catalonia (Spain). Patients aged ≥ 40 years undergoing THA in the period 2005-June/2012 in the linked dataset (about 75 % of those included in RACat) were included. Patients undergoing THA for hip fracture or malignancy were excluded. Outcomes: 1-year all-cause revision; and up to 5 years implant survival.

-Potential predictors: a list of pre-operative potential risk factors was pre-defined: age, sex, BMI, smoking, alcohol drinking, Charlson comorbidity index (CCI), healthcare resource use (number of GP visits), hip prosthesis characteristics, hospital volume (THAs per annum), drugs used in the previous year, and indication. Analyses: Backwards logistic regression (p exit 0.1) was used to identify key predictors of 1-year revision. Fine and Gray analyses were used to model implant survival accounting for a competing risk with death. Area under ROC curve (AUC-ROC) was used to estimate discrimination of the resulting models.

Results: 179/11,427 (1.6 %) subjects failed in the year and 5-years post-THA. Key predictors of failure are detailed in Table 1. Such models had poor discriminatory ability (AUC ROC 69.1 % for 1-year and 63.5 % for 5-year risk).

Conclusion: Certain patient characteristics are associated with an increased failure risk both early and mid-term following THA surgery. Even with the combination of primary, secondary care, drug use and implant-related variables, the derived models are unable to accurately predict implant survival.

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P728

HEMOCHROMATOSIS AS A CAUSE OF OSTEOPOROSIS

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Hemochromatosis represents the accumulation of iron in the form of hemosiderin in the parenchymal organs, primarily in

the liver, pancreas and skin. It is characterized by Triassic: a high level of serum iron, decreased UIBC and high ferritin. In hemochromatosis increased iron absorption in the digestive tract, whose cause is unknown. As a consequence of iron deposition in the anterior lobe of the pituitary gland can lead to decreased production of gonadotropins and the consequent reduction in gonadal function. Adrenal insufficiency, hypothyroidism and hyperparathyroidism are rare.

Case report: a person aged 30 years. Since 26 years of life has diminished potency and erectile dysfunction. In the personal history were elevated transaminases more in the ninth year of life, and on several occasions investigated possible viral etiology of liver lesions. In laboratory analyzes: low basal FSH levels 0.72, LH 0.82 and testosterone 0.34. Clomiphene test was without response to stimulation. Ferritin 7000 (28–39); iron 61.2 $\mu\text{mol/L}$, unsaturated iron binding capacity 14 (28–54). Azoospermia was seen. Testicular biopsy in 70 % of tubules severe aplasia of germinal cells in the ducts of others means hipospermogenez severe degree. The blind liver biopsy-diagnosed histopathologically hemochromatosis in first stage of fibrosis. Genetic examination showed that the patient bearer S65C mutations in the HFE gene, with two possible point mutation (C28Y, H63D) that are expected in patients with hemochromatosis. It is possible that a hereditary juvenile hemochromatosis was seen. Osteodensitometry registered decreased bone density as osteoporosis: The total score of the spine was - 2.9.

Conclusion: it is about a patient with juvenile hemochromatosis, which is not diagnosed in the early stage. It was diagnosed when there were already many complications present: liver fibrosis moderate degree, hypogonadism, impotence with azoospermia, infertility and osteoporosis.

P729

BONE MINERAL DENSITY IN PATIENTS WITH PARKINSON'S DISEASE

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Parkinson's disease (PD) is characterized by tremor slowness of movement and postural imbalance leading to immobility and frequent falls and in osteoporosis, characterized by compromised bone strength there is an increased fracture risk.

Objective: The objective of this written paper is to connect bone changes and PD. For investigation fall- risk estimation tests have been used: Tandem - Standing for balance estimation Timed-up & go test for walk and muscle function estimation, usual walk speed test, Chair - rising test - muscle strength test.

Methods: 78 patients were examined. Out of them, 48 were with PD (28 women, 20 men), while 30 of them were in the

control group (20 women, 10 men). Measuring of BMD was performed on the DXA Hologic apparatus, on lumbar vertebrae L1-L4 and on the left hip and was categorized by normal, low bone density (osteopenia) and osteoporosis as defined by WHO criteria.

Results: BMD of all the patients with PD was significantly lower compared to the controls, $p < 0.005$. Osteoporosis was diagnosed in 30 (62.5 %) patients with PD (20 women and 10 men) and in 9 (30 %) patients control group (6 women and 3 men). Osteopenia was detected in 13 (27.08 %) patients with PD (6 women and 7 men) and in 10 (33.34 %) patients control group (5 women and 5 men). Normal BMD have 5 (10.42 %) patients with PD (2 women and 3 men) and 11 (36.66 %) patients control group (4 women and 7 men). The BMD of the female PD patients was lower compared to the BMD of the male PD patients and to the BMD of the female control group. Tandem - Standing for balance estimation Timed-up & go test for walk and muscle function estimation, usual walk speed test, Chair - rising test were in over 80 % pathological i.e. they showed high risk for fall and possible fracture.

Conclusion: PD is associated with an increased incidence of osteoporosis falls and fractures. It is important that with monitoring these patients, assessment of the factors of the risk to fall with a fall prevention program is also included.

P730

OSTEOGENESIS IMPERFECTA: CASE REPORT AND TWO NEW EUROPEAN MUTATIONS

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In this case report a 19 years old boy with osteogenesis imperfecta is introduced. His medical history with 3 low-trauma fractures, progressive scoliosis and a total acoustic neural damage is presented. Laboratory findings including variables of calcium and bone metabolism as well as X-rays of the skull and the spine are shown. His BMD on the lumbar spine was found as 0.709 g/cm^2 , Z-score -2.6. The genetic evaluation included COL1A1, COL1A2, CRTAP and LEPRE1 genes. 10 frequent polymorphisms without clinical significance were found and two more alterations which have been appreciated as variant of uncertain significance. The first one was a heterozygotic alteration in COL1A2 gene substituting the 691 glycine to asparagine (p.G691D). The second one was a homozygotic alteration in COL1A1 gene substituting the 818 glycine to arginine (p.G818R). Neither of these two alterations have been found in the European population. They are not found in the dbSNP and Collagene Databases. However, according to SIFT software these alterations can have a harmful effect to the protein structure.

P731

ASSOCIATION BETWEEN VITAMIN D DEFICIENCY AND REDUCED MAXIMUM INSPIRATION FORCE IN COPD PATIENTS IS INDEPENDENT FROM MYOSTATIN

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We have previously demonstrated an association between vitamin D deficiency and reduced muscular inspiration force in patients with chronic obstructive pulmonary disease (COPD). Myostatin regulates muscle cell differentiation and proliferation, and 1,25-dihydroxyvitamin D inhibits myostatin *in vitro*. In humans, serum concentration of 25-hydroxyvitamin D (25-OH-D) was associated with serum myostatin concentration in men. The present study investigates the relationship between 25-OH-D, myostatin, and physical function in COPD patients. **Methods:** We recruited consecutive patients with COPD who were admitted to the Klinik Bad Reichenhall (a specialized hospital with rehabilitation therapy) from February to November 2013 and were willing to participate in this study. Blood samples and physical function data were obtained at the beginning of the hospital stay. 25-OH-D was measured in serum by an automated method (Roche Diagnostics). Myostatin was measured by ELISA (Immundiagnostik, Bensheim, Germany). Further, all participants were tested for the maximum inspiration force (PI) and for the 6-Minute-Walking-Distance (6MWD). Calculations were done by SPSS statistics software. **Results:** Complete data sets were obtained from 117 participants (40 females, 77 males). Myostatin was not different in females and males. There was no association with age. In the whole population, there was no significant association. In the subpopulation with vitamin D deficiency (25-OH-D <50 nmol/l), the multiple regression analysis demonstrated association of maximum inspiration force with vitamin D (β coefficient 0.257; $p=0.012$), but not with myostatin ($p=0.43$). Six-minute-Walking-Distance was neither associated with vitamin D nor with myostatin.

Conclusion: The association between vitamin D deficiency and reduced maximum inspiration force in COPD patients is not mediated by myostatin.

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SPINE MICROARCHITECTURE ASSESSED BY TBS AS A RISK FACTOR OF OSTEOPOROTIC FRACTURES IN POPULATION OF POLISH POSTMENOPAUSAL WOMEN

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The risk for osteoporotic low-energy fractures (OFs) is determined by BMD and bone quality. BMD alone is not sufficient to predict OFs. Deterioration of bone microarchitecture corresponds with predisposition to fracture. Trabecular bone score (TBS) gives possibility to measure bone microarchitecture quality and is considered as a strong risk factor for OFs. The aim of the study was to assess the association between the presence of: major/nonvertebral/vertebral fractures and TBS in Polish women >50.

Methods: We conducted retrospective, case-control study. 490 patients were recruited, of which 51 were not eligible for diseases or treatment influencing bone metabolism. To final analysis 439 women aged 50–86 with BMI 18.5–35 kg/m² were included. For each of them L1-L4 DXA scan was performed and fracture status was reviewed in medical record with analysis of VFs grade 2 and 3 by VFA (Genant criteria). We considered major osteoporotic fractures (MOF: hip, forearm, clinical spine, shoulder) and separately: nonvertebral fractures (nonVFs) and vertebral fractures (VFs) - both clinical and asymptomatic. Controls were subjects without low-energy fracture in any site, silent VFs were excluded by VFA. Every spine DXA images were reanalyzed using TBS iNsight software (Med-Imaps). Prevalence of fractures were analyzed in particular TBS tertiles: TBS <1.200 (1st), TBS <1.200–1.350> (2nd) and TBS >1.350 (3rd). Comparison between cases and controls depending on TBS and TBS tertiles were analyzed by chi-square. ORs and 95 %CIs were calculated. Statistical analysis was performed using Statistica 10 (StatSoft Inc).

Results: Analysis of OFs sites identified 184 MOF, 110 non-VFs and 116 VFs. Every type of fracture was associated with TBS tertiles: MOF ($p=0.00013$), VFs ($p=0.00000$) and nonVF ($p=0.02$). Analysis of fracture types distribution in 3 TBS tertiles revealed the highest prevalence of OFs independently of site in subjects with TBS <1.200. In over 95 % of cases MOF and VFs were related to TBS <1.350. Comparison between 1st and 3rd tertile revealed that in patients with history of MOF 71 % ($n=131$) had TBS <1.200 and only 4,3 % was in highest tertile. The difference was significant ($p=0.0014$) with OR 3,6 (95 %CI: 1.573–8.156). For women with non-VFs: 70 % ($n=77$) was in 1st tertile and tertile 3rd was observed in 5.5 % with significant difference ($p=0.013$; OR: 2.98, 95 %CI: 1.219–7.299), whereas 77.6 % ($n=90$) of VFs subjects had TBS <1.200, while TBS >1.350 concerned only 1.7 % of cases ($n=2$). The difference was statistically significant ($p=0.0002$), the risk for VFs was 9.56 (95 %CI: 2.244–40.751). Additional association was found for major and vertebral OFs when compared 1rd and 2nd tertile - both fractures were more frequent again for TBS <1.200, with ORs respectively: 2.05 ($p=0.0008$) and 2.7 ($p=0.0001$). There was no difference when compared 2nd and 3rd tertile for non and VFs, the association was weaker for MOF (OR= 2.46, $p=0.027$).

TBS is associated with the presence of osteoporotic fractures in Polish postmenopausal women irrespective of BMD. The prevalence of major, nonvertebral and vertebral fractures increases with TBS decreasing - the lower TBS is, the higher risk of fracture. TBS <1.200 was related to: 3 to 9.6-fold higher risk of OFs depending on fracture site. Our study suggests including TBS in fracture risk assessment in Polish women for more precise identification of women susceptible to low-energy fractures.

P733

ASSESSMENT OF LONG TERM EFFECTIVENESS OF DEXTROSE PROLOTHERAPY IN SUBJECTS WITH TEMPOROMANDIBULAR HYPERMOBILITY

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Objective: To investigate whether dextrose prolotherapy is effective in temporomandibular joint (TMJ) hypermobility treatment.

Material and Methods: 22 adult patients with bilateral TMJ hypermobility, but without TMJ degenerations were randomly divided into two groups (8 subjects for control group, 8 subjects for study group). Dextrose prolotherapy injections included 2 mL of 30 % dextrose, 2 ml of 0.9 % NaCl₂ and 1 ml of 4 % articaine or mepivacaine mixture for study group, and 4 ml of 0.9 % NaCl₂ and 1 ml of 4 % articaine or mepivacaine mixture for control group were performed three sessions in monthly to posterior disc attachment, superior joint space, lower and upper joint capsule and stylomandibular ligament. Clinical evaluations were conducted at initially and at 12 months follow-up after the last session in both groups.

Results: There was a statistically significant decrease in the joint sound and general pain complaints in both groups. Pain during palpation of head and neck muscles were remained relatively unchanged in both groups. Masticatory efficiency is increased, but maximum jaw opening increased significantly in only study group. No statistically significant difference observed in all clinical parameters between the groups.

Conclusion: Application of dextrose prolotherapy for treatment of TMJ hypermobility is not resulted in additional benefit.

P734

WANING LONG-TERM PREDICTIVE VALUE OF SERUM CTX FOR INCIDENT FRACTURE (OPRA COHORT)

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High serum C-terminal crosslinking telopeptide of type I collagen (s-CTX) has been shown in meta-analysis to be a significant risk factor for osteoporotic fracture. The aim of the present study was to study the predictive strength of s-CTX as a function of time since assessment. We studied the relationship between s-CTX and risk of fractures in 1044 elderly women with mean age 75 years, recruited in Sweden in a population based cohort (OPRA). Baseline data included s-CTX (Roche Elecsys) and age. The distribution of s-CTX was normalised. Incident major osteoporotic fractures were captured during an average of 8.8 years follow-up with maximum of 10.2 years. An extension of Poisson regression investigated the relationship between s-CTX and the risk of incident major osteoporotic fracture. Results were expressed as a gradient of risk (GR; hazard ratio/SD). All associations were adjusted for age and time since baseline. Interaction between s-CTX and time since baseline was investigated with time as continuous variable and examples given at specific times. There was a significant association between s-CTX and the risk of a major osteoporotic fracture over a 10-year time interval (GR=1.12; 95 %CI=1.01–1.25). There was a negative interaction between s-CTX and time since baseline of borderline significance ($p=0.054$), such that there was a decrease in the GR for fracture with time. The GR at baseline was 1.35 (95 %CI=1.09–1.67), GR at 2 years after baseline was 1.25 (95 %CI=1.04–1.46) and the GR at 8 years after baseline was 1.00 (95 %CI=0.85–1.17). These findings in women show that s-CTX has predictive value at the start of follow up but that the long-term predictive value diminishes with time.

P735

NUTRITIONAL OSTEOMALACIA WITH SECONDARY HYPERPARATHYROIDISM: WILL MASSIVE ORAL VITAMIN D DOSE ACHIEVE RAPID AND COMPLETE NORMALIZATION OF PARATHORMONE LEVEL?

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Vitamin D deficiency and osteomalacia is becoming common in Egypt especially in young females. Failure to normalize PTH level and bone architecture is a problem probably related to low dose of vitamin D supplement and nonadherence to treatment because of its long duration. This study aims to

determine the efficacy and safety of massive oral doses of alfacalcidol in the treatment of this condition.

Material and methods: 35 patients (2 were lost for follow-up and one died in a road-traffic accident) and remaining 32 were included; 27 females and 5 males; mean age 36.4 (18–70) years; grouped in 4 groups according to PTH level. Group-1: PTH level below 200 pg/mL (N:10–65) including 7 patients; group-2: PTH 200–500 pg/mL including 11 patients; group-3: PTH 501–1000 pg/mL including 8; and group-4: PTH over 1000 pg/mL including 6 patients. All patients were treated with calcium (Ca) 1000–1500 mg daily according to basal hypocalcemia level and was reduced to 500 mg daily after normalization of Ca. Alfacalcidol 6 µg daily was given for 3 months, then 2 µg daily for 3-months, then 1 µg daily till PTH normalized. Dose was reduced to 1 µg if hypercalcemia or hyperphosphatemia developed to 0.25 µg after normalization of PTH. Ca and phosphorus were determined/2 weeks for 3 months then monthly. Alkaline phosphatase (ALP) and PTH were determined/4 weeks for 3 months, then every 2 months for 10 months. Pelvis and rib-cage X-ray were requested every 3-months to assess bone architecture.

Results: Group1: PTH, Ca and ALP normalized by 3 months. Group2: PTH, Ca and ALP normalized by 5 months. Group-3: PTH, Ca and ALP normalized by 9 months. Group-4: PTH, Ca and ALP normalized by 12 months. Basal serum calcium and post treatment serum calcium, were similar in groups. Mild hyperphosphatemia developed in 4 patients which normalized after dose reduction. No patient developed severe hypercalcemia but 6 had mild hypercalcemia that normalized after dose reduction. Transient alfacalcidol side effects occurred in 5 patients which did not warrant stoppage of treatment. Symptoms improvement significantly related to normalization of Ca and phosphorus levels while restoration of normal bone architecture was significantly related to PTH normalization. Normalization of PTH and bone architecture were achieved in all patients.

Conclusion: Massive oral doses of oral alfacalcidol in nutritional osteomalacia with secondary hyperparathyroidism achieve rapid and complete normalization of PTH levels and bone architecture. These massive doses can lead to hyperphosphatemia or hypercalcemia that are not severe and can be dealt with successively with close monitoring. This needs to be further verified by randomized controlled trials.

P736

HOW IS THE RELATION BETWEEN LIPID PROFILE CHANGES AND BONE MARKERS IN HSCT PEDIATRIC THALASSEMIC PATIENTS

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Many investigators see hyperlipidemia as a risk factor for low bone density as well as cardiovascular diseases. Different studies showed contradictory results about various lipid parameters' effects on BMD. On the other hand, bone mineral densitometry (by DXA method), needs long time for showing effects of risk factors, but bone markers are tools for assessment of bone structure in shorter terms. So we assessed the effects of lipid profile changes during HSCT (hematopoietic stem cell transplantation) on growing bones of pediatric thalassemic patients.

Patients and Methods: Bone-specific alkaline phosphatase and osteocalcin (bone formation markers), NTX (bone resorption marker), TG, cholesterol, LDL and HDL measured in 20 major thalassemic patient with mean age of 10.8±3.9 year/old. The female to male ratio was 6:14. Parameters checked as a batch at a central facility (endocrinology and metabolism research institute of Tehran University of medical sciences laboratories, Tehran, Iran) at the baseline (before HSCT), and 1 and 3 months after HSCT.

Results: After stem cell transplantation, changes of mean serum levels of NTX, osteocalcin and HDL were not significant, but bone specific alkaline phosphatase (P value=0.001), TG, cholesterol and LDL changed significantly (P value<0.001 for all lipid parameters). In Pre-HSCT time, osteocalcin related negatively with HDL (P value=0.001). After 1 month, osteocalcin related negatively to TG (P value=0.003). After 3 months, osteocalcin negatively related to TG, cholesterol and LDL (P value=0.016, 0.023 and 0.040, respectively) and bone-specific alkaline phosphatase related negatively to TG (P value=0.010). Other relations were not significant.

Conclusion: In our study, during HSCT; anabolic bone markers (bone-specific alkaline phosphatase and osteocalcin) generally related negatively with TG, cholesterol and LDL in pediatric thalassemic patients in short term (3 months). Though finding a negative relationship of a bone formation markers (osteocalcin) with HDL (as a positive factor among lipid profile parameters) in pre-HSCT period; seems some conflicting, but we think our results support reports that find hyperlipidemia as a risk factor for low bone density.

P737

HOW IS THE RELATION BETWEEN ENDOCRINE CHANGES AND BONE MARKERS IN HSCT PEDIATRIC THALASSEMIC PATIENTS?

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β -thalassemia major, and its treatment by hematopoietic stem cell transplantation can have deleterious effect on bone integrity and a main part of such effects is due to their deleterious effects on endocrine systems. On the other hand, bone mineral densitometry (by DXA method), needs long time for showing effects of risk factors, but bone markers; are tools for assessment of bone structure in shorter terms. So we assessed the effects of endocrine changes during HSCT (hematopoietic stem cell transplantation) on growing bones of pediatric thalassaemic patients.

Patients and Methods: Bone-specific alkaline phosphatase and osteocalcin (bone formation markers), NTX (bone resorption marker), prolactin, LH,FSH,T4,T3, TSH,IGF-1, testosterone (in males) or estradiol (in females), measured in 20 major thalassaemic patient with mean age of 10.8 ± 3.9 year/old. The female to male ratio was 6:14. Parameters checked as a batch at a central facility (endocrinology and metabolism research institute of Tehran University of medical sciences laboratories, Tehran, Iran) at the baseline (before HSCT), and 1 and 3 months after HSCT.

