Volume 25 Supplement 2 April 2014

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
2–5 April 2014
Seville, Spain

National Osteoporosis Foundation
International Osteoporosis Foundation
Springer

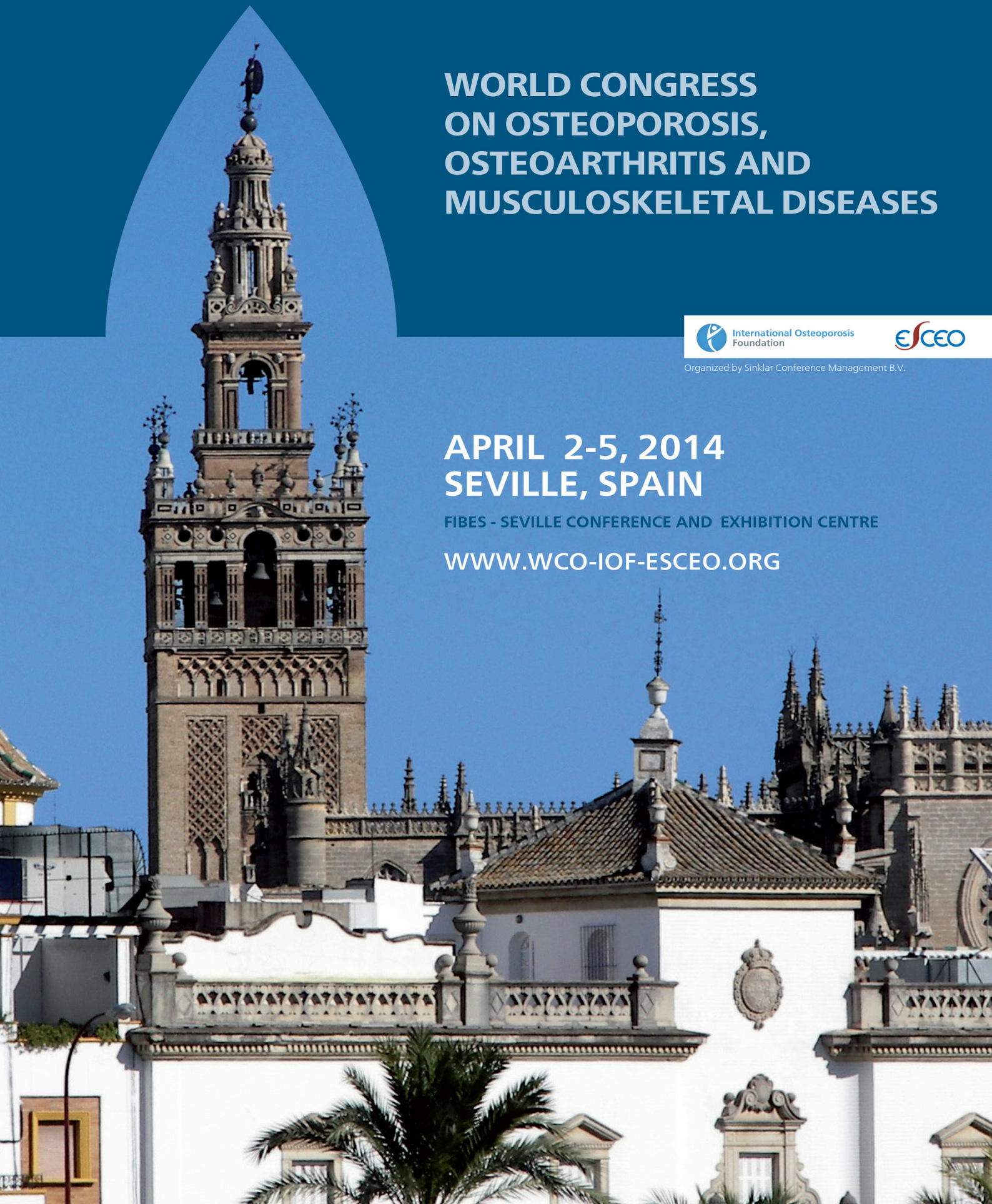
WCO-IOF-ESCEO | SEVILLE 2014

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

International Osteoporosis Foundation

ESCEO

Organized by Sinklar Conference Management B.V.



APRIL 2-5, 2014
SEVILLE, SPAIN

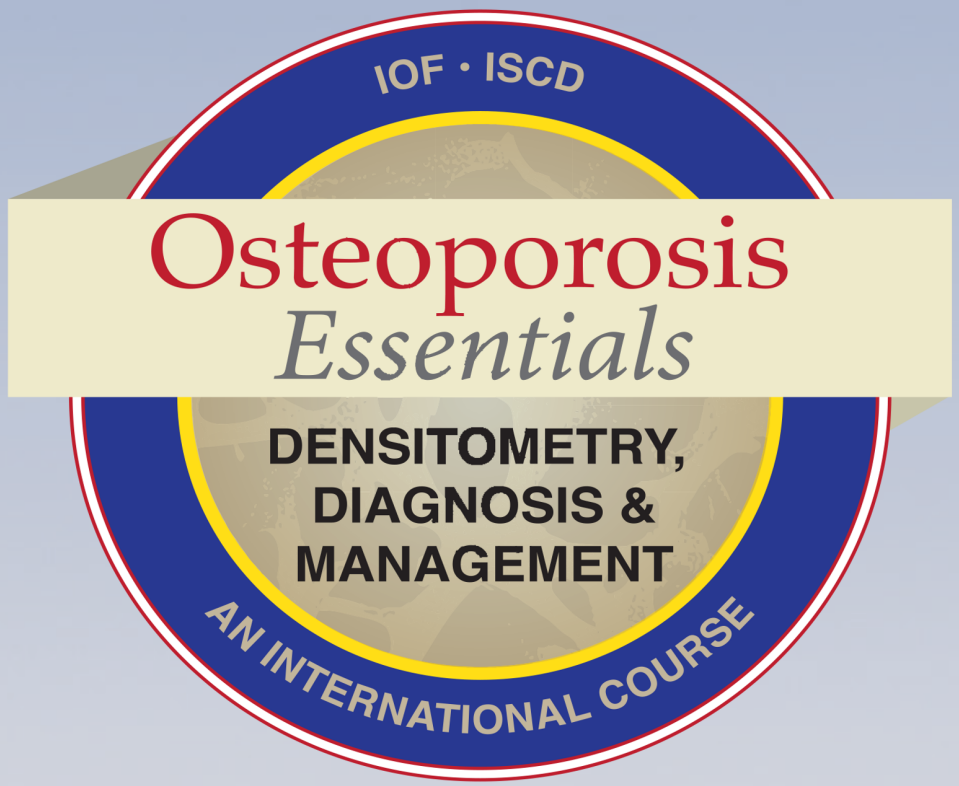
FIBES - SEVILLE CONFERENCE AND EXHIBITION CENTRE

WWW.WCO-IOF-ESCEO.ORG

AN INTERNATIONAL COURSE BY IOF AND ISCD

International Osteoporosis Foundation

ISCD The International Society For Clinical Densitometry



Take part in a comprehensive training course which provides the latest knowledge on densitometry, diagnosis and management of osteoporosis.

- Separate tracks for clinicians and technologists.
- Available to clinicians and allied health professionals worldwide.
- Participants may opt to take a post-course exam in order to attain an Attestation of Achievement.

Find out how to host or participate in a course near you.

www.osteoporosis-essentials.org

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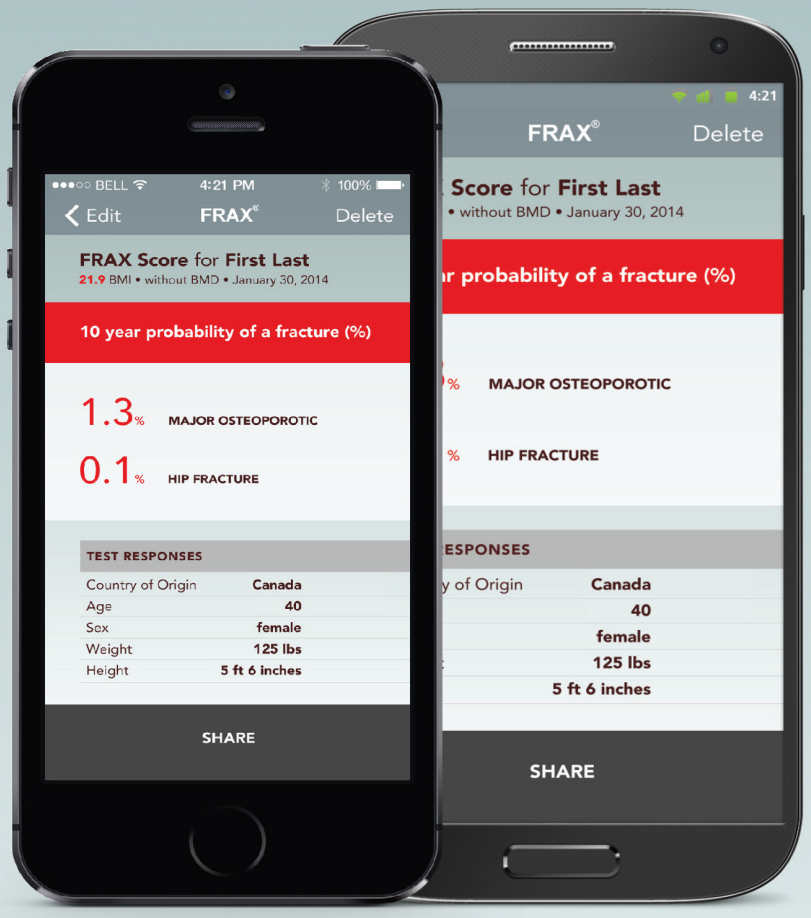
Pagination in this file differs from the version of record (Osteoporosis International vol. 25 supplement 2) found on link.springer.com

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

FRAX® new and improved iOS/Android Application

The WHO Fracture Risk Assessment Tool (FRAX®) is now easily available on iOS & Android mobile devices (tablets included), making the calculation tool independent of internet access and simple to use in any clinical setting.



Application features

- PIN protection for securing saved assessments
- Patient assessments management *(save, delete and sort options)*
- Ability to forward patient assessments via E-mail
- 58 models available for 53 countries
- Updated with the latest FRAX® algorithm *(version 3.8)*

Tool generates the following results

- 10-year probability of a major osteoporotic fracture
- 10-year probability of a hip fracture
- Body Mass Index
- NOGG guidelines accessible *(UK users)*

www.shef.ac.uk/FRAX/

FRAX® IS DEVELOPED IN PARTNERSHIP WITH THE INTERNATIONAL OSTEOPOROSIS FOUNDATION **WWW.IOFBONEHEALTH.ORG**
A PERCENTAGE OF ALL PROCEEDS FROM FRAX® DOWNLOADS WILL GO TO IOF TO SUPPORT EDUCATION PROGRAMS

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 195 societies in 93 locations around the world.
www.iofbonehealth.org

Mission
- increase awareness and understanding of osteoporosis.
- motivate people to take action to prevent, diagnose and treat osteoporosis.
- support national osteoporosis societies in order to maximize their effectiveness.

International Osteoporosis Foundation

CAPTURE *the* FRACTURE

CAPTURE *the* FRACTURE

A **global campaign** facilitating the implementation of Fracture Liaison Services (FLS) for secondary fracture prevention

- Providing internationally endorsed standards for best practice
- Facilitating change at a national level
- Raising awareness among health professionals and the general public

www.capturethefracture.org

International Osteoporosis Foundation

Message from the Congress Presidents

Dear Colleagues,

On behalf of the European Society for Clinical and Economic Aspects of Osteoporosis (ESCEO) and the International Osteoporosis Foundation (IOF), it is a pleasure to welcome you to Seville, and to the World congress on osteoporosis, osteoarthritis and musculoskeletal disease (WCO-IOF-ESCEO). The Congress' scientific programme has been developed by a team consisting of members of the Committee of Scientific Advisors of the IOF and the Scientific Advisory Board of 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.

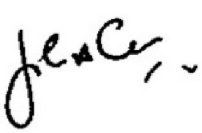
We are meeting in Seville with common aims – to gather new knowledge, skills and tools in the prevention and treatment of osteoporosis, osteoarthritis and musculoskeletal disease. The enlarging focus of this year's meeting covers major disabling conditions in elderly people. It is our hope that this Congress will move the field one step forward on all fronts; from new understanding of bone, joint and muscle metabolism and pathology, to new strategies and options in prevention, diagnosis and treatment.

The core scientific programme consists of 8 invited lectures by renowned speakers and 57 oral presentations selected from the very best of hundreds of submitted abstracts. In addition, participants can choose among 14 different Meet-the-Expert sessions and 11 special sessions and symposia on issues of clinical importance. We also encourage you to attend many of the scheduled poster sessions, 6 industry sponsored satellite symposia and to visit the large commercial exhibition presented by the leading companies in the bone field.

The city of Seville offers a most convenient and pleasant setting for international congresses. We hope that you will also take the opportunity to explore the many attractions in Seville, or simply savour the 'buena vida' 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

John A. KANIS
IOF President

Jean-Yves REGINSTER
ESCEO President

Scientific committee

Cyrus COOPER
Co-Chair, IOF Committee Scientific Advisors (CSA)

René RIZZOLI
Co- Chair, ESCEO Scientific Advisory Board (SAB)

John A. KANIS
IOF President

Jean-Yves REGINSTER
ESCEO President

Scientific advisory board

Donato AGNUSDEI
Kristina AKESSON
Maurice AUDRAN
Jean-Jacques BODY
Mary BOUXSEIN
Maria-Luisa BRANDI
Olivier BRUYERE
Nansa BURLET
Jorge Benito CANNATA ANDIA
Antonio CANO
Etienne CAVALIER
Claus CHRISTIANSEN
Juliet COMPSTON
Cyrus COOPER
Jean-Pierre DEVOGELAER
Adolfo DIEZ-PEREZ
Manuel DIAZ CURIEL
Andrea GASPARIK
Nicholas HARVEY
Gabriel HERRERO-BEAUMONT
Mickaël HILIGSMANN
John A. KANIS
Jean-Marc KAUFMAN
Paul LIPS
Roman LORENC
George LYRITIS
Johanne MARTEL-PELLETIER
Eugene McCLOSKEY
Santiago PALACIOS
Socrates PAPAPOULOS
Karel PAVELKA
Jean-Pierre PELLETIER
Jean-Yves REGINSTER
Johann RINGE
René RIZZOLI
Antonio HERRERA RODRIGUEZ
Christian ROUX
Manuel SOSA HENRIQUEZ
Pavel SZULC
Thierry THOMAS

Local organizing committee

Adolfo DIEZ-PEREZ and Ramón PÉREZ CANO
Chairs, LOC

Jorge Benito CANNATA ANDIA
Antonio CANO
Manuel DIAZ CURIEL
Antonio HERRERA RODRIGUEZ
Gabriel HERRERO-BEAUMONT
Santiago PALACIOS
Manuel SOSA HENRIQUEZ

CONGRESS ORGANIZATION

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

Pacific World
Diputación 238-244
08007 Barcelona, Spain
Registration: *registration-wco-iof-esceo@pacificworld.com*
Hotel booking: *hotel-wco-iof-esceo@pacificworld.com*
Tel: +34 902 090 561

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Tel: +32 (0)4 254 12 25
Fax: +32 (0)4 254 12 90

Sponsorship opportunities / Exhibition

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Bd G. Kleyer, 108
B-4000 Liège, Belgium
Tel: +32 (0)4 254 12 25
Fax: +32 (0)4 254 12 90

Congress venue (3-5 April)

FIBES, Palacio de Exposiciones y Congresos
Avda. Alcalde Luis Uruñuela, 1
41020 Sevilla, Spain
Tel: +34 954 47 87 00
Fax: +34 954 47 87 20

Congress venue (2 April)

Casino de la exposición
Glorieta San Diego
41013 Sevilla, Spain
+34 955 47 29 92

Congress website

www.wco-iof-esceo.org

Sponsors and Exhibitors list

DIAMOND SPONSORS

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Medi
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Wisepress

CONGRESS INFORMATION

Congress venue (3-5 April)

FIBES, Palacio de Exposiciones y Congresos
Avda. Alcalde Luis Uruñuela, 1
41020 Sevilla
Tel: +34 954 47 87 00
Fax: +34 954 47 87 20

Congress venue (2 April)

Casino de la exposición
Glorieta San Diego
41013 Sevilla
+34 955 47 29 92

Operating dates and hours

Congress Opening hours:
Location: Casino de la Exposición
Wednesday, April 2 from 16:50 to 21:10

Congress Exhibition hours:
Location : Fibes Congress Center
Thursday, April 3 from 9:00 to 18:30
Friday, April 4 from 9:00 to 18:30
Saturday, April 5 from 9:00 to 15:00

Registration Desks Opening Hours
Location : Fibes Congress Center
Thursday, April 3 from 8:00 to 18:30
Friday, April 4 from 8:30 to 18:30
Saturday, April 5 from 8:30 to 15:00

Poster viewing

Poster Session 1 (P101-P400)
Thursday April 3, 2014 14:00-15:00

Poster Session 2 (P401-P750)
Friday April 4, 2014 14:00-15:00

Oral presentation of selected posters
Thursday April 3, 2014 14:00-14:28
Friday, April 4, 2014 14:00-14:28

How to reach the congress center?

1) A FREE SHUTTLE SERVICE (by TUSSAM, Sevilla public transport company).
Route: Morning: San Bernardo --> Nervión --> Santa Justa --> Fibes Congress Center
Evening: Fibes Congress Center --> Santa Justa --> Nervión --> San Bernardo
Timetables: April 3rd and 4th: one service starting at 08.00 until 8:45 and returning at 18.30
April 5th: one service starting at 08.00 until 8:45 and returning at 15.00

2) FROM THE SAN PABLO INTERNATIONAL AIRPORT

TUSSAM AIRPORT BUS
There is a bus service between the airport and the city center from 4:30 am until 1:10 am
Please check the timetables : http://www.aena-aeropuertos.es/csee/Satellite/Aeropuerto-Sevilla/en/Seville.htlm

AIRPORT - CITY TAXI
Fixed fare for taxis from and to the airport, regardless the area you go within the city of Seville
FARE 1 : 21.89 € (working days, Monday-Friday / 7am-9pm)
FARE 2 : 24.41 € (Monday-Friday / 9pm-7am / Saturday-Sunday-bank holidays/ all day)
FARE 3 : 30.50 € (applied at Easter and April Fair)
For more information:
www.aena-aeropuertos.es/csee/Satellite/Aeropuerto-Sevilla/en

3) FROM THE RAILWAY STATION

TRAIN C4
This is the best and fastest means to get to Fibes from the railway station
Seville has 3 main train stations: Santa Justa, San Bernardo and Virgen del Rocío. In addition, there are also two further train halts: Padre Pio and Fibes Conference Centre.
- C4 Train from Santa Justa Main Train Station reaches FIBES in 6 minutes
- C4 Train from San Bernardo station reaches FIBES in 11 minutes
Fares Single Ticket: 1.70 € - Return Ticket: 1.90 €
More info: www.renfe.com/EN/viajeros/

TAXI
Many taxis can be found at the main entrance of the Santa Justa Railway Station (please note that taxis at Santa Justa Station apply a surcharge of 1.39 &euro)

BUS
From Santa Justa: take bus line 27 (gets to Fibes in 10/15 min)
It's approx. 8 min walking from Santa Justa Station.
Take bus line C1 and then take line 27.
From San Bernardo: take bus line B4 (reaches Fibes in approx. 15/20 min)

4) FROM THE CITY CENTER
Means to get to Fibes from the city/historical centre:

TRAM
It runs to/from San Bernardo station (connection with C4 train)

METRO
It stops at the city centre and San Bernardo station
(direct connection with C-4 train halt)

BUS
Take the lines 27 and B4 reach FIBES from the city centre or San Bernardo station.

5) BY CAR

The main highways are the N-IV, coming from Madrid, the A-92, coming from Malaga and the A-49, coming from the coast. When arriving in Seville, there are plenty of signs directing to Fibes.

CONGRESS INFORMATION

Accreditation

European accreditation
The WCO-IOF-ESCEO 2014 Congress was granted 18 European CME credits (ECMEC) by the European Accreditation Council for Continuing Medical Education (EACCME - www.eaccme.eu)

Belgian accreditation
Information soon.

Badges

Courtesy of MSD
Lost badges : 65 euros fee/badge
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.

Certificate of attendance

A certificate of attendance may be printed at the self-printing stations available in the Registration Area from Friday April 4th afternoon to Saturday April 5th. 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 cloackroom 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.

Congress bags

Courtesy of Servier

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.

Language

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

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 Bar point located in the exhibition area and opened during Congress hours.

Media

The WCO-IOF-ESCEO 2014 Congress will not provide any Media Centre, however Media representatives are free to use the Internet Corner available durng Congress hours.

Notebook and Pen

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

Pocket programme

Courtesy of MSD
A Pocket programme is included with your badge.

Tourist information

www.visitasevilla.es

General emergency number

European Telephone Number : 112

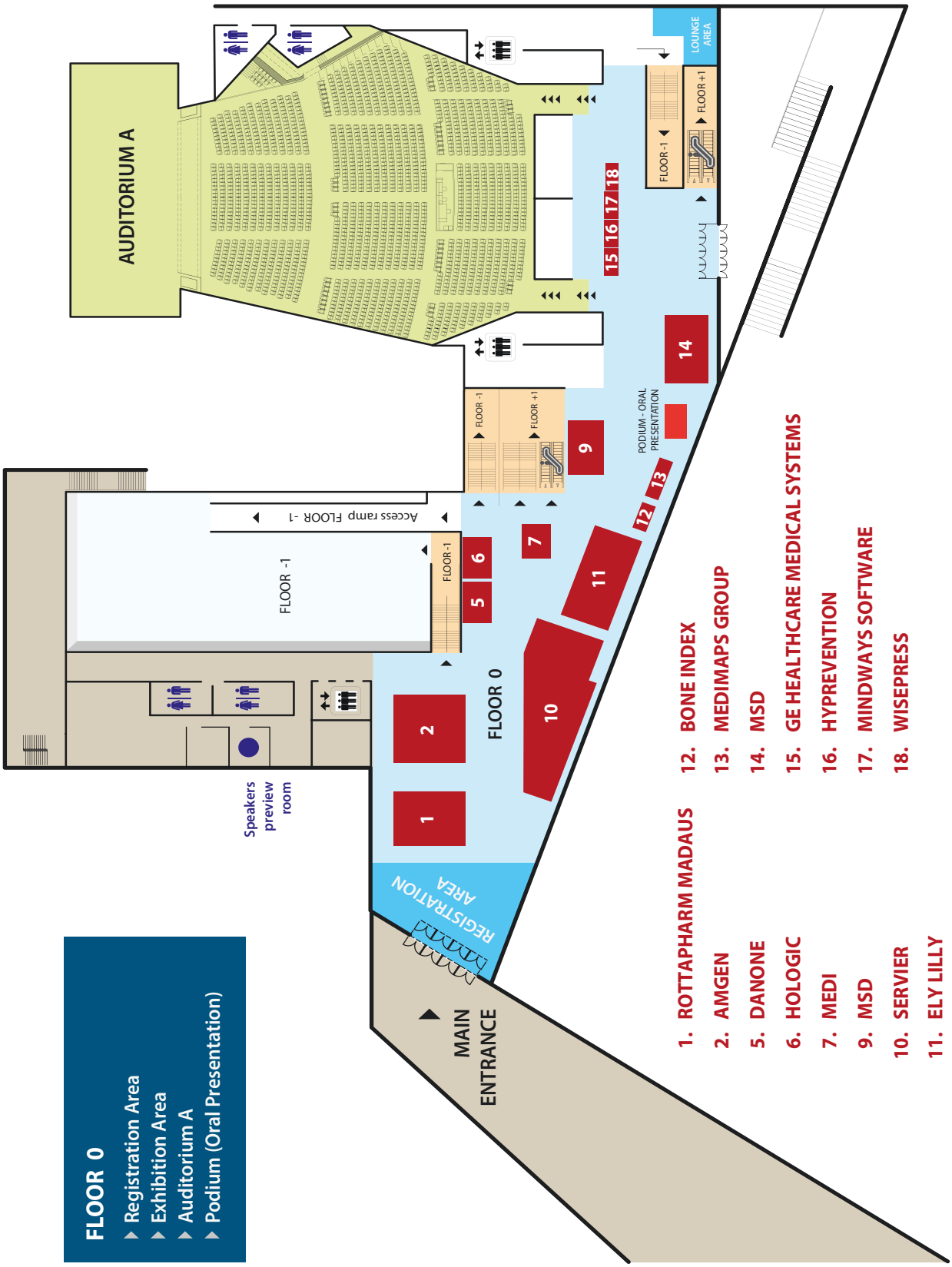
Welcome cocktail

Courtesy of Rottapharm | Madaus
All WCO-IOF-ESCEO 2014 participants are invited to the Welcome Cocktail on Wednesday April 2nd, 2014, 20:10 at the Casino de la Exposicion
Venue : Glorieta de San Diego | CP 41003 Sevilla
Tel: +34 955 47 29 92

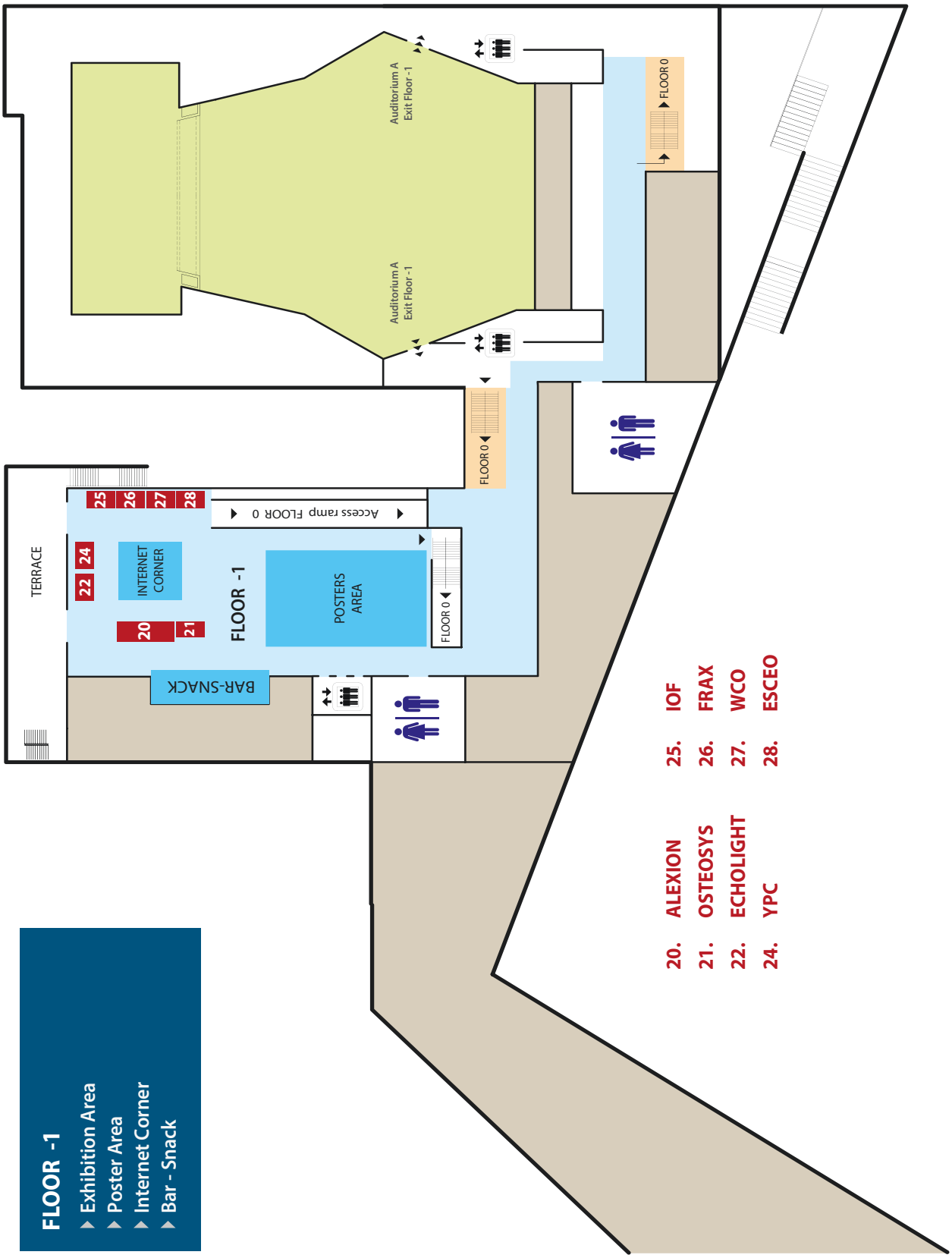
Future meetings

2015 – WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES WCO-IOF-ESCEO 2015
MiCo – Milano Congressi
Milan – Italy
March 26-29, 2015

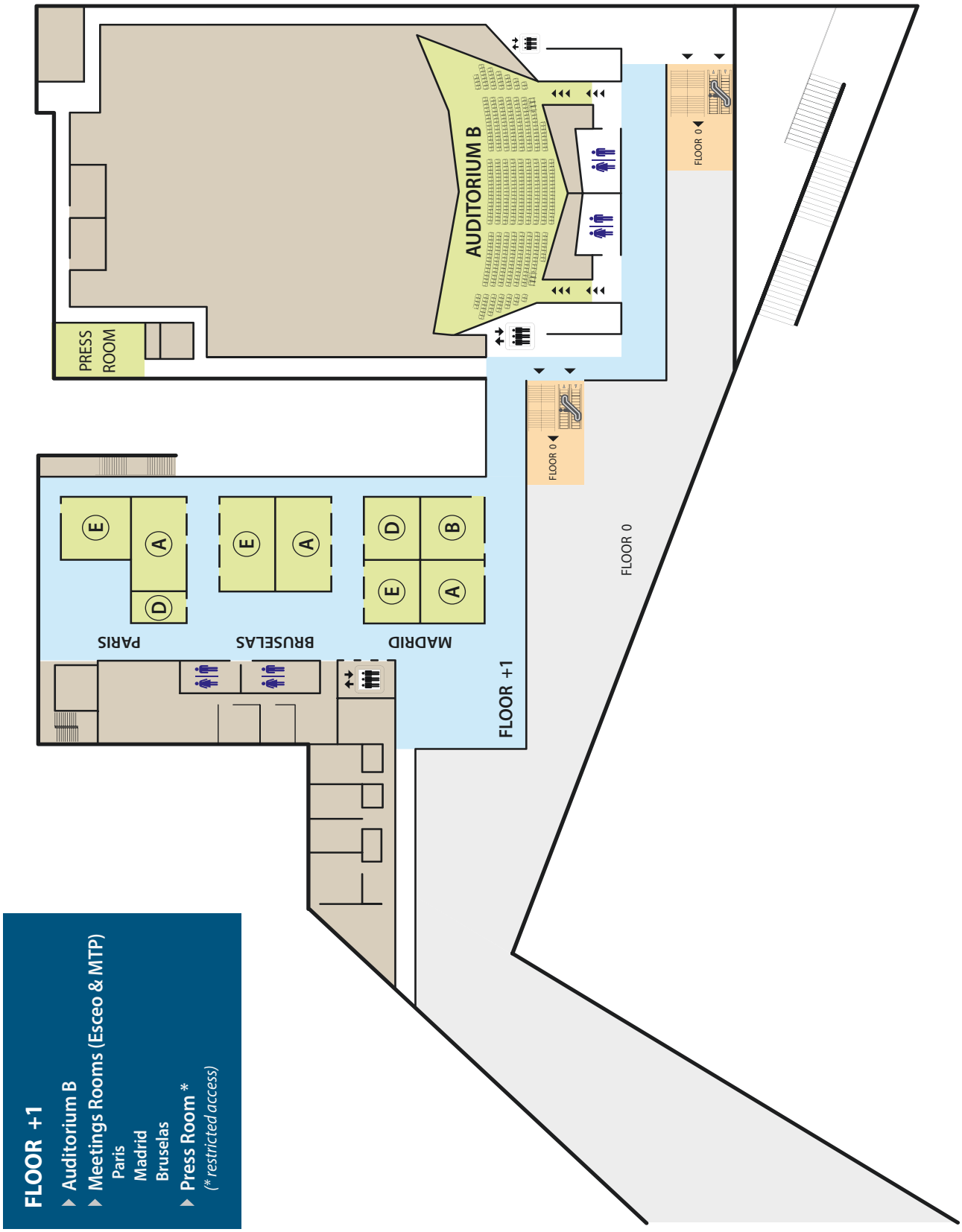
CONGRESS VENUE - FLOOR PLAN LEVEL 0



CONGRESS VENUE - FLOOR PLAN LEVEL -1



CONGRESS VENUE - FLOOR PLAN LEVEL +1



World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases

www.wco-iof-esceo.org/2015

MiCo - Fiera Milano Congressi

MILAN ITALY

WCO-IOF-ESCEO

MARCH 26-29, 2015

International Osteoporosis Foundation

ESCEO

Organized by Sinklar Conference Management B.V.