Results: After stem cell transplantation, changes of mean serum levels of NTX, osteocalcin, prolactin, LH,FSH,T4,T3, IGF-1, testosterone (in males) were not significant, but bone specific alkaline phosphatase, TSH and estradiol changed significantly (P value=0.001, 0.013, 0.001 and 0.010, respectively). In Pre-HSCT time, bone markers had no significant relation with hormonal parameters. After 1 month, osteocalcin related positively to T3, T4 and bone-specific alkaline phosphatase related positively to testosterone (P value=0.029, 0.009 and 0.021, respectively). After 3 month, osteocalcin related positively to T3, T4, IGF1 and bone-specific alkaline phosphatase related positively to T3, T4 (P value=0.002, 0.021, 0.034, 0.002 and 0.002, respectively). Other relations were not significant.

Conclusion: Endocrine disorders do not appear to have an overall positive or negative effect on bone metabolism (anabolism or catabolism) in HSCT pediatric thalassaemic patients in short term (3 months).

P738

RELATION BETWEEN BMD AND BONE MARKERS WITH ENDOCRINOLOGICAL PARAMETERS AND VITAMIN D IN PEDIATRIC THALASSEMIC PATIENTS

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Chronological and longitudinal changes of bone density in patients with secondary osteoporosis, have been shown helpful in providing a model of calcium and bone metabolism. This model can be used in the understanding and management of bone disorders in primary osteoporosis. Beta-thalassemia major is a risk factor for secondary osteoporosis that affected patients frequently have low BMD and increased fracture risk. So we tried to determine the relation between BMD and bone markers with endocrinological parameters and vitamin D in thalassaemic patients.

Patients and Methods: Twenty beta-thalassemia major patients (with a mean age of 10.8 ± 3.9 year/old) entered this study. The female to male ratio was 6:14. Bone-specific alkaline phosphatase and osteocalcin (bone formation markers), NTX (bone resorption marker), vitamin D, PTH, prolactin, LH,FSH,T4,T3, TSH,IGF-1, testosterone (in males) or estradiol (in females), Ca, P and alkaline phosphatase measured as a batch at a central facility (endocrinology and metabolism research institute of Tehran University of medical sciences laboratories, Tehran, Iran). Bone mineral densitometry of the spine, femur (neck and total) and whole body performed using a DXA Hologic discovery device.

Results: We found no significant relation between calcium, phosphorus, alkaline phosphatase, bone markers and hormonal parameters and vitamin D except a negative relation found between non-specific alkaline phosphatase and bone specific alkaline phosphatase and T4 (P value=0.010 and 0.048, respectively). BMD of femur (neck and total) and spine was not related significantly to hormonal parameters and vitamin D except spinal BMD that related to LH hormone positively (P value=0.030). Whole body BMC (bone mineral content) related positively to LH, testosterone and T3 (P value=0.009, 0.005 and 0.034, respectively). Other relations were not significant.

Conclusion: Among bone markers and BMD parameters, we found whole body BMC as the best marker of hormonal changes in pediatric thalassaemic patients. May be this finding can be generalized to normal children. Larger studies in normal cases are needed to confirm this result.

P739

PHYSICAL THERAPY INTERVENTION IN FUNCTIONALITY AND STAGING EVOLUTION OF FEMORAL HEAD IDIOPATHIC OSTEONECROSIS: CASE REPORT

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Objective: Osteonecrosis is a relatively common condition that occurs by reducing bone blood supply, most affected place is head of femur. Relates to various causes, such as the femoral neck fractures, and hip dislocation, however, most are idiopathic. Although it can affect anyone, is prevalent in men aged 40–60 years, covering about 20,000 / year in United States. Often, the clinical picture is associated with disabling pain and intermittent involvement location. Based on these, this study aims to evaluate stage evolution of femoral head osteonecrosis by NMR analysis, associated with the functional benefits of physical therapy treatment of a patient underwent surgery through Harris Hip Score.

Materials and Methods: Case report: 45-year-old male, walking with crutches, attended therapy sector 3 months after surgery for decompression due clinical diagnosis of femoral head idiopathic osteonecrosis. Did not use drugs and reported pain relief after surgery. Anamnesis and physical examination were performed. The evolution of patient was performed by applying Harris Hip Score, a specific assessment tool used to measure pain, deformities, mobility and functionality, at beginning and end of treatment, in addition, a classification analysis of necrosis level was performed via surveys carried out in pre and post surgical, and 6 months after start of physical therapy.

Results: It was found progression of lesion stage, starting in 3B staging, moving to 4A after surgery and maintained until the end of physical therapy treatment, according to Steinberg scale. However, it is worth noting there has been improvement in Harris Hip Score applied with baseline 43 (weak) rising to 93 (excellent).

Conclusion: Physiotherapy intervention in this case was of great value, because even with progression of osteonecrosis stage, there was improvement in its functionality supported by increase in questionnaire score.

P740

FUNCTIONAL RECOVERY OF A PATIENT WITH GLENOHUMERAL ATROSE AFTER PHYSICAL THERAPY INTERVENTION: CASE REPORT

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Objective: Glenohumeral arthrosis characterized by wear of articular surface of humerus and glenoid cavity, is prevalent in individuals aged between 50 and 70 years, resulting in functional disability in individuals. Usually present with surgical repair and, because of its complexity, physical therapy is of great value in the kinetic-functional recovery of these patients. Therefore, the objective of this study is to analyze functional recovery after physical therapy intervention, on the artrose glenohumeral patient after arthroscopic repair.

Material and Methods: Case report: A 53-year-old male diagnosed with glenohumeral arthrosis after complete rupture of the rotator cuff due to direct trauma from falls. Performed surgery for reconstruction of tendons involved in right shoulder and then used sling and analgesic drug for a 40 days period. Was instructed not to perform any treatment and after 3 months redid the tests because pain symptoms persisted, where the diagnosis was closed. Later, he was referred to physical therapy, which was carried out assessment by anamnesis, physical examination and application of DASH questionnaire (Brazil), with intervention based electrothermal and classical kinesiotherapy resources, subdivided weekly and vary according to therapeutic patient outcomes. Analysis was made using goniometer data, shoulder strength and flexibility muscle degree and employee questionnaire, obtained in treatment evaluation and re-evaluation.

Results: Patient still in physical therapy, however, can be seen through of questionnaire results, improved functionality related to affected limb, with initial score of 81 (Bad) and end 30 (good); and reduction of the numerical pain scale (9 to 1); Regression of edema; improves range motion, full gain for shoulder extension and internal rotation and increased muscle strength tested grouping, with grade 2 on Medical Research Council (MRC) scale in the evaluation and grade 5, in the reevaluation.

Conclusion: Protocol used was effective for functional recovery due to obvious progress in clinical picture, especially related to pain and disability, with consequent shift in carrying out their activities of daily living, which reinforces the importance of physiotherapy intervention in satisfactory results.

P741

EFFECTIVENESS OF SPECIFICALLY ADOPTED EXERCISE PROGRAMS ON CLINICAL PARAMETERS IN PATIENTS WITH CHRONIC NECK PAIN AND FIBROMYALGIA SYNDROME

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Objective: To determine effectiveness of specifically adopted exercise programs on pain, disability, range of motion of neck, sleep quality, quality of life (QOL), and depression in the patients with chronic neck pain (CNP) and fibromyalgia syndrome (FMS).

Material and Method: 30 FMS patients (Group 1) and 29 patients with CNP (Group 2) were included in the study. Both groups received specifically adopted exercise programs. The exercise treatment was performed 3 days a week, for 4 months. The pain (VAS), disability (neck pain disability index, NPDI), range of motion of neck, depression (Beck Depression Inventory scores, BDI), QOL (Short Form 36, SF-36), and sleep quality (Pittsburgh Sleep Quality Index, PSQI) of all participants were evaluated. Patients were assessed at baseline (BT), at the end of treatment (AT).

Results: Statistically significant improvements were found between groups regarding all of the clinical parameters over time. Pain, disability, range of motion of neck, depression, QOL, and sleep quality of both groups also showed improvements AT. There were statistically significant differences between the groups for pain, and disability between the groups ($P < 0.05$). Group 2 fared better than group 1.

Conclusion: We observed that specifically adopted exercise programs were effective in improving clinical parameters in patients with CNP and FMS. Exercise programs can be modified and used successfully in CNP and FMS.

P742

FUNCTIONAL AND STRUCTURAL DEFORMITY IN PRESCHOOLERS

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The pace of modern life is full of passive position, and running over, improper diet, the expansion of computer technology, prolonged viewing of television programs, leading to hypokinesia, which increasingly affects young children by supporting the emergence of posture disorders in preschoolers. Poor posture follows the protrusion sagging shoulders, relax the muscles of the anterior abdominal wall strain on the spinal column and creates the possibility of damage. Kyphosis is a deformity of the spine where there is a curving of the spine in the sagittal plane, usually in the thoracic spine. Statistics indicate a high percentage of children with flat feet, with a tendency to decrease. Therefore it is necessary to start work as soon as possible to prevent it in the plastic stage of child development period.

Objective: Early diagnosis, prevention and treatment of physical deformities in the posture of preschool children.

Methods: Observational clinical study, which included 1998 children aged 6 years examined in the period from September to November 2014. Of this number of girls was 1002, and the boys 996 specialist examination we examined posture of children in the normal course of systematic reviews in the department of Physical Medicine and Rehabilitation Health Center in Nis.

Results: Assessment of posture preschool children after physiotherapy, which included an assessment of posture, examination of the spine and lower extremities and distribution data are presented as percentage of the total number of children. Poor posture postural children had a total of 491 (24.57 %), boys 256 (12.81 %) and 235 girls (11.76 %). Kyphosis 73 (3.65 %), 38 boys (1.90 %), 35 girls (1.75 %). Flat feet in 1060 (53.05 %), boys 521 (26.08 %) and 539 girls (26.98 %).

Conclusion: Poor postural posture in preschool children is the most important problem, while the percentage of kyphosis less pronounced, but far more serious problem. Flat feet are in this age often unfairly negligible deformity, nedutim later on can lead to problems in ozbiljijih posture to functional limitations in physical activities. It is necessary in this age postivit timely diagnosis, implement prevention and correction of deformity skeletons.

P743

REPRESENTATION OF OSTEOPOROSIS IN GERIATRIC POPULATION

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Senile osteoporosis is a global health problem, and the disease now falling ill about one-third and one-fifth of men around the world. Its importance is growing as the world's population grows and as more lengthens the average human life expectancy.

Objective: The diagnosis of osteoporosis is important for growing volume of morbidity and to prevent serious consequences and complications such as fractures of the vertebrae, femur, disability.

Methods: Measurement of BMD was performed ultrasound densitometer the Department of Physical Medicine and Rehabilitation at the Health Nis. This research was conducted as a screening test, and included 472 patients older than 65 prominently in the period of 3 years.

Results: the work of the total number of respondents was 358 (75.85 %) women and 122 (25.85 %) men. Normal findings in the patients of the female population was 196 (41.53 %), at the male population 52 (11.01 %). Osteopenia had 88 (18.64 %) of the female population and 45 (9.53 %) male population. Osteoporosis was diagnosed in 74 (15.67 %) women and 25 (5.30 %) men.

Conclusion: Senile Osteoporosis is a disease that faces populations, third age or older people. According to latest research people who have been established osteoporosis will double over the next 50 years, due to the aging of the world population and the impact of various risk factors among which occupies an important place way of life. Senile osteoporosis occurs in both sexes

after 70 years, presents the hip fracture is caused by aging. The most common causes of secondary osteoporosis (caused by disease or drugs) are: treatment with steroids and anticonvulsants (medicines for the treatment of epilepsy). Osteoporosis long time remain clinically inconspicuous, it does not have characteristic symptoms and most importantly, it does not hurt. Therefore, it is rightly called “the silent thief” because bone mass impoverishes years until it drops below the so-called “threshold for fracture” when there is a dramatic clinical complications of the disease - fractures of the vertebrae. Vertebral fracture usually occurs during rapid movement, bending, heavy lifting, and sometimes for no apparent reason. Vertebral fracture leads to hunched posture characteristic of osteoporosis. Body height decreases with each fracture about 2–4 cm.

P744

CARDIOVASCULAR COMORBIDITY IN RHEUMATOID ARTHRITIS

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Rheumatoid arthritis (RA) is a chronic autoimmune disease, which if not treated early and aggressively may lead to disability. In RA inflammatory cytokines which originate during the disturbed immune reaction characterizing the disease and may arise from the inflamed synovium and other inflamed areas within the organism affect the vascular endothelium.

Aim: The observation and report of cardiovascular comorbidity in patients with RA who are being cared for in a single organized department of rheumatology - single center experience.

Methods: A group of 192 patients, 32 male and 160 female with RA, aged 29–88 (mean±SEM) 62.3±0.92 years, being cared for in a single organized department of rheumatology was studied.

Results: Within a group of 192 patients with RA, 51 (26.6 %) had arterial hypertension, 20 (10.4 %) coronary artery disease, 21 (10.9 %) hyperlipidemia, 18 (9.4 %) diabetes mellitus type 2, 4 (2.1 %) hyperuricemia, 4 (2.1 %) had suffered a stroke and 1 (0.5 %) had Parkinson's disease.

Conclusion: The results of this study show that RA is accompanied by factors leading to cardiovascular morbidity. These factors combined with the adverse effects of drug treatment lead to early cardiovascular morbidity and mortality in rheumatoid arthritis.

P745

CARDIOVASCULAR COMORBIDITY IN ANKYLOSING SPONDYLITIS

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Ankylosing spondylitis (AS) is a chronic disease in which the immune reaction is disturbed. The disease affects the entheses and induces new bone formation in the spine. It affects both sexes, the male sex being however preferably, earlier and more severely affected. In earlier times the disease was treated by the administration of NSAIDs and physiotherapy. Nowadays, AS is treated by biologic agents, a treatment aiming to the prevention of disability.

Aim: The description and report of cardiovascular comorbidity in patients with AS being cared for in a single organized department of rheumatology - single center experience.

Methods: A group of 59 patients, 34 male and 25 female with AS aged 21–76 (mean±SEM) 48.93±1.71 years being cared for in a single organized department of rheumatology was studied.

Results: Within a group of 59 patients with AS, 3 (5.1 %) had ulcerative colitis, 10 (16.9 %) had arterial hypertension, 2 (3.4 %) coronary artery disease, 2 (3.4 %) hyperlipidemia, 8 (13.6 %) had diabetes mellitus type 2 and 2 (3.4 %) had suffered a stroke. Within the group of 59 patients with AS 2 (3.4 %) had thyroid disease, 5 (8.5 %) had chronic obstructive pulmonary disease, 2 (3.4 %) had gastrointestinal reflux, 1 (1.7 %) had developed amyloidosis and 1 (1.7 %) had chronic infection from hepatitis C virus.

Conclusion: AS is a chronic autoimmune disease. In this study it was shown that factors such as arterial hypertension and hyperlipidemia lead to cardiovascular comorbidity in ankylosing spondylitis.

P746

ASSESSMENT OF SEQUELS OF POLIOMYELITIS IN HIPS BY 3D-DXA

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Objective: Polio is a devastating infectious disease that causes paralysis and severe muscular atrophy. When any of the legs is affected, a low aBMD at the corresponding hip is a common

finding in DXA measurement. The objective of this work is to study the influence of polio consequences on volumetric bone density and cortical thickness using the 3D-DXA technology. **Method:** 22 patients of both sexes suffering post-polio syndromes (mean age 57 ± 7 years old) were scanned using a GE iDXA system and both proximal femurs were reconstructed using the 3D-DXA technology. 3D-DXA is based on the registration of a 3D statistical model of the femoral shape and density onto the 2D DXA image and provides measurements of volumetric BMD (vBMD) and BMC of the trabecular and cortical bone as well as a quantification of the cortical thickness. The measurements at the leg affected by polio were compared by t-test with those at the non-affected leg.

Results: Trabecular BMC was 22 % lower (-1.8 g, $p < 0.01$) and cortical BMC 19 % lower (-2.9 g, $p < 0.01$) at the polio leg (total hip region). Similar findings were observed for the vBMD: 18 % decrease (-0.020 g/cm³, $p < 0.01$) at the trabecular region and a 2.3 % decrease for the cortical bone (-0.024 g/cm³, $p < 0.01$). The proximal femur volume was also inferior (-12 %, -9 cm³, $p < 0.01$). The cortical thickness was thinner at the polio leg (-12 %, -0.2 mm, $p < 0.01$).

Conclusion: A long period of decreased of mechanical charges, low muscle strength, postural imbalance has dramatic consequences on bone development. The analyses performed using the 3D-DXA technology indicates an overall impairment of cortical and trabecular BMD and a significant decrease of the cortical thickness.

P747

CARDIOVASCULAR COMORBIDITY IN PSORIATIC ARTHRITIS

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Psoriatic arthritis (PsA) is a systemic disease affecting the skin and the joints. It is an autoimmune multisystemic disease which is often accompanied by manifestations of the metabolic syndrome. Inflammatory cytokines released during the disturbed immune response which contributes to the pathogenesis of inflammation observed in the joints and the skin act on the blood vessels and cause systemic generalized infection damaging the endothelium of the blood vessels.

Aim: The report of cardiovascular comorbidity in patients with PsA being cared for in a single department of rheumatology - single center experience.

Methods: A cohort of 60 patients with PsA, 28 male and 32 female, aged 24–85 (mean \pm SEM) 54.63 ± 1.81 years followed-up in a department of rheumatology was studied.

Results: Within the cohort of patients with PsA 3 (5.0 %) had Sjogren's syndrome, 15 (25 %) arterial hypertension, 4 (6.7 %) coronary artery disease, 5 (8.3 %) hyperlipidemia, 2 (3.3 %) hyperuricemia, 3 (5.0 %) diabetes mellitus type 2 and 2 (3.3 %) had suffered a stroke. Within the group of patients with PsA 3 (5.0 %) had osteoarthritis, 7 (11.7 %) osteoporosis, 1 (1.7 %) gastroesophageal reflux disease, 6 (10 %) thyroid disease, 3 (5.0 %) chronic obstructive pulmonary disease and 2 (3.3 %) had developed cancer.

Conclusion: The results of this study show that PsA is accompanied by cardiovascular comorbidity. The disturbed immune reaction, along with hyperlipidemia and arterial hypertension contribute to the development of cardiovascular comorbidity in psoriatic arthritis.

P748

COEXISTENCE OF ANKYLOSING SPONDYLITIS AND RHEUMATOID ARTHRITIS

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Since their initial description connective tissue diseases are known to have similar clinical manifestations and overlapping clinical pictures. It is also known that patients with autoimmune diseases may develop other diseases of autoimmune etiology.

Aim: The description of a case of a patient with ankylosing spondylitis (AS) who developed rheumatoid arthritis (RA) with positive anti-CCP antibodies.

Case description: A patient, male, aged 48 years 8 years ago developed morning stiffness, low back pain, limited spine mobility, bilateral sacroiliitis found on X-rays and increased inflammation indices. Severe osteoporosis was observed T-score being -4.95 . The diagnosis of AS was made. Sulfasalazine along with NSAIDs and antiosteoporotic therapy were administered. The patient interrupted follow-up. He returned 6 years later with diffuse arthralgias, morning stiffness lasting >2 h, fatigue, anorexia, weight loss, low grade fever and symmetric polyarthritis of small and large joints, affecting the wrists, MCP, elbows, knees and ankles, low back pain and limited spine mobility. ESR was 55 mm/h, CRP 4.79 mg/dl, anti-CCP antibodies 29.34 U (normal values <1 U) and RF was positive. Bilateral sacroiliitis was observed and intense bone erosions in the MCP and PIP joints of hands and feet. Methotrexate and corticosteroids were administered. He returned 2 years later with a flare of his disease manifesting diffuse arthralgias, morning stiffness lasting >2 h, intense fatigue, anorexia, weight loss, low grade fever, symmetric polyarthritis of the peripheral joints and low back pain, DAS28 being 7.5, positive anti-CCP and increased inflammation indices. The diagnosis of RA was made. Subsequently, methotrexate and etanercept were administered.

Conclusion: The case of a male patient with coexistence of AS and RA is described fulfilling the criteria for AS (ASAS) and RA (ACR/EULAR 2010) with positive anti-CCP antibodies. Only one more case exists in the literature of coexisting AS and RA with positive anti-CCP. It is known that patients with autoimmune diseases may develop other autoimmune diseases, however, the coexistence of AS and serologically confirmed RA is extremely rare.

P749

SACROILIITIS IN A PATIENT WITH RHEUMATOID ARTHRITIS

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Sacroiliitis is a typical manifestation of seronegative spondyloarthritis. However, it has rarely been described in the context of rheumatoid arthritis (RA).

Aim: The description of a case of a patient with RA who developed sacroiliitis.

Case description: A patient, female, aged 45 years, developed arthralgias, peripheral symmetric polyarthritis affecting wrists, MCP and PIP joints with morning stiffness lasting >1 h. The diagnosis of RA was made and methotrexate along with sulfasalazine were administered. Two years later the patient developed low back inflammatory pain and limitation in spine mobility. MRI imaging of the sacroiliac joints showed bone marrow edema, erosions and ankylosis bilaterally. Adalimumab was administered. Five years later the patient developed an episode of intense low back pain and symmetric oligoarthritis of the wrists and MCP joints. She exhibited good spine mobility in the area of the neck, normal chest expansion, DAS28 was 5.32, anti-CCP antibodies were positive, HLA B27 negative and inflammation indices were increased. Mild erosions were found in the MTP and PIP joints of both feet and ankylosis of the sacroiliac and hip joints was observed, MRI showing bilateral sacroiliitis. The diagnosis of RA with sacroiliitis was made and methotrexate and certolizumab pegol were administered with good therapeutic response.

Conclusion: The rare case of a patient suffering from RA with positive anti-CCP antibodies developing bilateral sacroiliitis is described. Symptoms of spondyloarthritis such as low back pain, as well as, in rare cases sacroiliitis have been described in RA (Can et al., Rheumatol Int 2013).

P750

GENDER-SPECIFIC RELATIONSHIP BETWEEN PHYSICAL PERFORMANCE, BONE DENSITY, AND FRACTURE RISK

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Several factors increase the risk for fragility fracture, including low BMD, falls, and poor physical performance. The associations among these factors have been investigated but most of the subjects of previous studies were women and the associations were controversial. The aim of this study was to evaluate the associations between physical performance and the BMD at various skeletal sites, the risk of osteoporosis, and the history of falls and fractures in subjects stratified by gender and age group. We analyzed 5368 subjects who were 50 years of age and older in the Chungju Metabolic disease Cohort (CMC) study, including 1288 younger (<70) men, 1615 younger (<70) women, 1087 older (≥70) men, and 1378 older (≥70) women. Two measures were used to assess physical performance: the one-leg stance time (OLST), and the timed up-and-go test (TUGT). The subjects in the highest quartile for the OLST were more likely to be osteoporotic than those in the lowest quartile. Additionally, women who had experienced a fracture during the past 2 years were 1.91 times more likely to be in the highest quartile for the OLST than women without a previous fracture. Although the TUGT was associated with neither the incidence of osteoporosis nor the fracture history, the odds ratios for falling were 1.51, and 1.28 as TUGT increased by 1 SD in younger men, and younger women, respectively. The findings of the present study show that the OLST and TUGT are associated with the incidence of osteoporosis and previous fracture and with the incidence of falling in subjects younger than 70 years of age, respectively. Therefore, the OLST, which measures static balance, could be used to predict the risk of osteoporosis and fracture, and the TUGT, which measures dynamic balance, could be used to predict the fall risk.

P751

OUR EXPERIENCE OF ACHILLES TENDON REPAIR, ABSORBABLE VS. NONABSORBABLE SUTURE REPAIR

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Our experience of Achilles tendon repair, absorbable vs. non-absorbable suture repair. We retrospectively studied our Achilles tendon acute rupture cases done over past 2 years and reviewed the outcome and complications.

Methods: We studied 57 consecutive patients who came to our hospital with acute Achilles rupture. We did open end to end repair. We retrospectively collected their bio-data, medical history and mode of treatment. We followed them over up to 6 months with regards to outcome and complications using Boyden score.

Results: Out of 57, four were treated conservatively because of their medical comorbidities, age and functional requirements.

Fifty-three were operated using Ethibond Suture (a nonabsorbable, braided, sterile, surgical suture composed of polyethylene terephthalate) and PDS (polydioxanone-monofilament synthetic absorbable suture) or only PDS. About 6 surgical infections of the operative site and 2 complications over longer period came as thickening and stiffness.

Conclusion: We came with this outcome that in majority of patients the functional outcome results were good to excellent. We observed that a particular technique of repair was related to infection rate as all of them who got infection were repaired using ethibond. We also observed that dvt prophylaxis should be regularly give in the patients.

P752

IMPACT OF MISSED MINIMAL TRAUMA FRACTURE (MTF) ANTI-OSTEOPOROTIC TREATMENT ON SUBSEQUENT HIP FRACTURE IN THE ELDERLY

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Aims: To determine among patients with hip fracture (HF) the proportion of subjects with previous (within 5 years) MTF who missed adequate antiosteoporotic treatment and (2) to compare main parameters of mineral and bone metabolism in HF patients with and without prior MTF.

Methods: Analysis of the Canberra Hospital electronic medical record database for 327 consecutive elderly (>60 years, mean age 82.7±9.9 (SD), 73 % females) patients with HF admitted between the 1st January and the 31st December 2012. Hospital presentations in the last 5 years, (especially with MTF), osteoporotic treatment, clinical and biochemical profiles including serum levels of procollagen type 1 N-terminal propeptide (P1NP), collagen type 1 crosslinked C-telopeptide (CTX), 25 (OH) vitamin D and PTH were recorded.

Results: Of 327 HF patients, 112 (34.2 %) had previously 137 episodes of MTF, including 76 (55.4 %) vertebral, 28 (20.4 %) hip, 21 (15.3 %) upper limb, 7 (5.6 %) pelvic, and 5 (3.5 %) lower limb fractures. However, 52 (45.5 %) of these 112 patients even after the MTF did not receive adequate antiosteoporotic treatment, vertebral fractures were mostly neglected (89.5 %). The serum levels of bone resorption marker CTX in HF patients with prior MTF and discharged on antiresorptive treatment compared to those not treated were significantly lower (0.48±0.3 (SD) vs. 0.65±0.3 µg/L $p=0.003$), while serum concentrations of bone formation marker P1NP (54.13±59.3 vs. 39.98±30.4 µg/L, $p=0.16$), as well as 25 (OH) vitamin D and PTH did not differ.

Conclusion: More than one third of HF patients previously experienced of MTF, but about half of them missed adequate

osteoporotic treatment. The majority of vertebral fractures are not diagnosed and not treated. Although current antiresorptive therapy after MTF significantly decreases CTX levels, it is not sufficient to restore bone metabolism and prevent HF, indicating an urgent need of new approaches.

P753

COST-EFFECTIVENESS OF DAIRY PRODUCTS SUPPLEMENTED WITH VITAMIN D IN THE PREVENTION OF OSTEOPOROTIC FRACTURES

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Objective: The beneficial role of calcium and vitamin D (Ca/Vit D) in the prevention of osteoporotic fractures is widely accepted. Daily amounts of 1,000 mg of Ca and 800 IU of Vit D, combining dietary intakes and pharmacological supplementation are recommended for women at increased risk of osteoporosis [1]. Dietary supplementation, including dairy products containing Vit D is the preferred option. We assess the potential cost-effectiveness of a Vit D supplemented yogurt given to women with low bone density or prevalent vertebral fractures.

Material and methods: We adapted an extensively published and validated cost-effectiveness microsimulation model of osteoporosis management. Average costs and quality-adjusted life-years (QALYs) were computed and compared through an incremental cost-effectiveness ratio (ICER). Epidemiology and cost data were taken from Belgium. The perspective for the cost calculation is that of the health care payers (government and patients) and all costs were expressed in €2014. Price of dietary supplementation was derived from the observed market prices of a yogurt containing 400 mg of Ca and 200 IU of Vit D per unit. Utility data and relative fracture risk reduction from Ca/Vit. D intakes were taken from published systematic reviews. We conducted analyses for women aged 65, 70 and 80 years with low bone mass density (BMD T-score≤2.5) or prevalent vertebral fracture. Two scenarios were considered to reflect the needs of this population, taking into account the well known variations in dietary habits and a possible pharmacological supplementation in Ca/Vit D, given alone or in combination with anti-osteoporosis medications: two enriched yogurt units/day (800 mg of Ca+400 IU of Vit D) (2U) and three enriched yogurt units/d (1, 200 mg of Ca+600 IU of Vit D) (3U).

Results: In women with BMD T-score≤2.5, the ICER of Vit D-enriched yogurt supplementation vs. no supplementation were €56,498 and €71,058/QALY for the 2U and 3U supplementation scenario in women aged 65 years, respectively. The ICER decreased down to €32,467 and €55,943/QALY in the 70 years age group and down to €6,868 and €23,147/QALY in the 80 years age group. In women with a prevalent vertebral fracture, The ICER were €52,598 and €103,344/QALY for the

2U and 3U supplementation scenario in women aged 65 years, respectively. The ICER decreased again down to €32,685 and €58,001/QALY in the 70 years age group and down to €3,390 and €14,602/QALY in the 80 years age group.

Conclusion: Administration of 2 to 3 Units per day of a Vit D-enriched yogurt is a cost-effective strategy to promote bone health, beyond 70 years in women with increased risk of osteoporosis.

References: [1] Kanis JA et al., Osteoporos Int 2013;24:23.

Disclosures: This study was funded by Danone.

P754

EARLY DETECTION AND CORRECTION OF REDUCTION IN BONE MINERAL DENSITY: PREVENTION OF OSTEOPOROSIS AND EXTRA-OSTEAL CALCIFICATION

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Objective: to examine the state of BMD in the persons working under the impact of a number of harmful factors and the prevalence of cardiovascular disease (SCB) due to lower BMD.

Materials and methods: We have examined 1.850 persons of different sex and age, working under the impact of a number of harmful factors. Ultrasound densitometry, a complete clinical, biochemical examination, the study of cardiac hemodynamics, Doppler of carotid arteries, the analysis of medical records have been done.

Results: Decrease in BMD of different severity was detected in 563 individuals or 31 % of all patients (Fig. 1).

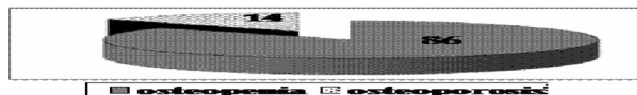


Fig. 1 Structure of reduced BMD.

Reduced BMD persons showed a significant spread of diseases of the circulatory system (hypertension, ischemic heart disease, etc.). Cardio-vascular system morbidity rate in this group was more than 2 times higher than in the general population (Fig. 2).

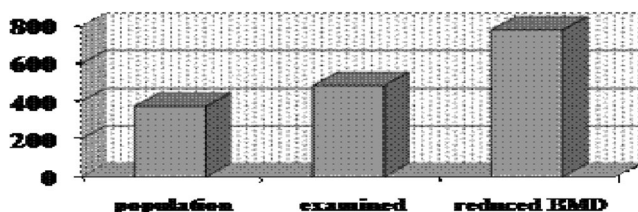


Fig. 2 The incidence of MSP in the general population and in the examined groups.

There was a significant “rejuvenation” of the disease. This indicates that the development of calcium-deficient states is associated

with risk factors that shape the life and eating habits, lifestyle, as well as, to a large extent, the conditions of the working environment.

Conclusion: Thus, early diagnosis of occupational osteopathy, early treatment and prevention will help reduce both osteoporosis and cardio-vascular pathology and may be strategically important for the increase the length and quality of life.

P755

EFFICACY AND SAFETY PROFILE OF COMBINATION OF TRAMADOL-DICLOFENAC VS. TRAMADOL-PARACETAMOL IN A SUB-GROUP OF PATIENTS WITH ACUTE MUSCULOSKELETAL PAIN: A PHASE III 5 DAY, OPEN LABELED STUDY

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Management of acute musculoskeletal pain involves Paracetamol, NSAIDs like diclofenac, opioids like tramadol alone or in combination based on the increase in severity of pain. WHO analgesic ladder suggests an opioid±NSAIDs as treatment of choice for moderate to severe pain. The current study was designed to evaluate safety and efficacy of fixed dose combination (FDC) of tramadol/diclofenac vs. standard approved FDC of tramadol/paracetamol in patients with acute musculoskeletal pain.

Methods: This was a randomized, open labeled, comparative, parallel group, multicentric trial. 52 patients with acute musculoskeletal pain were randomized to receive either of the two treatments: Group A received FDC tramadol hydrochloride 50 mg immediate release/diclofenac sodium 75 mg sustained release (one tablet twice daily) and Group B received FDC tramadol hydrochloride 37.5 mg/paracetamol 325 mg (two tablets every 4–6 h up to a maximum of 8 tablets daily) for 5 days. The primary efficacy endpoints were reduction in pain intensity from baseline at day 3 and day 5 as assessed by VAS. Secondary endpoints were reduction in swelling and inflammation from baseline to all the visits

Results: Group A showed a significant reduction in VAS scores for overall pain, from baseline on day5 ($p=0.002$) as compared to group B (68.85 % vs. 44.63 %). There was significantly greater reduction in swelling scores in group A on day 3 ($p=0.002$) (51.11 % vs. 13.19 %) and day 5 ($p=0.012$) (80 % vs. 50.40 %) as compared to group B. There was significant reduction in inflammation score in group A on day 5 ($p=0.001$) as compared to group B. (86.96 % vs. 51.35 %). The study medication had few mild to moderate adverse events (nausea, vomiting, epigastric pain, gastritis) which required minimal management without any treatment discontinuation.

Conclusion: FDC of tramadol/diclofenac showed significantly greater reduction in pain intensity and was well tolerated as

compared to tramadol/paracetamol resulting in a better analgesia in patients suffering from acute musculoskeletal pain.

P756

OSTEOPOROSIS: WHERE WE COME FROM AND WHERE WE ARE GOING TO

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Poor nutrition is the most common cause of osteoporosis. Most grains group is not good sources of calcium. Aim: Show the state of the art in the osteoporosis.

Material and method: One review in a world basis was performed and on the basis of our experience.

Results: Osteoporosis screening guidelines from the USPSTF miss three-quarters of women 50–64 years of age with osteoporosis. DXA is not a good tool. WHO's FRAX[®] tool arise for the study of osteoporosis. The widely used FRAX vastly underestimates the risk for fragility fractures. More than half of the population was not identified to be at high risk by the FRAX BMI. Vitamin D supplementation should be reserved for those with risk factors for deficiency or proven deficiency on testing with an accurate and precise assay. Researchers have found that a high intake of milk may be associated with higher mortality and fracture risks in women and higher mortality risk in men.

Conclusion: More imagination is needed in prevention, diagnosis and treatment. Osteoporosis screening guidelines are only slightly better than chance alone at discriminating between women with and without the condition, a new study has found. Routine osteoporosis screening is not recommended for young postmenopausal women. The question is when to start. Therefore it is necessary to carry out more research and to open new tracks to have any further reliable tool in the diagnosis of osteoporosis. Thus, a mathematical, physical and physiological 5-dimensional model must be developed in order to gauge bone properties including geometry (2-dimensional DXA), space, time, motion and stress with some portable computer-devices that uses the body space of the user as an interface with equipment and programs designed to communicate information from one system of computing devices and programs to another.

P757

MORTALITY IN FRAGILITY FRACTURE PATIENTS IN A DISTRICT HOSPITAL IN UK

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Aim: To identify the incidence of mortality in neck of femur fracture patients in a district hospital in UK, then ascertain the cause of death if possible in each case.

Methods: Monthly audit of all mortalities take place in the directorate of orthopaedics and trauma in Harrogate district hospital. These are the presented by the main author. The incidence and cause of death was then collated together. Associated comorbidities of each were studied with the help of the patient records. Assessment records on admission were studied. Possible prognosis in relation to the commorbidities risk of anaesthesia and relevant surgery were also looked at.

Results: The mortality rate in Harrogate District Hospital matches with that of the national data on fragility fracture patients taking in to account the commorbidities

P758

MOTION CHARACTERISTICS OF THE VERTEBRAL SEGMENTS WITH LUMBER DEGENERATIVE SPONDYLOLISTHESIS IN ELDERLY PATIENTS

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Spondylolisthesis refers to the forward displacement of one vertebra relative to another.

Objective: to compare the clinical results of lumbar decompression versus lumbar decompression with bilateral pedicle screw fixation and posterolateral fusion in elderly patients with lumbar degenerative spondylolisthesis (DS)

Methods: 30 patients (age more than 55 years) with lumbar DS with failed conservative measures for at least 3 months before surgical treatment were included. Vertebral kinematics obtained using plain X. ray; also MRI and/or CT scan of lumbosacral spine were done. During functional postures, vertebral instability was studied. All cases operated upon from May 2013 to December 2013 in neurosurgery department of Benha university hospital and followed up 6 months at least. Patients grouped into 2 groups according to vertebral instability : group A (15 cases) and group B (15 cases), cases chosen without privilege to sex , or weight, but suffering from midline low back pain and/ or claudication that were proven to be attributed to spondylolisthesis.

Results: adequate lumbar decompression alone in cases of group A (with no evident range of motion) showed good outcome with less complications when compared with cases of group B(showing instability) treated with decompression with posterolateral instrumented fusion using bilateral pedicle screw fixation.

Conclusion: Lumbar DS is a degenerative disease of lumbar spine results in neural compression but does not result necessarily in vertebral instability, some cases of lumbar DS may need only neural decompression as restabilization process may have occurred but other cases show instability which required decompression with instrumented fusion.

P759

PREVALENCE OF ENDOCRINE THERAPIES THAT COULD AFFECT BONE HEALTH IN WOMEN FOLLOWING A REHABILITATION PROGRAM AFTER SURGERY FOR BREAST CANCER

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Objectives: Breast cancer, prostate cancer and endometrial cancer are endocrine sensitive diseases. Endocrine therapies used to treat these cancers have effects on normal bone remodelling. The most commonly used breast cancer treatments (i.e. Aromatase Inhibitors and Tamoxifen) have opposite effects on bone health. Aromatase Inhibitors are only used in postmenopausal women. The aim of this study is to describe the different types of treatment received by postmenopausal women after surgery and the reasons for choosing one treatment over another.

Methods: Women were recruited at the Oncology Department of the University Hospital of Liège, Belgium. All women agreed to participate in this ongoing rehabilitation study (revalidation vs no revalidation) after their breast cancer surgery. Socio-demographic and clinical data were collected. Drug treatment was recorded and categorized into “Tamoxifen”, “Aromatase Inhibitor” or “no endocrine therapy”.

Results: To date, 178 women have been included in this study and 93 (52.2 %) of them were postmenopausal. Their average age is 60.1±6.08 years with a mean BMI of 26.5±5.32 kg/m². The mean time between surgery and the date of entry into the rehabilitation study is 11±3.42 months. The majority (74.2 %) of tumours were invasive ductal carcinoma. Tumour stage was 0 (6.45 %), I (47.3 %), IIa (26.9 %), IIb (9.68 %), IIIa (6.45 %) or not collected (3.22 %). Concerning the lateralization of the tumour, 46.2 % of them were on the right side, 50.5 % on the left side and 1.08 % were bilateral (3.22 % are not reported). All women underwent surgical treatment (59 % had axillary lymph node dissection), 79.6 % had a tumorectomy against 20.4 % who had mastectomy. Almost everyone (97.8 %) received radiotherapy, about half (40.9 %) of them had chemotherapy and 10.8 % had trastuzumab based antiHER2 therapy. Seventy seven women (82.8 %) are on endocrine therapy. Age ($p=0.82$), histology or adjuvant treatment (chemotherapy, radiotherapy or trastuzumab based antiHER2 therapy) did not differ between these two groups. Among women receiving

endocrine therapy, 55.8 % of them receive Tamoxifen and 44.2 % an Aromatase Inhibitor. Women who receive Aromatase Inhibitor have been on the treatment for longer time (12.8 vs 9.45 months; $p<0.0001$), underwent chemotherapy more often (73.5 % vs 11.6 %; $p<0.0001$) and antiHER2 therapy more often (23.5 % vs 0 %; $p<0.001$) than women who receive Tamoxifen. There is no difference between these two groups according to age ($p=0.06$), histology, number of positive nodes ($p=0.08$) and history of radiotherapy ($p=0.07$).

Conclusion: A substantial proportion of women receive endocrine therapy as part of their treatment after breast cancer surgery. However, some of the drugs could have a deleterious effect on bone suggesting that a global management of bone health should be considered. Women who have the highest risk relative to their breast cancer are those that receive most often an Aromatase Inhibitor (they undergo more chemotherapy and antiHER2 therapy). These women suffer a double risk of osteoporosis and appear to be an important target population. The potential impact on bone health of specific rehabilitation programs after breast surgery could warrant further studies.