Wednesday, April 02, 2014 - CASINO DE LA EXPOSICIÓN

Glorieta de San Diego | CP 41003 Sevilla

16:50 - 17:50
ESCEO SYMPOSIUM

- Efficacy and safety of anti-osteoporosis medications in the elderly Casino de la Exposición
Chairpersons: Jaime Branco, Maria Luisa Brandi
- *Introduction* - Maria Luisa Brandi
- *Presentation of the ESCEO Consensus* - René Rizzoli
- *Optimizing therapeutic adherence in the elderly* - John Weinman
- *Wrap-up and conclusion* - René Rizzoli
- *Discussion - Leader:* Johann D. Ringe

Panel: Jaime Branco, Maria Luisa Brandi, Olivier Bruyère, Patrice Cacoub, Cyrus Cooper, Adolfo Diez-Perez, Jonny Duder, Roger Fielding, Nicholas Harvey, Mickaël Hiligsmann, John A. Kanis, Jean Petermans, Jean-Yves Reginster, Johann D. Ringe, René Rizzoli, John Weinman

17:50 - 18:50
Chairperson: Cyrus Cooper Casino de la Exposición
Best clinical papers published in 2013
Socrates Papapoulos

18:50 - 21:10
WCO-IOF-ESCEO - OPENING CEREMONY
Chairpersons: Jean-Yves Reginster, John A. Kanis

18:50 - 18:55
OPENING OF THE MEETING Casino de la Exposición
René Rizzoli

18:55 - 19:55
INDUSTRY-SPONSORED HONORARY LECTURE Casino de la Exposición
- *The mammalian circadian timing system: how clocks talk to each other* - Ueli Schibler

19:55 - 20:10
Presentation of the ESCEO-IOF Servier Pierre D. Delmas Prize Casino de la Exposición
Bess Dawson-Hughes

Presentation of the IOF SERVIER Young Investigator Research Grant Casino de la Exposición
John A. Kanis

20:10 - 21:10
WELCOME COCKTAIL Casino de la Exposición

Thursday, April 3, 2014 - FIBES SEVILLA

Avda. Alcalde Luis Uruñuela, 1 | CP 41020 Sevilla

09:00 - 11:50
SCIENTIFIC SESSION I
Chairpersons: John A. Kanis, Jean-Yves Reginster

09:00 - 09:30
Plenary Lecture 1 — Auditorium A
- *The lifecourse epidemiology of musculoskeletal ageing* -
Cyrus Cooper

09:30 - 09:40
Presentation of the ESCEO-IOF Herbert Fleisch Medal — Auditorium A
Jean-Yves Reginster

09:40 - 10:20
Oral communications selected from abstracts

09:40 - 09:50
OC 1 — Auditorium A
RELATIONSHIP OF WEIGHT, HEIGHT, AND BODY MASS INDEX WITH FRACTURE RISK AT DIFFERENT SITES IN POSTMENOPAUSAL WOMEN: THE GLOBAL LONGITUDINAL STUDY OF OSTEOPOROSIS IN WOMEN (GLOW)
Presenting author: J. E. Compston
Authors: A. Z. Lacroix, F. H. Hooven, S. L. Greenspan, S. H. Gehlbach, A. Diez-Perez, C. Cooper, R. Chapurlat, S. Boonen, F. A. Anderson, S. Adami, L. March, J. C. Netelenbos, J. Flahive, D. W. Hosmer, N. B. Watts, E. S. Siris, S. Silverman, K. G. Saag, C. Roux, M. Rossini, J. Pfeilschifter, J. W. Nieves, J. D. Adachi

09:50 - 10:00
OC 2 — Auditorium A
QUANTITATIVE ULTRASOUND (QUS) IS ASSOCIATED WITH FRACTURE RISK: A META - ANALYSIS
Presenting author: E. V. McCloskey
Authors: J. A. Kanis, A. Odén, D. C. Bauer, C. C. Glüer, D. Hans, S. K. Kaptoge, K. T. Khaw, M. A. Krieg, A. Kwok, E. Lau, F. Marin, T. W. O'neill, E. S. Orwoll, J. Reeve, H. Johansson

10:00 - 10:10
OC 3 — Auditorium A
RISK FACTORS FOR FALLS AMONG ELDERLY NURSING HOME RESIDENTS: A 2-YEAR PROSPECTIVE STUDY
Presenting author: F. Buckinx
Authors: C. Beaudart, J. Slomian, D. Maquet, M. Demonceau, S. Gillain, J. Petermans, J.-Y. Reginster, O. Bruyère

10:10 - 10:20
OC 4 — Auditorium A
SUBCHONDRAL BONE TURNOVER, JOINT SPACE NARROWING AND OSTEOPHYTE FORMATION MAY BE PREDICTED BY ALPHA-CTX, A HIGH BONE TURNOVER DEGRADATION MARKER
Presenting author: M. A. Karsdal
Authors: J. L. H. Huebner, V. K. Kraus, A. C. Bay-Jensen

10:20 - 10:50
Plenary Lecture 2 — Auditorium A
- *Osteoporosis therapy, beyond fracture prevention* -
Jonathan D. Adachi

10:50 - 11:50
Oral communications selected from abstracts

10:50 - 11:00
OC 5 — Auditorium A
HOSPITALIZED AND NONHOSPITALIZED VERTEBRAL FRACTURES: COMPARISON OF PATIENT DEMOGRAPHICS AND HEALTH RELATED QUALITY OF LIFE IMPLICATIONS
Presenting author: A. Svedbom
Authors: V. Wintzell, V. Alekna, M. Tamulaitiene, M. L. Bianchi, P. Clark, M. Diaz Curiel, H. P. Dimai, O. Lesnyak, E. V. McCloskey, K. M. Sanders, T. Thomas, F. Borgström, J. A. Kanis

11:00 - 11:10
OC 6 — Auditorium A
FIRST-LINE ANALYSIS OF THE EFFECTS OF TREATMENT ON PROGRESSION OF STRUCTURAL CHANGES IN KNEE OSTEOARTHRITIS OVER 24 MONTHS: DATA FROM THE OSTEOARTHRITIS INITIATIVE PROGRESSION COHORT
Presenting author: J. Martel-Pelletier
Authors: C. Roubille, F. Abram, M. C. Hochberg, M. Dorais, P. Delorme, J.-P. Raynauld, J.-P. Pelletier

11:10 - 11:20
OC 7 — Auditorium A
ECONOMIC EVALUATION OF AN OSTEOPOROSIS SCREENING CAMPAIGN: USING FRAX AS A PRESCREENING TOOL
Presenting author: M. Hiligsmann
Authors: W. Ben Sedrine, O. Bruyère, P. Jeholet, V. Misson, G. Pire, J.-Y. Reginster

11:20 - 11:30
OC 8 — Auditorium A
DO OSTEOPOROTIC HIP FRACTURES IN RHEUMATOID ARTHRITIS VARY IN TYPE, TIMING AND SURGICAL INTERVENTION AND DO THEY IMPACT ON SURVIVAL? RESULTS FROM TWO LARGE UK INCEPTION COHORTS LINKED WITH NATIONAL DATA
Presenting author: E. Nikiphorou
Authors: L. Carpenter, J. Dixey, P. Williams, P. Kiely, D. A. Walsh, R. Williams, A. Young

11:30 - 11:40
OC 9 — Auditorium A
ASSOCIATION BETWEEN JOINT SPACE WIDTH, KELLGREN-LAWRENCE SCORE, PAIN AND PROGRESSION IN OSTEOARTHRITIS SUBJECTS FROM TWO PHASE III STUDIES: A CLINICAL STUDY REFERENCE DATABASE
Presenting author: C. Christiansen
Authors: A. B. Bihlet, I. B. Byrjalsen, B. J. R. Riis, P. A. Aleksandersen, M. A. Karsdal

11:40 - 11:50
OC 10 — Auditorium A
QUALITY OF LIFE BENEFITS OF KNEE ARTHROPLASTY FOR OSTEOARTHRITIS
Presenting author: A. Neuprez
Authors: G. François, W. Kurth, T. Thirion, C. Daniel, J. P. Huskin, J.-Y. Reginster

12:15 - 13:45
INDUSTRY-SPONSORED LUNCH SYMPOSIUM — Auditorium A
Efficacy and utility of glucosamine sulfate and hyaluronic acid in the management of osteoarthritis
Chairperson: Roy D. Altman
- *Critical review and interpretation of the newest meta-analyses of intra-articular hyaluronate for knee osteoarthritis* - Emmanuel Maheu
- *Crystalline glucosamine sulfate is the only SYSADOA that decreases consumption of NSAIDs in knee osteoarthritis: results from the PEGASUS cohort* - Lucio C. Rovati
- *Disease modification in knee osteoarthritis with oral glucosamine sulfate or intra-articular hyaluronic acid: a review of the current evidence* - Roy D. Altman

12:15 - 13:45
INDUSTRY-SPONSORED LUNCH SYMPOSIUM — Auditorium B
Hypophosphatasia: evolving our understanding of this serious and complex disease
Chairperson: Maria Luisa Brandi
- *What we should all know about HPP* - Etienne Mornet
- *HPP: clinical perspectives* - Gabriel Angel Martos Moreno
- *HPP and Osteoporosis - what are the links?* - Richard Eastell
- *HPP: an evolving disease landscape* - Maria Luisa Brandi

Thursday, April 3, 2014 - FIBES SEVILLA

Avda. Alcalde Luis Uruñuela, 1 | CP 41020 Sevilla

14:00 - 15:00
Poster Viewing — Poster Area
Session I (P101-P400)

14:00 - 14:28
Oral presentation of selected posters
Chairperson: Johanne Martel-Pelletier

14:00 - 14:07
P 420 — Podium
PLASMA SPHINGOSINE 1-PHOSPHATE LEVELS AND THE RISK OF OSTEOPOROTIC FRACTURES: THE CEOR STUDY
Presenting author: M.-S. M. Ardawi
Authors: A. A. Rouzi, S. A. Al-Sibiani, N. S. Senani, M. H. Qari

14:07 - 14:14
P 443 — Podium
DECLINING HIP FRACTURE RISK IN SWEDEN
Presenting author: A. Odén
Authors: E. V. McCloskey, H. Johansson, J. A. Kanis

14:14 - 14:21
P 313 — Podium
THE RELATIONSHIP BETWEEN DXA MEASURES OF MATERNAL, PATERNAL AND OFFSPRING BONE MASS: FINDINGS FROM THE SOUTHAMPTON WOMEN'S SURVEY
Presenting author: C. Holroyd
Authors: P. Taylor, S. C. Crozier, H. Inskip, K. M. Godfrey, C. Cooper, N. C. Harvey

14:21 - 14:28
P 413 — Podium
IMPACT OF COMPONENTS OF THE METABOLIC SYNDROME ON PROGRESSION OF KNEE OSTEOARTHRITIS IN THE SEKOIA STUDY
Presenting author: C. Parsons
Authors: M. H. Edwards, F. Eymard, J.-Y. Reginster, O. Bruyère, F. Petit-Dop, P. Richette, X. Chavalier, E. M. Dennison, C. Cooper

14:00 - 15:00
EDUCATIONAL LECTURE 1 — Auditorium B
- *How to formulate a research hypothesis?* - Ego Seeman

14:00 - 15:00
ESCEO SYMPOSIA

- Algorithm for the management of osteoarthritis in Europe — Bruselas A
Chairpersons: Marc Hochberg, Olivier Bruyère
- *Introduction* - Olivier Bruyère
- *Why do we need an algorithm for the treatment of osteoarthritis?* - Jean-Pierre Pelletier
- *Presentation of the ESCEO algorithm* - Jean-Yves Reginster
- *Discussion - Leader:* Cyrus Cooper

Panel: Jaime Branco, Maria Luisa Brandi, Olivier Bruyère, Cyrus Cooper, Andrea Ildiko Gasparik, Francis Guillemin, Marc Hochberg, John A. Kanis, Johanne Martel-Pelletier, Jean-Pierre Pelletier, Jean-Yves Reginster, René Rizzoli, Stuart Silverman

- Nutrition for musculoskeletal health in postmenopausal women — Paris A
Chairpersons: Maria Luisa Brandi, Adolfo Diez-Perez, René Rizzoli
- *Introduction* - René Rizzoli
- *Prevention of musculoskeletal ageing: interplay of nutrition and exercise* - René Rizzoli
- *Dairy protein & exercise to promote skeletal muscle anabolism* - Luc J. C. van Loon
- *Discussion & Take home messages for musculoskeletal health - Leader:* Jurgen Bauer

Panel: Jurgen Bauer, Maria Luisa Brandi, Olivier Bruyère, Cyrus Cooper, Adolfo Diez-Perez, John A. Kanis, Jean-Yves Reginster, René Rizzoli, John Stevenson, Luc J. C. van Loon, Stéphane Walrand

- Challenges with the development of bone forming agents in Europe — Bruselas E
Chairperson: John A. Kanis
- *Introduction* - John A. Kanis
- *Challenges faced by pharmaceutical industry in Europe for the development of bone forming agents* - Andreas Grauer
- *ESCEO experts consensus for the development of bone forming agents in Europe* - John A. Kanis
- *Discussion - Leader:* John A. Kanis

Panel: John Caminis, Cyrus Cooper, Andreas Grauer, John A. Kanis, Etoh Masaya, Yasuo Nakamura, Florence Petit-Dop, Jean-Yves Reginster, René Rizzoli, Koshi Sakamoto, Yannis Tsouderos

14:00 - 15:00
MEET-THE-EXPERT SESSIONS

14:00 - 15:00
-Fracture healing: facts and fantasy — Madrid A
Thomas Einhorn

14:00 - 15:00
-New molecules against osteoarthritis — Madrid B
Francis Berenbaum

14:00 - 15:00
-Hormone replacement therapy in the male — Madrid D
Jean-Marc Kaufman

14:00 - 15:00
-Prevention of bone metastases — Madrid E
Eugene McCloskey

15:00 - 16:40
SCIENTIFIC SESSION II
Chairpersons: Cyrus Cooper, Jonathan D. Adachi

15:00 - 15:30
Plenary Lecture 3 — Auditorium A
- *Definition, pathophysiology and management of sarcopenia* - Roger Fielding

15:30 - 15:40
Presentation of the IOF Pierre Delmas Award — Auditorium A
John A. Kanis

15:40 - 16:40
Oral communications selected from abstracts

15:40 - 15:50
OC 11 — Auditorium A
TRACKING OF ENVIRONMENTAL DETERMINANTS OF BONE STRUCTURE AND STRENGTH DEVELOPMENT IN HEALTHY BOYS: AN EIGHT-YEAR FOLLOW UP STUDY ON THE POSITIVE INTERACTION BETWEEN PHYSICAL ACTIVITY AND PROTEIN INTAKE FROM PREPUBERTY TO MID-LATE ADOLESCENCE
Presenting author: T. Chevalley
Authors: J.-P. Bonjour, B. van Rietbergen, S. Ferrari, R. Rizzoli

15:50 - 16:00
OC 12 — Auditorium A
EARLY GROWTH OF LEAN, RATHER THAN FAT MASS, PREDICTS BONE SIZE AND MINERAL DENSITY IN CHILDHOOD: FINDINGS FROM THE SOUTHAMPTON WOMEN'S SURVEY
Presenting author: R. J. Moon
Authors: Z. A. Cole, S. C. Crozier, A. Aihie Sayer, J. H. Davies, S. M. Robinson, H. Inskip, K. M. Godfrey, C. Cooper, N. C. Harvey

16:00 - 16:10
OC 13 — Auditorium A
FEATURES ASSESSED ON MAGNETIC RESONANCE IMAGING (MRI) IMPROVE PREDICTION OF TOTAL KNEE ARTHROPLASTY (TKA) IN SUBJECTS WITH SYMPTOMATIC RADIOGRAPHIC KNEE OSTEOARTHRITIS (OA): DATA FROM THE OSTEOARTHRITIS INITIATIVE (OAI)
Presenting author: M. C. Hochberg
Authors: A. Yip, K. Favors, J. Sorkin, J. Martel-Pelletier, J.-P. Pelletier

16:10 - 16:20
OC 14 Auditorium A

LOW SERUM THYROTROPIN LEVEL AND DURATION OF SUPPRESSION AS A PREDICTOR OF MAJOR OSTEOPOROTIC FRACTURES: THE OPENTHYRO REGISTER COHORT

Presenting author: B. Abrahamsen
Authors: H. L. Jørgensen, A. S. Laulund, M. Nybo, T. H. Brix, L. Hegedüs

16:20 - 16:30
OC 15 Auditorium A

INFLUENCE OF LONG-TERM HIV INFECTION ON BONE MICROSTRUCTURE IN MEN OLDER THAN 60 YEARS

Presenting author: E. Biver
Authors: A. Calmy, C. Delhumeau, C. Durosier, S. Zawadynski, R. Rizzoli

16:30 - 16:40
OC 16 Auditorium A

LONGITUDINAL STUDY OF BMD AMONG HIV-INFECTED MEN

Presenting author: K. Walker-Bone
Authors: A. Samarawickrama, S. Jose, C. Sabin, Y. Gilleece, M. Fisher

17:00 - 18:30
INDUSTRY-SPONSORED SATELLITE SYMPOSIUM Auditorium A

Management of severe osteoporosis: a call for action

Chairpersons: René Rizzoli, Maria Luisa Brandi
- *Introduction* - Maria Luisa Brandi
- *Severe osteoporosis, state of the art* - John A. Kanis
- *Why severe osteoporosis is still an unmet medical need?* - Cyrus Cooper
- *Strontium ranelate as a treatment of severe osteoporosis: an evidence-based efficacy* - Jean-Yves Reginster
- *Conclusion* - René Rizzoli

Friday, April 4, 2014 - FIBES SEVILLA

Avda. Alcalde Luis Uruñuela, 1 | CP 41020 Sevilla

09:00 - 11:50
SCIENTIFIC SESSION III
Chairpersons: Maria Luisa Brandi, Socrates Papapoulos

09:00 - 09:30
Plenary Lecture 4 — Auditorium A
- *Diabetes, obesity, metabolic syndrome and bone* - Serge Ferrari

09:30 - 09:40
Presentation of the ESCEO-MSD Fellowships — Auditorium A
Maria Luisa Brandi

09:40 - 10:00
Oral communications selected from abstracts

09:40 - 09:50
OC 17 — Auditorium A
ENHANCED BIOAVAILABILITY OF A NASAL FORMULATION OF TERIPARATIDE WITH CRITICALSORB™ COMPARED TO A SUBCUTANEOUS INJECTION: A NONINVASIVE APPROACH FOR THE TREATMENT OF OSTEOPOROSIS
Presenting author: F. Jordan
Authors: A. Williams, A. Perkins, T. Masud, R. Pearson, G. King

09:50 - 10:00
OC 18 — Auditorium A
ROMOSOZUMAB ADMINISTRATION IS ASSOCIATED WITH SIGNIFICANT IMPROVEMENTS IN LUMBAR SPINE AND HIP VOLUMETRIC BONE MINERAL DENSITY (VBMD) AND CONTENT (BMC) COMPARED WITH TERIPARATIDE
Presenting author: H. K. Genant
Authors: M. A. Bolognese, C. Mautalen, J. P. Brown , C. Recknor, S. Goemaere, K. Engelke, Y. C. Yang, M. Austin, A. Grauer, C. Libanati

10:00 - 10:30
Plenary Lecture 5 — Auditorium A
- *Extraskeletal effects of Vitamin D* - Bess Dawson-Hughes

10:30 - 11:50
Oral communications selected from abstracts

10:30 - 10:40
OC 19 — Auditorium A
VITAMIN D INSUFFICIENCY SUSTAINED OVER 5 YEARS CONTRIBUTES TO INCREASED 10-YEAR FRACTURE RISK IN ELDERLY WOMEN
Presenting author: D. Buchebner
Authors: F. E. Mcguigan, P. Gerdhem, M. Ridderstråle, K. Akesson

10:40 - 10:50
OC 20 — Auditorium A
THE EFFECTS OF VITAMIN D ON SKELETAL MUSCLE STRENGTH, MUSCLE MASS AND MUSCLE POWER: A META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS
Presenting author: C. Beaudart
Authors: F. Buckinx, V. Rabenda, S. Gillain, E. Cavalier, J. Slomian, J. Petermans, J.-Y. Reginster, O. Bruyère

10:50 - 11:00
OC 21 — Auditorium A
EIGHT YEARS OF DENOSUMAB TREATMENT IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: RESULTS FROM THE FIRST FIVE YEARS OF THE FREEDOM EXTENSION
Presenting author: S. Papapoulos
Authors: K. Lippuner, C. Roux, C. J. F. Lin, D. L. Kendler, E. M. Lewiecki, M. L. Brandi, E. Czerwinski, E. Franek, P. L. Lakatos, C. Mautalen, S. Minisola, J.-Y. Reginster, S. Jensen, N. Daizadeh, A. Wang, M. Gavin, R. B. Wagman, H. G. Bone

11:00 - 11:10
OC 22 — Auditorium A
FRACTURE PATTERNS WITH SELECTIVE SEROTONIN RECEPTOR INHIBITOR, PROTON PUMP INHIBITOR AND GLUCOCORTICOIDS USE IN GLOW
Presenting author: J. D. Adachi
Authors: A. Z. Lacroix, R. Lindsay, L. March, J. C. Netelenbos, J. Pfeilschifter, M. Rossini, C. Roux, K. G. Saag, E. S. Siris, S. Silverman, F. H. Hooven, S. L. Greenspan, A. Wyman, G. Fitzgerald, S. Adami, F. A. Anderson, S. Boonen, R. Chapurlat, J. E. Compston, C. Cooper, A. Diez-Perez, S. H. Gehlbach, N. B. Watts

11:10 - 11:20
OC 23 — Auditorium A
HIGHER SERUM OSTEOCALCIN IS ASSOCIATED WITH METABOLIC SYNDROME SEVERITY IN MEN FROM THE MINOS COHORT
Presenting author: C. B. Confavreux
Authors: P. Szulc, R. Casey, A. Varennes, J. Goudable, R. Chapurlat

11:20 - 11:30
OC 24 — Auditorium A
SEROLOGICAL BIOMARKERS OF JOINT TURNOVER FOR EARLY IDENTIFICATION OF RESPONDERS TO TOCILIZUMAB
Presenting author: A. C. Bay-Jensen
Authors: A. S. Siebuhr, C. Christiansen, M. A. Karsdal

11:30 - 11:40
OC 25 — Auditorium A
A META-ANALYSIS OF THE EFFECT OF STRONTIUM RANELATE ON THE RISK OF VERTEBRAL AND NON-VERTEBRAL FRACTURE IN POSTMENOPAUSAL OSTEOPOROSIS: THE IMPACT OF SEVERE OSTEOPOROSIS AND CONTRAINDICATIONS
Presenting author: J. A. Kanis
Authors: H. Johansson, A. Odén, E. V. McCloskey, C. Cooper, R. Rizzoli, J.-Y. Reginster

11:40 - 11:50
OC 26 — Auditorium A
PRESERVATION OF BONE MASS IN TRANS WOMEN DURING CROSS-SEX HORMONAL THERAPY: A PROSPECTIVE OBSERVATIONAL STUDY
Presenting author: E. Van Caenegem
Authors: K. Wierckx, Y. Taes, S. Vandewalle, K. Toye, J.-M. Kaufman, G. T'sjoen

12:15 - 13:45
INDUSTRY-SPONSORED LUNCH SYMPOSIUM — Auditorium B
Innovative Therapeutic Strategies for Patients with Osteoporosis and Fragility Fractures
Chairperson: Adolfo Diez-Perez
- *Welcome & Introduction* - Adolfo Diez-Perez
- *Role of bone quality parameters in the reduction of fragility fractures incidence* - Adolfo Diez-Perez
- *Effects on bone tissue of bone forming versus antiresorptive treatments for patients with osteoporotic fractures* - Erik Fink Eriksen
- *Combination or sequential treatment of patients with severe osteoporosis: pros and cons* - Jacques P. Brown
- *Closing Remarks* - Adolfo Diez-Perez

Friday, April 4, 2014 - FIBES SEVILLA

Avda. Alcalde Luis Uruñuela, 1 | CP 41020 Sevilla

12:15 - 13:45
ESCEO SYMPOSIUM

Inside the benefit-risk ratio of osteoporosis treatments: a global overview Auditorium A
Chairperson: Jean-Yves Reginster
- *Introduction* - Jean-Yves Reginster
- *Selective estrogen receptor modulators: Raloxifene and Bazedoxifene* - Jean-Marc Kaufman
- *Anti-resorptive treatments: Bisphosphonates and Denosumab* - Serge Ferrari
- *Strontium Ranelate* - Cyrus Cooper
- *Peptides of the parathyroid hormone family: PTH and Teriparatide* - Roland Chapurlat
- *Discussion and Wrap-up - Leader:* Jean-Yves Reginster

Panel: Maria Luisa Brandi, Roland Chapurlat, Cyrus Cooper, Serge Ferrari, John A. Kanis, Jean-Marc Kaufman, Jean-Yves Reginster, René Rizzoli

14:00 - 15:00
Poster Viewing Poster Area
Session II (P401-P750)

14:00 - 14:28
Oral presentation of selected posters
Chairperson: Johanne Martel-Pelletier

14:00 - 14:07
P 447 Podium
HOW WELL DOES SELF-PERCEPTION OF FRACTURE RISK RELATE TO FRACTURE PROBABILITY USING FRAX? FINDINGS FROM THE GLOW STUDY
Presenting author: E. M. Dennison
Authors: J. E. Compston, A. Wyman, E. S. Siris, S. H. Gehlbach, J. D. Adachi, R. Chapurlat, A. Diez-Perez, F. H. Hooven, A. Z. Lacroix, J. C. Netelenbos, J. Pfeilschifter, M. Rossini, C. Roux, K. G. Saag, S. Silverman, N. B. Watts, S. L. Greenspan, J. W. Nieves, L. March, C. L. Gregson, C. Cooper

14:07 - 14:14
P 600 Podium
DETECTION OF INCOMPLETE NONDISPLACED ATYPICAL FEMUR FRACTURES BY DENSITOMETER
Presenting author: A. M. Cheung
Authors: R. Bleakney, G. Tomlinson, L. E. Tile, H. Mcdonald-Blumer, R. Ridout, H. K. Genant

14:14 - 14:21
P 553 Podium
ANTHROPOMETRIC CHARACTERISTICS OF POSTMENOPAUSAL WOMEN DEPENDING ON APPENDICULAR SKELETAL MASS
Presenting author: V. V. Povoroznyuk
Authors: N. I. Dzerovych, R. V. Povoroznyuk

14:21 - 14:28
P 554 Podium
HIP-SPINE DIAGNOSTIC DISCORDANCE IN THE UNITED ARAB EMIRATES
Presenting author: N. Wilson
Authors: L. Sanchez Riera, I. Hussein, S. Nuhaily, N. Qahtani, N. Ibrahim, R. Aneja, T. Khan, H. Maashari, S. Waheeduddin, S. Gonuguntla, M. Al Maini

14:00 - 15:00
OSTEONECROSIS OF THE JAW TASKFORCE : IOF INTERNATIONAL CONSENSUS Paris E
Chairpersons: Cyrus Cooper, René Rizzoli
- *Introduction and background* - Cyrus Cooper
- *Pathophysiology* - Juliet Compston
- *Incidence , diagnosis and staging* - Aliya Khan
- *Advances in management* - Archie Morrison

14:00 - 15:00
MEET-THE-EXPERT SESSIONS

14:00 - 15:00
-Risks/benefits of calcium and/or Vitamin D Madrid A
Peter R. Ebeling

14:00 - 15:00
-Bariatric surgery and bone Madrid B
Nicholas Harvey

14:00 - 15:00
-Inadequate response in osteoporosis therapy Madrid D
Adolfo Diez-Perez

14:00 - 15:00
-Prevention of GIOP Madrid E
Jonathan D. Adachi

14:00 - 15:00
-Postmenopausal hormone therapy : risks and benefits Paris A
Serge Rozenberg

14:00 - 15:00
ESCEO SYMPOSIUM

Qualitative and quantitative Adverse Reactions induced by treatment of rheumatic disorders with Glucocorticoid Bruselas A
Chairperson: Jean-Pierre Devogelaer
- *Introduction : Role for glucocorticoids in the management of rheumatic diseases* - Willem Lems
- *Skeletal effects of glucocorticoid therapy in rheumatoid arthritis* - Kenneth Saag
- *Non-skeletal effects of glucocorticoid therapy in rheumatoid arthritis* - Pierre Miossec
- *Discussion - Leader:* Jean-Pierre Devogelaer

Panel: Maria Luisa Brandi, John Caminis, Roberto Civitelli, Cyrus Cooper, Patrice Cacoub, Jean-Pierre Devogelaer, Adolfo Diez-Perez, Thomas Einhorn, Olivier Ethgen, Jean-Marc Kaufman, John A. Kanis, Andrea Laslop, Willem Lems, Eugene McCloskey, Pierre Miossec, Jean-Yves Reginster, Susanne Reiter, Johann D. Ringe, René Rizzoli, Kenneth Saag, Yannis Tsouderos

14:00 - 15:00
ESCEO-EUGMS SYMPOSIUM

Can we identify which patients should be treated in osteoarthritis? Bruselas E
Chairpersons: Olivier Bruyère, Gabriel Herrero-Beaumont
- *Welcome* - Olivier Bruyère
- *Introduction* - Nigel K. Arden
- *Physiopathology and Risk factors for Progression* - Francis Berenbaum
- *Approach to substratification of the treatment of osteoarthritis* - Tim McAlindon
- *Discussion - Leader:* Stephania Maggi

Panel: Nigel K. Arden, Francis Berenbaum, Jaime Branco, Maria Luisa Brandi, Olivier Bruyère, Cyrus Cooper, Elaine M. Dennison, Jean-Pierre Devogelaer, Gabriel Herrero-Beaumont, Marc Hochberg, John A. Kanis, Andrea Laslop, Stephania Maggi, Tim McAlindon, Florence Petit-Dop, Jean-Yves Reginster, Susanne Reiter, René Rizzoli, Yannis Tsouderos

15:00 - 16:40
COMMITTEE OF NATIONAL SOCIETIES SPECIAL PLENARY SESSION
Lifestyle and dietary habits for fracture prevention and care
Chairpersons: Judy Stenmark, Jean-Yves Reginster

15:00 - 15:03
Introduction Bruselas A
Judy Stenmark, Jean-Yves Reginster

15:03 - 15:09
OCs 43 Bruselas A
DOES LIFESTYLE MODIFICATION AND PHYSICAL THERAPY IMPROVE QUALITY OF LIFE IN POSTMENOPAUSAL OSTEOPOROSIS?
Presenting author: U. Swadpanich Sangkomkamhang

15:09 - 15:15
OCs 44 Bruselas A
LIFESTYLE AND DIETARY HABITS FOR FRACTURE PREVENTION AND CARE
Presenting author: M. Tsagareli
Authors: E. Giorgadze, N. Dolidze, T. Sulikashvili, N. Jeiranashvili