P760

PERSISTENCE LONG-TERM OF ALENDRONATE THERAPY ON OSTEOPOROTIC POPULATION IN TUSCANY REGION

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Objective: Osteoporosis is a chronic disease and requires chronic treatment. Antiosteoporotic medications greatly increase bone strength. Compliance and persistence to antiosteoporotic drugs guarantee the protection against fractures and refractures over the long term. Bisphosphonates are first-line agents in the treatment of osteoporosis and are efficacious in substantially reducing fracture risk. Nevertheless, persistence with oral bisphosphonate reported varies but are generally sub-optimal, especially in the elderly. Alendronate is the first oral bisphosphonate approved by the FDA for the prevention and treatment of osteoporosis, and is one of the most used anti-resorptive agent in the world. The aim of this study is to investigate the persistence for alendronate in a regional subset represented by the whole population of the region of Tuscany (Italy). **Methods and materials:** The Regional Prescription Database administered by the Region of Tuscany (population of circa 3.8 million inhabitants) has been analyzed in order to search for alendronate (ATC5-M05BA04) delivered by the regional healthcare system to people living in Tuscany in the period encompassing years 2006–2013. The analyzed data were collected through the project named T.A.R.Ge.T. (Trattamento Appropriato delle Rifratture Geriatriche in Toscana,

Appropriate Treatment of Geriatric Refractures in Tuscany). All drugs directly distributed by hospitals or local health authorities (direct distribution dataset, FE), and those delivered through pharmacies (pharmaceutical distribution dataset, SPF) were included in the analysis. For each patient and for each year of therapy, MPR [Medication possession ratio, as defined by number of days of medication supplied within the refill interval (i.e. 1 year) / number of days in refill interval (i.e. 1 year)] was computed. Only patients under treatment for 8 consecutive years were included in the analysis (at least 1 dispensed box/year).

Results: The MPR values were generally low, even in the first year of therapy the highest mean values were observed during the first year of therapy (.42 for females and .31 for males) (Table). With regard to gender-related differences, females had higher mean MPR values compared to males in each year ($p < 0.001$). Repeated measures Anova indicates that the mean MPR values greatly decreased during the years under observation ($p < 0.001$), approaching to 0 values in the eighth year.

Conclusions: The low persistence to treatment with alendronate in a regional dataset may represent a widespread problem and a significant burden for the health care system, resulting in a poor clinical outcome and significantly increases healthcare costs.

Table

	Year	MPR mean	Standard Error	95 % Confidence Interval
Male	2006	0.305	0.007	0.291–0.320
	2007	0.115	0.008	0.100–0.131
	2008	0.077	0.007	0.063–0.091
	2009	0.058	0.006	0.046–0.070
	2010	0.042	0.005	0.032–0.053
	2011	0.030	0.004	0.021–0.038
	2012	0.019	0.004	0.012–0.026
	2013	0.012	0.003	0.006–0.018
Female	2006	0.421	0.003	0.416–0.427
	2007	0.227	0.003	0.221–0.233
	2008	0.170	0.003	0.165–0.176
	2009	0.120	0.002	0.115–0.125
	2010	0.088	0.002	0.084–0.092
	2011	0.061	0.002	0.057–0.064
	2012	0.041	0.001	0.038–0.044
	2013	0.026	0.001	0.024–0.029

P761

206 REASONS TO BE INFORMED ABOUT OSTEOPOROSIS-INCIDENCE OF OSTEOPOROSIS AMONG INDIAN FEMALE GYNAECOLOGISTS

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Introduction: Accelerated bone loss at menopause transition is a well established phenomenon. Awareness and interest in the subject of osteoporosis is low.

Objective: To study the incidence of osteoporosis in female gynaecologists in Telangana and Ahmedabad. To promote awareness, self help and instill interest in the area of osteoporosis

Design: Eligibility criteria for the participating gynaecologists was based on the predicted risk as per National Osteoporosis Foundation (NOF) risk assessment questionnaire (RAQ). The inclusion criteria for enrolment was documented menopause. Sixty four participants from the cities of Telangana and Ahmedabad (INDIA) participated in the study. Informed consent was taken. All sixty underwent Dual Energy x-ray absorptiometry (DXA). DXA was measured at dual hips and spine. Out of the sixty four participants fifty five were at risk as per the RAQ. The machine used at both the centres was GE Medical System DDX Mx73175. The study was approved by the Independent Ethical Committee of Hyderabad.

Results: 34.5 % of the participants were osteopenic at hip and 3.63 % of the participants were found to have osteoporosis. 47.27 % of the gynaecologists were suffering from osteopenia at the spine and 12.7 % had osteoporosis. Eight of the gynaecologist did not qualify for DXA assessment as per the NOF- RAQ. Seven of them had normal BMD and one had osteopenia. It was interesting to note that eight gynaecologists had a history of premature menopause and five of them were on long term estrogen therapy. Out of the five gynaecologists who were on estrogen therapy two had normal BMD and three had osteopenia. Of the four who did not use estrogen therapy, three were suffering from osteoporosis and one had osteopenia.

Conclusion: The incidence of osteoporosis amongst gynaecologists is similar to that in the general population. RAQ is helpful in screening women before referring the woman for DXA. Estrogen therapy probably helps and is indicated in the management of premature menopause unless contraindicated. There is a need to sensitise all professionals dealing with the care of the mature woman to be sensitized about osteoporosis.

Use of FRAX in India is limited by the lack of mortality statistics and determination of intervention thresholds is difficult. Since India did not have a validated risk assessment tool NOF-RAQ was used for risk assessment. Based on the available data on osteoporosis the Indian Menopause Society has developed guidelines on the indications for DXA at menopause.

Reference: Meeta, Harinarayan CV, Marwah R, Sahay R, Kalra S, Babhulkar S. Clinical practice guidelines on postmenopausal osteoporosis: *An executive summary and recommendations. J Mid-life Health 2013;4:77–106

P762

MANDIBULAR BONE CHANGES IN POSTMENOPAUSAL OSTEOPOROTIC PATIENTS AFTER TREATMENT WITH ZOLEDRONIC ACID

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The consequence of aging involves the risk of osteoporosis, leading to an impaired quality of life in the elderly persons, especially postmenopausal women. Osteoporosis is the leading cause of morbidity and mortality in Postmenopausal women. Postmenopausal osteoporotic patients has eroded mandibular cortex. aim of this study was to see mandibular bone changes in Postmenopausal osteoporotic patients after treatment with Zoledronic acid. 150 Postmenopausal osteoporotic patients were selected and divided in two groups: first group was freshly diagnosed osteoporotic patients and second group osteoporosis having Zoledronic acid treatment before 1 year. All ati ends were evaluated by Dual Energy X-Ray Absorptiometry (DEXA), Orthopatogram(OPG) and Radiovesiograph(RVG). Significant improvement of Mandibular alveolar bone occurred in treated group measured by RVG, 84 and 83 % Mandibular cortical index were eroded in nontreated and treated group respectively. Horizontal alveolar bone resorption of alveolar bone were less in treated group vs nontreated group (88 % vs 97 %). The vertical alveolar bone resorption were not significantly different in treated and nontreated group (12 %vs 13 %). In Postmenopausal osteoporotic patients, treatment with Zoledronic acid (Bisphosphonates) significantly improved Mandibular alveolar bone in parameter of Pixel intensity determined by RVG and cortical index by OPG.

P763

SELF-RATED HEALTH PREDICTS HIP FRACTURES INDEPENDENT OF FRAX

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A low self-rated health has been associated with a greater cardiovascular risk factor burden, an increased risk of future cardiovascular events and an increased all-cause mortality. However it has not yet been investigated in relation to bone health.

FRAX is the most widespread tool for fracture assessments. It includes 11 well-documented risk factors for fracture. The T-score at the femoral neck may also be included in the risk calculation as a twelfth risk factor.

The aim of this study was to see if self-rated health could predict hip fractures.

This population-based prospective cohort study included 351 Swedish women, aged 69–79 years. At inclusion they rated their global health between “worst imaginable health” and “best imaginable health” by putting an “x” on a line drawn between these two extremes. The distance from “worst imaginable health” to the “x” was measured in millimeters. Follow-up 10 years later was based on data on incident fractures and mortality from Swedish medical records. The main outcome was a hip fracture. No participant was lost to follow up.

During follow-up, 40 participants (11 %) had a hip fracture. For the lowest quartile of self-rated health, the age adjusted hazard ratio (HR) of a hip fracture was 3.70 compared to the highest quartile of self-rated health. This relation was unaffected by adjustment for BMD as well as for every other single risk factor of the risk factors included in FRAX. Adjustment for maximum one-leg standing time however made the hazard ratio non-significant. The Net Re-classification Improvement (NRI) was 39 % ($p=0.02$) when self-rated health was added to FRAX. Integrated Discrimination Improvement (IDI) was 3.1 % ($p=0.009$).

Self-rated health thus seems to identify a risk of hip fractures not discovered by FRAX. However it may be related to postural balance. It might be valuable as an addition to a FRAX assessment.

P764

HOW TO OPTIMISE TRAMADOL IN THE TREATMENT OF OSTEOARTHRITIS?

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It is the benefit of the recent ESCEO recommendation on osteoarthritis (OA) treatment of 2014⁽¹⁾ to translate the diversity of national and international guidelines into a readily usable 4 step flow-chart on evidence based treatment exemplified by OA of the knee.

According to ESCEO recommendation, patients who show insufficient outcome to Step 2 approaches to treat OA, i.e. predominantly prescription of NSAIDs, may be considered as candidates to surgery, i.e. Step 4. However, last pharmacological attempts for still or severely symptomatic patients, i.e. Step 3, could be made with short-term weak opioids, such as tramadol, or duloxetine.

Contrary to NSAID, tramadol has not been attributed to the risk of serious adverse reactions such as cardiovascular and gastrointestinal event with lethal outcomes or residuals. Nevertheless, the use of tramadol may be impeded by non-serious ADRs, i.e. nausea, dizziness, somnolence, constipation, headache, orthostatic hypotension and vomiting, resulting in withdrawal from initial treatment. The rate and severity of ADRs correlate with high plasma peaks of tramadol and variations of plasma concentrations above toxic levels.

It is the advantage of slow release (SR) products of tramadol vs. immediate release products to prolong efficient plasma levels of tramadol while preventing high plasma peaks and limiting the variations of plasma levels. Among SR products, the tramadol SR multiple units formulation (micro pellets)⁽²⁾ was clinically tested vs. a single unit SR formulation. The tramadol multiple units formulation was found to superiorly meet these goals yielding a significantly lower intra- and inter-individual variability of tramadol plasma concentrations with respect to extend and amount of absorption.

Due to the multiple units technology the intestinal absorption of the tramadol SR formulation is almost independent of varying gastric emptying and locally high concentrations. Plasma profiles were virtually identical in the tramadol SR formulation under fasting and non-fasting conditions.

Slow dose escalation starting from a dedicated low tramadol dose of 50 mg up to an effective dose leads to significantly reduced rates and severities of ADRs and reduced discontinuation rate from treatment. The tramadol SR multiple units formulation meets this objective as it is available at 50, 100, 150, and 200 mg dose strengths.

[1] Bruyere et al., *Semin Arthritis Rheum.* 2014 Dec;44(3):253–63.

[2] Brand names: Adamon, Dolo-Adamon, Gemadol, Timasen, Tradonal, Tranquel, Travex, Zamadol, Zamudol.

P765

12-MONTH PERSISTENCE WITH SUBCUTANEOUS DENOSUMAB ONCE EVERY 6 MONTHS (SC DMAB Q6M) IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS (PMO): INTERIM RESULTS OF A 24-MONTH PROSPECTIVE OBSERVATIONAL STUDY IN GERMANY, AUSTRIA, GREECE AND BELGIUM

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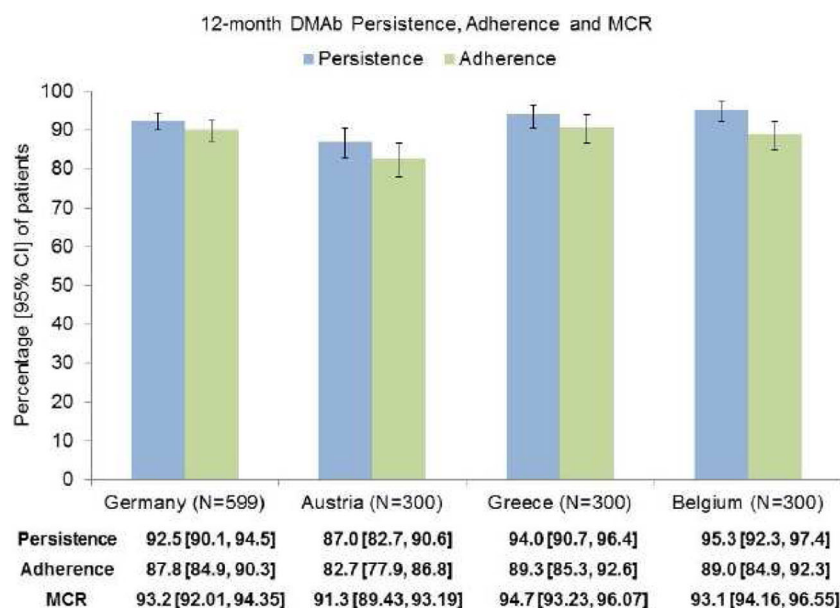
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Objective: It is recognized that poor persistence to/adherence with PMO therapy leads to increased fracture risk¹ and less frequent dosing may contribute to better persistence/adherence². We report medication-taking behavior of PMO women following receipt of their first DMAB injection in clinical practice.

Material and Methods: The study has been described elsewhere³. The pre-specified interim analyses reported here included data as of August 2013, for Germany, Austria and Greece, and as of May 2014 for Belgium. Interim endpoints included 12-month persistence and adherence (2 consecutive DMAB injections no more than 6 months + 8 weeks apart, and within 6 months ± 4 weeks, respectively), Medication Coverage Ratio (MCR; % of time a patient was covered by DMAB), and adverse drug reactions (ADRs). Univariate logistic regression assessed associations between pre-specified baseline covariates and 12-month persistence.

Results: Of 1501 women enrolled, 1500 were included in the analysis. Baseline characteristics were consistent with those of a PMO population (data not shown). At 12 months, DMAB persistence ranged from 87.0 to 94.0 % (Fig. 1). Results of the 12-month persistence univariate analysis will be included in the final presentation. Across countries, 1.7–5.0 % of patients reported ADRs, with 2 independently adjudicated cases of osteonecrosis of the jaw (one resolved, the other ongoing). No fatal ADRs were reported.



Conclusion: In PMO clinical practice in Austria, Belgium, Germany and Greece overall 12-month persistence to DMAB was high (approximately 90 %). Such high persistence may lead to improved outcomes, including fracture risk reduction.

References: ¹Siris et al., *Am J Med* 2009; ²Warriner and Curtis, *Curr Opin Rheumatol* 2009; ³Tepic et al., ECTS 2013

Acknowledgements: Amgen/GSK

P766

EPIDEMIOLOGY AND MORPHOLOGY OF OSTEOPOROTIC HIP FRACTURES IN ZARAGOZA (SPAIN)

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Keywords: Epidemiology, Hip Fractures, Osteoporosis

Introduction: Hip fractures are a major cause of public health burden because they result in increased morbidity, mortality and high health care costs. The increasing numbers of hip fractures has caused great concern in many countries. It is known that there has been an important change in the age distribution of the population, with an increase in the population aged more than 80 years. In addition the incidence of hip fractures are expected to increase significantly in the next few decades.

Objectives: The aim of the present population-based study is to describe age- and sex-specific incidence of hip fractures and describe time trends in hip fracture incidence in Zaragoza, Spain

Methods: The study included all the cervical, trochanteric and sub-trochanteric fractures in patients aged 65 years or more who were admitted to the Department of Orthopaedic Surgery at the Miguel Servet University Hospital, Zaragoza, during three periods 1989-1990, 1999-2000 and 2009-2010. Fractures related to bone tumors and metastases were excluded. The etiology was a low-energy trauma caused by a simple fall. For each patient we registered the age, sex and type of fracture.

Results: The mean age increased during the three periods 80.3 years in 1989-1990, 81.5 years in 1999-2000 and 82 years in 2009-2010 ($p < 0.041$). The incidence (per 100000 population) increased from 98 to 159 over the three periods ($p < 0.001$). The proportion of the different types of hip fractures did not differ significantly between the three periods, despite the trend of increasing proportion of trochanteric fractures and the decrease of cervical fractures between 1989 and 2010. Significant changes were observed in the mean ages of cervical and trochanteric fractures. No significant changes were observed in the mean ages of patients with subtrochanteric fractures. Significant changes were observed in the incidences of the different types of cervical fracture. Nondisplaced cervical

fractures were significantly decreased and the incidence of displaced cervical fractures was significantly increased. We observed an increasing trend of comminuted and unstable trochanteric fractures.

Conclusions: This study supports other international studies by showing changes in the incidence of hip fractures. We observed an increase in the incidence, in the mean age and a change in the pattern of hip fracture with an increase of displaced cervical fractures and comminuted and unstable trochanteric hip fractures. These changes modify the preoperative management and functional recovery of the patient.

P767

TRANEXAMIC ACID IN OSTEOPOROTIC HIP FRACTURE SURGERY

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Keywords: Blood loss, Complication, Hip fracture, Transfusión, Tranexamic acid

Introduction: Elderly patients that present an osteoporotic subcapital hip fracture are fragile and badly tolerate the bleeding and the transfusion; at the same time, they present a high thromboembolic risk. In the hip hemiarthroplasty the intraoperative blood loss is moderate and, when the surgery finishes, the fibrinolytic activity increases. A randomized controlled trial has showed that tranexamic acid (TXA) intravenous, reduces the bleeding and erythrocyte transfusion in hip fracture surgery but, may promote a hypercoagulable state. We think that the hip fracture patients could get benefit of the use of tranexamic acid peri-articular

Objectives: The objective of this study is to find out the efficacy and safety of peri-articular TXA in reducing blood loss during and after the hemiarthroplasty for hip fracture surgery.

Methods: A prospective cohort study was conducted on 141 patients undergoing hemiarthroplasty. 71 of them were given TXA peri-articular and compared with 70 others to whom TXA was not given. All patients received the same blood saving protocol and manage of anticoagulation protocol. The protocol in patients who received peri-articular TXA was: before connecting the peri-articular drainage to the aspiration bottle, 2 grams of TXA were injected and the peri-articular drainage kept closed during 30 min. Primary efficacy outcome was erythrocyte transfusion from surgery up to day 8. Hemoglobin level was estimated before arthroplasty surgery and two days after. The transfusion was administered according to a standardized protocol ($hb < 9$ g dl(-1)). Safety criterion was a composite of symptomatic and asymptomatic vascular events up to 6 weeks.

Results: 71 patients were received to TXA and 70 were control. The rate of erythrocyte transfusion was similar in both

groups. The fall of hemoglobin was significantly less in the study group (2,5 g/dl) in comparison to control (3.2 g/dl). Preoperative hemoglobin value, age, and to be treated with antiplatelet drugs or with oral anticoagulants, in per-operative hip fracture, were risk factors for erythrocyte transfusion, independent of treatment group. The probability of vascular events at 6 weeks was 13,3% in the TXA group and 6% in the historic control group.

Conclusions: The TXA cost is 4 Euros. The protocol is easy to implant, effective/efficient and like to be more secure than intravenous. However, further evaluation of safety is required before recommending the off-label use of peri-articular TXA.

P768

PELVIC FRACTURES IN ELDERLY: EPIDEMIOLOGY AND COMPLICATIONS

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Keywords: Falls in elderly, Low-impact trauma, Morbidity, Mortality, Outcomes acid, Pelvic Fracture

Introduction: The stable osteoporotic pelvic ring fractures are a type of fracture by fragility and they are considered by to be treated with Conservative treatment, although they have got annual mortality rate similar to hip fractures They entail a high social and sanitary charge by being associated with long periods of immobilization and frequent complications. Frequently patients don't attain their previous to the fracture after the recuperation

Objectives: The aim of our work is revised the stable osteoporotic ring pelvic fractures assist in our emergencies service during the 2013 year during and after the hemiarthroplasty for hip fracture surgery.

Methods: A retrospective study of all registered stable osteoporotic pelvic fractures produced by fall from standing height, with admission in Trauma Center from 2013 year.