15:15 - 15:21
OCs 45 Bruselas A
IMPACT OF DIETARY HABITS AND PHYSICAL ACTIVITY ON BONE HEALTH AMONG 40-60 YEAR OLD FEMALES AT RISK OF OSTEOPOROSIS IN INDIA
Presenting author: R. Munshi

15:21 - 15:27
OCs 46 Bruselas A
LIFESTYLE RISKS AND MEDICATION ISSUES DISCUSSED WITH OSTEOPOROSIS PATIENTS
Presenting author: A. I. Gasparik

15:27 - 15:33
OCs 47 Bruselas A
LIFESTYLE AND DIETARY FACTORS PROMOTING DEVELOPMENT OF HIP FRACTURES IN MEN
Presenting author: O. Sinitsyna
Authors: K. Belova, O. Ganert, M. Romanova, O. Ershova

15:33 - 15:39
OCs 48 Bruselas A
TOO FIT TO FRACTURE: INTERNATIONAL CONSENSUS TO ESTABLISH RECOMMENDATIONS ON EXERCISE AND SAFE MOVEMENT FOR INDIVIDUALS WITH OSTEOPOROSIS AND SPINE FRACTURES
Presenting author: L. M. Giangregorio
Authors: A. M. Cheung, A. Heinonen, S. Mcgill, J. Laprade, M. C. Ashe, K. Shipp, J. D. Wark, N. J. Macintyre, H. Keller, R. Jain, A. Papaioannou

15:39 - 15:45
OCs 49 Bruselas A
LEISURE TIME COMPUTER USE AND ADOLESCENT BONE HEALTH: FINDINGS FROM THE TROMSØ STUDY - FIT FUTURES
Presenting author: A. Winther
Authors: E. M. Dennison, O. A. Nilsen, R. Jorde, G. Grimnes, A. S. Furberg, L. A. Ahmed, N. Emaus

15:45 - 15:51
OCs 50 Bruselas A
FALLSCREEN: A COLLABORATIVE EFFORT FOR FEASIBLE AND EFFECTIVE PREVENTION OF FALLING IN COMMUNITY
Presenting author: H. Sievänen
Author: S. Karinkanta

15:51 - 15:57
OCs 51 Bruselas A
PHYSICAL THERAPY BENEFITS UPON FUNCTIONAL STATUS AND FALL RISK IN OSTEOPOROTIC WOMEN
Presenting author: D. Popa
Authors: M. Mihailov, R. Suciu

15:57 - 16:03
OCs 52 Bruselas A
RISK FACTORS OF OSTEOPOROSIS IN TURKISH WOMEN BEYOND FRAX
Presenting author: U. Akarirmak
Authors: S. Tuzun, N. Eskiyurt, D. Palamar, M. Saridogan

16:03 - 16:09
OCs 53 Bruselas A
CHARACTERISTICS OF SUBJECTS REPORTING LOW-ENERGY FRACTURES IN A LARGE POPULATION-BASED STUDY
Presenting author: A. Shinkov
Authors: A. M. Borissova, J. Vlahov, L. Dakovska, L. Kassabova, D. Svinarov

16:09 - 16:15
OCs 54 Bruselas A
LIFESTYLE, VITAMIN D AND OSTEOPOROSIS IN A VEIL COVERED WOMAN
Presenting author: S. Sokolovic

16:15 - 16:21
OCs 55 Bruselas A
THE IMPACT OF NON-NUTRITIONAL FACTORS ON VITAMIN D STATUS IN ELDERLY UKRAINIAN POPULATION
Presenting author: V. V. Povoroznyuk
Author: V. Muts

16:21 - 16:27
OCs 56 Bruselas A
A COMMON PROJECT OF THE OSTEOLOGICAL CENTRE AT THE OSTEOLOGY ACADEMY OF ZLÍN TOGETHER WITH THE NEUROSURGICAL DEPARTMENT OF TOMAS BATA HOSPITAL IN ZLIN MODEL PROJECT: CAPTURE THE FRACTURE ZLÍN - EVALUATION AFTER TWO YEARS
Presenting author: P. Novosad
Authors: P. Hrdý, M. Filip, P. Linzer, J. Blahos

16:27 - 16:33
OCs 57 Bruselas A
INTERNET AS A TOOL FOR HEALTH: SURVEY ON THE INTEREST AND THE USE OF THE INTERNET AMONG SUBJECTS FROM AN OSTEOPOROSIS CENTRE – A PRELIMINARY REPORT
Presenting author: J. Slomian
Authors: S. Streel, G. Appleboom, C. Beaudart, F. Buckinx, J.-Y. Reginster, O. Bruyère

16:33 - 16:40
Presentation of the IOF Committee of National Societies Medal Bruselas A
Jean-Yves Reginster

15:00 - 16:40
SCIENTIFIC SESSION IV
Chairpersons: Bess Dawson-Hughes, Adolfo Diez-Perez

15:00 - 15:30
Plenary Lecture 6 Auditorium A
- Guidelines and intervention thresholds in osteoporosis -
John A. Kanis

15:30 - 15:40
Presentation of the IOF Medal of Achievement Auditorium A
Cyrus Cooper

15:40 - 16:40
Oral communications selected from abstracts

15:40 - 15:50
OC 27 Auditorium A
FRAX BASED GUIDELINES: IS A UNIVERSAL MODEL APPROPRIATE?
Presenting author: M. Chakhtoura
Authors: A. M. Cheung, J. A. Kanis, W. D. Leslie, E. V. McCloskey, M. R. McClung, G. El-Hajj Fuleihan

15:50 - 16:00
OC 28 Auditorium A
WHICH FRAX MODEL IS APPROPRIATE FOR SWEDISH IMMIGRANTS?
Presenting author: H. Johansson
Authors: A. Odén, E. V. McCloskey, J. A. Kanis, M. Karlsson, M. Lorentzon, D. Mellström

16:00 - 16:10
OC 29 Auditorium A

CORTICAL POROSITY OF THE PROXIMAL FEMUR IDENTIFIES WOMEN WITH NONVERTEBRAL FRAGILITY FRACTURES

Presenting author: Å. Bjørnerem
Authors: L. A. Ahmed, R. Shigdel, R. Joakimsen, P. Eldevik, E. F. Eriksen , A. Ghasem-Zadeh, E. Seeman, R. Zebaze

16:10 - 16:20
OC 30 Auditorium A

CHANGES IN LUMBAR SPINE QCT, DXA AND TBS FOLLOWING TREATMENT WITH DENOSUMAB (DMAB), ALENDRONATE (ALN), OR PLACEBO (PBO) IN POSTMENOPAUSAL WOMEN WITH LOW BONE MASS

Presenting author: T. Thomas
Authors: A. M. Cheung, E. Shane, J. R. Zanchetta, A. Kearns, D. Hans, C. J. F. Lin, M. Austin, C. Libanati

16:20 - 16:30
OC 31 Auditorium A

EIGHT YEARS OF CONTINUED ODANACATIB THERAPY FOR POSTMENOPAUSAL WOMEN WITH LOW BONE MINERAL DENSITY: RESULTS FROM AN OPEN-LABEL EXTENSION TO A PHASE IIB STUDY

Presenting author: R. Rizzoli
Authors: J. A. Rodriguez Portales, C.-L. Benhamou, J. Halse, P. D. Miller, L. Reid, C. Dasilva, R. Kroon, A. Leung, D. Gurner

16:30 - 16:40
OC 32 Auditorium A

ASSESSMENT OF PERILACUNAR AND PERICANALICULAR TISSUE MASS DENSITY ALTERATIONS IN HUMAN JAW BONE AFTER BISPHOSPHONATE TREATMENT BY 3D SYNCHROTRON PHASE NANOCT

Presenting author: K. Raum
Authors: B. Hesse, P. Varga, M. Langer, F. Peyrin

17:00 - 18:30
INDUSTRY-SPONSORED SATELLITE SYMPOSIUM Auditorium A

Treatment needs in postmenopausal osteoporosis

Chairperson: Adolfo Diez-Perez
- *Welcome & Introduction* - Adolfo Diez-Perez
- *Current challenges in the management of postmenopausal osteoporosis* - Eugene McCloskey
- *Which patients benefit the most from current treatments?* - Santiago Palacios
- *Long-term therapy: How long?* - Serge Ferrari
- *Panel Discussion*

Saturday, April 5, 2014 - FIBES SEVILLA

Avda. Alcalde Luis Uruñuela, 1 | CP 41020 Sevilla

09:00 - 11:50
SCIENTIFIC SESSION V
Chairpersons: René Rizzoli, Jorge Benito Cannata Andia

09:00 - 09:30
Plenary Lecture 7 — Auditorium A
- PTH and bone: lessons from hypoparathyroidism therapy -
Roberto Civitelli

09:30 - 09:40
Presentation of the IOF Olof Johnell Science Award — Auditorium A
René Rizzoli

09:40 - 10:00
Oral communications selected from abstracts — Auditorium A

09:40 - 09:50
OC 33 — Auditorium A
RELATIONSHIPS BETWEEN BODY COMPOSITION AND BONE MICROARCHITECTURE IN OLDER MEN AND WOMEN OF THE HERTFORDSHIRE COHORT STUDY
Presenting author: M. H. Edwards
Authors: K. A. Ward, G. Ntani, C. Parsons, J. Thompson, E. M. Dennison, C. Cooper

09:50 - 10:00
OC 34 — Auditorium A
THE EFFECTS OF CALCIUM SUPPLEMENTATION ON CORONARY HEART DISEASE HOSPITALISATION AND DEATH IN POSTMENOPAUSAL WOMEN: A COLLABORATIVE META-ANALYSIS OF RANDOMISED CONTROLLED TRIALS
Presenting author: J. R. Lewis
Authors: K. L. Ivey, S. Radavelli-Bagatini, L. Rejnmark, J. S. Chen, J. M. Simpson, J. M. Lappe, L. Mosekilde, R. L. Prentice, R. L. Prince

10:00 - 10:30
Plenary Lecture 8 — Auditorium A
- How long can bone turnover be suppressed? - Socrates Papapoulos

10:30 - 11:50
Oral communications selected from abstracts

10:30 - 10:40
OC 35 — Auditorium A
RACIAL VARIATION IN MEASURES OF HIP MORPHOLOGY
Presenting author: C. P. A. Arden
Authors: K. M. Leyland, K. Edwards, M. T. Sanchez-Santos, T. D. Spector, A. E. Nelson, J. M. Jordan, M. Nevitt, D. J. Hunter, N. K. Arden

10:40 - 10:50
OC 36 — Auditorium A
TRABECULAR BONE SCORE IS ASSOCIATED WITH VERTEBRAL AND NON VERTEBRAL FRACTURE IN MEN - THE STRAMBO STUDY
Presenting author: S. Boutroy
Authors: D. Hans, R. Winzenrieth, R. Chapurlat, P. Szulc

10:50 - 11:00
OC 37 — Auditorium A
ANKLE FRACTURES ARE ASSOCIATED WITH LOW AREAL BMD AND BONE MICROSTRUCTURAL ALTERATIONS IN POSTMENOPAUSAL WOMEN
Presenting author: E. Biver
Authors: C. Durosier, T. Chevalley, F. Herrmann, S. Ferrari, R. Rizzoli

11:00 - 11:10
OC 38 — Auditorium A
HYPOPHOSPHATASIA IN ADULT: SCREENING OF AN ITALIAN POPULATION GROUP
Presenting author: L. Masi
Authors: F. Franceschelli, G. Leoncini, M. L. Brandi

11:10 - 11:20
OC 39 — Auditorium A
FURTHER REDUCTION IN NONVERTEBRAL FRACTURE RATE IS OBSERVED FOLLOWING 3 YEARS OF DENOSUMAB TREATMENT: RESULTS WITH UP TO 7 YEARS IN THE FREEDOM EXTENSION
Presenting author: S. Ferrari
Authors: J. D. Adachi, K. Lippuner, C. Zapalowski, P. D. Miller, J.-Y. Reginster, O. Törring, D. L. Kendler, N. Daizadeh, A. Wang, C. O'Malley, C. Libanati, R. B. Wagman, E. M. Lewiecki

11:20 - 11:30
OC 40 — Auditorium A
EARLY FINDINGS FROM PROLIA® POST-MARKETING SAFETY SURVEILLANCE FOR ATYPICAL FEMORAL FRACTURE, OSTEONECROSIS OF THE JAW, SEVERE SYMPTOMATIC HYPOCALCEMIA, AND ANAPHYLAXIS
Presenting author: M. Geller
Authors: R. B. Wagman, P. R. Ho, S. Siddhanti, C. Stehman-Breen, N. B. Watts, S. Papapoulos

11:30 - 11:40
OC 41 — Auditorium A
EFFECT OF TERIPARATIDE ON HEALING OF INCOMPLETE ATYPICAL FEMUR FRACTURES
Presenting author: A. M. Cheung
Authors: J. D. Adachi, A. Khan, L. E. Tile, E. R. Bogoch, H. Mcdonald-Blumer, R. Ridout, S. Cardew, K. Syed, J. Chang, J. Scher, H. Hu, S. Morin, A. Papaioannou, S. Jamal, R. Josse, R. Bleakney

11:40 - 11:50
OC 42 — Auditorium A
SURGICAL PREVENTION OF FEMORAL NECK FRACTURES IN OSTEOPOROTIC PATIENTS: LONG-TERM RESULTS
Presenting author: E. Chiarello
Authors: G. Tedesco, P. Capra, D. Luciani, S. Giannini

12:15 - 13:45
INDUSTRY-SPONSORED LUNCH SYMPOSIUM — Auditorium A
Interactive Discussion on the Management of Osteoporosis: Signaling a Change in the Conversation
Chairperson: Esteban Jodar
- Welcome & Opening Remarks - Esteban Jodar
- Long Term Treatment of Osteoporosis: The Risk Benefit Equation - Solomon Epstein
- The Role of Cathepsin K in Bone Homeostasis - Serge Ferrari
- New Approaches to the Treatment of Osteoporosis - Felicia Cosman
- Question & Answer Session

14:00 - 15:00
MEET-THE-EXPERT SESSIONS

14:00 - 15:00
-Management of osteoporosis in Latin America — Madrid A
Jose R. Zanchetta, Cristiano Zerbini

14:00 - 15:00
-Management of osteoporosis in Middle East — Madrid B
Basel Masri, Gemma Adib

14:00 - 15:00
-Responders in osteoarthritis treatment — Madrid D
Olivier Bruyère

14:00 - 15:00
-Advanced bone imaging in osteoporosis assessment — Madrid E
Harry K. Genant

14:00 - 15:00
-Management of Osteoporosis in Patients with Rheumatoid Arthritis — Paris A
Willem Lems

Saturday, April 5, 2014 - FIBES SEVILLA

Avda. Alcalde Luis Uruñuela, 1 | CP 41020 Sevilla

14:00 - 15:00
ESCEO SYMPOSIA

- Goal oriented treatment in Osteoporosis Paris E

Chairpersons: John A. Kanis, Jaime Branco
- *Introduction* - Serge Ferrari
- *Lessons from other diseases areas* - Eugene McCloskey
- *Lessons from osteoporosis* - Jean-Marc Kaufman
- *Discussion - Leader:* John A. Kanis

Panel: Jaime Branco, Maria Luisa Brandi, John Caminis, Cyrus Cooper, Elaine M. Dennison, Jean-Pierre Devogelaer, Andreas Grauer, John A. Kanis, Jean-Marc Kaufman, Eugene McCloskey, Socrates Papapoulos, Jean-Yves Reginster, René Rizzoli, Serge Ferrari

- Consideration and proposal for defining a reference case for economic evaluation in osteoarthritis Bruselas E

Chairpersons: Mickaël Hiligsmann, Cyrus Cooper
- *Welcome* - Mickaël Hiligsmann
- *Which comparators and outcome measures should we use?* - Marc Hochberg
- *Which costs and methods should we use?* - Francis Guillemin
- *Discussion - Leader:* Peter Tugwell

Panel: Nigel K. Arden, Francis Berenbaum, Annelies Boonen, Jaime Branco, Maria Luisa Brandi, Olivier Bruyère, Cyrus Cooper, Andrea Ildiko Gasparik, Francis Guillemin, Mickaël Hiligsmann, Marc Hochberg, John A. Kanis, Andrea Laslop, Jean-Pierre Pelletier, Florence Petit-Dop, Daniel Pinto, Jean-Yves Reginster, Susanne Reiter, René Rizzoli, Lucio C. Rovati, Stuart Silverman, Yannis Tsouderos, Peter Tugwell, Rafael Pinedo-Villanueva

14:00 - 15:00
ESCEO-FIRMO SYMPOSIUM

- Gaucher Disease: A rare disease that often affects bone Bruselas A

Chairperson: Maria Luisa Brandi
- *Introduction* - Maria Luisa Brandi
- *Gaucher disease - What a non-Gaucher expert should be aware of* - Ari Zimran
- *Gaucher disease - What we know and can do about bone in Gaucher disease; the unmet scientific questions.* - Bruno Bembi
- *Discussion - Leader:* Maria Luisa Brandi

Panel: Bruno Bembi, Maria Luisa Brandi, John A. Kanis, Jean-Yves Reginster, René Rizzoli, Ari Zimran

SPONSORED SATELLITE SYMPOSIA PROGRAMME

Wednesday, April 2

18:55 - 19:55
SERVIER HONORARY LECTURE — Casino de la Exposición
- *The mammalian circadian timing system: how clocks talk to each other* - Ueli Schibler

20:10 - 21:10
WELCOME COCKTAIL COURTESY OF ROTTAPHARM | MADAUS — Casino de la Exposición

Thursday, April 3

12:15 - 13:45
ALEXION LUNCH SYMPOSIUM — Auditorium B
Hypophosphatasia: evolving our understanding of this serious and complex disease
Chairperson: Maria Luisa Brandi
- *What we should all know about HPP* - Etienne Mornet
- *HPP: clinical perspectives* - Gabriel Angel Martos Moreno
- *HPP and Osteoporosis - what are the links?* - Richard Eastell
- *HPP: an evolving disease landscape* - Maria Luisa Brandi

12:15 - 13:45
ROTTAPHARM | MADAUS LUNCH SYMPOSIUM — Auditorium A
Efficacy and utility of glucosamine sulfate and hyaluronic acid in the management of osteoarthritis
Chairperson: Roy D. Altman
- *Critical review and interpretation of the newest meta-analyses of intra-articular hyaluronate for knee osteoarthritis* - Emmanuel Maheu
- *Crystalline glucosamine sulfate is the only SYSADOA that decreases consumption of NSAIDs in knee osteoarthritis: results from the PEGASUS cohort* - Lucio C. Rovati
- *Disease modification in knee osteoarthritis with oral glucosamine sulfate or intra-articular hyaluronic acid: a review of the current evidence* - Roy D. Altman

17:00 - 18:30
SERVIER SATELLITE SYMPOSIUM — Auditorium A
Management of severe osteoporosis: a call for action
Chairpersons: René Rizzoli, Maria Luisa Brandi
- *Introduction* - Maria Luisa Brandi
- *Severe osteoporosis, state of the art* - John A. Kanis
- *Why severe osteoporosis is still an unmet medical need?* - Cyrus Cooper
- *Strontium ranelate as a treatment of severe osteoporosis: an evidence-based efficacy* - Jean-Yves Reginster
- *Conclusion* - René Rizzoli

Friday, April 4

12:15 - 13:45
ELI LILLY LUNCH SYMPOSIUM — Auditorium B
Innovative Therapeutic Strategies for Patients with Osteoporosis and Fragility Fractures
Chairperson: Adolfo Diez-Perez
- *Welcome & Introduction* - Adolfo Diez-Perez
- *Role of bone quality parameters in the reduction of fragility fractures incidence* - Adolfo Diez-Perez
- *Effects on bone tissue of bone forming versus antiresorptive treatments for patients with osteoporotic fractures* - Erik Fink Eriksen
- *Combination or sequential treatment of patients with severe osteoporosis: pros and cons* - Jacques P. Brown
- *Closing Remarks* - Adolfo Diez-Perez

17:00 - 18:30
AMGEN SATELLITE SYMPOSIUM — Auditorium A
Treatment needs in postmenopausal osteoporosis
Chairperson: Adolfo Diez-Perez
- *Welcome & Introduction* - Adolfo Diez-Perez
- *Current challenges in the management of postmenopausal osteoporosis* - Eugene McCloskey
- *Which patients benefit the most from current treatments?* - Santiago Palacios
- *Long-term therapy: How long?* - Serge Ferrari
- *Panel Discussion*

Saturday, April 5

12:15 - 13:45
MSD LUNCH SYMPOSIUM — Auditorium A
Interactive Discussion on the Management of Osteoporosis: Signaling a Change in the Conversation
Chairperson: Esteban Jodar
- *Welcome & Opening Remarks* - Esteban Jodar
- *Long Term Treatment of Osteoporosis: The Risk Benefit Equation* - Solomon Epstein
- *The Role of Cathepsin K in Bone Homeostasis* - Serge Ferrari
- *New Approaches to the Treatment of Osteoporosis* - Felicia Cosman
- *Question & Answer Session*

Bone Research Society Events

BONE RESEARCH SOCIETY TRAINING COURSE

OSTEOPOROSIS
& OTHER METABOLIC BONE DISEASES

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.

The course takes place in Oxford, UK, in March each year. To join our mailing list, please contact **events@brsoc.org.uk**.

ORGANISERS

Tash Masud (Nottingham)
Jon Tobias (Bristol)

SOME COMMENTS FROM THOSE WHO 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"

"Excellent, relevant course – I have already started recommending it to my peers"

"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"

BONE RESEARCH SOCIETY **MEETING 2014**

25-26 JUNE 2014
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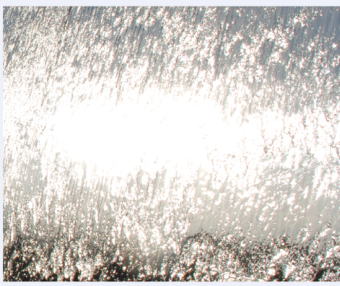

ORGANISERS

Richard Eastell (Sheffield)
Alison Gartland (Sheffield)
Eugene McCloskey (Sheffield)
Graham Russell (Sheffield/Oxford)
Tim Skerry (Sheffield)

PROGRAMME HIGHLIGHTS

- Osteoporosis treatments
- Engineering, including clinical applications
- Rare bone diseases
- Osteocytes
- Muscle, fat and bone
- Clinical cases
- Debate

WORKSHOPS

- Systems biology
- *In vivo* CT
- Histopathology
- Muscle and bone
- New Investigators' session

For more information please visit our website or email events@brsoc.org.uk

Bone Research Society
www.brsoc.org.uk

Osteoporos Int
DOI 10.1007/s00198-014-2637-1

World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2014): Plenary Lecture Abstracts

SERVIER HONORARY LECTURE
THE MAMMALIAN CIRCADIAN TIMING SYSTEM: HOW CLOCKS TALK TO EACH OTHER

U. Schibler[1]
[1]Department of Molecular Biology, University of Geneva, Sciences III, Geneva, Switzerland

This circadian timing system consists of a pacemaker in the brain's suprachiasmatic nucleus (SCN) and subsidiary oscillators in nearly all body cells. The SCN entrains the phase of peripheral clocks through a variety of systemic signals. While feeding rhythms - driven by rest-activity cycles - are the most dominant Zeitgebers for most peripheral oscillators, the SCN also employs blood-borne and body temperature- dependent signals to set the phase in peripheral tissues.
In the first part of the talk I will address the issue of how the SCN and feeding rhythms synchronize circadian oscillators in the liver. To this end we engineered the RT-Biolumicorder, a device enabling us to record circadian gene expression in the liver of unconstrained, freely moving mice during months. Using this approach, we can readily determine the velocity of feeding-induced phase shifting, a parameter that is obviously much more sensitive to the disruption of an individual signaling pathway than the steady-state phase. The results indicate that the SCN uses both indirect pathways (depending on rest-activity cycles and feeding rhythms) and more direct (feeding-independent pathways) to synchronize liver clocks. Moreover, our studies suggest that hepatocyte clocks are strongly coupled between cells.
In the second part of my talk I will present a novel strategy, dubbed Synthetic Tandem Repeat Promoter Screening (STAR-PROM), capable of identifying in an unbiased manner the signaling pathways participating in the systemic regulation of circadian gene expression. The principle underlying this approach is the high frequency of transcription factor binding sites in random synthetic DNA. Using STAR-PROM, we have identified signaling pathways depending on rhythmic blood-borne signals in humans and laboratory rodents. They involve the diurnal activation of SRF- and forkhead transcription factor-dependent genes. The STAR-PROM technology can be used for the unbiased identification of signaling pathways in a wide variety of biological systems.
We acknowledge support from the Swiss National Science Foundation (SNF 31-113565, SNF 31-128656/1, NCCR Frontiers in Genetics), the European Research Council (ERC-AdG-TimeSignal), the Canton of Geneva, and the Louis Jeantet Foundation of Medicine.

PL1
THE LIFECOURSE EPIDEMIOLOGY OF MUSCULOSKELETAL AGEING

C. Cooper[1,2]
[1]MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, United Kingdom, [2]Institute of Musculoskeletal Science, University of Oxford, Oxford, United Kingdom

Musculoskeletal disease constitutes a major health burden worldwide. The principal chronic musculoskeletal disorders are osteoporosis, sarcopenia and osteoarthritis; these conditions increase in frequency with advancing age, and understanding their epidemiology throughout the life course is critical to the development of effective preventive strategies. Osteoporosis contributes to disability and death through its association with age related fractures. These fractures typically occur at the hip, spine and distal forearm. It has been estimated from incidence rates derived in North America that the lifetime risk of a hip fracture in Caucasian women is 17.5 % with a comparable risk in men of 6 %. Age and sex

adjusted hip fracture rates are generally higher in Caucasian than in Asian populations. Furthermore the pronounced female preponderance in fracture incidence observed in White populations is not seen amongst Blacks or Asians in whom age adjusted female to male incidence ratios approximate unity. Life expectancy is increasing around the globe, and the number of elderly individuals is rising in every geographic region. Assuming constant age-specific incidence rates for fracture, the number of hip fractures occurring worldwide among people age 65 years and over, will rise from 1.66 million in 1990 to 6.26 million in 2050. Studies performed in the United States, Scandinavia and the United Kingdom, between 1930 and the late 1980's, consistently reported increases in the age adjusted incidence of hip fractures among men and women. This increase appears to have levelled off in the northern regions of the United States, as well as in Europe. Rates in Asian populations continue to show substantial rises between the 1960's and the present time. In the most recent data available from the United States, the incidence of first ever hip fracture declined by 1.4 % per year among women and 0.06 % per year among men. The reduction in hip fracture occurrence was even greater than that expected from the declining incidence of hip fractures more generally. Age-period-cohort models have suggested influences of all three contributors to these secular trends. Among current risk factors for low bone density and trauma, the trends are best explained by physical inactivity and vitamin D insufficiency. Developmental contributions to peak bone and muscle mass, for example maternal nutrition and lifestyle, also appear capable of contributing to cohort effects.

Sarcopenia refers to an age related loss of skeletal muscle mass and function. Between the ages of 20 and 80 years, a decline in muscle fibre size and number causes a loss of muscle mass (30 %), with a greater accompanying loss of muscle strength (60 %). The origins of sarcopenia are multifactorial and include biological senescence, muscle disuse, endocrine dysfunction, comorbidity, inflammation and nutritional deficiency. While the clinical relevance of sarcopenia is widely recognised, there remains no universally accepted definition of the term. Recent approaches to definition incorporate combinations of decline in fat free mass by DXA; strength assessments using isometric dynamometry; and poor physical performance using observational tests (gait speed, sit to stand time and standing balance). The establishment of these recent methods for the assessment of sarcopenia has led to a characterisation of the prevalence of this disorder with advancing age in men and women. Modifications of the definition will inform outcome studies and future randomised controlled trials. Finally, shared aetiological mechanisms underpinning the senescence of bone, muscle and joint, will open an arena in which novel therapeutic strategies for musculoskeletal disease will become available.

PL2

OSTEOPOROSIS THERAPY, BEYOND FRACTURE PREVENTION

J. D. Adachi[1]

[1]Medicine, McMaster University, St. Joseph's Healthcare, Hamilton, Canada

Objective: To review the benefits of osteoporosis therapy beyond fracture prevention.

Clinical trials have demonstrated that fractures including spine, hip and nonspine, nonhip fractures may be prevented. Importantly, many therapies have shown early efficacy with reductions in spine fractures occurring as early as 6 months upon initiation of therapy. While fractures are the primary outcomes of interest, it is equally important to consider the effects of therapy on quality of life, the development of frailty, increased healthcare utilization and ultimately mortality.

Several studies have shown reductions in quality of life (QoL) associated with a wide variety of fractures. Physical and emotional functioning and activities of daily living are all reduced with fractures. There is an increase in pain, increased pain related disability and increased days in bed associated with vertebral fractures. The type of fracture, the number of fractures and increasing age all affect QoL. Reductions in QoL due to fractures may be comparable to that seen with heart and lung disease and diabetes. Therapy has been shown to prevent the reduction in quality of life seen with fractures. While frailty may be a risk factor for fractures, it is also true that fractures themselves increase the development of frailty. This increase in frailty may in part explain the increase in mortality seen with fractures and the prevention of fractures might logically prevent the development frailty and subsequent mortality. Both hip and spine fractures are associated with an increase in mortality with men having greater mortality than women. Lyles was the first to demonstrate a reduction in mortality when he reported close to a 30 % reduction in mortality with zoledronate in those who had suffered a hip fracture. Since then several meta-analyses and systematic reviews of bisphosphonate therapy have confirmed this overall reduction in mortality. Denosumab has also shown a clinically relevant but statistically insignificant 20 % reduction in mortality.

In summary, there are many therapies that are effective in reducing fractures. In addition, they have been shown to improve quality of life, prevent the development or progression of frailty, and reduce overall mortality, important outcomes to those suffering from osteoporosis.

References: 1. Adachi JD et al. Mayo Clin Proceedings 2010;85:806

2. Adachi JD et al. Osteoporos Int 2011;22:2539

3. Ioannidis G et al. Osteoporos Int 2013;24:59
4. Ioannidis G et al. CMA J 2009;181:265
Disclosures: Amgen, Eli Lilly, Merck, Novartis, Warner Chilcott

PL3
DEFINITION, PATHOPHYSIOLOGY, AND MANAGEMENT OF SARCOPENIA

R. Fielding[1,2]
[1]Nutrition, Exercise Physiology, and Sarcopenia Lab., Jean Mayer USDA Human Nutrition, Research Center on Aging, Tufts University, Boston, MA, United States, [2] Boston Claude D. Pepper Older Americans Independence Center, Boston, MA, United States

The age-related loss of skeletal muscle mass and function, sarcopenia, is associated with well characterized functional limitations and physical disability. Underlying these age-related changes are physiological changes in the force/power generating capacity of skeletal muscle that appear to be driven by changes in skeletal contractile protein function, metabolic derangements and alterations in neuromuscular activation. I will present data illustrating the age-related changes in skeletal muscle gene expression, contractile function, neuromuscular activation, and the effects of acute and chronic contractile activity on changes in phosphorylation and expression of members of the Akt/mTOR signaling pathway in skeletal muscle from young and old animals and humans. Interventions that target sarcopenia are currently being explored with the goal of improving physical functioning and preventing disability in older adults. Although exercise training and other potent anabolic stimuli may attenuate age-related muscle loss in healthy older adults and animals, skeletal muscle growth capacity in response to anabolic stimulation appears to be limited with more advanced age and frailty. The cellular processes that initiate muscle hypertrophy and the extent to which they are altered with age continue to be investigated. We have examined the ribosomal protein S6 kinase (p70S6K), a member of the protein kinase B/mammalian target of rapamycin (Akt/mTOR) pathway that has been implicated as an important factor in regulating muscle size during overload and disuse atrophy, in both older animals and humans. These pathways are potential regulators of age-associated muscle wasting and may also contribute to the attenuation of muscle hypertrophy that has been reported in older humans and animals in response to exercise interventions. The underlying changes in skeletal muscle biology with age provide exciting potential therapeutic targets for further investigation.
Disclosures: Consultancies (Cytokinetics, Eli Lilly, Nestle', Regeneron), Advisory Board Memberships and stock (Pronutria, Ammonett, Insidetracker), Grant/Research Support (Nestle, Regeneron, National Institutes of Health, USDA).
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PL4
DIABETES, OBESITY, METABOLIC SYNDROME AND BONE

S. Ferrari[1]
[1]Division of Bone Diseases, Geneva University Hospitals and Faculty of Medicine, Geneva, Switzerland

In several Western countries, obesity and osteoporosis each affect as much 30 % of the aging population, whereas diabetes's prevalence is already over 10 %. In rapidly developing regions of the world, the incidence of these chronic disorders increases exponentially. Although the images of an overweight individual with the metabolic syndrome and of a frail elderly with osteoporosis at first seem hard to reconcile, there is growing evidence that diabetes and bone fragility coexist. Hence subjects with type 2 diabetes have a two-fold increased risk of fracture, despite the fact their aBMD is on average higher than in the nondiabetic population. Their increased BMI and aBMD challenge our fracture prediction models, including FRAX. Increased risk of falls and decreased bone quality have both been advocated, including alterations in collagen crosslinks by advanced glycation end products (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 Pparγ, 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 RANK Ligand, both recently found to regulate glucose metabolism. Moreover, genomewide association studies have started to unveil common genes that exert pleiotropic effects on the susceptibility to both diabetes and osteoporosis. In turn, pharmacological agents against diabetes have been found to influence bone loss and/or fracture risk, whereas osteoporosis drugs that affect bone turnover and/or RANK Ligand levels might modulate glucose metabolism.

PL5
EXTRASKELETAL EFFECTS OF VITAMIN D

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In addition to its classical effects on bone and muscle, vitamin D has been associated with a number of chronic diseases, including diabetes, cardiovascular disease, and several types of cancer and with increased mortality. Mechanisms may involve effects of vitamin D and its metabolites on inflammation, proliferation, and apoptosis. Alternatively, low 25-hydroxyvitamin D (25OHD) levels, may be a marker of ill-health. Diabetes currently affects 285 million people worldwide at a cost of 11.6 % of the total world health expenditure. Observational studies show a fairly consistent association between low 25OHD levels and both prevalent and incident type two diabetes mellitus (t2DM). Post hoc analyses of vitamin D trials and small randomized controlled trials with glucose tolerance endpoints suggest that vitamin D may have a role in the prevention of type 2 diabetes (t2DM), particularly in individuals at high risk for developing t2DM, specifically those with pre-diabetes. Larger trials are underway to evaluate this possibility. With regard to hypertension and cardiovascular disease, brachial artery flow-mediated dilation has been positively correlated with serum 25OHD levels in older adults. Low serum 25OHD levels have repeatedly been linked to higher blood pressure and increased risk of cardiovascular disease. There are scattered reports of inverse and U-shaped associations of 25OHD levels with the incidence of several types of cancers. Finality, there have be repeated associations of low 25OHD levels with increased mortality, and supplementation with 800 IU per day modestly lowered mortality in older women. The true effect of vitamin D on chronic disease incidence and progression will remain uncertain until large randomized, controlled trials are performed. It is important to define any nonskeletal benefits of vitamin D because small gains in prevention of common chronic diseases would have significant clinical and economic consequences. Clinical trials will determine whether low 25OHD levels increase risk of several chronic diseases, or, instead, are markers of ill health.

PL6
GUIDELINES AND INTERVENTION THRESHOLDS FOR OSTEOPOROSIS

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An important aspect of guideline development is to target treatments to those at high risk of fracture and, conversely, to avoid treatment in those at low risk. The prerequisite is the assessment of fracture risk and the setting off intervention thresholds. In the absence of a prior major fracture, this has historically been undertaken by the measurement of BMD. The development of risk engines that add information over and above BMD has begun to supplant the use of BMD as the primary gateway for the assessment of fracture risk.

The most widely used assessment tool is FRAX (http://www.shef.ac.uk/FRAX). 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. 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 is calculated from the risk of fracture and the risk of death. Probabilities differ 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 i-phone/i-pod.

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 the US, FRAX is reserved for patients with osteopenia and treatment recommended, based on cost-effectiveness, when the 10-year probability of a major fracture is 20 % or above or where the probability of a hip fracture exceeds 3 %. Similar thresholds are used in Canada. These thresholds are unsuitable for use elsewhere because of differences in the importance of osteoporosis, the heath care budget allocated, current practice guidelines, reimbursement and health economic considerations. In addition BMD, the gateway for risk assessment in the US, is not available or has limited availability in most countries of the world. Although intervention thresholds vary from country to country, European guidelines for postmenopausal and glucocorticoid-induced osteoporosis have been published that incorporate FRAX and which can be applied to all countries, irrespective of the availability of BMD. These may stimulate the cohesive development of risk assessment algorithms and the appropriate targeting of treatment.

PL7
PTH AND BONE: LESSONS FROM HYPOPARATHYROIDISM THERAPY

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Primary failure of the parathyroid glands (genetic, postsurgical, autoimmune, or infiltrative) presents with chronic

hypocalcemia, low bone turnover and increased bone mass. Hypoparathyroidism, one of the few endocrine insufficiency states for which a replacement therapy is not yet available, is conventionally managed by high calcium supplementation and active vitamin D metabolites. While with such approach serum calcium levels can be maintained within an acceptable range, this is usually associated with hypercalciuria and risk of nephrocalcinosis. Attempts have been made at using PTH analogs as replacement therapy. Daily or twice-daily PTH(1–34) maintained normal serum calcium without increasing urine calcium in adults and children with hypoparathyroidism. Similar positive results were also obtained with PTH(1–84) given daily or every other day, with reduced need of vitamin D and calcium intake and normal urine calcium excretion. Plasma phosphorus also normalized and bone turnover increased, without consistent changes in BMD by DXA. Although the doses of PTH used in these studies were far higher than those used in osteoporosis, intermittent PTH administration is also used to achieve bone anabolic effects. Indeed, bone biopsy studies have shown increased trabecular number, thickness and bone formation rates, resulting in increased trabecular bone volume in hypoparathyroid subjects treated with a PTH(1–84) replacement therapy regimen. However, cortical porosity and trabecular "tunneling" were also observed, consistent with decreased proximal femur bone density reported in some studies. These data would suggest that such PTH regimens result in a mixed anabolic and "catabolic" effect, with activation of both bone resorption (primarily in the cortex) and bone formation (mainly in the spongiosa). To more closely mimic endogenous secretion, continuous PTH(1–34) infusion using a pump was tested against twice daily injections, resulting in better control of serum calcium and magnesium without hypercalciuria, reduced PTH need to achieve eucalcemia, and normalization of bone turnover. While providing the basis for a future PTH replacement therapy, these studies are also disclosing valuable information for understanding how PTH affects bone homeostasis.

PL8

HOW LONG CAN BONE TURNOVER BE SUPPRESSED?

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High rates of bone turnover associated with bone remodelling imbalance are deleterious for bone strength while reduction of the rates of bone turnover protects skeletal integrity. The term "suppressed bone turnover" is frequently used to describe effects of pathological processes or pharmaceutical interventions on bone metabolism but the level that characterizes suppression is ill-defined. The purpose of bone remodelling is thought to be the maintenance of calcium homeostasis and the repair of fatigue damage. Consequently, persistently low rates of bone remodelling may impair the ability of bone to respond to hypocalcemic stimuli or to repair fatigue damage and thereby compromise its strength. Although conceptually valid, this hypothesis is difficult to prove because of methodological limitations in the assessment of pathologically low rates of bone turnover with available tools (e.g., bone histology and biochemical markers of bone turnover). Moreover, Heaney suggested that from an evolutionary point of view, contemporary levels of remodelling activity that are used to define reference ranges, are substantially higher than optimal for maintenance of bone strength and Parfitt estimated that turnover in peripheral cancellous bone of only 2 %/year is sufficient to maintain mechanical competence. With these limitations, excessive suppression of bone turnover can be operationally defined as the rate which is associated with metabolically inactive bone that is unable to respond to stimuli and is associated with increased fragility. Any questions regarding timing of persistence of low levels of bone turnover should be examined within this framework and available animal and human data should be interpreted accordingly.

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OC1

RELATIONSHIP OF WEIGHT, HEIGHT, AND BODY MASS INDEX WITH FRACTURE RISK AT DIFFERENT SITES IN POSTMENOPAUSAL WOMEN: THE GLOBAL LONGITUDINAL STUDY OF OSTEOPOROSIS IN WOMEN (GLOW)

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Objective: Low BMI is a well recognized risk factor for fracture in postmenopausal women. Height and obesity have also been associated with increased fracture risk at some sites. We examined the relationships of weight, BMI, and height with incident clinical fracture in postmenopausal women participating in the GLOW study.

Material and Methods: Data were collected at baseline and 1, 2, and 3 years. For hip, spine, wrist, pelvis, rib, upper arm/shoulder, clavicle, ankle, lower leg, and upper leg fractures, the time to incident self-reported fracture was modeled over a 3-year period using the Cox proportional hazards model and the best linear or nonlinear models containing height, weight, and BMI were fitted.

Results: Of 52,939 women, 3,628 (6.9 %) reported an incident clinical fracture during the 3-year follow-up period. Linear BMI showed a significant inverse association with hip, clinical spine, and wrist fractures with adjusted hazard ratios (HRs) (95%CIs) per increase of 5 kg/m^2 of 0.80 (0.71–0.90), 0.83 (0.76–0.92), and 0.88 (0.83–0.94), respectively (all $p<0.001$). For ankle fractures, linear weight showed a significant positive association: adjusted HR per 5-kg increase 1.05 (1.02–1.07) ($p<0.001$). Only linear height was associated with upper arm/shoulder and clavicle fractures: adjusted HRs per 10-cm increase were 0.85 (0.75–0.97) ($p=0.02$) and 0.73 (0.57–0.92) ($p=0.009$), respectively. The best models for pelvic and rib fractures were for non-linear BMI or weight ($p=0.05$ and 0.03, respectively), with inverse associations at low values and positive associations at high values.

Conclusion: These data demonstrate that the relationships between fracture and weight, BMI, and height are site-specific. The different associations may be mediated, at least in part, by effects on BMD, bone structure and geometry, and patterns of falling.

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OC2
QUANTITATIVE ULTRASOUND (QUS) IS ASSOCIATED WITH FRACTURE RISK: A META-ANALYSIS

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Objective: Quantitative ultrasound (QUS) is an established assessment of bone strength. The aim of this study was to investigate the association between QUS parameters and risk of fracture.

Material and Methods: We studied men and women in nine prospective cohorts from Asia, Europe and North America. Broadband ultrasonic attenuation (BUA dB/Mhz) and speed of sound (SOS M/s) were measured at baseline. Fractures during follow up were collected by self-report and in some cohorts confirmed by radiography. An extension of Poisson regression was used to examine the gradient of risk (GR, hazard ratio per 1 SD decrease) between QUS and fracture risk adjusted for age and time since baseline in each cohort. The results were merged and weighted according to the variance. Interactions between QUS and continuous age and time were explored.

Results: Baseline measurements were available in 46,124 men and women, mean age 70 years (range 20–100). 3,018 osteoporotic fractures (787 hip fractures) occurred during follow up of 214,000 person-years. The summary GR was 1.4 (95%CI: 1.4–1.5) for osteoporotic fracture for both BUA and SOS. For hip fracture the GR was 1.7 (95%CI: 1.6–1.8) for BUA and 1.6 (95%CI: 1.5–1.7) for SOS. However the GR was significantly higher for both fracture outcomes the lower the baseline BUA and SOS ($p<0.001$). The predictive value of QUS was the same for all ages ($p>0.20$) but the predictive value of both BUA and SOS for osteoporotic fracture decreased with time since baseline ($p=0.018$ and $p=0.010$, respectively). The GR for BUA after 1 year after baseline was 1.5 (95%CI: 1.4–1.6) and after 6 years it was 1.3 (95%CI: 1.2–1.5).

Conclusion: Our results suggest that QUS is an independent predictor of fracture for men and women particularly at low QUS values, but the predictive value for osteoporotic fracture risk decreases with time from baseline.

OC3
RISK FACTORS FOR FALLS AMONG ELDERLY NURSING HOME RESIDENTS: A 2-YEAR PROSPECTIVE STUDY

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Objective: This study considers demographic and clinical characteristics of "fallers" subjects to identify which ones could be considered predictive of the risk of falls among elderly nursing home residents.

Material and Methods: 100 subjects were followed for 24 months for the occurrence of falls. Demographic characteristics (sex, age, BMI, number of medications, medical history, history of falls) and clinical characteristics (Katz index of Independence, Tinetti score, quantitative gait assessed using a triaxial accelerometer) were collected at baseline.

Results: A total of 440 falls were recorded during the 2 years of the study and 75 subjects fell at least once (mean: 4.44± 6.79 falls per patient). The survival curve of Kaplan-Meier shows that 25 % of the subjects fell in the first 2 months of the study, while 75 % of subjects fell during the first year of monitoring. Baseline characteristics of "fallers" subjects compared to "no-fallers" subjects are comparable, except for the Tinetti score (18.4±4.45 points in "fallers" vs. 20.6±4.73

points among "no-fallers", $p=0.04$) and step frequency measured in dual task conditions (0.77±0.22 in the "fallers" vs. 0.66±0.14 among the "no-fallers", $p=0.02$). According to the logistic regression model, the step frequency measured in dual task conditions is the only predictor for falls among institutionalized elderly ($p=0.003$).

Conclusion: Fallers have a smaller Tinetti score and a greater step frequency measured in dual task conditions, compared to "no-fallers" subjects. This is particularly predictive of the risk of falls among the elderly nursing home residents.

OC4

SUBCHONDRAL BONE TURNOVER, JOINT SPACE NARROWING AND OSTEOPHYTE FORMATION MAY BE PREDICTED BY ALPHA-CTX, A HIGH BONE TURNOVER DEGRADATION MARKER

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Objective: Osteoarthritis (OA) is the most common form of arthritic disease. Subchondral bone remodeling is currently speculated to both an initiator and driver of disease. The aim of the current study was to evaluate a serological biomarker of high localized bone turnover previously associated with woven bone and cancer osteolytis, α-CTX, with measures of radiographic knee OA severity and progression and localized knee bone turnover as assessed by bone scintigraphy.

Material and Methods: 149 participants (111 women, 38 men) were included who met ACR criteria for symptomatic OA and had the presence of Kellgren-Lawrence (K/L) grade 1–4 radiographic OA in at least one knee. Late-phase bone scan images of both knees as well as 15 additional joint sites were obtained 2 h after administration of ^{99m}Tc-MDP and the intensity of uptake was scored semiquantitatively (range of 0–3) and summed for each joint site. Radiographic knee OA progression status was determined after 3-years. α-CTX and uCTXII was correlated to bone scintigraphy and radiographic features of OA.

Results: α-CTX was related to OST progression independent of the effects of age, gender, BMI, and HRT ($p=0.009$). α-CTX did not correlate with severity of knee OA based on the static radiographic features (OST and JSN), but did correlate with the dynamic measure of bone turnover based on intensity of bone scintigraphic uptake in the medial knee compartment. CTX-II was strongly associated with knee OA severity based on osteophyte and intensity of total knee bone scintigraphic uptake, and the degree of joint space narrowing.

Conclusion: α-CTX was associated with subchondral bone turnover, and osteophyte formation, both central features of the pathogenesis of OA. CTX-II was correlated to JSN, and burden of disease as previously reported. The significant association of α-CTX to knee bone turnover by bone scintigraphy suggests that this marker may be a noninvasive surrogates for active bone turnover in knee OA.

OC5

HOSPITALIZED AND NONHOSPITALIZED VERTEBRAL FRACTURES: COMPARISON OF PATIENT DEMOGRAPHICS AND HEALTH RELATED QUALITY OF LIFE IMPLICATIONS

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Objective: To compare patient characteristics and health related quality of life (HRQoL) consequences in hospitalized and nonhospitalized patients with vertebral fracture.

Material and Methods: The International Costs and Utilities Related to Osteoporotic fractures Study (ICUROS) is a prospective multinational study with the aim of estimating costs and HRQoL related to osteoporotic fractures. Patients rated their HRQoL before (recollected), directly after the fracture (within two weeks after fracture), and at 4, 12 and 18 months after the fracture using the EQ-5D instrument. For this interim analysis, patients were enrolled from study centres in Australia, Austria, Spain, France, Italy, Lithuania, Mexico, Russia and the United Kingdom. Data were extracted in November 2013.

Results: The number of patients initially treated in outpatient care (inpatient care) with follow-up data directly after fracture, and at 4, 12, and 18 months were 409 (338), 390 (246), 356

(216), and 345 (191), respectively. Patient characteristics elicited directly after fracture and HRQoL trajectory after fracture are presented in Table 1.

Table 1. Patient characteristics and HRQoL in patients with vertebral fracture

Patient characteristics elicited directly after fracture				
Variable	n	Hospitalized	Non-hospitalized	p-value
Mean age	747	71.6	69.0	0.0004
Proportion women	747	75%	86%	0.0002
Previous fracture last five years	747	20%	45%	<0.001
Working before fracture	747	17%	20%	0.2916
HRQoL measured using the EQ5D				
Time-point	n	Hospitalized	Non-hospitalized	p-value
Before fracture	747	0.77	0.84	0.0002
After fracture	747	0.02	0.24	<0.0001
4 months after fracture	636	0.52	0.63	0.0001
12 months after fracture	572	0.65	0.73	0.0039
18 months after fracture	536	0.67	0.73	0.0436
QALY loss up to 18 months	528	0.34	0.30	0.2079

Conclusion: Patients who were hospitalized in connection to a vertebral fracture had lower HRQoL prior to fracture and at all follow-up visits. Whilst the accumulated HRQoL loss was similar in the two patient groups, the relative decrement was higher in hospitalized patients than in nonhospitalized patients.

Disclosures: ICUROS is cosponsored by: IOF, Amgen, Eli Lilly, Medtronic, Novartis, Sanofi-Aventis, Servier, Pfizer, and the Australian National Health and Medical Research Council.

OC6

FIRST-LINE ANALYSIS OF THE EFFECTS OF TREATMENT ON PROGRESSION OF STRUCTURAL CHANGES IN KNEE OSTEOARTHRITIS OVER 24 MONTHS: DATA FROM THE OSTEOARTHRITIS INITIATIVE PROGRESSION COHORT

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Objective: To determine, using data from participants enrolled in the progression cohort of the OAI, the effects of conventional osteoarthritis (OA) pharmacological treatment and those of the combination of glucosamine and chondroitin sulphate (Glu/CS) on knee structural changes.

Material and Methods: Six hundred patients with knee OA were stratified based on whether or not they received for 24 consecutive months the OA conventional pharmacological treatment and/or Glu/CS. The main outcomes were knee structural changes, including the loss of joint space width (JSW) and of cartilage volume measured by quantitative MRI.

Results: Participants reported taking (+) (n=300) or not taking (−) (n=300) OA treatment (analgesic/NSAIDs). The + analgesic/NSAIDs participants had higher WOMAC scores (p<0.001) and smaller JSW (p=0.01), reflecting more severe disease at baseline. In the -analgesic/NSAIDs group, participants taking Glu/CS had significantly reduced loss of cartilage volume at 24 months in the medial central plateau (p=0.007). Further subdivision revealed that this effect of Glu/CS occurred in participants with a higher severity of the disease (JSW ≤ median). In the +analgesic/NSAIDs group, those taking Glu/CS had significantly reduced loss of cartilage volume in the global plateau at 12 months (p=0.05), and in the central plateau at 24 months (p=0.05). These effects occurred in participants with less disease severity (JSW > median). By contrast, no significant reduction in JSW was found between all groups.

Conclusion: In +analgesic/NSAIDs groups and -analgesic/NSAIDs groups, participants who took Glu/CS had reduced loss of cartilage volume over 24 months in subregions when assessed with qMRI, arguing for a disease-modifying effect of Glu/CS which could not be identified by X-rays.

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OC7

ECONOMIC EVALUATION OF AN OSTEOPOROSIS SCREENING CAMPAIGN: USING FRAX AS A PRESCREENING TOOL

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Objective: To evaluate the cost-effectiveness of an osteoporosis screening campaign in the Province of Liège (Belgium).

Material and Methods: A previously validated Markov microsimulation model was used to estimate the incremental cost-effectiveness ratio (ICER), expressed in costs (in €) per quality-adjusted life-year gained (QALY) gained, of the screening/treatment strategy with no intervention. The screening/treatment strategy consisted of prescreening using FRAX followed by a bone densitometry for patients with a positive FRAX result and combined with a 5-year branded alendronate therapy for women diagnosed with osteoporosis

(BMD T-score≤−2.5). Sensitivity analyses were based on model parameters, characteristics of screening campaign and medication adherence.

Results: The ICER for the screening/treatment strategy versus no intervention in the whole population (mean age=60 years) was estimated at €66,665 (95%CI: 51,384–81,947) and €39,504 (95%CI: 35,035–43,973) per QALY gained assuming real-world and full adherence respectively. ICERs decreased to €55,517 and €28,520 in the population aged over 60 years (mean age= 65 years). The ICER of the screening strategy decreases when improving the follow-up of a positive screening and when increasing fracture risk. Using the price of generic alendronate, the cost-effectiveness improved to €50,880 and €32,293 assuming real-world and full adherence, respectively.

Conclusion: Our analyses suggest that the osteoporosis screening strategy is cost- effective if the follow up of the screening and medication adherence are optimized. Therefore, BMD should be performed in all individuals with positive FRAX score; individuals having a positive BMD diagnosis should be treated and adherence to therapy should be optimized. Furthermore, to improve the efficiency of the screening strategy, we suggest targeting screening on women with one or more clinical risk factors, or on women aged 65 years and older.

OC8

DO OSTEOPOROTIC HIP FRACTURES IN RHEUMATOID ARTHRITIS VARY IN TYPE, TIMING AND SURGICAL INTERVENTION AND DO THEY IMPACT ON SURVIVAL? RESULTS FROM TWO LARGE UK INCEPTION COHORTS LINKED WITH NATIONAL DATA

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Objective: To examine the nature of osteoporotic hip fracture in rheumatoid arthritis (RA), its surgical management and impact on survival.

Material and Methods: The clinical features, time to, management and length of stay (LoS) of different types of hip fractures were examined in two consecutive RA inception cohorts in the UK (n=2,701) with a single continuous mode of data collection: the Early RA Study (9 centres, 1986–1998) and the Early RA Network (23 centres, 2002–2012). Standard clinical, radiological and laboratory measures were recorded yearly, along with comorbidities & in-patient hospital episodes including fracture sites and joint surgery. Clinical databases were supplemented & validated with national databases: the National Joint Registry, Hospital Episode Statistics, and the National Death Register.

Results: Out of 182 fractures (#) in 6.6 % of patients, 69 (38 %) involved the hip. For these, two main types of surgery were used: 13 total hip replacements (THR#) and 56 dynamic hip screw (DHS#) surgeries. Median time from baseline to hip# was 8 years (IQR 5–15). THR# were undertaken earlier than DHS#, with a median time to surgery from RA onset of 81 and 102 months, respectively (mean 97 and 121, IQR 60–122 and 51–190). Female gender and older age at disease onset were associated with higher risk for both types of #-related hip surgery, compared to non-# hip surgery (p<0.001). Mean LoS varied by year of, and types of RA interventions. Hip# surgery incurred the longest LoS (median 15 days in the 1990s, 8 in 2000s) but there was little variation for THR# and DHS#, 9 and 9.5 days, respectively (p=0.472). The mean number of all and only major comorbid conditions was increased (3.7 and 1.4) in hip# patients, compared to non-# (1.8 and 0.9, p<0.001), and survival reduced (48 % vs. 20 %, p<0.001). Hip# were recorded as contributory causes of death in 12 cases.

Conclusion: There were two main types of hip# in RA and these incurred the longest LoS and were associated with higher comorbidity and reduced survival compared to all other orthopaedic surgery.

OC9

ASSOCIATION BETWEEN JOINT SPACE WIDTH, KELLGREN-LAWRENCE SCORE, PAIN AND PROGRESSION IN OSTEOARTHRITIS SUBJECTS FROM TWO PHASE III STUDIES: A CLINICAL STUDY REFERENCE DATABASE

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Objective: Osteoarthritis (OA) is commonly evaluated X-ray (KL-score and JSW), as well as patient-reported pain and function (WOMAC). There is a significant difference between patient populations recruited in clinical trial and epidemiological studies. There is a need for publication of data from large clinical studies. The aim of the analysis was to investigate the

associations between JSW, KL-score, pain and JSN (joint space narrowing), as well as BMI, by combining data from two phase III studies.

Material and Methods: This is a post hoc analysis of two randomized, double- blind, multicenter, placebo-controlled trials (CSMC021C2301 and CSMC021C2302), evaluating the efficacy and safety of oral salmon calcitonin in subject with painful knee OA, enrolling 1,176 and 1,030, respectively. The analysis included baseline data on KL-score, pain and function metrics from the WOMAC questionnaire, as well as demographics and 2-year data on JSN was included for the placebo arm.

Results: Including all knees in the placebo group, the mean JSN was 0.318±0.018 mm, over 2 years. In the non-target knee, mean JSN progression was 0.279±0.025 mm, whereas it was 0.356±0.026 the target knee ($p<0.05$), over 2 years. These data was analysed in relation to KL-score, BMI and pain.

Conclusion: This dataset from the largest clinical trial dataset in OA to date clearly describe correlations between KL-score, JSW pain and BMI in patients with symptomatic knee OA is ideally suited for identification of different phenotypes of OA, and biomarkers associated with those. Progression in relation to pain and KL score was different in the target compared to the non-target knee. Whereas in the target knee KL score was more important than pain, in the nontarget knee pain was more important than KL score. Clearly different levels of progression was observed in relation to KL score and pain, in which the Q3 but strikingly not the Q4 quartiles of highest pain, Q3 progressed significantly faster.

OC10

QUALITY OF LIFE BENEFITS OF KNEE ARTHROPLASTY FOR OSTEOARTHRITIS

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Objective: To assess the impact of total knee replacement on quality of life, after 3 and 6 months, in patients with osteoarthritis.

Material and Methods: The primary analysis computed changes observed between baseline and 3 or 6 months postsurgery in health related quality of life (HRQOL), the EQ5D and EQ5D VAS. Specific HRQOL was assessed with the Short Form 36 (SF-36) and with the WOMAC Index WOMAC. Paired Student t-tests were used to compare mean values of EQ5D, EQVAS, the eight physical and mental health areas of SF36 and WOMAC preoperatively, 3 months postsurgery and 6 months postsurgery.

Results: 279 patients were enrolled the day before total knee arthroplasty (TKA). Our cohort included 127 men and 152 women aged from 39 to 86 years (mean 66.8±8.9) and with a BMI of 29.3±4.7. 123 of them received left knee prosthesis and 126 of them right knee prosthesis. They were all diagnosed with primary OA following the ACR criteria. We calculated the various dimensions of WOMAC (pain, stiffness, physical function) and SF-36. The results are summarized in the table (mean ± SD):

Time of administration	Preoperatively	3 months post surgery	Preoperatively	6 months post surgery
Variable		n=250		n=244
EQ5D	0.46 ± 0.23	0.66 ± 0.20 *p<0.05*	0.47 ± 0.22	0.68 ± 0.19 *p<0.05*
		n=249		n=243
EQVAS	65.2 ± 15.7	71.4 ± 15.4 *p<0.05*	65 ± 15.8	72.6 ± 15.1 *p<0.05*
		n=247		n=242
Physical Function	34.7 ± 22.3	46.7 ± 24 *p<0.05*	34.7 ± 22.3	50.6 ± 24.9 *p<0.05*
Social Function	69 ± 24.9	70 ± 23.1	69.4 ± 24.7	72.2 ± 22.8
Role limitations:				
Physical	30.1 ± 37.6	31.4 ± 37.6	39.4 ± 37.7	43.7 ± 41.2 *p<0.05*
Emotional	48.7 ± 43.3	48.3 ± 43.1	48.8 ± 43.4	56.2 ± 44.1 *p<0.05*
Mental Health	61.5 ± 21.3	63.7 ± 20.9 *p<0.05*	62 ± 20.9	64.7 ± 21.5 *p<0.05*
Energy/vitality	48.3 ± 18.9	49.2 ± 19.1	49 ± 18.6	53.7 ± 18.9 *p<0.05*
Bodily Pain	34 ± 17.9	51.3 ± 21.5 *p<0.05*	34.2 ± 17.7	55.9 ± 22.3 *p<0.05*
General Health Perceptions	61.8 ± 18.7	62.9 ± 18.5	62.8 ± 18.4	63.1 ± 19.5
		n=251		n=243
Womac – Pain	10.9 ± 3.7	6.7 ± 4 *p<0.05*	10.8 ± 3.6	6.1 ± 4 *p<0.05*
Womac – Stiffness	4.5 ± 1.9	3.4 ± 1.7 *p<0.05*	4.5 ± 1.8	3.2 ± 1.7 *p<0.05*
Womac – Physical function	36.2 ± 12.5	23.4 ± 13.4 *p<0.05*	35.8 ± 12.1	22.1 ± 13.7 *p<0.05*
Total Womac (0-96)	51.6 ± 16.7	33.5 ± 18.1 *p<0.05*	51.1 ± 16.2	31.3 ± 18.3 *p<0.05*

Note: lower score on the SF 36 reflect poorer health/higher score of WOMAC reflect bad results.

Conclusion: At 3 and 6 month follow-up, the EQ5D, the EQVAS and all components of the WOMAC scores show a statistically significant improvement compared to presurgical status. Patients experience an additional significant improvement of health and QOL between 3 and 6 months after surgery except EQVAS, EQ5D, physical function (WOMAC) and mental health (SF36) (no difference between 3 and 6 month follow-up). Three months after surgery, three dimensions of the SF36 generic QOL toll were significantly improved: physical function, mental health and bodily pain. At 6 month follow-up, all the dimensions are improved except “social function and general health perception”.

OC11
TRACKING OF ENVIRONMENTAL DETERMINANTS OF BONE STRUCTURE AND STRENGTH DEVELOPMENT IN HEALTHY BOYS: AN EIGHT-YEAR FOLLOW UP STUDY ON THE POSITIVE INTERACTION BETWEEN PHYSICAL ACTIVITY AND PROTEIN INTAKE FROM PREPUBERTY TO MID-LATE ADOLESCENCE

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Objective: High protein intake (HProt) was shown to enhance the positive impact of high physical activity (HPA) on proximal femur BMC/aBMD/Area in healthy prepubertal boys. This cohort was followed up until mid-adolescence, testing the hypothesis that Hprot and HPA would track and thus maintain their positive influence on bone structure and strength.
Material and Methods: BMC/aBMD/Area was measured at femoral neck (FN) and total hip (TotHip) by DXA in 176 boys at 7.4±0.4 and 15.2±0.5 years (±SD). Distal tibia (DistTib) microstructure and strength were also assessed at 15.2 years by HR- pQCT and μFEA.
Results: The positive impact on FN and TotHip BMC/aBMD/Area of relatively high (>median) HProt vs. moderate (<median) protein intake (MProt) on HPA (>median) recorded at 7.4 years remained unabated at 15.2 years. At this age, at DistTib, HProt-HPA vs. MProt-HPA was associated ($P<0.001$) with larger cross-sectional area (CSA, mm^2), trabecular number (Tb.N, mm^{-1}) and lower trabecular separation (Tb.Sp, μm). The interaction between physical activity and protein intake was significant for CSA ($P=0.012$) and Tb.N ($P=0.043$). Under MProt (38.0±6.9 $g.d^{-1}$), a difference in PA from 168±40 to 303±54 $kcal.d^{-1}$ was associated with greater stiffness (kN/mm) and failure load (N) of +0.16 and +0.14 Z-score, respectively. In contrast, under HProt (56.2±9.5 $g.d^{-1}$), a difference in PA of similar magnitude, from 167±33 to 324±80 $kcal.d^{-1}$, was associated with a larger difference in stiffness and failure load of +0.50 and +0.57 Z-score, respectively.
Conclusion: The positive influence of relatively HProt on the impact of HPA on proximal femur macrostructure tracks from prepuberty to mid-late puberty. At this stage, the impact of HProt on HPA is also associated with microstructural changes that should confer greater mechanical resistance to weight-bearing bones. These results underscore the importance of protein intake and exercise synergistic interaction in the early prevention of adult osteoporosis.