Results: We identify 60 patients (51 women) with an average

age of 83,5 years old, produced by a low energy trauma. A pelvis X-ray was taken to all the patients and TAC was taken to 9 of them. The most frequent lesion was the ilium and ischiopubic fracture in 50 cases. Eleven patients were diagnosed from the fracture in the second visit to the emergencies medical services. 6 cases had traumatic brain injury associated, 4 had other fractures associated, and 27 had lesions in other pelvic locations. The 98,3 % had associated 1-3 comorbidities. Blood pressure was normal to all patients. A blood analysis was made in 18 patients with an average of 12,6 of Hb and control analytic to 5 patients with an average Hb of 10, 4. Five patients presented anemia by bleeding, that required blood transfusion. 10 patients stayed under observation in the emergencies service. The average stay in emergencies was 390 minutes, 46 patients came to the emergencies service on the first 24 hours after the traumatism and 35 in less than 8 hours. Eight patients had stay at the hospital with an average stay of 18 days. The average prescriptions per patient was 3,2 and 47 patients were discharged from hospital in ambulance. Fourteen patients required second attention in the emergency medical service, even a third on, seven of them and 10 of them had to be sent to hospital because complications in their evolution. The main complications were: 10 analytic alterations (anemia post bleeding, hidroelectrolic alterations, dehydration^{1/4}.) 5 psychiatric alteration, 5 with a bad pain control, 5 with urinary tract infection, 4 with pneumonia, 2 deep vein thrombosis, thromboembolic pulmonary and 1 ilium. The mortality a year was the 13,3%.

Conclusions: We will see an increase in stable osteoporotic pelvic ring fractures in geriatric patients. Due to the patients fragility with these fractures, with frequent comorbidities, its manage must prevent complications derived from bad pain, bleeding and immobility Multidisciplinary management is very important from the emergencies service. Included sufficient pain medication and thromboembolic prophylaxis. The mortality one year later might be than high as the mortality in hip fractures Early care is mandatory to maximize survival.

World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2015): Satellite Symposia Abstracts

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ESCEO Algorithm for Osteoarthritis: from treatment guidelines to real life

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SY1

BIOLOGICAL AND CLINICAL EFFECTS OF INTRA-ARTICULAR HYALURONIC ACID: META-ANALYSES AND REAL-LIFE PATIENT STUDIES

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Knee osteoarthritis is the first cause of consultations for osteoarthritis (OA) related symptoms. Its current management requires the combination of pharmaceutical and non-pharmacological strategies, including intra-articular injections of hyaluronic acid (HA) that are aimed to decrease pain and improve joint function. This concept named “viscosupplementation” (VS) has been developed to the finding that the visco-elastic nature characterizing the healthy synovial fluid was altered in OA and that these changes were directly related to the quantitative and qualitative HA decline in the synovial fluid. Indeed HA plays a major role in cartilage lubrication and shock absorption, through the visco-elastic behavior of SF. In OA joints, SF visco-elasticity, and consequently ability to protect cartilage, are dramatically lowered when compared with healthy SF as a result of a decrease of both HA MW and concentration. However the therapeutic effects of HA are likely much more complex and are not fully clarified. They are probably mediated through several mechanisms such as promotion of endogenous HA production, interaction with pain receptors, and various anti-inflammatory effects. Most of these effects could be mediated through interactions between HA and its receptors CD44 and RHAMM.

After more than 20 years of use, VS is usually recognized by rheumatologists and orthopedic surgeons as an effective treatment of knee OA in most cases (effect-size similar or higher than that of other therapeutic modalities) and a well

tolerated modality, although the actual level of the benefit/risk/cost ratio and the precise indications remain subject to controversy. This is mainly due to conflicting results of meta-analyses which may arise from methodological differences but also from possible differences in efficacy between products. There are also increasing evidence on a structure-modifying effect of HA injections.

Beyond its moderate but certain efficacy, VS should be now considered as a first line therapy for mild and moderate knee OA, thanks to both its excellent safety and its potential chondroprotective effects.

SY2

PREVENTION AND TREATMENT OF KNEE OSTEOARTHRITIS WITH GLUCOSAMINE SULFATE: FROM CLINICAL STUDIES TO REAL LIFE

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Glucosamine is among the most commonly prescribed medications in osteoarthritis (OA) thanks to its good safety, efficacy as a Symptomatic Slow Acting Drug in OA (SYSADOA), with firm hints of disease modification over long-term treatments in knee OA. However, such features were confirmed only with the original formulation of prescription crystalline glucosamine sulfate, as also acknowledged in the recent ESCEO algorithm recommendations. Such preparation is the only one employed in successful glucosamine trials as assessed in several recent meta-analyses, beside having a well characterized pharmacokinetic and pharmacological profile as compared to the more erratic characteristics of glucosamine over-the-counter formulations. Such differences have been lately confirmed in a real-life patient study. The Pharmaco-Epidemiology of GonArthroSis (PEGASus) study is a cohort experiment of patients with knee OA pain with dynamic exposure to all available SYSADOA in France (namely

crystalline glucosamine sulfate, glucosamine hydrochloride, chondroitin sulfate, avocado soybean unsaponifiables and diacerein), aimed to assess the impact of such medications on non-steroidal antiinflammatory drugs (NSAIDs) consumption. Overall, the study involved over 6.000 patients. Crystalline glucosamine sulfate was the only SYSADOA able to decrease the use of NSAIDs over treatment up to 24 months [OR=0.64 (95 % CI: 0.45-0.92) in the protocol primary analysis]. Remarkably, glucosamine hydrochloride did not decrease NSAID consumption either, confirming the different efficacy profile than glucosamine sulfate as previously emerged from clinical trials.

Real-life observations also confirmed the postulated disease-modifying effect of crystalline glucosamine sulfate. While two 3-year randomized, placebo-controlled trials in knee OA suggested that the drug is able to delay radiological joint space narrowing, a prospective observation of patients receiving at least 12 months of treatment in the studies and followed for up to 5 years after trial completion, showed that those who received glucosamine sulfate decreased their risk of undergoing total joint replacement compared to former placebo patients [RR=0.43 (95 % CI: 0.20-0.92)].

Since crystalline glucosamine sulfate proved to be particularly effective in mild knee OA, the logical question was whether the drug might even prevent the development of the disease in high-risk subjects. New results from the 30-month PRevention of knee Osteoarthritis in Overweight Females (PROOF) study suggest that glucosamine sulfate may prevent the disease compared with no intervention or a diet and exercise program.

SY3

HOW CAN WE HELP IMPLEMENTING ESCEO ALGORITHM IN REAL LIFE?

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Most osteoarthritis (OA) treatment guidelines analyze the evidence behind each proposed treatment, but the intervention strategies are not prioritized in the way which would meet the need of everyday clinical practice. This apparent “gap” results from the fact that few clinical trials have been designed to study the effect of a given treatment in patients in whom initial therapies have failed and/or how new treatments should be introduced. As a consequence, treatments are sometimes based on individualized patient’s assessment and the physicians’ subjective interpretation of the (often contradicting) evidence.

An accurate analysis of the evidence, by an international task force of 10 rheumatologists (from Europe and North America) and 2 clinical epidemiologists experienced in the performance, analysis and interpretation of RCTs in OA,

allowed to prioritize interventions into logical steps and to develop the ESCEO algorithm recommendation, with the purpose to adapt current global or other guidelines to the European situation.

The ESCEO algorithm has been presented and discussed in 2014 at both OARSI and EULAR Congresses, and it is now a published document which we consider an easy-to-follow and evidence-based advice on how and when establishing treatment flow in patients with knee OA.

Patient education with an appropriate exercise program, together with weight reduction when necessary, represent the background non-pharmacological treatment, to be joined early by pharmacological treatment represented by paracetamol for rescue analgesia and/or continuous prescription glucosamine sulfate (and/or other SYSADOA) for long-term symptom control and for delaying joint damage progression.

In case of symptom persistence, the choice of a NSAID may consider not only the option “COX-2 selective or nonselective in combination with a proton pump inhibitor”, but also evaluations about overall safety and absence of negative interaction with the cartilage metabolism. In case of persistent pain, use of weak opioids, particularly in slow-release formulations with smooth PK curves, could represent a suitable option.

Implementation of the ESCEO algorithm recommendations in real life may represent a framework for the development of new international guidelines for the management of OA and other rheumatological conditions.

Dairy products & bone health : turning facts and beliefs into clinical practice

Sponsor: CERIN/CNIEL, EMF, GDP

SY4

THE ACID-ASH HYPOTHESIS AND BONE HEALTH

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Many books and websites currently state that the modern diet causes many diseases through an accumulation of acids and that this produces whole body acidification. These promotions state that this acid from the modern diet cause the bones to demineralize to buffer the whole body acidosis. People are encouraged to measure their urine pH as an assessment of how well they are doing at alkalinizing themselves and achieving a better health status.

These claims are based on the acid-ash hypothesis that was developed between 1907 and 1920. The main claims of the acid-ash hypothesis, that the body becomes acidified by the modern diet and that urine pH reflects whole body acidification are simply not true. While many studies have examined the changes in urine pH with diet changes, these studies have

uniformly found that diet or supplement changes can change urine pH, however, the studies that examined both urine and blood pH found that the diet changes does not change blood pH. In fact, acidic urine shows that kidneys are effective at excreting acid. Although claims are made that Western industrialized nations suffer from problems caused by acidification, because both modern lifestyle and the modern diet promote acidification of the body, evidence does not support these claims.

While many diseases have been claimed to be caused by the acid-producing modern diet, the only disease process that has been comprehensively studied regarding this topic is the maintenance of bone health. A systematic review by our group of all of the studies that could be located on the topic of the alkaline diet and bone health (including randomized control trials, as well as observational, and cellular mechanism studies) found no evidence of benefit of the alkaline diet or alkaline supplements on bone health.

SY5

DAIRY PRODUCTS & BONE HEALTH: TURNING FACTS AND BELIEFS INTO CLINICAL PRACTICE

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Dairy products provide a package of essential nutrients that is difficult to obtain in low-dairy or dairy-free diets, and for many people it is not possible to achieve recommended daily calcium intakes with a dairy-free diet. The recommended consumption is 3 servings of dairy products per day (for example, 1 glass of milk, 1 portion of cheese, 1 yogurt) - an amount that provides most of the RDI of calcium for the general population. Regarding bone health, there is growing evidence that the consequences of age-related or postmenopausal bone loss on fracture risk depends on the level of peak bone mass achieved during childhood and adolescence. Interestingly, it has been shown that adequate dietary calcium and protein intakes are essential to achieve optimal peak bone mass during skeletal growth and to prevent bone loss in the elderly. Current European guidance on osteoporosis incorporates nutritional recommendations for bone health, including at least 1000 mg/d calcium and 800 IU/d vitamin D. The available data show a positive association between dairy food intake and markers of bone health (i.e., bone mineral density, bone turnover markers), although data on the relationship with fracture risk are currently limited.

SY6

DAIRY PRODUCTS: FACTS AND FICTION

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Dairy products provide a source of key nutrients that is difficult to obtain in low-dairy or dairy-free diets. Despite the established benefits for bone health, some people avoid dairy in their diet due to beliefs that dairy may be detrimental to health, especially in those with weight or digestion concerns, arthritis or trying to avoid cancer.

The bioavailability of calcium from milk is high. In some people, milk ingestion causes gastrointestinal symptoms due to a relative deficiency of the enzyme lactase causing undigested lactose to be fermented by the colonic bacteria. Self-diagnosis of lactase deficiency is common and often incorrect; in fact the degree of lactose tolerance varies, and drastic restrictions are usually not needed. Yogurts which contain pre-digested lactose and hard cheese which do not contain lactose are other excellent sources of dietary calcium.

Meta-analyses concluded that restriction of dairy products intakes has not been reliably shown to aid in weight loss programs. Data actually suggest that consumption of dairy products reduces body fat and preserves lean body mass. Recent data from limited prospective studies suggest even that consumption of dairy products protects against the risk of overweight and obesity.

Cancer is a complex and multifactorial disease and diet has received considerable attention. The abundant scientific data has been collated and interpreted by the World Cancer Research Fund (WCRF), one of the world's most authoritative reference in that field. In their recent updates, the WCRF experts panel concluded that the evidence for any link between milk/dairy products and breast, ovarian or prostate cancer was limited whereas milk consumption probably decreases the risk of cancers of the colon and rectum. Results of ongoing trials are eagerly awaited.

Studies on dairy products and arthritis are scarce but there appears to be no physiopathological reason why patients with osteoarthritis or rheumatoid arthritis should avoid dairy consumption.

In conclusion, the intake of dairy products at the recommended dose of 3 servings per day as part of a balanced diet is safe, practical and affordable. Overall, the proven benefits of dairy foods on bone health greatly outweigh possible but unproven harms.

Putting the Patient First: Effective Therapeutic Strategies to Reduce the Burden of Fractures

Sponsor: Eli Lilly

SY7

PUTTING THE PATIENT FIRST: EFFECTIVE THERAPEUTIC STRATEGIES TO REDUCE THE BURDEN OF FRACTURES

Eli Lilly and Company, Indianapolis, Indiana, United States

While considerable progress has been made in recent years in the management of patients with osteoporosis, many challenges remain that prevent healthcare professionals from being able to provide the right treatment to the right patient at the right time. This symposium will address three of these challenges: deficiencies in diagnosis and follow-up, assessment and treatment of the fragile osteoporotic patient, and treatment strategies in patients with secondary osteoporosis. A distinguished panel of speakers will provide their expert opinion on these key issues. The 90-minute programme will begin with a discussion of the proven benefits of implementing a Fracture Liaison Service (FLS). A series of cases of fragile patients will then be presented and best practice management strategies highlighted. Finally, the clinical benefits of anabolic therapy in patients with secondary osteoporosis will be reviewed. All of these issues will be discussed in the context of “putting the patient first”. Through participation in this symposium, it is hoped that attendees will leave better equipped to:

Understand how implementation of a FLS enables patients to receive timely treatment and follow-up care.

Identify specific challenges encountered in fragile osteoporotic patients, and develop appropriate care pathways for the individual patient.

Evaluate current therapeutic options available for secondary osteoporosis, and select the best treatment for each patient.

The ultimate aim of this symposium is to help clinicians make informed decisions when presented with specific patient scenarios in practice.

This symposium is sponsored by Eli Lilly and Company.

Old and new treatments for bone diseases

Sponsor: Abiogen

SY8

VITAMIN D: ITS EXPANDING ROLE IN THE MAINTENANCE OF BONE HEALTH

M. L. Brandi¹

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Vitamin D is a hormone with a key role in calcium and phosphate metabolism and bone health. Even though in the last decade Vitamin D has been the focus of research, beyond these known effects (with low Vitamin D levels being associated with neurodegenerative disorders, cancer, altered glucose metabolism, and cardiovascular diseases), its main recognized function is as a calcitropic hormone.

The association of Vitamin D deficit with many non-skeletal disorders has facilitated the attention not only to the elderly people but also to younger populations, that also appear to exhibit low 25(OH)D3 circulating levels.

The accumulated information of Vitamin D status in a wide range of ages is going to be described in detail, along with potential future interventional approaches, with a main focus to the maintenance of bone health.

SY9

NEW TRENDS IN THE TREATMENT OF ALGODYSTROPHY

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Complex Regional Pain Syndrome type I (CRPS-I) is a severely disabling pain syndrome for which no definite treatment has been established. Aim of this multi-centre, randomized, double-blind placebo controlled trial was to test the efficacy of the amino-bisphosphonate neridronate in patients with CRP-I.

The treatment of CRPS-I has been a medical challenge until recently. A number of therapeutic approaches have been proposed with uncertain results based on randomized controlled trials (RCTs) with methodological limitations in terms of homogeneity and size of the study samples.

For long-time bisphosphonates were used off-label for the treatment of CRPS-I based on 4 RCTs and a number of small uncontrolled studies, all of them showing positive results in controlling pain, oedema and functional impairment. However, none of these trials provided sufficient data to make the use of a bisphosphonate formally indicated for the treatment of CRPS-I.

This gap was fulfilled recently by a registration RCT properly powered to show efficacy on pain at either hand or foot. The included 82 patients were randomly assigned to 100 mg neridronate infused intravenously 4 times over 10 days or placebo. After 50 days the former placebo patients were given open label the same regimen of neridronate.

Within the first 20 days ≥ 50 % reduction of the pain VAS score was seen in 73 % of patients in the neridronate group versus 32 % in the placebo group (a 40.7 % treatment difference; 95 % CI 20.8-60.5 %, $P=0.0003$). Reduction in pain was associated with decreased allodynia, hyperalgesia and oedema, and improvements in quality of life. Subsequent treatment of patients from the placebo group with the active medication produced similar outcomes to those in the patients initially treated with neridronate, such that in the total group, no patient had clinical features of CRPS-I at 1 year. At the study entry all patients initially had CRPS-I for less than 4 months and all showed either bone oedema at the Magnetic Resonance Imaging (RMI) or positive local over-uptake at bone scintigraphy. These features identify a sub-group of patients with CRPS-I who have active bone-related pain. Thus, the efficacy of neridronate in patients without active bone disease remain to be assessed. The persistent positive effects

of bisphosphonates in CRPS-I challenges the most accredited theories on the pathogenesis of the disease. It is worth mentioning also that the doses of nitrogen-based bisphosphonates required to treat CRPS-I are considerably higher than those normally used to treat Paget's disease of bone.

The results accumulated so far provide conclusive evidence that the use of bisphosphonates, at appropriate doses, is the treatment of choice for CRPS-I.

SY10

ADHERENCE TO TREATMENT IN OSTEOPOROSIS: CHALLENGES AND NEW SCENARIOS

N. Napoli¹

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Bisphosphonates are key players for the treatment of osteoporotic patients. Data available have shown a clear, strong, effect on preventing both vertebral and femoral fractures up to 10 years. Nevertheless, fractures prevalence in Europe is still alarming and many patients, even after a fragility fracture, do not receive an appropriate treatment. Bisphosphonates are generally safe although concerns have been raised in the last years because of the onset of osteonecrosis of the jaw (ONJ) or atypical femur fractures (AFF). Alendronate treatment, the most studied and commonly prescribed bisphosphonate, may be limited by gastro-esophageal discomfort that may affect up to 10 % of treated patients. Clinical evidences show that the onset of upper intestinal discomfort is, in many cases, a reason to stop bisphosphonates. Therefore, if from one side, the fear for rare events like AFF or ONJ are a barrier to start an appropriate treatment, adherence to treatment is the new burden for bone specialists. A new available alendronate formulation has shown promising results, improving esophageal transit and lowering the risk of side effects. Empowerment of patients remains a main challenge for health professionals but new available formulations may offer new promising scenarios to improve adherence to anti-osteoporotic treatment.

Managing Long-Term Osteoporosis : New Insights

Sponsor: Amgen

SY11

MANAGING LONG-TERM OSTEOPOROSIS: NEW INSIGHTS

Amgen

This educational symposium sponsored by Amgen is entitled "Managing long-term osteoporosis: new insights" and will be chaired by Serge Ferrari and Ego Seeman.

During the 90-minute programme, the following topics will be covered:

Efficacy and safety of long-term therapy with denosumab

Socrates Papapoulos

The extension study of the 3-year randomised placebo-controlled FREEDOM trial evaluates the long-term safety and efficacy of denosumab treatment for up to 10 years in women with postmenopausal osteoporosis¹. This presentation will summarise long-term efficacy and safety data for up to 8 years of denosumab treatment from the ongoing study. It will also provide perspectives on long-term data of other currently used therapies.

Target for osteoporosis therapy: Supportive evidence from the FREEDOM extension

Serge Ferrari

The concept of treat-to-target has been employed for many years in various chronic diseases and recently has been increasingly discussed with regards to the management of osteoporosis². Bone mineral density (BMD) gains with denosumab have been shown to explain a considerable proportion of the fracture risk reduction demonstrated with this drug³. This presentation will review the opportunities and challenges of a treat-to-target concept and will provide some new evidence supporting this concept, based on data on up to 8 years of continuous denosumab therapy in over 1500 subjects from the FREEDOM extension study.

Explaining the differences in long-term BMD gain across therapies

Ego Seeman

Many approved and experimental osteoporosis therapies have been shown to increase BMD at sites such as the lumbar spine, femoral neck and total hip; however, while short-term BMD gains during the first few years of therapy are roughly comparable, there are notable differences in BMD increases in the long term^{1,4-6}. This presentation will consider a number of hypotheses for the continuous long-term increase in BMD with denosumab. Factors such as secondary mineralisation⁷, reduced cortical porosity^{8,9}, the transient increase in parathyroid hormone levels after each denosumab injection¹⁰, as well as modeling- based bone formation in the presence of markedly reduced bone resorption¹¹ will be discussed.

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Hypophosphatasia: a rare disease with heterogeneous presentation

Sponsor: Alexion

SY12

HYPOPHOSPHATASIA: A RARE DISEASE WITH HETEROGENEOUS PRESENTATION

Alexion Pharmaceuticals

Supported by Alexion Pharmaceuticals Inc., the aim of this 90-minute symposium is to raise awareness of hypophosphatasia among healthcare professionals and researchers. A panel of internationally recognised experts, co-chaired by Professor Maria Luisa Bianchi and Professor Maria Luisa Brandi, comprising Professors Thomas Weber, Francesco Conti and Christian Roux, will discuss the burden

of disease in patients with hypophosphatasia and the diagnostic challenges associated with the heterogeneous presentation of this rare genetic disease, focusing on distinguishing it from other musculoskeletal diseases. A case study will also be presented, in which several members of a family share the same genetic mutation but experience differing manifestations of hypophosphatasia.

Calcium and vitamin D – Fact and fiction

Sponsor: Takeda

Abstract not available.

Evolving Strategies for Management of Osteoporosis

Sponsor: MSD

Abstract not available.

Management of severe osteoporosis: personalized medicine in practice

Sponsor: Servier

Abstract not available.

World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2015): Non-sponsored Symposia Abstracts

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NS1

APPLICATION OF SHAPE AND APPEARANCE MODELS IN OSTEOPOROSIS AND OSTEOARTHRITIS

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Many objects of interest in medical images can be represented as deformed versions of some average structure.

This talk will describe methods of constructing statistical models of the variation in shape and appearance of such structures from annotated sets of medical images, with a particular focus on bones.

The shape of an object is represented with a set of ‘landmark’ points, each defining the position of a particular part, and thus the correspondences across a set of example images. Statistical analysis of the sets of points leads to a model of the shape variation, which has been shown to be a powerful approach and is now widely used in both medical image analysis and in studies of the ways in which bones change during disease.

The talk will include an overview of efficient approaches for matching such models to new images, including Active Appearance Models and a powerful recent technique which uses Random Forest regression to vote for the most likely position of each model point. This latter technique has been shown to lead to robust, accurate delineation of the outline of bony structures and opens the way to automated analysis of large image datasets.

A range of examples will be included, focusing on the analysis of radiographs and DXA images.

NS2

APPLICATION OF SHAPE AND APPEARANCE MODELS IN OSTEOPOROSIS AND OSTEOARTHRITIS

K. Poole^{1,2}

¹HEFCE Senior Lecturer, Honorary Consultant in Metabolic Bone Disease and Rheumatology, Department of Medicine, University of Cambridge, Cambridge, United Kingdom, ²Cambridge NIHR Biomedical Research Centre, Addenbrooke’s Hospital, Cambridge, United Kingdom

CT technology has been used to image bone structure and pathology for more than 40 years. There is a growing interest in combining the 3D imaging capabilities of modern multi-slice CT scanners with advanced image processing techniques and statistical methodology. Such techniques allow the study of bone anatomy and in particular allow researchers to pinpoint the differences between groups of living patients’ bones in health, disease and in response to treatment. By making reasonable assumptions about both the anatomy and the imaging blur, cortical thickness can be measured to super-resolution accuracy across the entire proximal femur, by fitting a model to the data at many thousands of surface points, distributed uniformly across, and passing through, the bone isosurface. The methodology has been validated against thickness measurements obtained from high resolution Xtreme CT scans of cadaveric femurs. We have used cortical thickness mapping to explore differences between women with and without recent hip fracture and identified generalised thinning of the femoral cortex in fracture patients. More intriguingly, we also discovered focal differences manifest as several well-defined patches of markedly thinner femoral cortex in hip fracture patients compared to controls. Since osteoporosis is defined as microarchitectural deterioration of bone tissue, we

described these areas of focally thinner bone as patches of focal osteoporosis. The patches were evident at common sites involved in fracture, the most severe being a thumbnail-sized patch of up to 30 % thinner bone at the head-neck junction in patients with femoral neck fracture. Focal osteoporosis at the head-neck junction may play an important role in fractures associated with falls, and might even be involved in ‘spontaneous’ hip fracture on rare occasions. Several groups have also identified focal differences in trabecular bone using parametric mapping technology, and our own best prospective predictors of eventual hip fracture required a model including cortical and trabecular bone as well as overall bone size.

NS3

APPLICATION OF SHAPE AND APPEARANCE MODELS IN OSTEOPOROSIS AND OSTEOARTHRITIS

T. Neogi¹

¹Medicine and Epidemiology, Clinical Epidemiology Unit, Boston University Schools of Medicine and Public Health, Boston, United States

Osteoarthritis is the most common form of arthritis, and knee osteoarthritis in particular is a leading cause of disability among older adults worldwide. There are presently no therapies proven to prevent the onset of osteoarthritis or its progression, with treatment development partly hampered by use of insensitive radiographs to identify incidence and progression of disease. While osteoarthritis had traditionally been considered a disease of primarily cartilage degeneration, it is now understood to involve all joint tissues, with both active anabolic and catabolic processes. Knee osteoarthritis itself is considered to be a largely mechanically-driven disease. As bone adapts to mechanical loads by remodeling, bone alterations likely play an important role in OA development and progression. The normal functioning of diarthroidal joints is dependent upon stability provided by ligaments, tendons and musculature; appropriate load distribution across the joint surfaces, which is dependent upon the geometry and material properties of the articulating joint tissues; and joint congruity. Joint geometry has a clear role in predisposition to hip osteoarthritis due to developmental hip dysplasia and to a lesser extent due to femoroacetabular impingement. More recently, bone morphology has begun to be recognized as a possible risk factor in knee osteoarthritis. Advanced imaging modalities are being utilized to develop 3D bone shape of the knee with statistical shape modeling as a potential imaging biomarker that may provide a more sensitive means of identifying and monitoring changes in knee osteoarthritis than that afforded by tracking the relatively slow changes that occur in cartilage. Indeed, MRI-based 3D bone shape was recently shown to predict the onset of radiographic knee osteoarthritis

several years later. Studying the patterns of 3D bone shape changes of the knee through use of statistical shape modeling will provide opportunities to gain further insight into biomechanical and other pathophysiological influences in the pathogenesis of knee osteoarthritis.

NS4

APPLICATION OF SHAPE AND APPEARANCE MODELS IN OSTEOPOROSIS AND OSTEOARTHRITIS

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Statistical shape and appearance models describe a mean shape and intensity image and main variations around the mean for the study population. Models of this type proved effective at segmentation of unseen images coming from the same population, with various applications in bone imaging including rather complex shapes like that of the vertebral column in DXA images. Another application of statistical models is the shape/appearance classification problem. There are few publications devoted to the classification of bone structures, namely fracture prediction, in particular for proximal femur. Here, we analyzed the performance of statistical shape and appearance models for the problem of discrimination between subjects with and without acute osteoporotic femur fracture in 3D QCT. To be able to evaluate the performance of the models, we compared it with the results of fracture discrimination by other methods, such as voxel-wise comparison (voxel- and deformation-based morphometry) and some conventional integral parameters (total hip BMD, neck cortical thickness, etc.). The results highlighted a certain weakness of statistical shape and appearance models when applied to the fracture discrimination which we discuss in more detail.

NS5

OSTEOARTHRITIS, COMORBIDITY AND FUNCTIONAL LIMITATIONS IN THE EPOSA COHORTS

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The objective of the present work is to evaluate the relationships between osteoarthritis (OA) and functional limitations in the EPOSA cohorts and to analyze the role of comorbidity and pain. The baseline data of 2942 men and women between 65 and 85 years of age were analyzed, outcomes included self-reported physical function measured by the WOMAC index and walking test. A clinical diagnosis of hip/knee OA was performed. Pain was evaluated by WOMAC. Comorbidities

included: obesity, cognitive impairment, anxiety, depression, self-reported chronic lung, cardiovascular and peripheral artery diseases, diabetes, stroke, cancer and osteoporosis. Participants with the worst WOMAC scores or walking times were older, mostly women, least educated, with higher prevalence rates of all diseases. Adjustment for age, sex, education, country, comorbidities did not affect the significant association between hip/knee OA and physical functional limitations. Pain was only a partial mediator in the association between OA and self-reported functional limitations (OR=1.63, CI=1.05-2.52), while it was a complete mediator in the association between OA and the walking test (OR=1.38, CI=0.97-1.96). Obesity, anxiety, depression, and cardiovascular diseases were associated to worst WOMAC scores, while obesity, cognitive impairment, depression, peripheral artery disease, and stroke were associated to worst walking times. These findings demonstrate that OA and comorbidity play an important and independent role in determining physical functioning, and pain has a complex mediator role.

NS6

TARGETING OSTEOSARCOPENIA: A PRACTICAL APPROACH FOR THE PREVENTION OF FALLS AND OSTEOPOROTIC FRACTURES

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Sarcopenia and osteoporosis affect older adults around the world and many times have devastating complications that affect their well being and quality of life. Analysis of the pathophysiologic pathways of sarcopenia and osteoporosis reveal several overlapping features. These conditions are age-related, both are multifactorial processes and both are characterized by progressive loss of tissue mass. Additionally, physical inactivity, vitamin D deficiency and poor nutrition accelerate the progression of both conditions. Despite these similarities, most interventions to date target these conditions separately. In this symposium we will review the current state of knowledge about sarcopenia and osteoporosis and will analyze preventive measures and therapeutic interventions that can benefit both conditions 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 mechanisms contributing to sarcopenia and osteoporosis including metabolic and cell signaling changes. For example, we will analyze how changes in protein and amino acid intake affect muscle and bone metabolism. Next, we will discuss the benefits and limitations of current diagnostic schemes for both conditions. For instance, the benefits and limitations of DXA as a diagnostic and research

tool will be analyzed. 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 pharmacologic interventions. Finally we will translate this information into practical approaches that can improve older adult care.

NS7

PHYSICAL PERFORMANCE IN LATER LIFE AND ITS RELATIONSHIP WITH OSTEOARTHRITIS

M.H. Edwards¹, A. Litwic¹, K. A. Jameson¹, D. J. Deeg², C. Cooper¹, E. M. Dennison¹

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Objective: Poor physical performance (PP) is associated with disability, lower quality of life and higher mortality rates. In this study we examined relationships between hip and knee osteoarthritis (OA) according to self-report or clinical American College of Rheumatology (ACR) definition and PP, before and after adjustment for pain scores, in a cohort representing 6 European countries.

Material and Methods: The EPOSA study comprises 2942 men and women from the Netherlands, Germany, Sweden, Spain, Italy and the United Kingdom. Participants completed a questionnaire detailing self-reported OA, demographics, lifestyle and WOMAC. Clinical OA was defined based on ACR criteria. PP was determined from assessments of walking speed, chair stands and balance (tandem stand) to create a composition score (0–12); low PP was defined as ≤ 9 .

Results: The mean(SD) age of the study population was 74.2(5.1) years. Advanced age, female gender, lower educational attainment, alcohol consumption, and higher BMI were independently associated with low PP. Having clinical knee OA, hip OA, or both were associated with a higher risk of low PP; OR(95%CI) 2.93(2.36,3.64), 3.79(2.49,5.76), and 7.22(3.63,14.38) respectively, with relationships robust to adjustment for the confounders above and WOMAC pain score. Self-reported OA was also associated with low PP, but relationships were attenuated after adjustment for confounders, and relationships were not observed at the knee in Sweden. Low PP correlated well with low self-reported WOMAC physical function score ($p < 0.001$).

Conclusion: OA at the hip, knee, or both are associated with low PP, and relationships are robust to adjustment for pain for a clinical diagnosis.

Disclosures: CC has received consulting and lecture fees from AMGEN, GSK, Alliance for Better Bone Health, MSD, Eli Lilly, Pfizer, Novartis, Servier, Medtronic and Roche.

NS8

FRAILTY SYNDROME PREVALENCE AND SLOW SPEED IN OSTEOARTHRITISA. Otero¹¹Department of Public Health, Universidad Autonoma de Madrid (UAM). Member of EPOSA team, Madrid, Spain

Objective: Frailty syndrome is associated with higher morbimortality. In this study we analyze the association between hip/knee/hand osteoarthritis (OA) and frailty in elderly population in the EPOSA cohort and relationships between walking speed (WS) and frailty in OA people.

Material and Methods: The EPOSA study comprises 2942 men and women aged 65–85 years. OA at hand, knee or hip was defined based on American College of Rheumatology (ACR) criteria. Frailty was defined following Fried's criteria. Logistic regression was used to analyze the associations between OA, frailty and other covariates. The relationships between Frailty and WS was analyzed using likelihood ratios (LR).

Results: Frailty was present in 10.2 % (95%CI: 9.0–11.4) and it was associated with increasing age, female sex, low education, country comorbidity and obesity. Having lower limb OA or Hand OA were associated with higher risk of frailty; OR(95%CI) 1.64(1.22–2.17) and 1.62(1.02–2.56), respectively. The association was stronger if two or more joints were affected; OR=2.75(95%CI: 1.81–4.18). The LR+ y LR- for WS greater than 1.0 m/s as frailty test in OA population were 1.50 and 0.10, respectively

Conclusion: OA at hip, knee or hand OA are associated with frailty in older adults in European countries. This association should be considered when designing appropriate intervention strategies for management of OA patients.

NS9

THE NEIGHBOURHOOD ENVIRONMENT AND USE OF NEIGHBOURHOOD RESOURCES IN OLDER PEOPLE WITH AND WITHOUT OSTEOARTHRITISE. J. Timmermans¹, S. Van Der Pas¹, C. Cooper², L. A. Schaap³, M. H. Edwards², D. J. H. Deeg¹, C. R. Gale², E. M. Dennison²

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Objective: To examine whether the associations of perceived and objective neighbourhood characteristics with the use of neighbourhood resources are stronger in older people with osteoarthritis (OA) than in older people without OA.

Material and Methods: Data from the Hertfordshire Cohort Study were used. American College of Rheumatology classification criteria were used to diagnose OA in older people from Hertfordshire, United Kingdom. Use of neighbourhood resources was assessed using the Home and Community Environment instrument. Participants were asked about their perceptions of neighbourhood cohesion and neighbourhood problems. Objective neighbourhood deprivation was assessed using the Index of Multiple Deprivation score based on 2010 census data. Associations were examined using logistic regression analyses and were adjusted for confounders.

Results: Of the 404 participants (71–80 years), 110 (27.2 %) had OA in knee, hand and/or hip. Older people with OA perceived significantly more neighbourhood problems than older people without OA. A significant modification effect of OA showed that perception of more neighbourhood problems was associated with more use of public transport in older people without OA (odds ratio (OR)=1.20, 95%CI=1.04–1.39), whereas perception of more neighbourhood problems was associated with less use of public transport in older people with OA (OR=0.60, 95%CI=0.40–0.91). Regardless of OA, objective neighbourhood deprivation was not significantly associated with use of neighbourhood resources in older people.

Conclusion: The perception of neighbourhood problems has a greater influence on the use of neighbourhood resources by older people with and without OA than objective neighbourhood deprivation. Older people with OA seem to be less able to overcome perceived neighbourhood problems in comparison to their counterparts without OA and, as a consequence, they are less likely to use public transport.

NS10

HANDS-ON ON DXA ACQUISITION AND ANALYSIS: ARTIFACTUAL PITFALLS AND POSSIBLE ESCAPESB. Muzzi Camargos¹, B. H. Albergaria²

¹IOF Latin America Advisory Committee Member, ISCD Iberian American Panel Chair, FEBRASGO Osteoporosis Committee President, Belo Horizonte, Brazil, ²CEDOES Technical Director and Clinical Investigator, UFES Epidemiology Professor, FEBRASGO Osteoporosis Committee Vice-President, Vitória E.S, Brazil

1- Dual X-Ray Absorptiometry Basic Principles

1.1. X-Ray Beam: Collimation and Parallax Effect

DXA systems operate with collimated X-Ray beams. The word collimate means “to direct in a straight line”. Therefore, a collimated X-Ray beam is a beam with little or no dispersion. This is important because dispersed X-Rays have different energy from collimated ones. On DXA systems, X-Rays must be collimated in order to have the same energy value,

necessary for a better precision. Therefore, DXA X- Rays should be as much collimated as possible. The collimation is produced by a narrow pinhole through which the X-Ray trespasses, minimizing its dispersion. Although the X-Ray dispersion is minimized, there is some dispersion, especially on wide fan beams. It produces a parallax effect. Parallax is a displacement or difference in the apparent size of an object viewed along two different lines of sight. The Parallax effect might superestimate the bone area. In order to reduce this distortion, wide fan beams were replaced by narrow fan beams.

1.2. Areal and Volumetric BMD

DXA systems estimate BMD from bone area, on a bi-dimensional way. Thus, it estimates areal BMD (aBMD). Other technologies like Quantitative Computed Tomography (QCT) estimate BMD on a tri-dimensional way. They estimate the true volume BMD (vBMD). The difference between a aBMD and vBMD is that aBMD tend to underestimate BMD value on shorter bones and overestimate BMD on larger bones. Therefore, shorter bones might have the same true volume BMD of larger ones but the aBMD might be lower on shorter bones.

1.3 Absorptiometry Histograms

Histograms are a diagrams of rectangles whose area is proportional to the frequency of a variable and whose width is equal to the class interval. On DXA systems, histograms represent the X-Ray absorption of and specific point of a structure. The DXA lumbar spine acquisition has a feature that produces an absorption histogram. This feature helps to define the best place to locate intervertebral lines and can be used to enhance L-L4 region of interest (ROI) definition. Intervertebral lines should be placed over the smallest absorption interval on histogram.

2- Clinical Cases

2.1. Lumbar Spine

2.1.1. External Artifacts

Scintigraphy: It is widely known that scintigraphy interferes with DXA many days after the contrast is injected. Some contrast agents may last more than 1 week. This case demonstrates that DXA can be influenced by scintigraphy even up to 30 days. Poor bone edges definition is an indicator that there is still interference of the contrast agent over DXA bone margin detection algorithms. Additionally, even if bone margins are not visually compromised, there might be contrast effects over the bone and soft tissue counts. The duration of this effect may vary from agent to agent. The best way to avoid this undesired effect is to align agendas Nuclear Medicine and DXA units agendas in order to perform DXA before scintigraphy, whenever possible. And, if not possible, postpone DXA for 1 month, at least.

Clothing: Metal buttons, zippers and other clothing artifacts must be avoided on a DXA exam. It is a fundamental step to

remove every clothing artifact. This case demonstrates how elastic bands (from underwear) might interfere with DXA results. Considering that soft elastic bands should not be an issue on DXA counting, it's effect might happen due to a skin fold produced by elastic compression, rather than the elastic content itself. The best way to avoid this possible interference, elastic band retraction should be encouraged on lumbar spine DXA acquisitions.

2.1.2. Vertebra Exclusion

When the BMD of adjacent vertebra differs from each other in more than 1.0 DP T-score, it is recommended to exclude the vertebra with the highest T-score. This procedure was proposed to minimize artifactual effects decurring from vertebral body compression and degenerative calcifications.

After neutralization, the excluded vertebra is represented between parenthesis. Therefore, if L3 is neutralized within the L1-L4 segment, it will be quoted as L1-L4(L3). It is recommended to exclude a maximum of two vertebra from the four possible at the lumbar spine segment on DXA. This case illustrates a situation where vertebra exclusion enhances one patient's the fracture risk prediction.

2.2. Femur

2.2.1. Anatomical Artifacts

Abdominal Fat Panniculus: When there soft tissue thickness / density is high, bone tissue can be overestimated. It is what happens when abdominal fat panniculus is overlying proximal femur ROI. The soft tissue influence is so expressive that a mechanical (manual) fat panniculus displacement may lower proximal femur BMD up to 5 or 6 %. This case exemplifies how is the so called panniculul retraction maneuver is performed and how the BMD results on proximal femur might be influenced.

Ischium Overlapping: Not only fat but also bone tissue can overlap proximal femur regions of interest (ROI). When one patient's ischium is anatomically prominent and femoral neck is short, there might be bone overlapping at these two regions. This overlapping can be minimized by repositioning the patient over the table scan. This maneuver promotes the patient's longitudinal axis inclination in order to avoid ischium overlapping the femur neck ROI.

Scarce Soft Tissue: As seen previously, on item 2.2.1, soft tissue excess might produce artifactual changes on proximal femur BMD. But a remarkably scarce soft tissue also represents an artifactual change on BMD. Bone margins might be defined mistakenly. To avoid such situation, an artificial soft tissue pad is placed laterally femur great trochanter and bone margins are better defined by DXA device's software. This case illustrates how identify poor bone margin definition and the best way to place soft tissue pads on proximal femur.

2.2.2. Internal Artifacts

Gluteal Silicon: Gluteal silicon implants may interfere BMD estimates on the same basis as soft tissue does. In some cases, the silicon can be moved mechanically, clearing proximal femur regions of interest. Sometimes, this mobilization is not possible due the plastic surgery technique used. This case illustrates how is performed the maneuver to mobilize gluteal silicon from overlapping valid BMD regions of proximal femur.