Disclosures: Bert van Rietbergen is consultant for Scanco Medical AG.

OC12
EARLY GROWTH OF LEAN, RATHER THAN FAT MASS, PREDICTS BONE SIZE AND MINERAL DENSITY IN CHILDHOOD: FINDINGS FROM THE SOUTHAMPTON WOMEN'S SURVEY

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Objective: Studies in childhood suggest that body composition is associated with BMD. However there is scant evidence relating longitudinal changes in fat (FM) and lean mass (LM) to early childhood bone development. We therefore investigated these relationships in a population-based mother-offspring cohort, the Southampton Women's Survey.
Material and Methods: Total FM and LM were assessed at birth, 4 years (4y) and 6–7 years (7y) by DXA (Hologic Discovery). At 7 years, total cross-sectional area (CSA) and trabecular volumetric BMD at the 4 % site (metaphysis) of the tibia was assessed using pQCT (Stratec XCT-2000). Total CSA, cortical CSA and cortical vBMD were measured at the 38 % site (diaphysis). FM and LM were adjusted for age and sex and standardised to create within-cohort z-scores. Change in LM (ΔLM) or FM (ΔFM) was represented by change in z-score from birth to 4 years and from 4 to 7 years. Linear regression was used to explore the associations between ΔLM or ΔFM and standardised pQCT outcomes. The β-coefficient represents SD change in outcome per unit SD change in predictor.
Results: pQCT scans and change in body composition z-scores were available for 122 children from birth to 4 years and 181 children from 4 to 7 years. ΔLM from 0 to 4 years was positively associated with total CSA at both 4 % ($\beta=0.26$, $p=0.009$) and 38 % sites ($\beta=0.29$, $p=0.001$) and 38 % cortical CSA ($\beta=0.24$, $p=0.008$). ΔLM from 4 to 7 years was also positively associated with 4 % total CSA ($\beta=0.27$, $p=0.08$) and with 4 % trabecular vBMD ($\beta=0.32$, $p=0.04$). Although ΔFM from 0 to 4 years was also associated with 4 % total CSA ($\beta=0.16$, $p=0.04$), there were no associations between ΔFM from 4 to 7 years and bone geometry or BMD.
Conclusion: In this study, gain in childhood LM was positively associated with bone size and trabecular vBMD at 7 years. In contrast, relationships between change in FM and bone were weaker, suggesting that muscle growth, rather than

accrual of fat mass, may be a more important determinant of childhood bone development.

OC13
FEATURES ASSESSED ON MAGNETIC RESONANCE IMAGING (MRI) IMPROVE PREDICTION OF TOTAL KNEE ARTHROPLASTY (TKA) IN SUBJECTS WITH SYMPTOMATIC RADIOGRAPHIC KNEE OSTEOARTHRITIS (OA): DATA FROM THE OSTEOARTHRITIS INITIATIVE (OAI)

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Objective: Features assessed on MRI of the knees, including cartilage volume (CV), bone marrow lesions (BMLs) and synovial effusion, are associated with pain and structural progression in subjects with knee OA. Few studies, however, have examined the association of MRI findings with TKA or estimated the ability of MRI findings to improve prediction of TKA over and above routine demographic, clinical and radiographic parameters.

Material and Methods: Data from the OAI "Progression" cohort were analyzed. Subjects included were aged 45–79 years and had symptomatic radiographic knee OA, defined as pain on most days of at least 1 month during the past year and a definite tibiofemoral osteophyte in the same knee, in one or both knees at baseline; had at least one follow-up visit; had all available knee radiographs through 48-month follow-up visit centrally read for Kellgren-Lawrence (KL) grade; and had baseline knee MRIs analyzed for CV at the femoral condyle and tibial plateau (mm^3), presence of BMLs in the femoral condyle, and synovial fluid (SF) volume (mm^3), using fully automated quantitative methodology developed by ArthoLab Inc. (Montreal, Quebec, CA). Fixed-flexion PA knee radiographs and knee MRIs were obtained using standard protocols. TKA was self-reported at annual follow-up visits through 72 months and validated with medical records. Base knee-specific multiple variable Cox proportional hazards models were constructed with time to TKA as the dependent variable and the following variables from the OAI baseline visit as independent variables: age, gender, race, marital status, BMI, depressive symptoms, KOOS quality of life scores, pain on motion and effusion on physical examination and KL grade. Improvement in prediction of TKA was assessed by examining the improvement in likelihood ratio when CV, presence and size of BMLs and logSF volume were added individually and together to the best "base" models. Finally, change in area under the receiver operating characteristic curve (AUC) was calculated from logistic regression models further adjusted for follow-up time.

Results: Of 1,390 subjects enrolled in the "Progression" subcohort, 1,024 and 982 subjects with OA involving their right and left knees, respectively, had complete data and were included in these analyses. There were a total of 81 (8.0 %) and 83 (8.4 %) TKAs in the right and left knees, respectively, among these subjects during 72 months of follow-up. In knee-specific Cox proportional hazards models, medical compartment CV ($P<0.05$), size of BMLs in the medial femoral condyle ($P<0.0001$) and logSF volume ($P<0.0001$) were significantly associated with TKA in both knees. After addition of these MRI features individually to the "best" base knee-specific models, only size of BMLs ($P=0.02$ in both knees) and logSF volume ($P=0.02$ in both knees) were significantly associated with time to TKA. Furthermore, size of BMLs and logSF volume remained significantly associated with time to TKA when all three MRI features were added to the best "base" model. The improved prediction based on change in AUC, however, was minimal with an increase from 0.86 to 0.87 in each knee.

Conclusion: These data suggest that some MRI findings, particularly BMLs and SF volume, minimally improve the prediction of receiving a TKA in subjects with symptomatic radiographic knee OA when added to demographic, clinical and radiographic variables.

Disclosures: Dr. Hochberg is Principal Investigator of the Baltimore Clinical Center of the OAI. Drs. Martel-Pelletier and Pelletier are officers in ArthroLab Inc.

OC14
LOW SERUM THYROTROPIN LEVEL AND DURATION OF SUPPRESSION AS A PREDICTOR OF MAJOR OSTEOPOROTIC FRACTURES: THE OPENTHYRO REGISTER COHORT

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Objective: To assess the relationship between thyrotoxicosis and osteoporotic fractures in men and women.

Material and Methods: Register-based cohort study in patients with a serum thyrotropin (TSH) measurement in the region of Funen 1996–2010. All TSH determinations were done in the same lab, which served all hospitals and GP

practices. Persons with raised TSH or a history of thyroid/pituitary disease were not included.

Results: The study population consisted of 222,138 (96 %) persons with normal and 9,217 (4 %) with low TSH. During a median follow-up of 7.5 years, 13.5 % of the low TSH group and 6.9 % of the normal TSH group sustained major osteoporotic fractures (MOF), $p<0.01$. A single, low TSH at baseline was associated with increased risk of hip fractures (Table 1) but less strongly with MOF (HR 1.06, 95%CI 0.99–1.12, $p=0.058$). There was a significant association also with duration of thyrotoxicosis. In euthyroid patients, the risk of hip fractures (HR 1.45, 95%CI 1.22–1.71, $p<0.001$) and MOFs (HR 1.32, 95%CI 1.19–1.46, $p<0.001$) increased with each SD unit of TSH decrease.

	Single, low TSH measurement	Per 6 mo of low TSH
All	1.16 (1.07-1.26); p<0.01	1.07 (1.04-1.10); p<0.01
Women	1.17 (1.06-1.28); p<0.01	1.07 (1.04-1.10); p<0.01
Men	1.17 (0.95-1.42); p=0.1	1.07 (0.99-1.14); p=0.05

Conclusion: In a population-based cohort, a single, first measurement of decreased TSH in a patient without known thyroid disease was associated with an increased long term risk of hip fracture, which remained significant in women but not in men after adjusting for confounders. Moreover, the risk of both hip fracture and MOF increased exponentially by the length of time during which TSH had remained low.

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OC15
INFLUENCE OF LONG-TERM HIV INFECTION ON BONE MICROSTRUCTURE IN MEN OLDER THAN 60 YEARS

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Objective: HIV infection is associated with increased fracture risk. Progress in antiretroviral therapy has led to increasing number of long-term HIV infected patients. The objective of this study was to investigate the influence of long-term HIV infection on bone microstructure in men.

Material and Methods: We determined distal radius and tibia cortical and trabecular bone microstructure by HR-pQCT (XtremCT, Scanco Co, Bruttisellen, CH), and aBMD by DXA, in HIV-positive (+ve) men older than 60, compared to HIV negative (−ve) controls. Dietary protein and calcium intakes, and physical activity were evaluated by questionnaires.

Results: Thirty HIV+ve men on successful antiretroviral therapy (undetectable HIV- RNA), aged 64.9±3.6 years, with BMI of 25.7±3.3, infection duration of 17±7 years, CD4 of 612±304, were compared to 195 HIV-ve men, aged 65.2±1.4 years ($p=0.38$), with BMI of 26.3±3.4 ($p=0.37$). Compared to HIV-ve men, HIV+ve men had higher CTX, P1NP and vitamin D levels ($p\leq0.002$), but similar testosterone ($p=0.68$). HIV+ve men had lower areal BMD at the proximal femur (total hip T-Score −0.7 vs. −0.4, $p=0.027$), but similar lumbar spine BMD. At distal radius and tibia, HIV+ve men had lower total volumetric BMD (−9.5 %, $p<0.01$; −6.6 %, $p<0.05$), lower BV/TV (−13.3 % at both, $p<0.01$), respectively. At distal radius, HIV+ve men had lower trabecular number (−9.3 %, $p<0.05$) and higher trabecular separation (+18.6 %, $p<0.01$). Cortical density and cortical thickness were also lower (−3.1 %, $p<0.05$; −10.5 %, $p<0.01$, respectively). At distal tibia, trabecular thickness was 12.5 % lower ($p<0.05$).

Conclusion: At the age when fracture risk markedly increases in the general population, long-term HIV infected men have alterations of both trabecular and cortical bone microstructure, which are not captured by areal BMD, and that despite adequate vitamin D supplementation. These alterations, which are not explained by hypogonadism, are associated with higher bone turnover markers levels. These data provide a rationale for fracture prevention measures in the emerging population of long-term HIV infected men aged of 60 or older.

OC16
LONGITUDINAL STUDY OF BMD AMONG HIV-INFECTED MEN

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Objective: To evaluate the change in BMD over 1-year of follow-up among a cohort of HIV-infected men treated with combination antiretroviral therapy (cART) and to explore factors associated with bone loss.

Material and Methods: A random sample of HIV-infected men were recruited among 1,900 outpatients at an HIV clinic. At baseline and 12-months, all completed a questionnaire about medication and comorbidities, lifestyle and risk factors for osteoporosis. Casenotes were scrutinised for: duration of HIV infection, mode of transmission and exposure to cART. DXA of the total hip, femoral neck and lumbar spine was measured at both time points using one Hologic QDR machine. Change in absolute BMD at each site was assessed and risk factors for loss were investigated using logistic regression for the smallest detectable difference (SDD).

Results: 400 HIV-infected men, mean age 47 years were recruited: 94 % Caucasian, 93 % infected sexually and diagnosed with HIV a median of 9.1 years. 92 % were current users of cART, most of whom had undetectable viral loads. At baseline, the prevalence of osteopenia at the lumbar spine, total hip and femoral neck was 31 %, 36 % and 47 % and of osteoporosis was 10 %, 3 % and 3 %, respectively. At 12 months, there was no significant change in total hip BMD, there was a small significant increase in spine BMD (p=0.006) and a small, significant decrease in femoral neck BMD (p=0.008). In total, 14 % of men lost >SDD in BMD at the spine and 10 % lost >SDD at the other sites. No association was seen with HIV stage, nadir CD4 count, cART use or type and >SDD loss at any site.

Conclusion: Cross-sectionally, we found similar rates of osteopenia and osteoporosis to those of other studies. 10 % of subjects showed a significant loss of F.neck BMD over 12 months. We found no significant associations between BMD loss and recognised risk factors, including type of cART. Loss of BMD has been shown in cART studies over the first 12–24 months but our data suggest bone loss stabilises thereafter.

OC17
ENHANCED BIOAVAILABILITY OF A NASAL FORMULATION OF TERIPARATIDE WITH CRITICALSORB™ COMPARED TO A SUBCUTANEOUS INJECTION: A NONINVASIVE APPROACH FOR THE TREATMENT OF OSTEOPOROSIS

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Objective: PTH is an effective treatment for osteoporosis and unlike other therapies that reduce bone resorption, PTH increases bone formation resulting in greater BMD. The biological activity of PTH resides in the N-terminal sequence with the 34 amino acid peptide (PTH1-34) [teriparatide]. Currently administration requires a subcutaneous injection and an intranasally delivered formulation would potentially improve patient convenience and may improve efficacy. In certain patient groups, it has been shown that nasal delivery is preferred over injections.

Material and Methods: CriticalSorb is an advanced nano-enabled nasal delivery system that facilitates the absorption of macromolecules across biological membranes. We have used this technology to develop CP046, a nasal spray formulation of teriparatide. Solutions of CriticalSorb and teriparatide were prepared and administered intranasally to SD rats and NZW rabbits. The animals also received a s.c. injection in order to compare bioavailability. Blood samples were collected for up to 6 h and teriparatide concentrations in the plasma were analysed by LCMS.

Results: CriticalSorb proved to be highly effective at enhancing the transport of teriparatide across the nasal mucosa in both rats and rabbits with a relative bioavailability of 79 and 64 %, respectively. When teriparatide was administered intranasally to rats without CriticalSorb the bioavailability was below 6 %.

Conclusion: In conclusion, CriticalSorb is an effective absorption promoter for the systemic delivery of teriparatide via the nasal cavity and offers a non-invasive route for delivery. The pulsatile pharmacokinetics obtained following nasal delivery of teriparatide may further improve efficacy. Proof of concept has been demonstrated in animal models and a clinical trial is being carried out in postmenopausal women to assess nasal deposition and clearance using gamma scintigraphy and to provide pharmacokinetic data comparing nasal and subcutaneous delivery in humans.

OC18
ROMOSOZUMAB ADMINISTRATION IS ASSOCIATED WITH SIGNIFICANT IMPROVEMENTS IN LUMBAR SPINE AND HIP VOLUMETRIC BONE MINERAL DENSITY (VBMD) AND CONTENT (BMC) COMPARED WITH TERIPARATIDE

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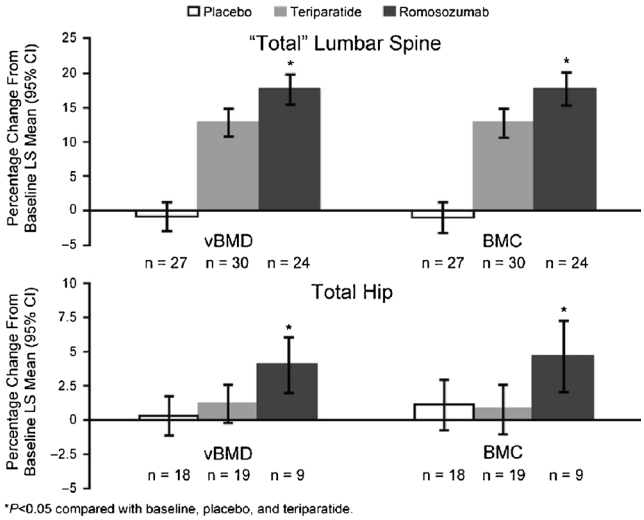
Objective: Sclerostin is an osteocyte-derived inhibitor of osteoblast activity. In a phase 2 study, romosozumab, a monoclonal antibody to sclerostin, increased BMD at the lumbar spine (LS) and total hip (TH) as measured by DXA compared with placebo (Pbo), alendronate, and teriparatide (TPTD) in postmenopausal women with low bone mass. Here, we describe the effect of romosozumab on LS and TH vBMD and BMC at 12 months as measured by QCT in this trial.

Material and Methods: In this international, randomized, Pbo-controlled study, QCT measurements were performed at the "total" LS (mean of L1 and L2 entire vertebral bodies) and TH in subjects receiving Pbo, subcutaneous TPTD (20 μg QD), and subcutaneous romosozumab (210 mg QM).

Results: Treatment with romosozumab significantly increased integral vBMD and BMC at the "total" LS and TH from baseline, and compared with Pbo and TPTD (Figure). TPTD and Pbo were similar at the TH, but not the LS. In the LS trabecular compartment, vBMD increased similarly from baseline with both romosozumab and TPTD (18.3 % vs. 20.1 %, respectively). At the TH trabecular compartment, romosozumab treatment resulted in significantly larger gains than TPTD (10.8 % vs. 4.2 %, P=0.01). Cortical vBMD and BMC gains were larger with romosozumab compared with TPTD at the LS (13.7 % vs. 5.7 % [vBMD] and 23.3 % vs. 10.9 % [BMC], P<0.0001) and TH (1.1 % vs. −0.9 % [vBMD], P=0.12 and 3.4 % vs. 0.0 % [BMC], P=0.03).

Figure. Percentage Change in Integral vBMD and BMC From Baseline at 12 Months



*P<0.05 compared with baseline, placebo, and teriparatide.

Conclusion: Romosozumab significantly increased vBMD and BMC at the "total" LS and TH compared with Pbo and TPTD in postmenopausal women with low bone mass. The gains support the continued clinical investigation of romosozumab to reduce fractures in patients at increased risk.

Disclosures: Amgen/UCB

OC19

VITAMIN D INSUFFICIENCY SUSTAINED OVER 5 YEARS CONTRIBUTES TO INCREASED 10-YEAR FRACTURE RISK IN ELDERLY WOMEN

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Objective: Vitamin D insufficiency among the elderly has been shown to contribute to increased risk of osteoporotic fractures. Previous studies have used single vitamin D measurements to investigate effects on bone. However, in elderly women, relatively little is known about the effects of long-term hypovitaminosis D on bone health. In this study we investigated sequential assessment of serum vitamin D to determine if sustained hypovitaminosis D leads to increased 10-year fracture incidence in elderly women.

Material and Methods: Study participants were Swedish women from the population based OPRA cohort. 1,044 women, all aged 75 attended at baseline (BL), 715 attended at 5 year follow-up. Serum 25-hydroxyvitamin D (25OHD) levels (nmol/l) were classified as low (<50), Intermediate (50–75) and high (>75) and were available for 987 (BL), and 640 (5 years) women. Women with values in the same 25OHD category at both samplings were considered to have consistently low, intermediate or high levels. Fracture data was followed for 10 years through X-rays at the radiology department.

Results: The incidence of hip fractures within 10 years was significantly lower in those women who were 25OHD sufficient (≥50 nmol/l) at baseline and maintained this level at 5 years (6.9 % (H) and 9.9 % (Int) vs. 20.6 % (L); (p=0.005 and 0.031). The proportion of women sustaining FRAX fractures was 26.2 % and 30 % in the consistently high and intermediate 25OHD groups compared to 45.6 % in the consistently low group. (p=0.004 and 0.022). The incidence of shoulder, radius and vertebral fractures was not associated with 25OHD status in our study. The majority of fractures occurred between 5 and 10 years after baseline (hip 77 %; FRAX 64 %) however the time to first fracture (hip and FRAX) did not significantly differ between the three categories of 25OHD using either a single or serial measurement.

Conclusion: In this population sample of elderly women, 25OHD insufficiency sustained over 5-years was associated with increased 10-year risk of osteoporotic fracture.

OC20

THE EFFECTS OF VITAMIN D ON SKELETAL MUSCLE STRENGTH, MUSCLE MASS AND MUSCLE POWER: A META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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Objective: There is growing evidence that vitamin D plays a role on several tissues including skeletal muscle. Previous studies have suggested that vitamin D deficiency is associated with low muscular function and especially, with low muscle strength and muscle mass. The objective of this meta-analysis is to summarize the effects of vitamin D supplementation on muscle function.

Material and Methods: A systematic research of randomized controlled trials (RCTs) assessing the effect of vitamin D supplementation on muscle function and performed between 1966 and June 2013 has been conducted (Medline, Cochrane Database of Systematics Reviews, Cochrane Central Register of Controlled Trials, manual review of the literature and congressional abstracts). All forms and doses of vitamin D supplementation, with or without calcium supplementation, compared with placebo or control were included. The quality of the RCTs was evaluated using the Jadad criteria.

Results: Out of the 215 potentially relevant articles, 21 RCTs involving 4,916 individuals (mean age: 65.8 years) met the inclusion criteria. Studies showed a median quality score of 5/5 points. Results revealed a significant positive effect of vitamin D supplementation on global muscle strength with a standardized mean difference (SMD) of 0.107 (95%CI= 0.012–0.201; p=0.028). A moderate effect of vitamin D supplementation on muscle mass was found with a SMD of 0.265 (95%CI=0.032–0.498; p-value=0.026). No effect was found on muscle power (SMD 0.015; p=0.914). Moreover, effects are significantly more important with people presenting a baseline 25(OH)D concentration lower than 35 nmol/L compared to others (p=0.03) and with people aged 65 years or younger compared to older (p=0.04).

Conclusion: Vitamin D supplementation has a small to moderate positive impact on muscle function, including muscle strength and muscle mass. Evidence supports the use of vitamin D supplementation to improve muscle function but additional studies are needed to define optimal treatment modalities.

OC21

EIGHT YEARS OF DENOSUMAB TREATMENT IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: RESULTS FROM THE FIRST FIVE YEARS OF THE FREEDOM EXTENSION

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Objective: Denosumab (DMAb) is an approved therapy for the treatment of postmenopausal women with osteoporosis at increased risk for fracture. The effects of DMAb treatment for up to 10 years are being evaluated in the 3-year FREEDOM study and its 7-year extension. Here, we report the 5-year results from the extension, representing up to 8 years of continued DMAb treatment.

Material and Methods: During the extension, all women received 60 mg of DMAb every 6 months and daily calcium and vitamin D. In this analysis, women in the long-term group received 8 years of DMAb (3 years in FREEDOM and 5 years in the extension); women in the cross-over group received 5 years of DMAb (3 years of placebo in FREEDOM and 5 years of DMAb in the extension).

Results: Of the women who entered the extension, 66 % completed the 5th year. BMD data showed continued mean increases from the FREEDOM baseline for cumulative 8-year gains of 18.4 % at the lumbar spine (LS) and 8.3 % at the total hip (TH) in the long-term group and cumulative 5-year gains of 13.7 % at the LS and 4.9 % at the TH in the cross-over group (all p<0.0001 compared with FREEDOM and extension baselines). Serum C-telopeptide was rapidly and similarly reduced after each DMAb dose with the characteristic attenuation of effect at the end of the dosing period. Incidence

of new vertebral and nonvertebral fracture continued to remain low throughout the extension; during year 8, hip fracture incidence was 0.2 % and 0.1 % for the long-term and crossover groups, respectively. Overall incidences of adverse events (AEs) and serious AEs were consistent with data reported previously in the extension study.

Conclusion: DMAb treatment for up to 8 years was associated with continued increases in BMD, persistent reduction of bone turnover, and low fracture incidence. The benefit/risk profile for DMAb remains favorable.

Disclosures: Amgen/GSK

OC22

FRACTURE PATTERNS WITH SELECTIVE SEROTONIN RECEPTOR INHIBITOR, PROTON PUMP INHIBITOR AND GLUCOCORTICOIDS USE IN GLOW

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Objective: Selective serotonin receptor inhibitors (SSRIs), proton pump inhibitors (PPIs) and glucocorticoids (GCs) are associated with fractures. The objective of this study is to assess fracture patterns over 5 years among participants in the GLOW study.

Material and Methods: GLOW comprises women 55 years of age and older, in 615 primary care practices (17 sites, 10 countries). Self-administered surveys, mailed at baseline, 12, 24, 36 and 60 months, sought data on patient characteristics, risk factors, estrogen, SSRI, PPI, GC use and antiosteoporosis medication (AOM). Multivariable regression calculated odds ratios (ORs) and 95%CIs.

Results: There were 9,347 subjects who were never treated with SSRIs, GCs, PPIs, estrogen or AOM, 2,715 on PPIs, 5,304 on GCs and 1,149 on SSRIs at baseline. Risk factors that were adjusted for include age, BMI, parental history of hip fracture, rheumatoid arthritis, prior fracture, osteoarthritis, celiac disease, Crohn's disease, Parkinson's disease, falls in the past year, smoking, alcohol intake, anxiety/depression, general health, physical function and vitality.

Table 1. Multivariable regression model predicting year 3/year 5 fracture based on medication use (versus no medication use)

Medication Use		PPI	Cortisone	SSRI
Any fracture*				
	Odds ratio	1.16	1.06	1.66
	95% CI	(0.97–1.40)	(0.91–1.23)	(1.31–2.11)
	p-value	0.11	0.46	<0.0001
Hip fracture				
	Odds ratio	0.57	1.13	0.65
	95% CI	(0.28–1.17)	(0.71–1.79)	(0.20–2.09)
	p-value	0.13	0.60	0.47
Spine fracture				
	Odds ratio	1.43	1.63	2.18
	95% CI	(0.86–2.38)	(1.08–2.47)	(1.12–4.26)
	p-value	0.17	0.02	0.02
NHNV fracture				
	Odds ratio	1.19	0.99	1.66
	95% CI	(0.98–1.45)	(0.84–1.17)	(1.29–2.15)
	p-value	0.08	0.90	<0.0001

Conclusion: SSRIs are associated with the greatest risk for fracture followed by GCs and vertebral fractures. PPI=s were the least likely to be associated with fractures.

OC23

HIGHER SERUM OSTEOCALCIN IS ASSOCIATED WITH METABOLIC SYNDROME SEVERITY IN MEN FROM THE MINOS COHORT

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Objective: Bone has emerged as an endocrine organ regulating energy metabolism through secretion of osteocalcin.

In epidemiological studies, presence of metabolic syndrome (MetS) was associated with lower osteocalcin level. We evaluated whether osteocalcin level was associated with MetS severity in men and whether it was more strongly associated with MetS compared with P1NP, BAP, and CTX.

Material and Methods: We included 798 men aged 51–85 with total osteocalcin measurement. Number of MetS criteria was used to define severity. We used polytomous logistic regression to assess the relationship between MetS severity and osteocalcin level.

Results: 30 % of men had MetS. In patients with MetS, the higher the number of MetS traits were present, the lower was the average osteocalcin level (0–2 criteria: 551 men: 19.5±6.7 ng/ml, 3 criteria, 155 men: 19.3±7.4 ng/ml, 4 criteria, 72 men: 17.3±5.7 ng/ml, 5 criteria, 20 men: 15.0±5.1 ng/ml; p for trend=0.002). After adjusting for age, 25OHD, testosterone, physical activity, smoking and alcohol consumption, comparison for Akaike information criterion of the models using the bone markers, showed that osteocalcin was the most specifically associated with MetS. In the polytomous logistic regression model, an increase in osteocalcin level of 10 ng/ml was associated with lower prevalence of severe MetS: three criteria (OR=0.93 [0.70–1.24]), four criteria (OR=0.54 [0.34–0.84]) and five criteria (OR=0.28 [0.10–0.82]) in comparison to no MetS (p for trend=0.008).

Conclusion: In older Caucasian men, total osteocalcin level was associated with MetS severity. Osteocalcin was more strongly associated with MetS severity than other bone turnover markers.

OC24
SEROLOGICAL BIOMARKERS OF JOINT TURNOVER FOR EARLY IDENTIFICATION OF RESPONDERS TO TOCILIZUMAB

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Objective: Personalized medicine is needed in rheumatoid arthritis (RA) as response rates are low compared to the side effects and cost of treatments. Anti- IL6R treatments is effective in suppression disease activity[1]–only a small proportion patients are protected from further joint destruction[2]. Protein fingerprint may describe disease-specific mode of actions[1]. We investigated whether biomarker could identify patients that would respond to either anti-IL6.

Material and Methods: Biomarkers were measured in 800 RA patients treated with methotrexate or tocilizumab (LITHE study); C1M and C3M (MMP-degraded type I and III collagen), CRPM (MMP-degraded CRP), C2M (Cartilage degradation), CTx/osteocalcin (bone balance), MMP3 and CRP. The predictive power of the biomarkers for identification of responders and nonresponders, was investigated by logistic regression and CART analysis.

Results: Tocilizumab significantly suppressed ($p<0.0001$) the markers MMP3, C1M, C2M, C3M, CRPM and significantly increased ($p<0.05$) the level of the bone markers CTx/ostoecalcin. A combination of the biomarkers (C1M, C3M, C2M, osteocalcin and CRPM) was able to double the DAS28 response rate of tocilizumab 27 to 54 %. When including the change from baseline to 4 cartilage degradation or bone formation the rate was increased to 64 %. Methothraxate had no effect on the markers.

Conclusion: Protein fingerprint markers may assist in identification of the patients, who respond most optimally to given interventions, and thus provide a stronger risk/benefit/cost value proposition to patients and payers.

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[2]Smolen JS et al. Ann Rheum Dis 2012;71:687.

OC25
A META-ANALYSIS OF THE EFFECT OF STRONTIUM RANELATE ON THE RISK OF VERTEBRAL AND NON-VERTEBRAL FRACTURE IN POSTMENOPAUSAL OSTEOPOROSIS: THE IMPACT OF SEVERE OSTEOPOROSIS AND CONTRAINDICATIONS

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Objective: There have been recent concerns raised by the Pharmacovigilance Risk Assessment Committee (PRAC) over the cardiac safety of strontium ranelate so that the SmPC for strontium ranelate has been modified to contraindicate its use in patients at high risk of cardiovascular events and to limit treatment to patients at high fracture risk. The aim of the present analysis was to examine the impact of contraindications for strontium ranelate on the efficacy of intervention. An additional aim was to determine the impact of severe osteoporosis on efficacy.

Material and Methods: We examined the efficacy of strontium ranelate from the primary data of two phase 3 studies in which potential contraindications had been identified at baseline. High fracture risk was defined in several ways including

the WHO criteria (a T-score of −2.5 or less and a prior fragility fracture). A Poisson model was used to study the relationship between age, the time since baseline, treatment, calculated 10 year probability on the one hand and on the other hand, the risk of fracture.

Results: Treatment with strontium ranelate was associated with a 20 % (95%CI=9–29 %) decrease in osteoporotic clinical fractures and a 40 % decrease in vertebral fractures assessed by semiquantitative morphometry (95%CI=31–48 %). Neither the efficacy of strontium ranelate nor its relation to FRAX was altered by adjustment for the severity of osteoporosis or the presence of contraindications to treatment.

Conclusion: The efficacy of strontium ranelate is maintained in severe osteoporosis and in patients in whom the intervention is not contraindicated.

OC26

PRESERVATION OF BONE MASS IN TRANS WOMEN DURING CROSS-SEX HORMONALTHERAPY: A PROSPECTIVE OBSERVATIONAL STUDY

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Objective: To examine the evolution of bone in trans women undergoing sex steroid changes, during the first 2 years of hormonal therapy.

Material and Methods: In a prospective intervention study, we examined 49 trans women (male-to-female) before and after 1 and 2 year of cross-sex hormonal therapy (CSH) in comparison with 50 age-matched control men measuring grip strength (hand dynamometer), areal BMD (aBMD) and total body fat and lean mass using DXA, bone geometry and volumetric BMD, regional fat and muscle area at the forearm and calf using pQCT. Standardized treatment regimens were used with oral estradiol valerate, 4 mg daily (or transdermal estradiol 100 μg/24 h for patients >45 years old), both combined with oral cyproterone acetate 50 mg daily.

Results: Prior to CSH, trans women had lower aBMD at all measured sites (all $p<0.001$), smaller cortical bone size (all $p<0.05$) and lower muscle mass and strength and lean body mass (all $p<0.05$) compared with control men. During CSH, muscle mass and strength decreased and all measures of fat mass increased (all $p<0.001$). The aBMD increased at the femoral neck, radius, lumbar spine and total body; cortical and trabecular bone remained stable and bone turnover markers decreased (all $p<0.05$).

Conclusion: Although trans women have a lower aBMD and cortical bone size compared with control men before any kind of hormonal treatment, probably related to a more sedentary lifestyle, their skeletal status is well preserved during CSH treatment, despite substantial muscle loss, illustrating the major role of estrogen in the male skeleton.

OC27

FRAX BASED GUIDELINES: IS A UNIVERSAL MODEL APPROPRIATE?

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Objective: This paper discusses FRAX-based guidelines, derived intervention thresholds, and explores the applicability of a universal model.

Material and Methods: Osteoporosis guidelines were retrieved from IOF website, Pubmed and Google Scholar, for years 2009–2013.

Results: The US, UK and Canadian osteoporosis treatment guidelines agree on treating individuals with fragility fractures, but adopt different approaches to define treatment thresholds in non-fracture subjects. Applying the National Osteoporosis Guideline Group (UK) age-specific intervention threshold model to the Philippines, China, Indonesia, Lebanon, Jordan, Palestine, Morocco and Tunisia would result in recommending treatment in individuals until age 70 years with low 10 year probabilities for major osteoporotic fractures, of <10 %. This approach also results in recommending treatment to a high proportion of such subjects with low risk, for example 25–30 % in Lebanon. Conversely, applying the National Osteoporosis Foundation (US) and Osteoporosis Canada composite models, with a fixed intervention threshold and/or BMD T-score≤−2.5 cutoff, to Asian and Middle Eastern countries would not be appropriate. In Lebanon, this model would lead to treating 41 % and 9 % of women age 70–75 years, considering 10 % and 20 % intervention thresholds, respectively. Similarly, a T-score intervention threshold of −2.5 is not justified in several countries for women until age 70 years, as it would incur treating subjects with an overall 10-year fracture risk <10 %, and <20 % in the US

until age 80. Therefore, a hybrid model may be a preferable consideration in countries with low baseline fracture rates, as adopted in Lebanon. This model uses a fixed 10 % intervention threshold in women <70 years and an age-specific intervention threshold in women ≥70 years. With such approach 19 % of Lebanese women age 70 years would be treated, a proportion almost identical to that of women with moderate or severe vertebral compression fractures at this age. Such a model also avoids over treating young subjects at low risk for fracture, and ensures treating elderly subjects with a fracture risk equivalent to that of an age-matched woman with a fragility fracture.

Conclusion: A universal FRAX based threshold model may not be appropriate. Further research is needed to explore the applicability of different models in various countries.

OC28
WHICH FRAX MODEL IS APPROPRIATE FOR SWEDISH IMMIGRANTS?

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Objective: FRAX tools are country-specific since the incidence of fracture varies between countries. In the case of immigrants, the question arises whether the model for the original or the new country is most appropriate. The aim of this study was to investigate the hip fracture incidence of foreign-born individuals living in Sweden.

Material and Methods: We studied the incidence of hip fracture in all men and women aged 50 years or more in Sweden between 1987 and 2002. The population consisted of 5 million Swedish-born (Swb) and 423,000 foreign-born (Fb) individuals. The effects of age, sex and time from immigration on hip fracture were examined by an extension of Poisson regression.

Results: 249,850 Swb and 3,258 Fb individuals sustained a hip fracture. The hip fracture incidence rose with age for both groups. The risk of hip fracture was higher for women than for men (HR 1.6 (95%CI: 1.6–1.6)) for Swb and for Fb (HR 1.4 (95%CI: 1.3–1.5)). The hip fracture incidence for Swb was approximately twice the incidence for Fb. At the age of 50 years the hip fracture incidence (per 100,000) was 39 (95%CI: 38–39) for a Swb woman and at the age of 90 years the incidence was 5,629 (95%CI: 5,523–5,738). The corresponding incidences for Fb were 15 (95%CI: 13–17) and 3,089 (95%CI: 2,812–3,394) after 5 years from immigration. The hip fracture incidence rose slowly with time from immigration for Fb (0.4 % per annum, 95%CI: 0.2–0.6 %) whereas rates slowly declined with time in Swb.

Conclusion: Our results indicate that hip fracture incidence in Sweden is substantially lower in immigrants than in the population born in Sweden. Although there is a small rise in incidence after immigration, the incidence remains markedly different to that observed in Swedish-born individuals. Thus, the use of a FRAX model from the country of origin is likely to be more appropriate than using the Swedish model when estimating fracture risk.

OC29
CORTICAL POROSITY OF THE PROXIMAL FEMUR IDENTIFIES WOMEN WITH NONVERTEBRAL FRAGILITY FRACTURES

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Objective: Fractures increase as a real BMD (aBMD) decreases. However, most fractures arise from the large population without osteoporosis. The Fracture Risk Assessment Tool (FRAX) is used to identify these women but does not include cortical porosity, a major determinant of bone fragility.

Material and Methods: To test whether combining measures of porosity with aBMD or FRAX better identifies women with fractures, we quantified femoral neck (FN) aBMD, the FRAX score and femoral subtrochanteric cortical porosity in 211 postmenopausal women aged 54–94 years with fractures and 232 controls in Tromsø, Norway. Odds ratio (OR) for fracture and area under the receiver operating characteristic curve (AUC) was calculated using logistic regression analysis.

Results: Women with fractures had lower FN aBMD, higher FRAX score and higher cortical porosity. Each standard deviation higher porosity was associated with fracture independent of aBMD (OR 2.11; 95%CI 1.67–2.68) and FRAX (OR 2.10; 95%CI 1.65–2.67). AUC increased from 0.69 to 0.75 by adding porosity to aBMD, and from 0.67 to 0.74 by adding porosity to

FRAX ($P<0.001$). Fewer women needed to be screened to identify one with fracture, combining porosity with aBMD (1.9; 95%CI 1.7–2.1) or FRAX (1.9; 95%CI 1.7–2.1) compared with using only aBMD (4.1; 95%CI 2.8–7.8), FRAX (3.3; 95%CI 2.4–5.5) or porosity (2.3; 95%CI 1.8–3.2).

Conclusion: Combining cortical porosity with aBMD or FRAX better identifies women with increased fracture risk than aBMD or FRAX alone.

Disclosures: R. Zebaze, A. Ghasem-Zadeh and E. Seeman are inventors of the StrAx1.0 software.

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OC30

CHANGES IN LUMBAR SPINE QCT, DXA AND TBS FOLLOWING TREATMENT WITH DENOSUMAB (DMAB), ALENDRONATE (ALN), OR PLACEBO (PBO) IN POSTMENOPAUSAL WOMEN WITH LOW BONE MASS

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Objective: Patients with osteoporosis require treatment to reduce fracture risk. Fracture risk at the spine is significantly influenced by bone microarchitecture. QCT and DXA measure BMD, a robust indicator of fracture risk. Trabecular bone score (TBS), a novel gray-level measurement derived from spine DXA image texture, is related to microarchitecture and fracture risk independent of BMD. DMAb is associated with greater BMD gains than oral bisphosphonates and Nakamura et al. showed this larger improvement was associated with a larger reduction in vertebral fracture with DMAb vs. ALN.[1] To further characterize bone response with DMAb and ALN, we compared QCT vBMD, DXA aBMD and TBS in postmenopausal women with low BMD.

Material and Methods: In a randomized, double-blind, double-dummy study, postmenopausal women aged 50–70 years with low spine or total hip BMD received DMAb 60 mg SC Q6M, branded ALN 70 mg orally QW or Pbo for 12 months (mo).[2] Lumbar spine (LS) vBMD, aBMD and TBS were measured from QCT and DXA spine scans obtained at baseline (BL) and 12 mo.

Results: In 215 women (73 DMAb, 68 ALN, 74 Pbo) with TBS values at BL and 12 mo, mean age was 60 years and BL mean LS vBMD, LS aBMD T-score and TBS were 90.4 mg/cm^3, −2.4 and 1.234, respectively. Overall, vBMD, aBMD and TBS decreased with Pbo; increased or were maintained with ALN; and improved, vs. both Pbo and ALN, with DMAb. At BL, TBS was better correlated with vBMD ($r=0.42$, $P<0.001$) than aBMD T-score ($r=0.13$, $P=0.051$). TBS% changes did not positively correlate with those of vBMD or aBMD in any treatment group.

Conclusion: Pbo (calcium/vitamin D) was associated with reductions in BMD and TBS. ALN significantly increased BMD but not TBS. DMAb significantly improved BMD and TBS, vs. both Pbo and ALN. TBS appears to capture information at both BL and in response to therapy that is not reflected by BMD (from QCT or DXA). Further studies are needed to identify the explanation and clinical relevance for TBS improvements observed with DMAb.

References: [1]Nakamura, ASBMR 2012. [2]Seeman, JBMR 2010.

Disclosures: Amgen/GSK

OC31

EIGHT YEARS OF CONTINUED ODANACATIB THERAPY FOR POSTMENOPAUSAL WOMEN WITH LOW BONE MINERAL DENSITY: RESULTS FROM AN OPEN-LABEL EXTENSION TO A PHASE IIB STUDY

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Objective: Treatment with odanacatib (ODN), a selective cathepsin K inhibitor, produces progressive increases in spine and hip BMD in postmenopausal women, as shown in a 2-year dose-ranging study and prespecified 3-year extension.[1] A further 5-year extension (Years 6–10: NCT00112437) was designed to evaluate long-term efficacy and safety of weekly oral ODN 50 mg. We will present Year 8 interim analysis results.

Material and Methods: In this 5-year extension T-Scores were initially between −2.0 and −3.5 at the lumbar spine or hip and all eligible patients receive open-label weekly ODN 50 mg plus vitamin D3 (5,600 IU weekly) and calcium if

required. The primary objective is to estimate the change from baseline (randomization start of PN004) in lumbar spine BMD at Years 8 and 10 and to evaluate long-term safety. Secondary endpoints include changes in BMD at the total hip, femoral neck, hip trochanter and one-third distal radius. Changes in markers of bone resorption and formation are also evaluated.
Results: 117 women were eligible to participate in this 5-year extension and received ODN. 37 were <65 years, 80 were ≥65 years when they entered the study. Ethnicity of the patients was: white n=84, Asian n=1 and other races n=32. We will present efficacy and safety data at Year 8.
Conclusion: During the 5-year placebo-controlled period of this Phase IIb study of postmenopausal women with low BMD, ODN increased spine and hip BMD and was generally well tolerated. Data from this extension study will allow us to estimate how the effect of ODN on BMD continues beyond 5 years and to monitor long-term safety of ODN.
References: [1]Langdahl B et al. J Bone Miner Res 2012 27:2251.
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OC32
ASSESSMENT OF PERILACUNAR AND PERICANALICULAR TISSUE MASS DENSITY ALTERATIONS IN HUMAN JAW BONE AFTER BISPHOSPHONATE TREATMENT BY 3D SYNCHROTRON PHASE NANOCT

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Objective: The interaction of osteocytes with their surrounding bone tissue is the subject of recent research [1]. The high connectivity of the lacunar-canalicular-network (LCN) and distribution of the mineral around the LCN has recently been demonstrated [2]. The present study investigates alterations of mass density of the pericanalicular and perilacunar matrix in human jaw bone after bisphosphonate (BP) treatment.
Material and Methods: Human jaw bone samples from BP-treated donors (N=4) and healthy controls (N=4) were imaged with 3D synchrotron phase nanoCT providing sufficient spatial resolution (50 nm voxel size) to resolve the LCN and high sensitivity to mass density fluctuations [3]. In total, 23 osteocyte lacunae and their surrounding tissue regions were analyzed, providing the mean mass density as functions of the shortest distances to canaliculi and lacunae.
Results: We found significantly higher mean mineralized tissue mass densities for the BP treated samples. In average, 50 % of bone tissue was found to be located within less than 1.4 μm and 14 μm away from the closest canalicular and lacunar boundaries, respectively. Mass density was highest close to the LCN and showed a decreasing trend with increasing distance from both canaliculi and lacunae. Mass density gradients adjacent to canaliculi were significantly lower for the BP group.
Conclusion: Phase nanoCT based analysis revealed that in human jaw bone mass density is higher close to both canaliculi and lacunae, resulting in gradients and supporting recent discussion on the ability of osteocytes to interact with their surrounding matrix [1]. Our results indicate that this interaction is not limited to the lacunar boundary, but involves the canaliculi. Moreover, the smaller pericanalicular mass density gradients in the BP group suggest a mineral saturated state of bone tissue due to the drug treatment.
References: 1. Qing et al. J Bone Miner Res 2012;27:1018
2. Kerschnitzki et al. J Bone Miner Res 2013;288:1837
3. Langer et al. PLoS One 2012;7:e35691

OC33
RELATIONSHIPS BETWEEN BODY COMPOSITION AND BONE MICROARCHITECTURE IN OLDER MEN AND WOMEN OF THE HERTFORDSHIRE COHORT STUDY

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Objective: Rates of sarcopenia and obesity are rising. Therefore, understanding the effects of both muscle and fat on bone is increasingly important in the optimisation of bone health. HR-pQCT) permits the in vivo assessment of bone microarchitecture. We explored relationships between bone microarchitecture and body composition in older men and women of the Hertfordshire Cohort Study.
Material and Methods: 175 men and 167 women aged 72.1–80.9 years were studied. HR-pQCT images (voxel size 82 μm) were acquired from the non-dominant distal radius and tibia with a Scanco XtremeCT scanner. Standard morphological analysis was performed for assessment of macrostructure, densitometry, cortical porosity and trabecular microarchitecture. Body composition assessment was completed using DXA (Lunar Prodigy Advanced). Lean mass index (LMI) was calculated as lean mass divided by height squared and fat mass index (FMI) as fat mass divided by height squared. All variables were then standardised.

Results: The mean age in men and women was 76.0 and 76.4 years, respectively. LMI was greater in men, whereas FMI and percentage fat mass were greater in women. Cortical area, cortical thickness and trabecular number were positively associated with LMI and FMI in both men and women. After mutual adjustment, relationships with trabecular number persisted. However, relationships between cortical area and thickness were only maintained with LMI [tibial cortical area, β(95%CI): men 0.41(0.28,0.54), women 0.40(0.26,0.54)] and not FMI.

Conclusion: Both LMI and FMI were positively related to trabecular microarchitecture. In contrast, only LMI is independently associated with cortical area and thickness. This suggests differential effects of components of body composition on bone microstructure.

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OC34

THE EFFECTS OF CALCIUM SUPPLEMENTATION ON CORONARY HEART DISEASE HOSPITALISATION AND DEATH IN POSTMENOPAUSAL WOMEN: A COLLABORATIVE META-ANALYSIS OF RANDOMISED CONTROLLED TRIALS

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Objective: To determine if calcium supplements increase the risk of coronary heart disease in elderly women.

Material and Methods: We undertook a meta-analysis of randomised controlled trials of calcium supplements with or without vitamin D for two primary outcomes: coronary heart disease and all-cause mortality verified by clinical review, hospital record or death certificate. The Cochrane Central Register of Controlled Trials, MEDLINE, and EMBASE databases were searched from January 1, 1966 to May 24, 2013 for potentially eligible studies, reference lists were checked, and trial investigators were contacted where additional data was required. Eligibility criteria included randomised controlled trials of calcium supplementation with or without vitamin D with events with a mean cohort age >50 years. Trial data were combined using a random-effects meta-analysis to calculate relative risk of heart disease events in participants supplemented with calcium.

Results: The search yielded 661 potentially eligible reports of which 18 met the inclusion criteria and contributed information on 63,564 participants with 3,390 coronary heart disease events and 4,157 deaths from any cause. Five trials contributed coronary heart disease events with pooled relative risk (RR) for calcium of 1.02 (95%CI, 0.96–1.09; P=0.51). Seventeen trials contributed all-cause mortality data with pooled RR for calcium of 0.96 (95%CI, 0.91–1.02; P=0.18). Heterogeneity among the trials was low for both primary outcomes (I^2=0 %). For secondary outcomes the RR for myocardial infarction was 1.08; 95%CI, 0.92–1.26; P=0.33, angina pectoris and acute coronary syndrome 1.09; 95%CI, 0.95–1.24; P=0.22 and chronic coronary heart disease 0.92; 95%CI, 0.73–1.15; P=0.46.

Conclusion: This meta-analysis, using stringent pre-specified inclusion criteria and outcome reporting, does not support the hypothesis that calcium supplementation with or without vitamin D increase coronary heart disease or all-cause mortality risk in elderly women.

OC35

RACIAL VARIATION IN MEASURES OF HIP MORPHOLOGY

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Objective: There is known variation in prevalence of hip osteoarthritis (OA) between racial groups. While cultural and environmental factors likely contribute to these differences, morphological variation in hip shape directly affects biomechanics and alignment, both of which are risk factors for

OA. This research compares measurements of hip shape between English Caucasian, American Caucasian, African American and Chinese population groups.

Material and Methods: A study sample of 60–70 women randomly selected from each racial group (Chingford Cohort, Johnston County Cohort, Beijing Osteoarthritis Study) with an age range of 45–75 and no radiographic OA. HipMorf, a validated software program developed by University of Oxford was used to measure both hips on each x-ray. Three readers read x-rays blinded to race in addition to clinical factors. The measurements of interest were lateral centre edge angle (LCE), alpha angle and femoral shaft angle (FSA). Means with standard deviations (SD) were calculated for each measurement and linear regression was used to compare groups.

Results: All three readers had good reproducibility for the selected measures. Significant differences were found between group trends for LCE and alpha angle (Table). FSA was significantly increased ($p<0.001$) in African Americans compared to English Caucasians, and the Chinese group showed a significantly decreased LCE (an indication of hip dysplasia). English Caucasians had an increased proportion of high alpha angles compared to all other groups.

Racial Groups	*N*	*Age*	*BMI*	*LCE* (mean, SD)	*Alpha Angle* (n %>60°)	*Femoral Shaft Angle* (mean, SD)
English Caucasian (CHIN)	148	54.4 (5.7)	25.2 (3.4)	30.7 (7.7)	97 (65.5)	129.6 (4.8)
American Caucasian (JCC)	114	69.7 (3.3)	28.5 (4.7)	31.3 (6.2)	23 (20.2)	129.6 (6.2)
African American (JCC)	114	69.4 (3.2)	28.7 (4.9)	32.1 (7.3)	21 (18.4)	132.7 (5.8)
Chinese (Beijing)	120	63.9 (3.1)	25.2 (3.4)	23.9 (6.8)	31 (25.8)	128.7 (5.7)
P-value (trend)		<0.001	0.5	<0.001‡	<0.001‡	0.86‡
*Chingford Cohort (CHIN), Johnston County Cohort (JCC), Beijing Osteoarthritis Study (Beijing)						
‡adjusted for age						

Conclusion: Variation in morphological measurements of hip shape was found between several racial groups. These results indicate the need for further investigation on using hip morphology as risk factors for OA.

OC36
TRABECULAR BONE SCORE IS ASSOCIATED WITH VERTEBRAL AND NON VERTEBRAL FRACTURE IN MEN: THE STRAMBO STUDY

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Objective: Areal BMD (aBMD) is a less powerful predictor of fracture (Fx) in men than in women. TBS is related to microarchitecture and Fx risk in women independently of BMD. Our goal was to assess the ability of TBS to improve discrimination of prevalent vertebral and peripheral Fx in men, over aBMD.

Material and Methods: TBS was assessed in 886 men aged 50 years and over from the STRAMBO cohort, who had a lumbar spine (LS) DXA scan (Hologic Discovery A) at baseline. 164 men had prevalent fragility Fx (vertebral=70, peripheral=74, both=20).

Results: Men with prevalent Fx were older (73±8 vs. 70±9 years, $p<0.001$), had lower TBS (−5.5 %, −0.6SD, $p<0.001$), LS_aBMD (−7.9 %, −0.5SD, $p<0.001$) and total hip (TH) aBMD (−8.1 %, −0.6SD, $p<0.001$) than men without Fx. After adjustment for age, height, weight and treatment, the magnitude of association with peripheral, vertebral and all types of Fx jointly was similar for TBS, LS_aBMD and TH_aBMD with OR per 1SD decrease [95%CI] of 1.7[1.4;2.0], 1.5[1.3;1.7] and 2.0[1.6;2.5], respectively. In multivariate analysis including the above covariables as well as LS_aBMD and/or TH_aBMD, TBS remained significantly associated with an increased prevalence of peripheral and vertebral Fx alone and in combination (OR=1.7[1.3;2.1], 1.6[1.2;2.1] and 1.6[1.3;1.9], respectively). When using the WHO classification, 13 % of Fx occurred in osteoporotic (Fx rate=42 %), 57 % in osteopenic (Fx rate=23 %) and 29 % in men with T-score>−1 (Fx rate=11 %). 44 % of Fx occurred in the lowest quartile of TBS, regardless of BMD. By combining osteoporotic men with osteopenic men in the lowest quartile of TBS, we were able to depict three times as many Fx as in the osteoporotic men alone (41 % vs. 13 %) with a rather small decrease of the Fx rate: 38 % vs. 42 %.

Conclusion: TBS is a useful tool to discriminate men with and without prevalent Fx, even in addition to aBMD measured either at the lumbar spine or total hip. Its use in prospective studies in men should confirm its ability to predict Fx independently of aBMD.

OC37
ANKLE FRACTURES ARE ASSOCIATED WITH LOW AREAL BMD AND BONE MICROSTRUCTURAL ALTERATIONS IN POSTMENOPAUSAL WOMEN

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Objective: Ankle fractures are among the most common non-vertebral fractures. Previous studies have suggested that peripheral, but not axial areal (a) BMD predicted, though poorly, ankle fracture risk, in contrast to the well recognized

association between forearm fracture and aBMD. Bone microstructure analysis may reveal alterations not captured by aBMD. The objective of this study was to investigate the association between bone microstructure and ankle fracture.

Material and Methods: We determined distal radius cortical and trabecular bone microstructure by HR-pQCT (XtremCT, Scanco Co, Bruttisellen, CH), together with aBMD by DXA, in 749 women aged 65.0±1.4 (x±SD) years, with or without prevalent ankle or forearm fracture. Dietary protein and calcium intakes, and physical activity were evaluated by questionnaires.

Results: Prevalent ankle and forearm fractures (both having occurred after the age of 20) were found in 63 (8.0 %) and 59 (7.8 %) women, respectively. As compared with women without prevalent fracture, and after adjustment for height, weight, dietary intakes and physical activity, postmenopausal women with prevalent ankle fractures, had lower aBMD (spine: −7.7 %, $p<0.0001$; femoral neck: −6.4 %, $p<0.001$; distal third radius: −4.1 %, $p<0.01$), and lower distal radius total volumetric BMD (−7.9 %, $p<0.01$), cortical thickness (−7 %, $p<0.05$) and BV/TV (−10.9 %, $p<0.01$). The corresponding values in women with prevalent forearm fracture were: −8.8 %, $p<0.0001$; −6.8 %, $p<0.001$; −3.4 %, $p<0.025$, for aBMD; and −15.1 %, $p<0.0001$; −11.2 %, $p<0.001$; −21 %, $p<0.0001$, distal radius microstructure. For 1 SD decrease as compared with patient without prevalent fracture, ORs for ankle and forearm fracture were 1.9 and 2 (both $p<0.001$), 2 and 2.1 (both $p<0.001$), and 1.6 and 1.5 (both $p<0.01$) for spine, femoral neck and distal third radius aBMD, respectively. Similarly, ORs were 1.6 and 2.2 (both $p<0.01$), 1.6 and 2.7 (both $p<0.001$) and 1.6 and 2.2 (both $p<0.01$) for distal radius volumetric BMD, BV/TV and trabecular number, respectively. There was no statistically significant difference in aBMD or bone microstructure values between women with prevalent ankle and forearm fracture.

Conclusion: These results highlight lower aBMD and altered bone microstructure in postmenopausal women with prevalent ankle or forearm fracture. These alterations suggest that prevalent ankle fractures should be considered as a significant risk factor for subsequent fracture and taken into account in fracture risk assessment.

OC38
HYPOPHOSPHATASIA IN ADULT: SCREENING OF AN ITALIAN POPULATION GROUP

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Objective: The process of bio mineralization that occurs in bone tissue takes place throughout an individual's life. Complex biological systems carefully orchestrating the crosstalk between skeletal tissue and modulator of mineralization include factors acting as promoters or inhibitors. The physiological role of alkaline phosphatase (ALP) is not fully understood, and a useful model is provided by the rare genetic disease hypophosphatasia (HPP), an inherited disorder characterized by a defect in skeletal mineralization caused by tissue nonspecific ALP (TNSALP) deficiency due to TNSALP gene mutations. It is highly variable in its clinical presentation, ranging from stillbirth and absence of mineralization in severe disease to mild dental problems or osteopenia in adulthood. Patients with the adult form present with osteomalacia, chondrocalcinosis, nonhealing fractures, and premature tooth loss. BMD is often osteopenic, and the disease is misclassified as primary osteoporosis. It is also being mistreated, for example with bisphosphonates, that also cause misinterpretation of the low ALP levels. Scope of the present study was to recognize adult HPP in a population of patients referring to the Bone and Mineral Diseases Unit at the University of Florence Hospital.

Material and Methods: The clinical records of a population of 2,850 subjects have been revisited in order to select subjects with low serum ALP before any osteoporotic treatment, with history of non-healing fractures, with metatarsal fractures, premature tooth loss, periodontal diseases and low BMD. Additional clinical symptoms: fatigue, chronic pain, nephrocalcinosis, hypercalciuria, and seizures. As the osteoporosis patients referred to our Unit undergo blood withdrawal to be stored for genetic analysis when informed consent is obtained. ALP gene was evaluated in suspicion of HPP.

Results: So far we identified 16 subjects with clinical characteristic of HPP. The biochemical investigations of these patients showed very low values of bone ALP in serum (mean 6±2 μg/L; n.v.: 7–22), serum calcium and phosphate in the normal range. Low levels of vitamin D (25OHD3) were observed in all subjects (mean: 15.6± 6.1 ng/ml, n.v.: 30–70). BMD measured at the lumbar spine and femoral neck by DXA showed a picture of osteopenia or osteoporosis. The results of the genetic analysis showed the presence of a variant in exon 5 codon 152 (CGC>CAC, Arg>His) in heterozygosity in two patients, a variant of exon 9, codon 292; (CCA>GCC; Pro>Pro) in two patients, a change in intronic IVS5 +14 ex 5 in 6 patients. Six patients did not show mutations in the gene TNSALP.

Conclusion: These preliminary data, open up to the possibility that polymorphic variants of the ALP gene may be

associated with a low BMD with a tendency to spontaneous fractures and insufficient response to drugs used to date in the treatment of osteoporosis.

OC39
FURTHER REDUCTION IN NONVERTEBRAL FRACTURE RATE IS OBSERVED FOLLOWING 3 YEARS OF DENOSUMAB TREATMENT: RESULTS WITH UP TO 7 YEARS IN THE FREEDOM EXTENSION

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Objective: Evidence for further reduction of nonvertebral fracture (NVFX) beyond 3 years of antiresorptive therapy is limited. The effects of long-term denosumab (DMAb) treatment are being evaluated in the ongoing FREEDOM extension study. We hypothesized that the NVFX rate with DMAb decreases with 4–7 years of therapy compared with the first 3 years.

Material and Methods: During the extension, all subjects received 60 mg DMAb Q6M. Long-term subjects received 7 years of DMAb (3 years in FREEDOM; 4 years in extension); cross-over subjects received 3 years of placebo in FREEDOM and 4 years of DMAb in the extension. NVFX rates for the first 3 years of DMAb were compared with rates in the 4th year of DMAb in each group separately and combined and with the NVFX rate during years 4–7 (long-term group only). Adjusted rate ratios (RR) (95%CIs) between observational periods were computed via generalized estimating equation (GEE) Poisson regression.

Results: 4,550 of 5,928 (77 %) eligible women enrolled in the extension (N=2,343 long-term; N=2,207 cross-over). In the long-term group, the NVFX rate was 1.98 per 100 subject-years during years 1–3 of DMAb (FREEDOM). This rate decreased during year 4 (extension) to 1.43 (RR=0.73; P=0.096; Table), and the rate remained low at 1.45 during years 4–7 (RR=0.74; P=0.016). Similarly for the cross-over group, the NVFX rate was 2.20 during years 1–3 of DMAb (extension) and decreased to 1.03 at year 4 (RR=0.48; P=0.004).

Table. Comparison of Nonvertebral Fracture Rates up to 7 Years of DMAb Treatment

	First 3 Years of DMAb Treatment	4th Year of DMAb Treatment	Years 4–7 of DMAb Treatment
Long-term Subjects (N=2343)	140 Fractures	33 Fractures	119 Fractures
Fracture Rate (95% CI)	1.98 (1.67–2.35)	1.43 (1.02–2.01)	1.45 (1.21–1.74)
Rate Ratio (95% CI)	Referent	0.73 (0.50–1.06)	0.74 (0.59–0.95)
P-value		*P*=0.096	*P*=0.016
Cross-over Subjects (N=1730)	114 Fractures	17 Fractures	
Fracture Rate (95% CI)	2.20 (1.82–2.66)	1.03 (0.64–1.66)	
Rate Ratio (95% CI)	Referent	0.48 (0.29–0.79)	
P-value		*P*=0.004	
Long-term and Cross-over Subjects Combined (N=4073)	254 Fractures	50 Fractures	
Fracture Rate (95% CI)	2.08 (1.83–2.36)	1.27 (0.96–1.67)	
Rate Ratio (95% CI)	Referent	0.62 (0.46–0.83)	
P-value		*P*=0.002	

N = number of subjects who completed FREEDOM (ie, completed their 3-year visit and did not discontinue IP), did not miss >1 dose of IP in FREEDOM, and who enrolled in the extension. In addition, cross-over subjects completed 3 years of the extension and did not miss >1 dose of DMAb during the first 3 years of the extension. Fracture rates and rate ratios were obtained using GEE Poisson models; fracture rates are per 100 subject-years. Rate ratios relative to the first 3 years of DMAb treatment were adjusted for age, total hip BMD T-score, weight, and history of nonvertebral fracture. In addition, the treatment group variable was included in the model for the combined analysis only.

Conclusion: Three years of DMAb treatment significantly reduced the NVFX rate compared with placebo. Continued DMAb treatment was associated with further reductions in NVFX rates, which remained low throughout an additional 4 years of continuous therapy.

Disclosures: Amgen/GSK

OC40
EARLY FINDINGS FROM PROLIA® POST-MARKETING SAFETY SURVEILLANCE FOR ATYPICAL FEMORAL FRACTURE, OSTEONECROSIS OF THE JAW, SEVERE SYMPTOMATIC HYPOCALCEMIA, AND ANAPHYLAXIS

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Objective: We characterize post-marketing (PM) experience for four adverse drug reactions (ADRs) with denosumab (Prolia): atypical femoral fracture (AFF), osteonecrosis of the jaw (ONJ), severe symptomatic hypocalcemia (SSH), and anaphylaxis.

Material and Methods: The Amgen PM database undergoes continual assessment of adverse events reported from health care providers, patients, and other sources. AFF and ONJ cases were assessed and adjudicated by independent committees. SSH and anaphylaxis prompted further assessment by Amgen Global Safety because causality due to Prolia could not be excluded.

Results: As of September 2013, estimated exposure with Prolia was 1,252,566 patient-years. Four PM reports have been adjudicated as consistent with the ASBMR definition for AFF (Shane et al., JBMR 2010). All patients had prior bisphosphonate (BP) use. Two subjects had healing and two did not have follow-up information. For ONJ, 32 PM reports were adjudicated as consistent with the AAOMS definition (Position Paper, AAOMS 2009). Risk factors included ≥1: glucocorticoids, chemotherapy, prior BP use, older age, and invasive dental procedures. One-third of reports indicated resolution, 1/3 were ongoing, and the remainder were unknown. Eight reports of SSH included symptoms of seizures and/or tetany; nearly all (7 of 8) had chronic kidney disease, a risk factor for hypocalcemia; most SSH events occurred within 30 days of Prolia administration and responded to IV/PO calcium/vitamin D. For anaphylaxis, five reports included hypotension, dyspnea, throat tightness, facial and upper airway edema, pruritus, and/or urticaria. Most events occurred within 1 day of the first Prolia dose; emergency room treatments included antihistamines and IV/PO steroids with no fatal outcomes.