Metal Implants: This case illustrates one case of a patient with multiple metal implants on proximal femur and how the artifact neutralization was performed. Lumbar spine, dual femur and forearm DXA acquisitions are combined to promote a more precise patient's evaluation.

3 - Monitoring DXA 3.1. Precision Error

As a quantitative and non-invasive procedure, DXA is subject to error. This error affects bone mass monitoring. Part of this error derives from the technology itself. But a great contribution to precision error derives from patient positioning and analysis. The recommended procedure to estimate the influences of clinical DXA acquisition protocols over the BMD results is the calculation of the Least Significant Change (LSC). A subset of images illustrates how to perform such evaluation and what the calculated LSC represents on clinical monitoring by DXA.

3.2. Mask Tool

DXA devices are equipped with resources designed to enhance comparison between specific-site acquisitions. Mask tool is a feature that allows visual and side-by-side comparison between two exams. This case illustrate how to compare bone margins and how to minimize positioning differences between acquisitions of a single patient in order to enhance bone mass monitoring prospectively through evaluation of regions of interest displacement and bone area reproducibility.

NS11

CLINICAL APPLICATION OF BONE MICROINDENTATION

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Bone microindentation is a recently developed technique that permits a direct assessment, in ex vivo samples or in patients, of biomechanical characteristics of cortical bone tissue. In this symposium the focus will be on the

application of reference point indentation in the clinical setting. Dr Bouxsein will explain the theoretical basis of the technique and discuss in vitro studies reporting an association between reference point indentation and bone biomechanical properties. Drs Papapoulos, Eriksen and Diez-Perez will then explain their own clinical experience and the main data obtained in different research experiments. The speakers will then discuss with the audience the strengths, limitations and future opportunities of the technique and the potential for use of microindentation in management of patients with bone disease in clinical practice.

NS12

FUNCTIONAL BONE PERFORMANCE MEASUREMENTS AND ADAPTATIONS USING NOVEL SELF-APPLIED BONE-LOADING EXERCISE APPARATUS.

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Objective: To determine valid functional bone performance metrics and adaptations from multiple-of- bodyweight (MOB) compressive force loading using an impact level loading exercise apparatus from a population of 2380 adult males and females.

Materials and Methods: Forces that compress bone stimulate adaptive response of BMD growth, in accordance with Wolff's Law; bone that can tolerate more load is of greater density [1]. Further, clinical fracture risk assessment is determined by a combination of BMD analysis and level of general physical function (i.e., age/ability) [2]. A novel apparatus that allows for these compressive forces to the level required to have an effect on osteoblastic function has been shown to produce osteogenic effect. This was confirmed in subset test with pre-post DXA in both hip and spine with 14 subjects (P **Results:** The MOB force/loading levels in the DXA subset was correlated to the MOB forces seen with the larger population ($N=2380$) showing spine and lower extremity loading with 2.89 ± 1.02 SD and 9.67 ± 3.68 SD MOB, respectively.

Conclusion: These data present a new metric of functional bone performance, and an opportunity to consider a supplementary treatment option for ambulatory individuals with low BMD.

References: 1. Wolff J. (1892). The Law of Bone Remodeling. Springer, (Marquet and Furlong, 1986 trans. from German 1892 edition). 2. Kanis JA et al., Osteoporos Int 2001;12:989. 3. Jaquish J, Osteoporos Int 2013;198; 24:s594.

Conflict Disclosure: J. Jaquish has ownership/financial interest in Performance Health Systems, LLC., manufacturer of

OL apparatus. Data shared by physicians whose patients were using the OL apparatus.

NS13 OSTEOPOROSIS: DEGENERATIVE OR INFLAMMATORY DISEASE

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Objective: Osteoporosis (OP) is a metabolic, systemic skeletal disease. OP is a major public health problem characterized by low bone mass and microarchitectural deterioration of bone tissue with a consequent increase in susceptibility to fracture.

Material and Methods: The association between OP and atherosclerosis/cardiovascular disease has been documented. Recent studies show that OP is an independent predictor of cardiovascular mortality.

Results: The risk of osteoporosis and fracture is closely related to the typical decline in bone mass during the ageing process. In both sexes the balance between bone formation and resorption becomes progressively negative with advancing age, but most bone loss occurs after age 65. Beside low bone mass there are age dependent changes in the quality of bone. Cortical porosity increases by 176 % and 259 % from age 20 to 90, for women and men, respectively. The incidence of OP increases with age as is the case in other chronic degenerative diseases. Pathophysiological mechanisms of atherosclerosis as well as OP are multifactorial and very complex. They seem to be partly connected with functions of vitamin D. Potential pathophysiological mechanisms of vitamin D in atherosclerosis and OP are presence of VDRs in immune cells (T lymphocytes, macrophages) and a downregulation in the production of inflammatory markers and several cytokines. Oxidative stress is another shared mechanism in the pathogenesis of several degenerative disorders associated with aging, including OP. An increase in reactive oxygen species has been implicated in the decreased bone formation associated with advancing age. The age-related decline in osteocyte number is important as osteocyte death leads to decline in bone vascularity and hydration, which reduces bone strength by mechanisms including changes in crystallinity and promotion of micropetrosis. Aging, cigarette smoking, excessive alcohol consumption, inadequate physical activity, estrogen deficiency, diabetes, and chronic kidney failure are well-recognized risk factors for both OP and atherosclerosis. **Conclusion:** OP is clearly not only a degenerative condition but associated with inflammatory changes as well.

NS14 ATHEROSCLEROSIS AND OSTEOPOROSIS: IS THERE ANY LINK?

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Objective: Osteoporosis is decalcification of bone tissues and atherosclerosis is calcification of vascular tissues. The link between atherosclerosis and osteoporosis has been shown in a several investigatory studies. The scientific evidence have shown a similar pathophysiological pathway and the common risk factors, especially in elderly and postmenopausal women. Therapy of both chronic disorders share some identical medications like statins, vitamin D, etc. Since both diseases are degenerative ones at the later stages with some inflammatory mechanisms and oxidative stress during advanced process, the incidence of cardiovascular diseases (CV) and osteoporosis increase for both gender and age. Atherosclerosis with calcified plaque share the same bone proteins like collagen 1, osteopontin, osteonectin, osteoprotegerin and osteocalcin. Our objective was to study the association of atherosclerosis and osteoporosis.

Material and Methods: Total of 114 patients suffering from postmenopausal osteoporosis (PO), glucocorticoid induced osteoporosis (GIO) and senile OP were screened for CV risk factors, concomitant diseases and the use of glucocorticoids as the follow up of the previous clinical study. The cardiovascular risk factors like smoking, arterial hypertension, cholesterol, triglycerides, glucocorticosteroids, diabetes, and other conditions were analysed in all. BMD and transthoracic echocardiography (TTE) including 2D and 3D and transoesophageal echocardiography (TEE) was performed. There were 100 females (87.7 %) and 14 males (12.28 %). The average age in all was 64.26 years, females 66.55 years (range 39–90 years), males 65.47 years (range 46–78 years). The most frequent cause of OP was GIO observed in 61 (53.50 %) of patients and 53 (46.49 %) patients with PO.

Results: The results have shown the significant influence of cardiovascular risk factors and concomitant disorders on osteoporosis. Majority were females and approximately 65 years old. The major concomitant disorder was rheumatoid arthritis in 52 patients. The lipids were increased in 61 patients, smoking in 52 individuals and arterial hypertension in 44 patients. The GC was used in 61 patients or 53.50 %. Average BMD was -3.2 .

Conclusion: There is strong association between atherosclerosis and osteoporosis in BMD values and echocardiography findings, cardiovascular risk factors, smoking, arterial hypertension, gender, age, underlying disorders and use of

corticosteroids. So, atherosclerosis and osteoporosis may be the one single disease. More epidemiological and investigative studies are needed to prove this hypothesis.



NS15

THE DRUGS FOR OSTEOPOROSIS, PAST, PRESENT AND FUTURE.

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Osteoporotic fractures cause substantial clinical and economic burden for society. Hormone replacement therapy (HRT) has been shown to reduce the risk of fracture, but increases the risk of breast cancer and cardiovascular diseases. Estrogens have been used for prevention of bone loss. However, due to discussions/developments, there has been a shift in thinking about the use of medicinal products in osteoporosis. New developments for prevention of bone loss after menopause are seen as a goal. The use of estrogens in this indication is left to local treatment guidelines, which will take into account both existing data for efficacy and safety. Indication for prevention of osteoporosis or postmenopausal bone loss will not be specifically granted to new products. The aim of the pharmacological intervention is to decrease the incidence of fractures. From the regulatory viewpoint, the therapeutic indication will generally be the treatment of osteoporosis in postmenopausal women at increased

risk of fracture, or, secondarily, the treatment of osteoporosis in men at increased risk of fracture. Treatment of osteoporosis should always include a well-balanced diet, getting the right amounts of calcium and vitamin D, being physically active every day, not smoking and quitting if you do smoke, limiting the amount of alcohol you drink, and taking safety precautions to prevent falls. Bisphosphonates have been widely used in the treatment of osteoporosis with robust data from numerous placebo-controlled trials demonstrating efficacy in fracture risk reduction over 3–5 years of treatment. Nowadays, there is a concept of that a reservoir of bisphosphonates accumulates after years of treatment that is gradually released over months or years and appears to result in a lingering antifracture benefit for some time after therapy is stopped. This makes it possible to consider 'drug holidays', time off bisphosphonate therapy (but possibly on another agent), and then resuming therapy. There are two different categories of medications, antiresorptive and anabolic. Antiresorptive medication slows down the breakdown of bone and this helps to prevent bone loss and lower the risk of fracture. Bisphosphonate antiresorptive medications: alendronate -generic medication (Brand name: Fosamax, Fosamax D), risedronate (Brand name: Actonel, Actonel with Calcium), ibandronate (Brand name: Boniva), zoledronic acid (Brand name: Recast, canasta). Other antiresorptives: estrogen therapy or hormone therapy raloxifene (Brand name: Elista), denosumab (Prolix). Anabolic medication helps to make new bone, increases bone density and can also reduce the risk for a broken bone. The only currently FDA approved anabolic medication is: teriparatide (Forteo). Recently, two new drugs are under studies: Odanacatib is a new drug that increases BMD by inhibiting cathepsin K, an enzyme that breaks down bone and cartilage. The second new drug, romosozumab, it is an antibody that targets sclerostin, a protein that inhibits bone formation.

NS16

THE ANTIFRACTURE EFFICACY AND THE ADVERSE EFFECTS OF THE OSTEOPOROSIS DRUGS

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Anti fracture Efficacy: Zoledronic acid: Efficacy > vertebral fractures by 70 % (10.9 % vs. 3.3 %, p relative risk reductions of 68 % (7.2 % vs. 2.3 %, p reduced vertebral fractures by 41 % (32.8 % vs. 20.9 %, p vertebral fractures of 65 % (14 % vs. 5 %, p

Side Effects:

Bisphosphonates (Alendronate, Ibandronate, Risedronate and Zoledronic Acid): Side effects for all the bisphosphonates

(alendronate, ibandronate, risedronate and zoledronic acid) may include bone, joint or muscle pain. Side effects of the oral tablets may include nausea, difficulty swallowing, heartburn, irritation of the esophagus (tube connecting the throat to the stomach) and gastric ulcer. Side effects that can occur shortly after receiving an IV bisphosphonate include flu-like symptoms, fever, headache and pain in muscles or joints. Inflammation of the eye (called uveitis) is a rare side effect of all bisphosphonates. Bisphosphonates are not recommended for people with severe kidney disease or low blood calcium. People with certain problems of the esophagus may not be able to take the oral tablets.

There have been rare reports of osteonecrosis (death of bone cells or tissue) of the jaw (ONJ) with bisphosphonate medicines. Although quite unusual, patients treated with the bisphosphonate tablets, alendronate (Fosamax®), ibandronate (Boniva®) and risedronate (Actonel®), for osteoporosis prevention or treatment have also been reported to have developed ONJ. There have also been recent reports of unusual fractures of the upper femur (thigh bone) in people taking bisphosphonate medicines. If you have been taking bisphosphonate medicines for several years or longer and have an unusual ache or pain in your hip or thigh bone, it's important to tell your healthcare provider. There have been reports of people having an ache or pain, sometimes for several weeks or even months, before having an unusual break in the thigh bone. Patients taking the oral bisphosphonate tablets should stop taking the drug and contact their healthcare provider immediately when experiencing chest pain, new or worsening heartburn, or difficult or painful swallowing.

Adverse effects:

Zoledronic acid: Symptoms including fever, myalgia, influenza-like symptoms, headache, nausea and arthralgia occur for 1–3 days. Giving paracetamol shortly after the infusion reduces these symptoms. Zoledronic acid may also increase serum creatinine concentrations, particularly in patients with pre-existing renal impairment. In postmenopausal women with osteoporosis, the incidence of serious atrial fibrillation was increased versus placebo (1.3 % vs. 0.5 %, p

Denosumab: The most common adverse reactions include musculoskeletal pain, hypercholesterolaemia and eczema, and discontinuation should be considered if the latter is severe.¹³ Hypocalcaemia may rarely occur, especially in patients with stage 5 chronic kidney disease. Pancreatitis has also been reported. Denosumab has the potential to increase the risk of infection and neoplasia. Increased rates of serious skin infections, predominantly cellulitis, have been observed in trials and patients should seek prompt medical attention if they develop signs and symptoms of

infection. No significant increases in malignancy rates have been noted to date. Atypical fractures and delayed fracture healing have not been observed in trials. Osteonecrosis of the jaw has rarely been reported (two cases) and a routine oral examination is recommended before starting treatment.¹⁷ In patients with bone metastases from breast or prostate cancer, osteonecrosis of the jaw may be associated with denosumab treatment, suggesting decreased bone turnover may be an important contributing factor.

Strontium ranelate: The annual incidence of venous thromboembolism over 5 years was 0.9 % with strontium ranelate versus 0.6 % with placebo (relative risk of 1.4).²³ Strontium has also been associated with rare and potentially fatal cases of hypersensitivity reactions with eosinophilia and systemic symptoms. The incidence of this adverse reaction is extremely low, estimated at 1:54 000 patient-years of treatment. Patients should be warned of the possibility of a rash and it may be prudent to stop strontium if this occurs within the first 6–8 weeks of treatment. Diarrhoea and nausea also occur. Initiating treatment every second day for 1 month may reduce these adverse effects.

Teriparatide: Adverse reactions reported during phase III trials with teriparatide generally have been mild. The most frequent events were dizziness, headache and leg cramps in fewer than 10 % of patients. Injection site hypersensitivity occurred in a small number of patients. Allergic reactions, including dyspnoea, urticaria and chest pain, occurred in less than one in 1000 patients.³¹ About 5 % of recipients experienced mild transient hypercalcaemia which resolved within 24 h. If hypercalcaemia occurs, it is generally recommended to reduce calcium intake to 1000 mg daily or less or to decrease the frequency of injections. Monitoring of serum calcium is not routinely needed, however it may be worth measuring serum calcium at baseline and after a month of therapy. A recent study evaluating the effect of teriparatide on urinary calcium at one, 6 and 12 months^{27, 28} showed small increases in urinary calcium excretion, with less than 1 % of the participants requiring a dose change in calcium or teriparatide due to hypercalciuria.

Osteosarcoma was reported in a rat oncogenicity model. However, only two cases have been reported in patients during postmarketing studies of approximately one million patients to date. This frequency is less than anticipated for people aged over 60 years. Each patient commencing teriparatide must sign a consent form acknowledging they are aware of this risk and treatment should be avoided in patients at increased baseline risk for osteosarcoma, such as children, and those with Paget's disease, unexplained elevations in alkaline phosphatase, or prior radiation therapy involving the skeleton.

NS17

THE ECONOMIC IMPACT OF ANTI FRACTURE EFFICACY VERSUS SIDE OR ADVERSE EFFECTSA. Itria^{1,2}¹International Adviser, Federal University of Rio Grande do Sul, Porto Alegre, Brazil, ²Health Economics and Outcomes Research, Goiania University, Goias, Brazil

The economic evaluations in health, which proposes to study the more efficient allocation of resources, an expansion in the last 20 years. For osteoporosis drugs specifically (Table > Current Price of the Drugs In Brazil), there is increasing emergence of economic evaluations of treatment regimens because price increases of new drugs and the costs of the disease and anti fractures efficacy plus the side or adverse effects. In this scenario have that severe osteoporosis disease still a disorder of extreme importance in the world population with peculiar characteristics when considering events, morbidity, mortality and incidence in different regions. The susceptibility of the population, favorable climatic conditions, poor socioeconomic situation, making the primary prevention of the disease hard and requires specific interventions such as medications. There are several complications of osteoporosis disease (Table > Costs of Hip Fracture - Price of Prostheses in Brazil), mostly the sequels, as like treatments adverse effects and non responders set of patients. Brazil, through the National Program, included in its agenda for Technology Assessment in Health via the Health Surveillance Secretariat of the Ministry of Health, local economic assessments for the introduction of new drugs in national osteoporosis treatment schedule. So the purpose of this discussion is to develop a complementary study of cost-effectiveness for the antifracture efficacy, the economic impact of the side or adverse effects with inclusion of supplementary estimates of additional costs for analysis of its impact on the incremental ratios found in the original study. In order to deepen the studies that measures the proportions of sequels and indirect costs, as well as the inclusion of new costs. The hypothesis suggests that the measurement and valuation of costs involved with sequelae of disease, improves the results of cost-effectiveness and add additional elements in the decisions of managers. Were held in the city of Curitiba's interviews with the patients and family questionnaires for routine expenditures and quality of life - EuroQol (EQ-5D), and inserted into the cost-effectiveness, the spending made by many families, some-

times called "Family Expenditures". The hypothesis resulted in the fact that better detail and inclusion of family spending in treating people who have acquired disabilities as a result of disability, has changed the cost effectiveness in the program of osteoporosis management. The sensitivity analysis showed that these data, when extrapolated result in incremental value showed closer to the ideal value of cost-effectiveness.

NS18

DRUG FOR BONE EVENT ESPECIALLY IN DISMETABOLIC PATIENTSF. Gatti De Menezes¹¹Health Economics and Outcomes Research Manager Pharm, São Paulo, Brazil

Cost-effectiveness of paricalcitol in end stage chronic kidney disease secondary hyperparathyroidism patients on dialysis in Brazil.

Objective: To understand from the perspective of the Brazilian National Health System (SUS) the cost- effectiveness of treating secondary hyperparathyroidism with IV paricalcitol versus IV calcitriol in dialysis patients diagnosed with end stage chronic kidney disease.

Methods: A decision-analytic Markov model comparing the use of IV paricalcitol versus calcitriol. Main outcomes include parathyroidectomy, hospitalizations or death, life time costs and the results are reported as incremental cost-effectiveness ratios (ICER). The treatment costs are based on the DATASUS administrative claim database which includes individuals with an end stage chronic kidney disease secondary hyperparathyroidism diagnosis, who underwent hemodialysis at SUS, from 2009 to 2012. The main clinical outcomes are based on clinical trials or cohort studies reporting those outcomes.

Results: The reference case analysis was a 5-year time horizon based on a comparison of treatment with paricalcitol versus calcitriol, of end stage chronic kidney disease secondary hyperparathyroidism dialysis patient. The use of paricalcitol leads to savings amounting R\$113.999.601,06 to SUS and an increase in life-years gained (0.52 years). Paricalcitol was dominant over the comparator (calcitriol), indicating better health outcomes and lower costs. One-way sensitivity analyses and probabilistic sensitivity analyses confirmed the robustness of the model.

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OCs1

HEALTHY LIFE, HEALTHY BONES

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Objective: We intended to raise awareness towards healthy lifestyle habits in Georgian population as it is the main determinant of healthy bones.

Materials and methods: Patients examined in our clinic with variety of diagnosis concerning bone health were involved in a project—Healthy Bones. The program was specifically created to increase patients awareness towards bone health and prevent diagnosed low bone mass progression into osteoporosis and osteoporotic fracture. Patients were handed brochure “You Have Osteoporosis-First Steps Towards Fighting It”. Besides we have chosen patients for the detailed instructions on osteoporosis prevention and care through dietary lifestyle and physical activity habit modification. Georgian Association of Skeletal Metabolism Diseases has worked on interpretation of IOF patient’s brochure on male osteoporosis “Real Men Build their Strength from Within” possibly seen on IOF website. Georgian Association of Skeletal Metabolism Diseases has actively participated in creation of Georgian National Guidelines on Osteoporosis Management and Prevention. The recommendations besides pharmacologic intervention emphasizes universal guidance on preventive measures of both: nutritional support and physical activity. In order to increase awareness not only among patients but also among primary care physicians we are continuing lecturing on topics of osteoporosis. Association members are presenting lectures at the local polyclinics of urban and rural areas of Georgia. At the end of each lecture session we are handing special book focused on nutrition and bone health issues.