Conclusion: These PM events with Prolia have not shown any unexpected findings; the benefit/risk profile for Prolia remains favorable. Ongoing safety surveillance will continue in the clinical trial program and pharmacovigilance activities.

Disclosures: Amgen/GSK

OC41

EFFECT OF TERIPARATIDE ON HEALING OF INCOMPLETE ATYPICAL FEMUR FRACTURES

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Objective: With increased awareness of atypical femur fractures (AFFs), incomplete non-displaced fractures (iAFFs) associated with antiresorptive therapy are diagnosed more frequently. Optimal therapy for these fractures is unclear. We describe a case series of 25 patients (pts.) with iAFFs treated with teriparatide (TPD) therapy.

Material and Methods: All 25 pts. satisfied the criteria set forth by the ASBMR Task Force. We assessed radiographic fracture healing using CT scans and plain radiographs, measuring depth of the lucent line through the cortex and degree it extended around the circumference every 6 months for up to 2 years. Pain, mobility, and progression or regression of fracture line as well as surgical intervention were noted.

Results: All were postmenopausal women (mean age 67 years; 76 % Caucasian, 24 % Southeast/South Asian). Eighteen pts. had one iAFF and seven had bilateral iAFFs for a total of 32 iAFFs. Mean duration of TPD therapy was 16.8 months (range 1.2–24.6 months). Three pts. [5 iAFFs] underwent surgical repair (2 pts [3 iAFFs] for debilitating pain/progression of iAFF, and 1 pt. [2 iAFFs] for patient/physician preference). Three other pts. (4 iAFFs) did not have follow-up imaging. Of the remaining 18 pts. with 23 iAFFs, 3 iAFFs were completely healed, 6 showed healing but still had residual lucent lines, 13 were stable and 1 showed worsening of fracture line. Overall, 32 % were healing or healed, 46 % were stable, and 21 % had progression of fracture line or required prophylactic surgery. In addition, 4 pts developed new lucent lines in the same femur while on TPD therapy.

Conclusion: TPD may promote healing of iAFFs, but results of our randomized controlled trial will be better suited to definitively answer this question.

OC42

SURGICAL PREVENTION OF FEMORAL NECK FRACTURES IN OSTEOPOROTIC PATIENTS: LONG-TERM RESULTS

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Objective: The aim of our RCT was to evaluate safety and efficacy of a new device called Prevention Nail System (PNS) developed for the prevention of femoral neck fractures (FNFs) in patients with severe osteoporosis.

Material and Methods: The PNS is a titanium screw with an hydroxyapatite coating implanted in the femoral neck in order to reinforce it. We enrolled patients with: intracapsular FNF; age ≥65 years; DXA of the noninjured hip with a T-score≤ −2.5 SD. All patients received standard treatment for the fractured hip (arthroplasty, emiarthroplasty, cannulated screws); the contralateral hip was randomized either to receive PNS (group A) or not: control group (B). During each follow-up (FU) at 3, 12 and 24 months, DXA, CT and X-rays of the reinforced hip were performed.

Results: From September 2008 to May 2012 we enrolled 80 patients (46 A, 34 B). The mean age was 83 years (A) and 82.9 (B). The preoperative DXA was −3.3 SD in both groups. At

1 month FU no patients reported pain in the reinforced hip. The walking ability of patients with PNS were comparable to controls. The CT scan showed good osteointegration of the PNS. At the longest available FU 23 patients reported one or more falls. 16 nonfemoral fractures Were recorded: 10 (A) and 6 (B) and 7 contralateral hip fractures (CHFs): 3 in the PNS group and 4 in the control group. In A all CHFs occurred within 1 month after surgery and there was a difficult screw placement during surgery, in the control group the CHFs were consequence of a fall (6 months to 2 years after the first FNF).

Conclusion: No statistical differences were reported between A and B; however, there is a trend that shows prevention of fractures in the PNS group. The device was well tolerated. CHFs in the PNS group should be considered a technical error due to the surgical instruments. Safety of the device can be increased by improving the instruments to reduce the risk of iatrogenic fractures. Moreover larger cohort of patients is necessary to evaluate the effectiveness in preventing FNF.

OC43

DOES LIFESTYLE MODIFICATION AND PHYSICAL THERAPY IMPROVE QUALITY OF LIFE IN POSTMENOPAUSAL OSTEOPOROSIS?

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Objective: To find an adequate physical therapy program for women with postmenopausal osteoporosis and to evaluate outcomes regarding quality of life.

Material and Methods: For 1 year we followed 96 women (age 47–72) with postmenopausal osteoporosis, under treatment with bisphosphonates. Initially, at 6 and 12 months, we evaluated the patients, using DXA osteodensitometry and SF-36 questionnaire. We recommended a short program (30 min) of fall prevention and ROM exercises, at least three times weekly.

Results: The adherence to physical activity program was poor, only 22 % respected the schedule. After 6 months the SF-36 score was better in patients who performed the prescribed physical training program. 18 patients left the study at this moment. The average score of SF-36 was significantly improved after 1 year. We did not find significant BMD changes after 1 year.

Conclusion: The implementation of an adequate physical activity lifestyle may be difficult and requires a suitable methods for educating osteoporosis patients. For physical therapy activity has no effect on BMD but seems to improve the quality of life in women with postmenopausal osteoporosis.

OC44

LIFESTYLE AND DIETARY HABITS FOR FRACTURE PREVENTION AND CARE

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Objective: To raise the awareness towards osteoporosis and osteoporotic fracture prevention through modification of Lifestyle and Dietary habits in Georgian population.

Material and Methods: 567 women were examined at our Clinic In 2013–2014 year. All patients diagnosed with osteopenia or osteoporosis were involved in a specific programme for nutritional support and lifestyle modification—"Life Without a Fracture". The programme was specifically created to increase patient awareness towards bone health and prevent diagnosed low bone mass progression into Osteoporosis and Osteoporotic Fracture. Involved patients were handed brochure "You Have Osteoporosis-First Steps Towards Fighting It" dedicated to the specifically prepared for series of presentation sessions. Brochure featured following chapters: Calcium and Dairy Nutrition; Body Weight and Its Influence on Bone mass; Smoking and Alcohol Cessation; Lifestyle Modification; Fall Prevention; Consultations and Supervision by a Health Professional. We have prepared Lecture course on Osteoporosis risks and Nutritional Support for Osteoporosis Prevention and Treatment. Georgian Association of Skeletal Metabolism Diseases members were presenting lectures at the local polyclinics in order to help primary care physicians to recognize and diagnose OP in primary healthcare setting. At the end of each session they were handed the Book "Issues of Nutrition and Bone Health".

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.

Conclusion: The program has raised the awareness of primary care physicians towards recognition, correct diagnostics and timely treatment accompanied with appropriate Nutritional recommendations.

OC45

IMPACT OF DIETARY HABITS AND PHYSICAL ACTIVITY ON BONE HEALTH AMONG 40–60 YEAR OLD FEMALES AT RISK OF OSTEOPOROSIS IN INDIA

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Objective: To check the evidence of diet and nutrition and physical activity relating to risk of osteoporosis among 40–60 year old women in India.
Material and Methods: IOF One-Minute Osteoporosis Risk Test questionnaire, a separate questionnaire to assess the activities and their relation to generation of pain and assessment of BMD through broadband ultrasound of wrist. Assessing dietary habits and food intakes through food frequency questionnaire, following were considered: milk, poultry, fleshy foods, fruits and vegetables along with portion size.
Results: The IOF One-Minute Osteoporosis Risk Test questionnaire provided information regarding genetic risk and secondary risk of osteoporosis. A total of 102 females (40–60 years of age) were assessed, and 43 % were found at risk of osteoporosis. The genetic risk was found among 8 % of subjects, 7 % were suffering from osteoarthritis and; only 3 % were having thyroid problems. About 78 % had onset of menopause between 47 and 55 years of age. About half of the assessed population was university lecturers constituting 36 % of those at risk of osteoporosis. Dietary assessment revealed strong relation between less intake of milk, poultry and fleshy foods and increased risk to osteoporosis and related symptoms. The women not at risk were found to be physically active having healthy eating habits. Majority of them were taking milk and poultry on daily basis besides fresh fruits and vegetables. Almost 75 % of all women assessed were not exposing themselves to sunlight daily.
Conclusion: A positive relation was found between diverse food habits and bone health, suggesting foods rich in vitamins, minerals and other phytochemicals reduce the risk of bone density loss. A strong relation was found between physical activity to risk of skeletal problems and related symptoms of pain, supporting the fact that exercise stimulates skeletal growth. Early onset of menopause was also found prevalent among some women, at increased risk of osteoporosis.

OC46
LIFESTYLE RISKS AND MEDICATION ISSUES DISCUSSED WITH OSTEOPOROSIS PATIENTS

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Objective: Compliance with recommendations (lifestyle or medication) implies actually a shared responsibility between physician and patient and, however adherence is accepted as being linked to >200 different variables, it is affected mainly by the communication between the parts. We aimed to explore the frequency and duration of discussions regarding lifestyle-risks and medication-related issues, when prescribing osteoporosis medication to a patient.
Material and Methods: The observational-descriptive analysis, carried out in a non-participatory manner, included 227 interactions between doctors and osteoporosis patients in seven ambulatory clinics (rheumatology, physiotherapy, endocrinology) in four cities. In all cases the patient was initiated or already taking an osteoporosis drug. We observed the presence, and if the case: the length of discussions about lifestyle. It was also assessed, whether medication issues were discussed (possible side effects, patient fears) and the proportion of time spent with this, compared to the overall duration of the visit.
Results: Lifestyle discussions were present in 14 % of the interactions between the physician and osteoporotic patient. In these cases, it took in average 7 s to discuss about lifestyle (including investigation and providing information or recommendation). Total dialogue about osteoporosis medication inclusive: exploring patient fears or giving advice was observed to represent 10 % of the time spent with the patient.
Conclusion: We observed meetings focused on tasks at the expense of discussions (exploring risk factors, providing information and advice) that were less than brief and represented a reduced percentage of the encounter. Time spent in lifestyle and medication related discussions was insufficient to provide patients with adequate information and motivation to reduce their osteoporosis risks and adhere to the prescribed medication.

OC47
LIFESTYLE AND DIETARY FACTORS PROMOTING DEVELOPMENT OF HIP FRACTURES IN MEN

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Objective: The incidence of hip fractures in Yaroslavl (Russian Federation) in men aged till 70 years they meet more often than at women that distinguishes the obtained epidemiological data from other countries. The aim of the study was to estimate the lifestyle risk factors (smoking, alcohol consumption, the hard physical work, insufficient consumption of calcium with food) in men with hip fractures in 40–69 years.
Material and Methods: The main group included 128 men–inhabitants of Yaroslavl (Russia) aged 40–69 years with hip fracture. The control group was included 50 healthy men 41–67 years old. In comparison group there were 108 patients at the age older than 70 years with hip fracture. Consumption of

alcohol was estimated on CAGE questionnaire. The statistical analysis was carried out by means of a package of the applied programs Statistica 10.0.

Results: In the analysis of major osteoporosis risk factors in the main group comparing with control groups were revealed significantly more often current smoking ($p<0.00001$), abuse and systematic alcohol ($p<0.00001$), heavy physical activity at the age of 25–50 years ($p<0.01$), insufficient consumption of dietary calcium (≤1,500 mg/d, $p<0.05$; ≤500 mg/d, $p<0.05$). The comparing of the frequency of the risk factors at the main and comparison groups we revealed significantly distinctions. There were following risk factors in the main group: current smoking ($p<0.0002$), systematically intake alcohol ($p<0.05$); abuse alcohol ($p<0.05$), heavy physical activity at 25–50 years ($p<0.001$). Insufficient consumption of calcium with food was revealed in both groups, $p>0.05$, but more patient of the main group consumed ≤500 mg/d, $p<0.05$.

Conclusion: The positive correlation of the development of hip fractures in men 40–69 years old to the lifestyle factors as smoking, systematic consumption and abuse of alcohol, heavy physical activity, low consumption of calcium with food was established.

OC48

TOO FIT TO FRACTURE: INTERNATIONAL CONSENSUS TO ESTABLISH RECOMMENDATIONS ON EXERCISE AND SAFE MOVEMENT FOR INDIVIDUALS WITH OSTEOPOROSIS AND SPINE FRACTURES

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Objective: To develop consensus on physical activity recommendations for individuals with osteoporosis.

Material and Methods: Using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) method, an international multidisciplinary panel examined literature on exercise effects on: 1) falls, fractures, BMD, and adverse events for individuals with osteoporosis or spine fractures; and 2) pain, quality of life, and physical function after spine fracture. Evidence was rated as high, moderate, low, or very low. An online Delphi process (2 rounds) was used to establish consensus on assessment, exercise, and safe movement related to three cases with varying risk (moderate risk for fracture; 1 spine fracture; multiple spine fractures, kyphosis & pain). Duplicate content analyses of free text responses to each question were performed.

Results: GRADE Recommendations: All individuals with osteoporosis should engage in a multicomponent exercise program that includes resistance and balance training; they should not engage in aerobic training to the exclusion of resistance or balance training. Response rates on the 2 Delphi rounds were 52 % (39/75), 69 % (48/70). Key points: a) current physical activity guidelines are appropriate for individuals with osteoporosis in the absence of spine fracture, but not for those with spine fracture; b) after spine fracture, aerobic activity of moderate intensity is preferred to vigorous; physical therapy consultation is recommended; c) daily balance training and endurance training for spinal extensor muscles are recommended for all; d) health care providers should provide guidance on safe movement, considering activity history and preference rather than providing generic restrictions (e.g., lifting).

Conclusion: Our recommendations guide health care providers on assessment, exercise prescription and safe movement for individuals with osteoporosis.

OC49

LEISURE TIME COMPUTER USE AND ADOLESCENT BONE HEALTH: FINDINGS FROM THE TROMSØ STUDY–FIT FUTURES

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Objective: There is growing concern regarding the possible adverse effects of decreasing physical activity and obesity on bone health in adolescence. Here we explore the hypothesis

that greater computer use at weekends is associated with lower BMD.

Material and Methods: In 2010–2011 more than 90 % of all first year comprehensive school students in the Tromsø region (a total of 1,038) attended the Fit Futures study, an expansion of the Tromsø study. BMD at total hip, femoral neck and total body was measured as g/cm^2 by DXA (GE Lunar prodigy). Lifestyle variables were collected by self-administered questionnaires and interviews, including questions on time per day during weekends spent in front of the television or computer and time spent on leisure time physical activities, according to the Gothenburg instrument. The analyses included 463 girls and 484 boys aged 15–18 years.

Results: Many adolescent balanced 2–4 h screen time with moderate or high levels of physical activity. Boys spent more time in front of the computer than girls ($p<0.001$), and among boys screen time was positively related to higher BMI levels ($p=0.010$). When we explored associations between BMD and screen time in a multiple regression model, that included adjustment for age, sexual maturation, BMI, leisure time physical activity, smoking, alcohol, cod liver oil and carbonated drink consumption, we found contrasting relationships. In boys, higher screen time was adversely associated to BMD at all sites ($p<0.05$), and these associations remained robust to adjustments for all life style factors described above. In contrast, girls who spent 4–6 h in front of the computer, had higher BMD than counterparts who spend <1.5 h screen time each day; this could not be explained by adjustments for the measured confounders.

Conclusion: We see different associations between time spent in sedentary activities and BMD levels among Norwegian boys and girls, and these findings warrant further studies in other populations.

OC50
FALLSCREEN: A COLLABORATIVE EFFORT FOR FEASIBLE AND EFFECTIVE PREVENTION OF FALLING IN COMMUNITY

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Objective: Fragility fractures are a growing, global health problem leading to increased mortality, morbidity, and declined quality of life, besides exerting enormous costs on health and social care systems. Number of these fractures is projected to rise exponentially as populations age and have poorer physical functioning in general. Thus, all practical and effective efforts need to be targeted to high-risk citizens: i.e., to those likely to fall and/or have fragile, osteoporotic skeleton. It is noteworthy that falls can be prevented and bones strengthened largely by similar measures and activities. The objective of the FallScreen project (KaatumisSeula in Finnish) is to put all relevant evidence on effective fall prevention into practice.

Material and Methods: The implementation of FallScreen is based on a wide, coordinated cooperation between local NGOs (including pertinent patient and senior citizen societies) and health and social caregivers of the community. In short, all older adults aged >65 years living in the community are to be reached and subsequently evaluated for individual fall risk within the normal activities of local NGOs which are trained for basic risk assessment. All reached citizens receive pertinent information on physical activity, healthy nutrition (calcium, vitamin D, proteins) and lifestyle (alcohol, smoking) in general, in addition to information on local activities arranged for older people. Those identified at increased fall risk are asked to visit a fall prevention clinic, where a more comprehensive evaluation (e.g., medical and medication review, physical functioning and vision, home hazards) of various factors accounting for the fall risk is done, and if necessary, specific measures and corrections are taken. This type of clinic is shown to reduce the rate of falls and related injuries by about 30 % among older adults[1].

Results: The FallScreen project will start in 2014 in the city of Seinäjoki, Finland and it is expected to reach 8,000–10,000 older adults.

Conclusion: If even few prevented hip fractures can be attributed to FallScreen, this collaborative effort between NGOs and local health and social caregivers will provide a cost-saving and feasible community-based approach to prevent fractures among aging population.

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OC51
PHYSICAL THERAPY BENEFITS UPON FUNCTIONAL STATUS AND FALL RISK IN OSTEOPOROTIC WOMEN

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Objective: To test the efficacy of 12 weeks Balance Training Program on functional status and fall risk in women with osteoporosis in Medical Rehabilitation Hospital Felix Spa Romania. Design: randomized, controlled observational study.

Material and Methods: A total of 54 consecutive outpatients were randomized in control group ($n=25$) and study group ($n=25$), as four patients from study group desisted. Interventions: The control group received medical treatment for osteoporosis and educational materials to prevent falls. The study group

completed a balance training program for a period of 30 min three times weekly for 12 weeks and continued the same exercises at home, daily. Outcome measures: Functional mobility was evaluated by the Timed "Up and Go" Test (TUGT), functional balance with Berg Balance Scale (BBS). Assessments: the data were expressed as the mean and standard deviation for each variable at baseline, and after 12 weeks. "Effect size" was applied for Timed "Up and Go" Test and Berg Balance Scale to describe the magnitude of the clinical changes.

Results: The difference in BBS score was greater in the study group, no significant changes were registered in control group. A significant difference in the functional mobility, as measured by the TUGT was observed in the study group compared to control.

Conclusion: Our study showed that balance training performed three times weekly supervised by a physiotherapist and complemented by home based exercises has important benefits in the improvement of balance, mobility and in reduction of falls in women with osteoporosis.

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OC52
RISK FACTORS OF OSTEOPOROSIS IN TURKISH WOMEN BEYOND FRAX

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Objective: Although FRAX evaluation doesn't include some risk factors regarding lifestyle such as nutritional habits, physical activity and gynecologic profile. It is still important to explore these factors in terms of bone health. The aim of this study is to explore clinical risk factors regarding bone health with a simple questionnaire among women over 50 years of age, and to increase awareness of community-based risk factors.

Material and Methods: This study was performed in 13,530 residents via face to face interview by trained staff using a structured questionnaire, in 12 different geographical regions of Turkey.

Results: The mean age of females was 62.25, mean BMI was 29.16. Excessive alcohol intake was 0.4 %, current smoking was 12.25 %. Residential location was urban in 72.90 %, rural in 27.10 %. In terms of milk consumption before 25 years 30.95 % always, 35.65 % sometimes, 24.22 % rarely and 9.17 % never; between 25 and 50 years 19.52 % always, 37.30 % sometimes, 31.91 % rarely, 11.26 % never; milk consumption after 50 years 18.80 % always, 31.80 % sometimes, 32.57 % rarely, and 16.83 % never. Regular physical exercise or sports activities were reported in 27.90 %. The mean age at menarche was 13.69. 28.37 % had premature menopause. The mean number of birth was 4.15 with a maximum of 15 births. The mean duration of breastfeeding in whole life was 58.62 months. Breast-feeding ratio per a child; 33.86 % lactated for 6–12 months, 40.45 % for 12–24 months.

Conclusion: In terms of preventive strategies education of patients as well as the healthy population is of great importance. A primary aim is to establish healthy nutrition habits including increased intake of dairy products in diets, and calcium vitamin D supplementations in women over 50 years. It is crucial to detect these risk factors in women with population-based studies in order to establish powerful preventive strategies.

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OC53
CHARACTERISTICS OF SUBJECTS REPORTING LOW-ENERGY FRACTURES IN A LARGE POPULATION-BASED STUDY

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Objective: To explore the prevalence of some factors for low bone strength like age, gender, body constitution, smoking and vitamin D deficiency in subjects who reported past fractures in a large population-based study.

Material and Methods: 2,033 subjects (1,076 female, 957 male), 20–80 years of age participated and filled a questionnaire concerning current or previous morbidity and medication, past fractures (all and vertebral, hip or Colles'), smoking habits. Body weight and height were measured. Blood sample was drawn for 25(OH)D. The fracture prevalence was estimated and the relationship to the studied factors was explored.

Results: 90 subjects (4.5 %) reported past fractures (71 female, 19 male, $p<0.001$). Thirteen hip fractures (8 female, 5 male), 5 vertebral (3 female, 2 male) and 31 Colles' (22 female, 9 male) were reported. One subject reported more than one fracture. In both genders the subjects with fractures

were older ($p<0.001$). The females with fractures, but not the males, had higher BMI than those without (29.0±5.0 vs. 27.1 ±5.8, $p<0.001$) and had higher waist circumference (85.1± 12.8 vs. 90.4±11.5). In both genders 25(OH)D was lower in the subjects with fractures, though marginally significant in the males. In both genders the fracture prevalence was significantly higher in those with 25(OH)D below 25 nmol/l, as was the hip, but not the Colles' fracture prevalence. 25(OH)D levelas were lower in the female subjects with obesity (34.2±16.1 vs. 37.7±17.9, $p=0.07$). We found no correlation of the fracture prevalence with smoking.

Conclusion: The subjects reporting fractures were older, predominantly female and had lower vitamin D. The latter may be linked to insufficient sun exposure and in the females to overweight and obesity. Overweight and abdominal obesity especially in the females were associated to fracture prevalence, presumably due to lower physical activity and unbalanced diet.

OC54
LIFESTYLE, VITAMIN D AND OSTEOPOROSIS IN A VEIL COVERED WOMAN

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Objective: A 47 years old female patient suffering from polymorphic musculoskeletal symptoms including fatigue and fibromyalgia was screened for the premature osteoporosis. Since she has been a wearing a dress code with a veil covering the whole body including head, face and chest and determined lifestyle indicating her extremely low exposure to daily sun, vitamin D sera was measured before and after the initiation of treatment. Past history showed that she went into premature osteoporosis when she was 38 years old.

Material and Methods: A case report study.

Results: Vitamin D level was <3.00 ng/ml and DEXA average T score for the lumbar spine was −2,8 and for the hip T score was −0,8. Two years before T score for the lumbar spine was −1,7 and for the hip −0,3 respectively. So, T score has worsened from −1,7 to −2,8 for the lumbar spine and from −0,3 to −0,8 for the hip respectively just in a two years. The bisphosphonate with vit D in itself was initated as therapy including the supplementation therapy. Dietary regime with the minimum half an hour of sun exposure during the noon time was advised. The control DEXA and Vitamin D was measured after one year and improvement was observed, but not significantly due to entire covered body, head and face with veil. The musclosceletal symptoms and general health was improved.

Conclusion: The sun exposure is necessary for the bone health and total avoidance of sun is connected with extremely low vitamin D level in a sera that may lead to premature osteoporosis. Different lifestyle has impact on bone strength.

OC55
THE IMPACT OF NON-NUTRITIONAL FACTORS ON VITAMIN D STATUS IN ELDERLY UKRAINIAN POPULATION

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Objective: Verification of vitamin D status in elderly Ukrainian subjects; assessment of the influence of various factors on vitamin D and bone tissue status.

Material and Methods: 1,209 subjects (90.9 % women, age 50–90 years) from various regions of Ukraine. Blood sampling done in 2011–2013; separate subset of subjects assessed between November and April. Vit. D status assessed by measuring serum 25(OH)D levels by electrochemiluminescence method (Elecsys 2010, Roche). Vit. D deficiency diagnosed at <50 nmol/l (severe deficiency <25 nmol/l); insufficiency - 50–75 nmol/l; optimal vitamin D status declared at >75 nmol/l. Serum intact parathyroid hormone levels were also assessed. Subjects completed a set of questionnaires (VAS, Lequesne, Rolland-Morris, ECOS-16) and underwent DXA. BMI was calculated.

Results: 80.3 % of population found to be vit. D deficient (46.9 % had severe deficiency). Women (mean 29.9±22.1 nmol/l) are affected more significantly than men (38.6±22.5 nmol/l). The deficiency was more pronounced with age, notably for men ($p<0.01$). Severely obese (>35 kg/m^2) subjects had significantly lower 25(OH)D levels (26.1±16.2) than those with normal BMI (34.3±25.3) or moderate obesity. 25(OH)D levels fluctuated throughout the year with a 2-month lag (mean ultraviolet index values for a given month being a reference). VAS index was closely linked to vit. D status (mean 38.0±26.3 in severely deficient patients, and 14.0±25.2 in patients with optimal vit. D status). Other questionnaires revealed a number of correlations as well. Biological age was found to be inversely dependent on 25(OH)D levels. Patients in lower quartile by 25(OH)D had significantly lower BMD than those in the upper quartile ($p<0.01$).

Conclusion: Vit. D deficiency is widespread in Ukrainian elderly population; age, male sex and BMI all adversely affecting 25(OH)D levels. Vit. D deficiency results in markedly decreased BMD and biological age increase. VAS index correlates well with vit. D status.

OC56

A COMMON PROJECT OF THE OSTEOLOGICAL CENTRE AT THE OSTEOLOGYACADEMY OF ZLÍN TOGETHER WITH THE NEUROSURGICAL DEPARTMENT OF TOMAS BATA HOSPITAL IN ZLIN MODEL PROJECT: CAPTURE THE FRACTURE ZLÍN–EVALUATION AFTER TWO YEARS

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Objective: After a logistic analysis of similar programmes we have come to a conclusion that the project is plausible only with special cooperation of the workplaces which are, within their specialized area, capable of complex patient's care.
Material and Methods: Densitometric detection and diagnostics is carried out while using DXA GE Lunar Prodigy, I DXA GE Lunar Encore including LVA and child software, RTG workplace is equipped with modern digital system Siemens, complex spectrum of osteomarkers from blood, osteocalcin, bone ALP, CTX, P1NP. Cohorts: women n=45, average age: 64.6 years, (3 women more than 80 years of age); men n=28, average age: 65.0 years.
Results: Fracture location: L1-39.2 %, Th12-21 % L2-12.5 % L3-8.9 % two vertebrae −10.6 % three vertebrae one time, one time fracture in Th8, L5, L4, Th11, C2.
Type of surgery: vertebroplasty-57 %, traditional treatment 14.3 %, other surgeries 23.7 % (kyphoplasty, spongioplasty, transped. Fixation, etc.).
Increased bone turnover evaluated according to OC, CTX and P1NP - 28.6 %.
Diagnosis: 27 % patients, BMD - L spine, average 0.658 g/cm^2, BMD-Prox. femur and average 0.613 g/cm^2, other physiological findings and osteopenia BMD L - spine, average 0.846 g/cm^2, prox. femur: 0.930 g/cm^2.
Anamnesis: 21 % of patients have previously suffered one fracture at a different location; one patient has undergone two fractures at one location in spinal area. All patients were educated in motion, dietary and rehabilitation regime. No fracture recurrence so far with any of the observed patients.
Conclusion: The key moment in the transition is the organisation based on cooperation and effective database communication of individual workplaces and its qualitative control. The aim is to have current updated information about each patient at the managing centre and specialists must be able to change a routine procedure to an individual approach at any moment as the situations may require. From the logistics point of view general practitioners need to be trained in proper cooperation with osteological centres.

OC57

INTERNET AS A TOOL FOR HEALTH: SURVEY ON THE INTEREST AND THE USE OF THE INTERNET AMONG SUBJECTS FROM AN OSTEOPOROSIS CENTRE–A PRELIMINARY REPORT

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Objective: To evaluate the interest and the level of Internet use for health issues among people who use care institutions in the field of bone health.
Material and Methods: Self-administered questionnaires were distributed to subject screened for osteoporosis at the Bone Metabolism Unit at the polyclinic Lucien Brull (Liège, Belgium).
Results: Currently, 30 patients have responded to the survey but the inclusion of subjects is ongoing. The average age of respondents is 74.3 years, there are 73.3 % of women, 86.7 % of them are retired and 84.6 % have at least one health problem. Among all subjects, 37.5 % are osteoporotic. There are 43.3 % of Internet users, and those who do not use Internet say either they do not see the interest of it or do not like it or find it too expensive, not easy to use or that it provides too much information. Among the Internet users, 63 % of them said searching to be informed about their health and 27.6 % said using the Internet as a tool of research. Whatever the means of information, once informed, 73.1 % of them expressed the need to talk about it with their relatives, friends or physicians. All respondents attributed an average score of 6.6/10 regarding the consistency of information found on the Internet. The use of Internet differs significantly (p=0.007) depending of age: those who use the Internet have an average age (69.5 years) lower than those who do not use it (78.2 years). The same observation can be made about the fact of searching information on their health on the Internet (68.3 vs. 76.3 years; p=0.009). No significant difference was found for socio-economic status or number of health problem.
Conclusion: Even if age appears to be an important factor in the use of the Internet for searching for health information in patients screened for osteoporosis, almost 30 % of the study population uses Internet for this purpose. Action to promote health through an Internet platform must therefore take this parameter into account.

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World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2014): ESCEO Symposium Abstracts

SE1
EFFICACY AND SAFETY OF ANTIOSTEOPOROSIS MEDICATIONS IN THE ELDERLY

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Even though the efficacy of osteoporosis pharmacological treatment in the elderly is well recognized, the underprescription of antifracture drugs is frequent in this vulnerable segment of the population. This is even more true in the oldest old (80 years and older). Such scenario is the opposite that we would expect from the epidemiological data indicating the growing incidence of fragility fractures in a world's population that is growing, with the recognition that fracture risk increase progressively with age, irrespective of BMD T-score.
Explanations for the underprescription of osteoporosis drugs is the perception that these treatments are perceived as effective only after long-term treatment. Conversely, anti-fracture efficacy is present already by 12 months. Thus in the elderly and even in the oldest old patient population starting treatment with an anti- fracture drug would have time to exert a beneficial effect on BMD.
The impact of direct and indirect burden of osteoporotic fractures in the elderly and especially in the oldest old is a major healthcare concern, both in term of patients' lives and society's costs. This makes unacceptable the underprescription of registered drugs effective in preventing fragility fractures even in the elderly and in the oldest old. In the elderly population, pharmaceutical osteoporosis treatment should change from being cost-effective to being cost-saving.
Recent revised guidance papers in this area, along with campaigns launched around the world with the aim of reducing the incidence of secondary fractures are contributing to create effective standard of care procedures. These efforts will be reviewed during the Symposium.