Results: Patients involved in the program have showed high motivation to change lifestyle and develop good dietary habits

for the prevention or treatment of established bone mass decrease. Primary care physicians are actively participating in management and prevention of osteopenia and osteoporosis.

OCs2

A POPULATION-BASED ANALYSIS OF THE POST-FRACTURE CARE GAP IN HONG KONG: THE SITUATION IS NOT IMPROVING

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Patients who sustain an osteoporotic fracture are at increased risk of sustaining further osteoporotic fracture. There are different guidelines internationally to close this post-fracture care gap. However there is no such guideline in Hong Kong and the practice varies between different hospitals and departments. The aim of this study is to determine the current situation and practice of secondary drug prevention of fragility fracture after osteoporotic hip fracture.

Materials and methods: We retrieved dispensation of osteoporosis drug record from patients with new fragility hip fractures aged 65 or above, from 2009 to 2012 using Hospital Authority clinical data analysis and report system. Those who took anti-osteoporotic drugs before the fracture and those with pathological fractures were excluded.

Results: 15,866 osteoporotic hip fracture patients who met the criteria were included. Based on the record of osteoporosis medicines initiation, only 9–15 % of fracture patients who are eligible for treatment of osteoporosis received medicines within 1 year after their hip fracture. Orthopaedic Surgeons initiate 63 % of osteoporosis medicines, whereas physician initiated 37 %. The drugs of choice in descending order are alendronate (76 %), ibandronate (12 %), strontium (5 %), zoledronate (4 %), and others (3 %).

Conclusion: There is a huge post fracture care gap in secondary prevention for osteoporotic hip fracture patient in Hong Kong. Majority of the patients are neither diagnosed nor being tested for osteoporosis. Most remained untreated for 1 year after the osteoporotic hip fracture. The Government needs to allocate more resources to implement the best practices framework to those high risk post hip fracture patients before they go on to break another bone. By reducing the number of subsequent osteoporotic fractures, the Government can get significant cost savings that can be utilized in other valuable healthcare program.

OCs3

“LET’S HOLD THE BONE TOGETHER”: ORTHOPEDIC-METABOLIC COLLABORATIVE MANAGEMENT FOR OSTEOPOROTIC HIP FRACTURE

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Osteoporotic hip fractures are associated with increased morbidity and mortality in older adults. Appropriate metabolic treatment can reduce the risk of future fractures. Only 30 % of patients receive calcium and vitamin D supplementation, and 10–15 % osteoporosis-specific treatment. Previous research indicated that involvement of a multidisciplinary professional team can improve the quality of care for hip fracture patients.

Methods: An Orthopedic-Metabolic team was established at a university-affiliated hospital in Israel, for managing hip fracture patients. The intervention included staff educational activities, a structured, in-hospital treatment protocol, and a collaborative follow-up clinic. An observational study evaluated the impact of the intervention.

Results: During 7 months, 222 patients with osteoporotic hip fractures were operated. Thirty died within 6 months of surgery and were excluded. Among the remaining 192 patients, 80 % had vitamin D levels tested on the ward (mean 44 nmol/L); over 84 % began calcium and vitamin D supplementation; 79 and 47 % came to follow-up Orthopedic and Metabolic Clinic, respectively. Of patients that came to the metabolic clinic, 46 % started pharmacological therapy at the first visit, while others needed vitamin D loading or additional investigation. Attending a follow-up clinic visit correlated with competent cognitive state, home residency and Clalit HMO (health management organization) membership.

Conclusion: An Orthopedic-Metabolic team can effectively improve quality of care for patients with osteoporotic hip fractures. Yet, only 50 % of the patients arrived for a follow-up metabolic visit, and of those, only half received specific

treatment recommendations at that visit. Additional research is required to enhance adherence to follow-up visits and treatment decision-making during visits.

OCs4

HANDGRIP STRENGTH PREDICTS ABILITY TO FUNCTION IN ACTIVITIES OF DAILY LIVING: A PROSPECTIVE STUDY OF 193 WOMEN WITH HIP FRACTURE

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Objective: To investigate the independent contribution of handgrip strength in predicting the functional outcome after hip fracture in women.

Design: We prospectively investigated white women ($N=193$ of 207) who were consecutively admitted to our rehabilitation hospital after a hip fracture. We measured handgrip strength with a Jamar dynamometer on admission to rehabilitation. Ability to function in activities of daily living was assessed by the Barthel Index both on discharge from rehabilitation and at a 6-month follow-up.

Results: We found significant correlations between handgrip strength measured before rehabilitation and Barthel index scores assessed both on discharge from rehabilitation ($\rho=0.52$; p

Conclusion: Handgrip strength assessed before rehabilitation independently predicted the functional outcome both after inpatient rehabilitation and at a 6-month follow-up in hip fracture women.

OCs5

RECENT TREND IN THE INCIDENCE OF HIP FRACTURE IN TOTTORI, JAPAN

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Objective: It has been reported that the incidence of hip fracture among Asians is lower than that among Caucasians in North America or North Europe. It has also been reported that the age-adjusted incidence rate in Japan has been increasing from 1998 to 2006. The purpose of this study was to

investigate the recent trend in the incidence of hip fracture in Tottori Prefecture, Japan.

Material and Methods: Tottori Prefecture is located in mid-western Japan and its population was 581,870 in 2012. The percentage of the total population aged 65 years and over was 27.0 % in 2012. A survey of all hip fractures in patients 35 years old and over during 2010–2012 was performed in all hospitals in Tottori Prefecture. Registration information included gender, age, date of fracture, type of fracture, and treatment. Patients residing in other prefectures were excluded. The age- and gender-specific incidence rates (per 100,000 person-years) were calculated based on the population of Tottori Prefecture in each year. We compared the data with the results of the same survey we performed before in Tottori Prefecture.

Results: Registered numbers of patients were 197, 249, and 233 for men, and 892, 842, and 944 for women in 2010, 2011, and 2012, respectively. The mean age- and gender-specific incidence rates for men in 2010–2012 were 265, 496, and 1014 in the age groups of 75–79, 80–84 and over 84, respectively, while those for women were 566, 1181, and 2302, respectively. The incidences for men increased compared with those in 2004–2006; however, the increase was small. Those for women showed no increase compared with those in 2004–2006.

Conclusion: With this data, we can see that the incidence of hip fractures has reached a plateau in Tottori Prefecture, Japan.

References: Hagino H et al., *Osteoporos Int* 2009;20:543.

OCs6

ACCUMULATED ONE YEAR HEALTH UTILITY LOSS AFTER SUSTAINING A HIP FRACTURE IN MEXICO

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Objective: Hip fractures are common in older people and incur substantial pain and suffering, disability, increased risk of death and high costs. The burden of hip fractures is expected to grow considerably during next years due to population aging. We aimed to describe the health-related quality of life

(HRQoL) and the determinants in patients sustaining a hip fracture in Mexico.

Methods: Data from Mexican patients enrolled in the International Costs and Utilities Related to Osteoporotic Fractures Study (ICUROS) was gathered. Patients had to be diagnosed with a low-energy-induced hip fracture and to be at least 50 years old. HRQoL was prospectively collected in three phases over 12 months after fracture using the EQ-5D instrument. The UK preference weights were used to determine health utility at different times. The accumulated HRQoL loss in the first year after fracture was calculated using the trapezoid method. Multivariate regression analysis was conducted to identify determinants of HRQoL reductions.

Results: Two hundred patients were evaluated. Mean (\pm SD) age was 77.4 \pm 9.9 years. Eighty percent were women. 15.5 % of the sample reported a prior fracture in last 5 years; 54 % had a job before fracture and 78 % were classified into the low level of income category. Mean (95%CI) utility value before fracture was 0.64 (0.59–0.68). Utility dropped to 0.01 (0.01–0.02) immediately after fracture and then improved to 0.46 (0.42–0.50) and 0.59 (0.55–0.63) at month 4 and 12 post-fracture, respectively. Accumulated utility loss over the first year was 0.35 (0.31–0.39). HRQoL before hip fracture and age at fracture were the two most relevant characteristics associated with the accumulated utility loss.

Conclusion: Hip fractures impair HRQoL in a significant way leading to utility values close to death shortly after fracture. Mean utility value elicited after 1 year follow-up was lower than before sustaining the fracture.

OCs7

RHEUMATOID CACHEXIA, OSTEOPOROSIS AND VERTEBRAL FRACTURES

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Objective: To assess the prevalence and risk factors of cachexia and evaluate its relationship with osteoporosis and vertebral fractures (VFs) in patients with rheumatoid arthritis (RA).

Patients and methods: We enrolled in a cross-sectional study 178 consecutive patients with RA (female: 82.6 %), who fulfilled the ACR criteria for the classification of RA with a mean age of 54.1 \pm 11.5 (25 to 82) years. Body composition, Lateral VFA images and scans of the lumbar spine and proximal femur were obtained using DXA. Rheumatoid cachexia was defined by a fat free mass (FFM) index below the 10th percentile and a fat mass (FM) index above the 25th percentile compared to a reference population. VFs were defined using Genant semiquantitative approach.

Results: Rheumatoid cachexia was observed in 96 patients (53.9 %) and osteoporosis in 52 patients (29.2 %). Comparison between women with and without cachexia showed that women with cachexia had a longer disease duration, higher disease activity parameters, higher steroid cumulative dose, and higher proportion of patients with erosive arthritis than women without cachexia. They had lower total hip BMD and T-score than women without cachexia while comparison in men found only BMI to be significantly lower in men with cachexia. Regression logistic analysis showed an independent and significant association between rheumatoid cachexia and age and disease activity in women.

Conclusion: Our study showed that half of the patients with RA may have rheumatoid cachexia, a condition that was significantly associated to disease activity and low hip BMD but not to vertebral fractures.

OCs8

PSYCHOLOGICAL WELL BEING AND QUALITY OF LIFE ASSESSMENT OF WORKING WOMEN WITH OSTEOPOROSIS VERSUS RETIRED WOMEN WITH OSTEOPOROSIS

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Aim: To assess and compare self esteem, anxiety and quality of life among women with osteoporosis.

Material and method: We studied patients women with osteoporosis. First group consisted of 58 working—active women with osteoporosis, second group of 58 retired women with osteoporosis. All the patients were recruited from ambulatory system Bihor county, Romania. The mean age in the first group was 60.31±2.43 and in the second group was of 60.97±3.26. Both groups had similar educational level. The main inclusion criteria were: fulfilling the WHO criteria for osteoporosis, complying with the principles of medical ethics. The exclusion criteria were: chronic severe diseases, noncompliance. All of the patients were assessed by DXA method for osteoporosis. We used Rosenberg Self Esteem Scale for self esteem, Hamilton Anxiety Rating Scale for anxiety and Qvaleffo-41 Questionnaire for quality of life for all the subjects in our study.

Results: The mean self esteem value was lower in the group of retired women than in the group of active women with osteoporosis. The mean anxiety value was higher in the group of retired women with osteoporosis than in the group of active women with osteoporosis. Quality of life was lower in the group of retired women with osteoporosis than in the group

of active women with osteoporosis. We found also correlations between quality of life self esteem and anxiety in patients in our study.

Conclusion: Our study underline that osteoporosis itself has an impact on patient's psychological well being and quality of life. It seems that working activities play an important role in achieving a better quality of life in women with osteoporosis versus retired women with osteoporosis. By promoting an active life and including healthy habits in everyone's life we could help improving psychological wellbeing and quality of life of patients with osteoporosis.

OCs9

CAFFEINE, COFFEE AND TEA IN RELATION TO RISK OF HIP FRACTURE IN THE SINGAPORE CHINESE HEALTH STUDY

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Objective: The relationship between dosage of caffeine or coffee and risk of osteoporotic hip fractures is unclear. In this study, we examined the associations between caffeine or coffee intake and risk of hip fracture in the Singapore Chinese Health Study.

Methods: This is a prospective cohort of 63,257 Chinese men and women (ages 45–74 years) recruited during 1993–1998 in Singapore. At baseline, habitual diet, including coffee and tea, was assessed by a validated food frequency questionnaire. Multivariate Cox proportional regression model was used to estimate hazard ratio (HR) and its 95%CI with adjustment of other risk factors of hip fracture, including demographic, dietary and lifestyle factors.

Results: During a mean follow-up of 9.9 years, we identified 1630 incident cases of hip fracture. There were 450 cases among 27,913 men and 1180 cases among 35,241 women. Compared with those drinking coffee

Conclusion: We concluded that daily caffeine 200-

OCs10

RISK FACTOR FOR THE FIRST-INCIDENT HIP FRACTURE IN POSTMENOPAUSAL WOMEN

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Objective: To identify the risk factors resulting in the first occurrence of hip fracture in Taiwanese postmenopausal women.

Methods: This project is a prospective cohort study and designed for a period of 1 year to enroll 50 postmenopausal women admitted to Keelung Chang Gung hospital for an accidental first-incident hip fracture as patient group and 50 age-matched postmenopausal (without hip fracture) as control group. The evaluation includes questionnaire and interview to record the risk factors, and examination to test the body height, body weight, and BMD of hip and spine by DXA.

Results: The mean age of patients with an accidental first-incident hip fracture is 79.6 years of old. Compared to the control group, the potential risk factors of the first-incident hip fracture in Taiwanese postmenopausal women include age of menopause, body height, level of education, chronic disease (including coronary heart disease, renal disease, epilepsy, Parkinson's disease, or cancer), eye disease (cataracts or glaucoma), weight-bearing exercise, and BMD of femoral neck. Low bone masses were noted up to 95 % in both of the control and patient groups.

Conclusion: Most of hip fracture occurred in older postmenopausal women. Although low BMD were noted in most of these older women, several modifiable risk factors and decreased BMD of femoral neck increase an older woman's risk of developing a first-incident hip fracture.

OCs11

NATIONAL BONE HEALTH ALLIANCE: A MULTISECTOR PUBLIC-PRIVATE PARTNERSHIP WORKING TOGETHER TO IMPROVE AMERICA'S BONE HEALTH

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The National Bone Health Alliance (www.nbha.org) is a public-private partnership launched in late 2010 that brings together the expertise and resources of its members to collectively promote bone health and prevent disease; improve diagnosis and treatment of bone disease; and enhance bone research, surveillance and evaluation. NBHA currently includes 56 participating organizations (35 nonprofit member organizations, 17 member companies and liaisons representing CDC, FDA, NASA and NIH). The concept for NBHA stems from the 2004 Bone Health and Osteoporosis: A Report of the Surgeon General and the June 2008 Summit for a National Action Plan for Bone Health. NBHA's "20/20 vision" is to reduce the incidence of hip and other bone breaks 20 % by the year 2020. NBHA provides a platform for its collective voice to weigh in on subjects important to bone health, particularly vitamin D, calcium, BMD reimbursement and utilization and the risks and benefits of the use of bone health therapies; communication among organizations interested in bone

health; shared priorities to become reality through pooled funding; and working together towards the goals and recommendations of the National Action Plan. Activities for 2015 include: Fracture Prevention CENTRAL (www.FracturePreventionCENTRAL.org) provides tools to health professionals, health insurers, hospitals and other sites interested in implementing this model of care. Bone Turnover Marker Standardization Project: NBHA is leading the effort to standardize U.S. bone marker sample collection procedures, establish a U.S. reference range for one bone formation and one bone resorption marker and standardize bone turnover marker assays. FLS Demonstration Study: The Bone Health Collaborative has launched a cloud-based study that will provides study sites with the FLS model of care and a cloud-based platform, to assess adoption and implementation of a Fracture Liaison Service. 2Million2Many Public and Health Professional Awareness Campaign is educates about the 2 million bone breaks in the U.S. each year that are not accidents but signs of osteoporosis.

OCs12

OVERWEIGHT AND OBESITY AND RISK FRACTURE STUDY IN POSTMENOPAUSAL WOMEN FROM HAVANA AND MADRID

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Obesity and osteoporosis are chronic disorders with increasing prevalence worldwide with a relationship not well established as a risk factor. The aim of this study was to investigate the association between BMI and bone mineral content (BMC) in postmenopausal women from Madrid, and La Habana. A cross-sectional study included 250 women aged ≥ 55 years: 196 from Madrid (Jimenez Diaz Foundation) and 155 from Clinic of menopause and osteoporosis, La Havana. In all women we determined BMI and osteoporosis with DXA study in lumbar column according to diagnostic criteria established by WHO protocol.

Results: According to age group the values of BMI were 26.94 (4.2) and 25.93 (4.3) for women aged between 45 and 59 years and over 60 years, respectively. BMI were 25.9 (5.5) kg/m², respectively. No association were found between BMI and BMC, although, we found tendency to higher values of BMI with lower bone mineral content. Our results support the view that obesity is a risk factor for both cardiovascular disease for fragility fracture.



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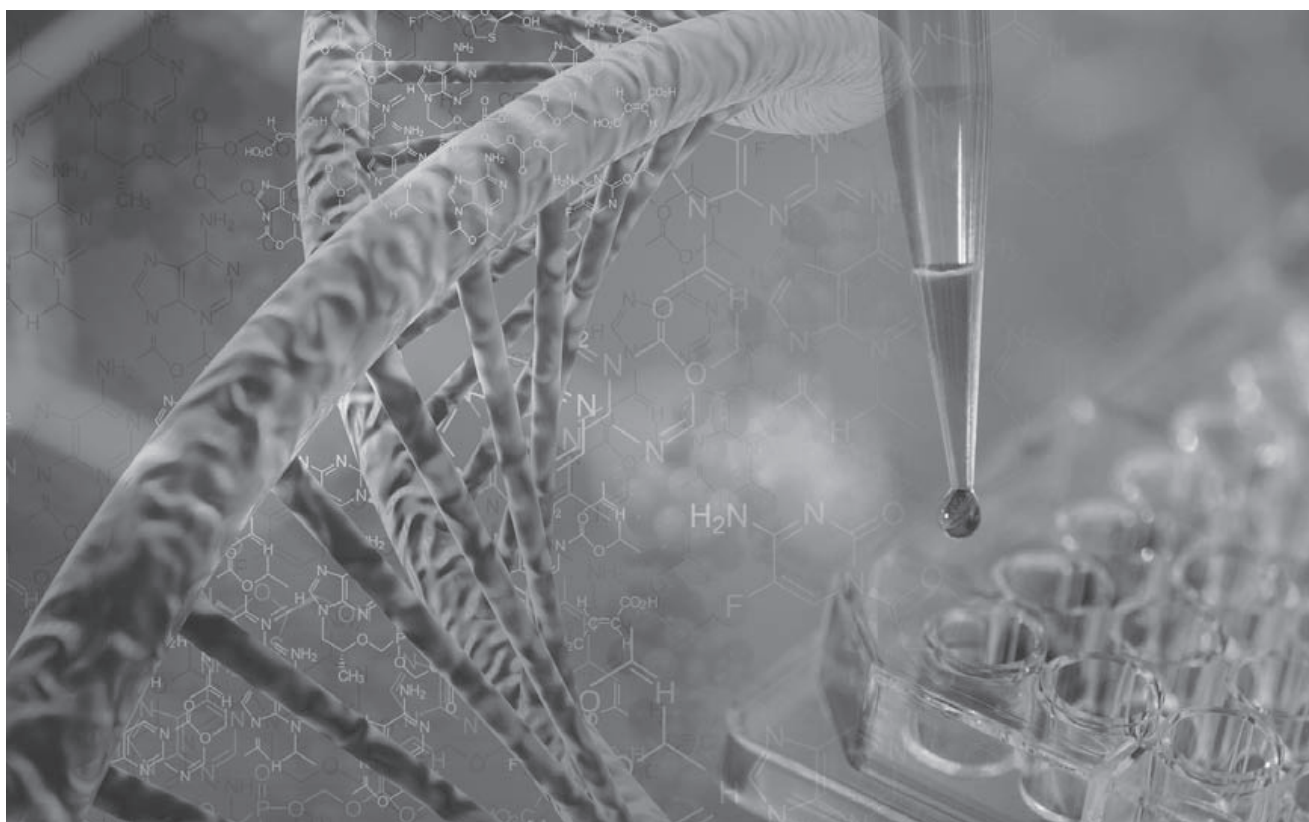
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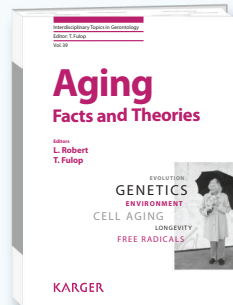
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