SE2
EFFICACY AND SAFETY OF OSTEOPOROSIS MEDICATIONS IN THE ELDERLY: AN ESCEO CONSENSUS

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The risk of osteoporotic fractures in the geriatric (≥75 years) and especially the oldest old (≥85 years) is a major healthcare concern. At the age of 50, the lifetime risk of experiencing a fracture is more than 50 % for women and 20 % for men. The impact of a fracture on patients' quality of life is immense, often heralding the transition to frailty and dependence. The costs borne by society are also significant, both in terms of immediate care and rehabilitation and over the longer term if dependence begins to take hold. The fact that many older people—at high risk of fracture—receive no treatment or highly inadequate treatment—is unacceptable. There is now sufficient evidence of the already short-term benefits of treatment and of the long-term safety profile of osteoporosis treatments. There is clear evidence that many older people are under nourished and vitamin D insufficient—a situation that needs to be rectified quickly and before starting any pharmacological therapy. A few major studies did specifically include older post-menopausal women and had prespecified analyses of fracture endpoints: the HIP study on risedronate, a clodronate study, the TROPOS and SOTI studies on strontium ranelate, the HORIZON study on zoledronic acid and the FREEDOM study on denosumab. All of these studies showed convincing results on fracture endpoints after 3 years of treatment. A number of RCTs have demonstrated clinically significant benefits in terms of fracture reduction within the first year of treatment. Thus even in an oldest old patient population, it appears that starting an osteoporosis treatment would, by and large, have time to exert a beneficial effect. Because of

the widespread levels of poor adherence to treatment, compliance and persistence need to be addressed in order to ensure that the benefits of treatment can be fully realized. In the treatment of the oldest old however safety and dosing considerations might possibly outweigh minor efficacy differences. The IOF Capture the Fracture Campaign aims at reducing the incidence of secondary fractures by the creation of effective standard of care procedures. The idea is built around the adoption of Fracture Liaison Services that provide comprehensive follow-up of patients after an initial fragility fracture and proposes to establish a Best Practice Framework. Although none of these programs specifically targets the oldest old, it may be hoped that they reach a wide audience that will make intuitive associations, and contribute to reduce fracture risk and the associated burden in the elderly.

SE3
OPTIMIZING THERAPEUTIC ADHERENCE IN OSTEOPOROSIS

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This paper will provide an overview of the nature, causes and effects of non- adherence to treatment in patients with osteoporosis. It will begin by providing a background introduction to the prevalence of the adherence problem and the different behavioural aspects of nonadherence, focusing on the distinction between intentional and unintentional factors. There will be an emphasis on the role of patients' beliefs about their illness and treatment, and the ways in which they have been shown to affect intentional nonadherence to treatment in osteoporosis. The final part of the talk will build on these recent findings by examining their implications for current healthcare practice. This will focus on the ways in which adherence problems can be identified and managed in routine consultations as well as on the development and application of specialist interventions.

SE4
WHY DO WE NEED AN ALGORITHM FOR THE TREATMENT OF OSTEOARTHRITIS?

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Osteoarthritis (OA) is the most common musculoskeletal disorder. Its prevalence is steadily growing with the aging of the world population, imposing an increasing medical need and financial burden on society. The treatment of OA symptoms can often be challenging to the medical community for many reasons. OA is a chronic condition involving long term management in a patient population in whom the mean age is increasing steadily. The choice of treatment should take into consideration a balance between the benefits and risks for patients. In addition to the evaluation of every available treatment in that regard, it is well known common daily practice for physicians to rely on an orderly and rational approach to pharmacological treatment of medical conditions such as OA. A therapeutic algorithm aimed specifically at this group of patients would provide physicians with a stepwise approach to treatment, which should benefit the vast majority of OA patients, integrating in a practical and orderly manner, a positive benefit-to-risk ratio of such treatment, thereby reducing the risk of management missteps. Such management should aim at improving the quality of life of OA patients while minimizing the potential risks that can be associated with it. Therapeutic guidelines are essential for the management of OA.

SE5
AN ALGORITHM GUIDELINE FOR THE MANAGEMENT OF KNEE OSTEOARTHRITIS IN EUROPE: A REPORT FROM A TASKFORCE OF THE EUROPEAN SOCIETY FOR CLINICAL AND ECONOMIC ASPECTS OF OSTEOPOROSIS AND OSTEOARTHRITIS (ESCEO)

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Osteoarthritis (OA) is the most common form of arthritis and a major cause of disability. Knee OA treatment guidelines have been issued by the most influential scientific authorities. However, there is a need to find a common denominator to the published and draft guideline documents from different sources and to generate a treatment algorithm applicable throughout Europe and elsewhere. Most of the existing practice guidelines analyze the evidence behind each proposed treatment but do not prioritize the interventions. The ESCEO algorithm summarizes the evidence on all proposed treatments and puts them in the sequence suggested by the evidence.

SE6
CHALLENGES FOR THE DEVELOPMENT OF BONE FORMING AGENTS IN EUROPE: INTRODUCTION

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In recent years significant advances have been made in the management of osteoporosis, particularly with respect to the development of pharmacological interventions to reduce fracture risk. Most of these agents are primarily inhibitors of bone turnover, sometimes referred to as anticatabolic agents whereas teriparatide, PTH and strontium ranelate act in part or predominately by the stimulation of bone formation (anabolic agents). There is also a number of bone forming agents in clinical development including agents targeting the endogenous inhibitors of bone formation sclerostin and dickkopf-1, cathepsin K inhibitors, new formulations of PTH and PTHrP analogues, and calcilytics. The clinical use of these agents in the management of osteoporosis is dependent on marketing authorization from the Committee for Medicinal Products for Human Use (CHMP) of the European Medicines Agency last updated in 2007. These requirements, well rehearsed for inhibitors of bone turnover, pose some problems in the development of bone forming agents. These include the duration of study, the duration of exposure, offset of effect and the use of sequential interventions. A consensus view is presented that might be considered in future guideline provision.

SE7
CHALLENGES FOR THE DEVELOPMENT OF BONE FORMING AGENTS IN EUROPE: AN INDUSTRY PERSPECTIVE

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Agents that stimulate bone formation are necessary for the management of patients with osteoporosis as they have the potential to increase bone mass as well as improve bone microarchitecture. The clinical development of bone forming agents poses a number of interesting scientific and logistical challenges and may require large, complex and costly clinical trials to generate the necessary evidence to support regulatory approval.

Although many aspects of a development program will fit into the established framework for the approval of an antiresorptive drug in this indication, some elements are unique to bone forming agents. This creates clinical, scientific and regulatory challenges. To highlight one example: Which observation period is appropriate to support the approval of a bone forming agent? The evolving understanding of bone biology suggests that the optimal treatment duration for bone forming agents may vary and for specific agents may be less than 2 years. To address this situation, the regulation should allow for flexibility to investigate a treatment program that may involve sequential, cyclical or combination therapy to achieve and maintain optimal benefit and clarify the overall time of observation necessary for regulatory approval. In this regard, 2 years seems a reasonable to evaluate the benefit risk profile of a bone forming intervention.

A regulatory framework that allows for practical flexibility to demonstrate the unique effects of an individual agent in light of the anticipated use in clinical practice and clearly outlines the requirements for approval is necessary to effectively design and execute clinical programs to develop novel bone forming agents.

SE8
SELECTIVE ESTROGEN RECEPTOR MODULATORS: RALOXIFENE AND BAZEDOXIFENE

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Osteoporosis is closely related to menopause in women. Therefore, replacing the declining hormones may solve the estrogen deprivation-associated consequences of menopause. However, estrogen therapy, alone or combined with progesterone, has been associated to a series of potential risks that have restricted its use for the treatment of osteoporosis.

The diversity of tissue-specific estrogen receptor-cofactors complexes, however, offered opportunities for designing substances activating these receptors in some tissues (bone) while being neutral or antagonistic in others (endometrium, breast). These so called SERMs or Selective Estrogen Receptor Modulators were primarily designed as antagonists for adjuvant treatment in breast cancer. However, two molecules, raloxifene and bazedoxifene are currently available for treatment of osteoporosis because of their demonstrated efficacy profile.

SERMs are mild depressors of bone remodeling and, therefore, act as antiresorptives. This degree of suppression is reassuring as to some of the long- term side effects associated with some more potent anticatabolic drugs. Their main antifracture effect is in decreasing the risk of vertebral fractures while an effect on preventing nonvertebral fractures has been suggested by post hoc analyses in high risk subgroups. Their most important side effect is an increased risk of venous thrombosis and the associated risk of pulmonary embolism in a degree comparable to estrogen therapy. On the positive side, they are safe for the endometrium and a protective effect against hormone dependent breast cancer has been firmly demonstrated. Therefore, there is a group of women at high risk for vertebral fracture, still too young for having a

substantial risk of hip fracture, that are good candidates to this class of drugs. In those in the fifties, sixties or even early seventies, at high risk for vertebral fracture and with no contraindication the drug can clearly be an option of choice, with the potential additional advantage of resolution of the effect when the treatment is stopped. This leaves open the options for follow-up treatments with other types of drugs if needed, offering patient and treating physician the possibility to treat the disease, a chronic condition, for as long as needed.

SE9
BENEFITS-RISK RATIO OF OSTEOPOROSIS TREATMENT: ANTIRESORPTIVES-BISPHOSPHONATES AND DENOSUMAB

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Most amino-bisphosphonates (BPs) and denosumab (Dmab) reduce the incidence of new vertebral and nonvertebral fractures by 50–70 % and 20–30 %, respectively. Whereas the rapid and consistent reduction of vertebral fractures with these drugs may mostly be explained by the suppression of stress risers on trabecular surfaces, the more tedious reduction nonvertebral fractures suggests different mechanisms of action on long bones. QCT (high-resolution) analyses have started to delineate the differential effects of anti-resorptives on cortical bone, which may explain the wide range of RRR of hip fractures (−20–60 %) observed in the elderly, depending on the study and the drug used. Recently, the FDA has questioned the efficacy of long-term administration of BPs. Particularly, the strong association between long-term BPs therapy and the occurrence of atypical femoral fractures (AFF) has raised questions about the risk/benefits ratio of continuous treatment with these drugs. Truth is that only few studies have examined the long-term effects of antiresorptives, which were primarily focused on BMD changes at spine and/or hip and were neither designed nor powered to look at antifracture efficacy. Hence, the FLEX and HORIZON extension studies, which rerandomized women previously on alendronate, respectively zoledronate, to continuous treatment or placebo, showed a further gain of LS BMD but not FN BMD, and further reductions in vertebral, but not non-vertebral fractures. Interestingly, post hoc analyses of these two long-term studies indicate that patients whose FN BMD remained below −2.5 T-score after 3 to 5 years of therapy were at greater risk of nonvertebral fractures if therapy was stopped vs. continued. In contrast, long-term exposure to Dmab has shown a continuous increase of hip BMD for up to 8 years so far, as well as a further reduction of nonvertebral fractures in the 4th year of therapy and beyond. In any case, the number of patients needed to treat (NNT), i.e., to prevent a fragility fracture, with BPs or Dmab, is at least two orders of magnitude less than the number of patients needed to harm (NNH), i.e., to cause an AFF. Hence the benefits of antiresorptives are far greater than their risks, particularly if appropriately targeted to patients with the highest fracture probability.

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SE10
STRONTIUM RANELATE

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Osteoporosis, with its associated morbidity and mortality, constitutes a major public health problem. Women aged 50 years have a remaining lifetime risk of suffering an osteoporotic fracture close to 50 %; this compares with around 11 % for breast cancer. The last two decades have witnessed the emergence of a number of pharmacological strategies to reduce the risk of osteoporotic fracture. An ideal antiosteoporotic drug should demonstrate effectiveness over short and long durations of treatment; in different types of patient; at different stages of the life course; and against fractures at vertebral, non-spine and hip sites. Strontium ranelate has been shown to be such an agent. Trials have demonstrated anti- fracture efficacy across a broad range of patients ranging from the younger postmenopausal woman (aged 50–65 years) to those aged over 80 years. Among frail elderly women with co-morbidities, a notoriously difficult group to treat, strontium ranelate is among the only treatments to have shown both vertebral and non-vertebral antifracture efficacy over a 5-year period. Fracture data from the 4 and 5 year time points in double-blind, placebo-controlled trials of strontium ranelate in osteoporotic women reveal: 33 % reduction of vertebral fracture over 4 years (RR 0.67; 95%CI 0.55–0.81 p).

SE11
INSIDE THE BENEFIT RISK/RATIO OF ANTI-OSTEOPOROSIS TREATMENTS; A GLOBAL OVERVIEW OF PEPTIDES OF THE PARATHYROID HORMONE FAMILY: PTH AND TERIPARATIDE

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PTH stimulates bone formation and resorption and can increase or decrease bone mass, depending on the mode of administration. Continuous infusions, which result in a

persistent elevation of the serum PTH concentration, lead to greater bone resorption whereas daily injections, which cause only transient increases in the serum PTH concentration produces a positive bone balance. Two peptides of the PTH family have been developed as bone forming agents in phase 3 trials, the 1–34 peptide (teriparatide), which produces the main biologic effects [1], and the intact 1–84 PTH [2].

In a trial enrolling 1,637 postmenopausal osteoporotic women with vertebral fracture (mean age 69), two doses of teriparatide were compared to placebo (20 and 40 mg/day). After a median duration of follow-up of 21 months, the risk of new vertebral fracture was significantly reduced by 75 % in the 20 mg group and by 79 % in the 40 mg group, compared with the placebo group. New non vertebral fractures were significantly reduced by 53 % in the 20 mg group and by 54 % in the 40 mg group, compared with the placebo group.

In a randomized placebo-controlled trial over 18 months, 2,532 postmenopausal women with low BMD at the hip or lumbar spine were enrolled. Women received 100 mg of recombinant human PTH or placebo daily by subcutaneous injection. PTH reduced the risk for new or worsened vertebral fractures, but in sensitivity analyses, the magnitude of the reduction was changed with assumptions about fracture incidence in patients who did not complete the study. Nonvertebral fracture risk was not significantly reduced.

While the safety profile of teriparatide was favorable with only minor adverse events, patients on PTH1-84 were quite often affected with hypercalciuria (24 %) and hypercalcemia (14 %).

In this context, teriparatide at 20 mg has been widely used worldwide in the treatment of severe osteoporosis, while PTH1-84 at 100 mg is marketed only in a few European countries.

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SE12
INTRODUCTION: ROLE FOR GLUCOCORTICOIDS IN THE MANAGEMENT OF RHEUMATIC DISEASES

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p>It is well known that both active rheumatoid arthritis (RA) and the use of high dose glucocorticoids (GC) are associated with generalized bone loss and with fractures. This negative effect on bone particularly occurs in patients with high dosages of GC and in patients with suboptimally treated RA, with persisting systemic inflammation (1).

However, GC have also strong immunosuppressive effects, and adequate suppression of systemic inflammation in RA might have bone sparing effects. This was investigated in the BeSt study, a novel study design comparing four different treatment strategies in which treatment adjustments were made continuously when low disease activity was not reached in patients with recent onset RA (2). The treatment strategies consists of 4 groups, among which group 3 with initial combination therapy with MTX, sulphasalazine and quickly tapered high dose of prednisone, and group 4 with MTX and tumor necrosis factor alpha inhibitor infliximab. After 2 years of treat to target therapy, no difference was found in decrease in BMD at the spine and hips between all 4 groups. (3). In addition, radiological joint damage was low in all 4 groups. This clearly suggests that the negative effect of glucocorticoids (GC) on bone should be outweighed against the strong anti-inflammatory effects of GC on bone (1).

Recently it has been demonstrated in a treat to target study aiming at clinical remission that with the use of low dose GC (10 mg/day combined with MTX) it is possible to arrest both the local and generalized bone loss in RA (4).

These data suggest that it seems possible that with adequate suppression of systemic inflammation the negative effects of GC on bone can be prevented.

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SE13
SKELETAL EFFECTS OF GLUCOCORTICOID THERAPY IN RHEUMATOID ARTHRITIS

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Glucocorticoids have experienced a resurgence in their use due to efficacy in RA disease activity and severity. Despite clear benefits from newer clinical trials, glucocorticoid use is marked by a plethora of serious adverse events. At high doses glucocorticoids produce predictable loss of bone via direct deleterious effects on osteoblasts, osteocytes, and osteoclasts. At lower doses, the evidence is less robust, but it continues to support toxicity to bone, in a dose dependent fashion. In contrast to their toxic effect to bone, glucocorticoids also suppress the pro- inflammatory cytokines that contribute to bone loss and these effects potentially partially counter their negative effects on bone. Beyond bone, new data is emerging

on the association of glucocorticoids with other adverse outcomes including infections, atherosclerotic related events, and even pancreatitis. The majority of data on the glucocorticoid safety come from observational studies; many of these studies examining non-rheumatic disease. The association of glucocorticoids with adverse outcomes using observational data is prone to bias, such as confounding by indication and diagnostic detection bias. Several randomized controlled trials of glucocorticoids also have examined this issue. However, RCTs are frequently underpowered to examine these question. A variety of therapeutic agents are approved for prevention and treatment of glucocorticoid induced osteoporosis. The timing of initiation, sequencing, and long-term safety of these drugs is a subject of debate. Despite international guidelines from EULAR and other groups, many rheumatic disease patients on glucocorticoids do not receive prevention for glucocorticoid adverse outcomes.

SE14
NON-SKELETAL EFFECTS OF GLUCOCORTICOID THERAPY IN RHEUMATOID ARTHRITIS

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Rheumatoid arthritis (RA) is the most common and severe inflammatory arthritis. Following the identification of cortisone, proofs of concept experiments in RA patients have quickly shown that steroids had a quick and profound anti-inflammatory effect on disease activity. At the same time, it was shown that addition of slow acting drugs could improve the overall efficacy. Based on these early results, steroids alone or combined have been used for the daily common treatment of RA. Quickly however, it was observed that long term use specifically at high dose was associated with severe side effects including infections, skin atrophy and bone loss. More recent results based on in vitro and in vivo studies have indicated however, that use of low dose of steroids could have a better efficacy/safety balance. Reasons are much better understood. Since chronic inflammation induces a cell mediated immune defect responsible of infections with intra- and cellar cellular bacteria, control of inflammation by itself has a beneficial effect on these side effects. Indeed control of inflammation in RA induces a correction of the production of Interferon gamma, the signature cytokine of the Th1 pathway. Furthermore, it was recently shown that part of this effect was observed through inhibitory effects of low dose steroids on cell-cell interactions leading to reduced production of two key proinflammatory cytokines, IL-6 and IL-17. Additional effects can be observed when low steroid are combined with biotechnology products, which target TNF, IL-6 and other inflammatory pathways.

SE15
CAN WE IDENTIFY WHICH PATIENTS SHOULD BE TREATED IN OSTEOARTHRITIS: INTRODUCTION

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Osteoarthritis is a common disease with significant associated morbidity, mortality and costs. Although there are a number of treatments available for osteoarthritis, most aim to improve symptoms and as yet there are no proven disease modifying drugs. Although most of these treatments reduce pain and improve function, their effect is limited and heterogeneous across patients. Furthermore not all patients diagnosed with osteoarthritis will progress either clinically or structurally.
In the era of personalised medicine, it is imperative that we are able to predict which patients are going to progress using clinical predictors of progression. This will enable targeting of interventions to the appropriate patient. Furthermore, in an era of increasing available of treatments, it is important to be able to target the therapy to the appropriate patient. We therefore need to identify predictors of response to treatment which are likely to be different from predictors of progression. Research is progressing in this exciting and important area and predictive models should be available within the next couple of years.

SE16
OSTEOARTHRITIS: PHYSIOPATHOLOGY AND RISK FACTORS FOR PROGRESSION

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Advances in the knowledge of osteoarthritis (OA) pathophysiology have dramatically progressed in the last 10 years. Initially considered as a "cartilage- centric" disease due to tear and wear, our views have now profoundly changed thanks to strong experimental studies, shifting to a more integrative view. Cartilage, bone, synovium, adipose tissues, meniscus, tendons, muscles, vessels, all play some roles in the initiation and/or in the progression of the disease. More interestingly, interactions between these tissues are at the forefront of these processes. For example, communications between subchondral bone cells and deep zone chondrocytes may explain very early events leading to cartilage degradation. Synovial cells activated by cartilage fragments that fell down in the joint cavity during the OA process release a soap of inflammatory and catabolic mediators acting on the surface of cartilage by activating superficial zone cartilage-derived

chondrocytes. More recently, various pathophysiological pathways have been demonstrated according to the known risk factors. This lecture will address the different and the common pathways related to post-traumatic, aging and metabolic syndrome-induced OA, the main risk factors for primary OA.

SE17
APPROACH TO SUBSTRATIFICATION OF THE TREATMENT OF OSTEOARTHRITIS

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Deeper understanding of the characteristics of OA and the pathological processes involved in its development and progression has led to a new paradigm as a common final pathway of joint failure. Furthermore, we now appreciate that the initiating factors can be diverse and often joint specific. Research has also characterized a range of processes in osteoarthritic joints ranging from cartilage damage to subchondral trabecular changes and synovitis, each of which could represent a target for therapeutic intervention. This polymorphic nature of OA predicates patient oriented therapeutic approaches directed at the dominant phenotypic pathways in the context of individual characteristics and preferences.

Different manifestations of hand OA were first recognized as potential subphenotypes, characterized by perimenopausal onset in women, clinical evidence of inflammation, and development of central and perientheseal erosions. The association of hand OA with obesity has, in the absence of a biomechanical explanation, prompted conjecture about a metabolic basis for OA. These insights have been a basis for exploration of hormonal effects on OA (in epidemiologic studies) and clinical trials of immune modulators and biological therapies (with mixed results).

Studies of knee OA have greatly enhanced our understanding of the biomechanical factors involved in its progression, especially the structural basis for the development of malalignment and its contribution to progression. There is evidence that severe malalignment may render pharmaceutical interventions futile. However, different subphenotypes of knee OA malalignment exist (i.e., valgus, varus) and require tailored interventions.

Abnormalities, or variation, in articular anatomy also account for a number of OA subphenotypes, the most recognized of which are the femoral acetabular dysplasias, which predispose to impingement and damage to the labrum and articular cartilage. Others identified so far include patella alta and variation in thumb-base geometry. Detection of these abnormalities in individuals offers the opportunity for screening and patient-specific preventive interventions.

There may also be phenotypic subdifferentiation at a pathological level. While most OA is considered non-inflammatory, biopsy and MRI studies of knees with OA have revealed a high prevalence of focal synovitis. The presence of such synovitis correlates with pain and appears to predispose to structural progression. These observations provided a rationale for clinical trials testing intra-articular corticosteroids as structure-modifying intervention, as well as biological therapies. Bone marrow lesions (BMLs) are also prominent in the subchondral bone of OA joints, correlate with symptoms and associate with progressive cartilage loss. One recent clinical trial tested zoledronic acid for knees with OA that exhibited BMLs. Finally, there have been several initiatives to develop targeted therapies directed at articular cartilage repair or regrowth.

In summary, the therapeutic field of OA is benefiting from an acceleration of progress stimulated by recognition of the numerous clinical and pathological subphenotypes that offer new insights into potential preventive approaches and therapeutic targets.

SE18
GOAL-ORIENTED TREATMENT IN OSTEOPOROSIS: AN INTRODUCTION

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The ultimate goal of osteoporosis therapy is to prevent fragility fractures. Several drugs have proven efficacious and safe to reduce the incidence of new vertebral fractures, and to some extent non-vertebral fractures, however their long-term effects are less well established. Until recently, no drug, or combination of drugs, appeared capable to improve bone mass and structure continuously, i.e., until bone strength was fully restored. Hence we have treated osteoporosis for nearly three decades without really knowing or considering, how long to treat. However, emerging data with some recently developed pharmacological agents suggest that optimal bone strength might be restored after many years of continuous, sequential or combined therapy. This new evidence has therefore paved the way to question whether a measurable target could be defined for osteoporosis treatment—as has been proposed for diabetes or hypertension- and what the target should be: an absolute aBMD value at hip? a given increase in aBMD? a certain value or change in BTMs? A fracture probability below a certain threshold (using FRAX for instance)? A given strength estimate by finite element

analysis? Anything else? In the search of an answer to these challenging questions, this symposium will review the lessons from other disease areas and the evidence for goal-oriented therapy in osteoporosis.

SE19
GOAL ORIENTED TREATMENT IN OSTEOPOROSIS: LESSONS FROM OTHER DISEASES AREAS

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There is much that appears, at least at first, both self-obvious and logical in the setting of targets or goals in the treatment of chronic diseases such as osteoporosis. If patients are identified to be at risk because of well-characterised components of risk or biomarkers, then the argument is that a target can be set for that biomarker, the achievement of which would signify a reduced level of risk. Such approaches can simplify and facilitate disease management decisions, and much is made of their success in other fields of medicine, particularly with treatment targets in hypertension, hypercholesterolemia, diabetes mellitus and rheumatoid arthritis.

A critical reading of the literature underpinning treatment targets in these areas does not readily support the setting of such targets. For example, the often quoted meta-analysis of blood pressure reduction and cardiovascular outcomes found that none of the studies had actually addressed individual tailoring or titration of antihypertensive drugs compared with fixed therapy selection. Indeed the authors concluded that their analysis did not indicate to what extent blood pressure should be lowered. More recently, treatment targets for LDL-C and HDL-C have been questioned and in the recently published 2013 ACC/AHA Blood Cholesterol Guideline, the panel found that despite the previous "consensus" on targets all the RCTs either compared fixed doses of statins with placebo or untreated controls, or compared fixed doses of higher-intensity statins with moderate-intensity statins. Indeed, the trials were not designed to evaluate the effect of titrated (dose- adjusted) statin treatment to achieve prespecified LDL-C or non-HDL-C goals. For this reason, the panel abandoned the concept of treatment targets and instead emphasised the approach of targeting proven therapies to those at highest risk. This is a timely lesson from these other disease areas but one that is already appreciated within the osteoporosis field with development of risk calculators such as FRAX.

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SE20
GOAL ORIENTED TREATMENT IN OSTEOPOROSIS: LESSONS FROM OSTEOPOROSIS

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The goal of any osteoporosis therapy is to reduce fracture risk and thus to improve or preserve quality of life, function and survival. Progress has been made in our ability to select the patients at substantial risk of fracture, most likely to benefit from pharmacological intervention with one of the several available agents shown to fairly consistently reduce fracture risk by 40–60 %. Baseline fracture risk can be estimated by combined use of BMD and validated clinical risk factors, e.g., with use of the FRAX® algorithm. In contrast with the situation for some other chronic diseases, such as hypertension or diabetes, there are no obvious (surrogate) treatment targets in osteoporosis to help clinicians to confidently monitor treatment efficacy or guide decisions on issues such as duration of treatment or switch to alternative treatment because of treatment failure. Suspicion of failure is usually because of fracture incidence under treatment, decrease or lack of increase of BMD, lack of or escape from expected changes in biochemical markers of bone turnover (BMT). Unfortunately, on the basis of available evidence, none of the routinely accessible possible assessment tools of treatment effect has on closer scrutiny the potential to set valid and useful treatment goals. Changes in BMD capture only part of treatment effect on fracture risk and represent a relatively poor surrogate of change of fracture risk. Changes in BMT can be informative, e.g., to document patient compliance, but their potential as candidate for treatment target is limited by several factors, e.g., intra- and between-subject variability, variable patterns of changes according to type of treatment, overall only limited predictive power at the level of individual patients. Changes in fracture risk estimates, e.g., with FRAX®, are not sensitive to treatment effects, with changes in part driven by increasing age, and may or may not capture risk factors susceptible to alter fracture risk independently from treatment effects (e.g., risk of falls). Finally, incident new fracture itself is rather poorly informative of treatment efficacy in view of the fact that even optimal treatment efficacy ensures only partial reduction of fracture risk and a majority of fractures in the population occur anyhow in subjects not identified as osteoporotic. Clearly, the time is not ripe to focus on goal-oriented treatment of osteoporosis, whereas there is presently greater potential to improving osteoporosis care by tackling the two major issues of underdiagnosis and undertreatment, on the one hand, and of poor treatment compliance, on the other hand.

SE21
WHICH COMPARATORS AND OUTCOMES MEASURES SHOULD WE USE?

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General recommendations for a reference case for economic studies in rheumatic diseases were published in 2002. Since then, economic evaluations in osteoarthritis (OA) continue to show considerable heterogeneity in methodological approach. The objective of this ESCEO initiative was to develop a reference case specific for economic studies in OA including the standard optimal care with which to judge new pharmacologic or nonpharmacologic interventions.

Four subgroups of the ESCEO expert working group on economic assessments were charged with producing lists of recommendations which would potentially improve the comparability of economic analyses in OA: outcome measures, comparators, costs and methodology. These proposals were presented and refined during a face- to-face meeting in 2013. This abstract summarizes the recommendations of the outcome measures and comparators working groups.

We propose three reference cases: one each for hand, knee and hip OA. The first two have clinical heterogeneity that gives rise to different treatment options; specifically, interphalangeal- vs. thumb-base disease for hand OA, and the presence or absence of joint malalignment for knee OA. We propose a set of outcome measures for hand, knee and hip OA that are reliable, valid and responsive to treatment interventions. Finally, we suggest management strategies that are recommended by various international organizations in published recommendations for the management of OA that should be further evaluated to help establish a consensus on the optimal care for each proposed reference case.

The ESCEO working groups for outcome measures and comparators propose a set of specific recommendations for the conduct and reporting of economic evaluations in hand, knee and hip OA that could help the standardization and comparability of studies that evaluate therapeutic strategies of OA in terms of costs and effectiveness.

SE22
WHICH COSTS AND METHODS SHOULD WE USE?

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A reference case must give, among others, clear indications on costs identification and methods for reporting economic evaluation. The CHEERS statement gives orientations regarding costs and methodological considerations (items 8, 9, 13, 14, 19, 20, 21), and has been extended by the ESCEO consensus expert group to hand, knee and hip osteoarthritis (OA) clinical situations.

Subgroups from the ESCEO expert group listed the most important topics based on a review of the literature, and made a set of preliminary recommendations, further shared in a face-to-face meeting with the whole group.

The main focus was on:

• Costing considered in two stages: 1) Identifying resources incurred for delivering the strategies compared. It should be structured by payer perspective, by type of drug, examination, disposal, and identified as significant resources, relevant to the health care system and to the payer perspective; 2) Valuing the resources by applying the methods that fit the payer perspective.

• Payer perspective, e.g., society, insurer, patient; it should be described and relate to the costs being evaluated. The identification of the correct payer perspective should be governed strictly by the research economic question. In OA, if no specific guideline needs be followed, then the societal perspective is preferred, then indirect costs should be attributed. The productivity costs are important, may rely on the friction cost method or the human capital approach, and should be produced separately.

• Discount rate: it needs to be applied with the usual agreed on rule in the country at stake if available.

• Time horizon over which costs and consequences are being evaluated should be stated and appropriateness justified.

• Cost-effectiveness threshold: there is no strict recommendation, since some authors indicate a nominal value, while others prefer a threshold expressed as a function of the gross domestic product per habitant.

These considerations will be further submitted to larger consensus. They have generic application to OA clinical situations considered in the reference case (hand, knee and hip OA) and whatever the treatments recommended as standard optimal care.

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SE23
GAUCHER DISEASE: A RARE DISEASE THAT OFTEN AFFECTS BONE

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Gaucher Disease (GD), the most prevalent lysosomal storage disorder, affects multiple organ systems. The bone symptoms and signs include osteolytic and osteosclerotic

lesions, vascular impairment with infarcts and osteonecrosis, osteomyelitis and fragility fractures, and acute and chronic pain resistant to common analgesis therapies.

GD represents a congenital disorder not bone in origin, but with important bone complications, that deserve a great attention by the physicians who follow these patients. Importantly, bone symptoms can represent the first manifestation of the disease and the patient could see a bone specialist, who most often will not be in the condition to make the right diagnosis.

As recent data show a broad range of bone manifestations in otherwise asymptomatic individuals and benefits of earlier versus later GD-specific treatment initiation with respect to BMD loss and osteonecrosis, it becomes necessary for the bone specialist to recognize the disease and to direct the patients to GD dedicated centers.

Future programs should see bone specialists and GD experts working together to develop studies to recognize the natural history of bone complications in GD gene carriers and to better define their pathogenesis throughout in vitro and in vivo studies. Moreover, prospective analyses should be made on the impact of GD- specific therapies and registered osteoporotic pharmacological treatments, used alone or in combination.

The Symposium is a first effort towards a multidisciplinary approach in GD-bone disease.

SE24
WHAT A NON-GAUCHER EXPERT SHOULD BE AWARE OF

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Gaucher disease (GD), an autosomal recessive disorder with decreased β- glucocerebrosidase activity (diagnostic of GD), results in "Gaucher cells" in affected organs, especially spleen, liver, and bone marrow. GD and also carriership of one mutation are risk factors for Parkinson disease. There is clinical heterogeneity in the prevalent type 1 (associated with one N370S mutation and predilection in Ashkenazi Jews); longevity is rarely affected. Most visceral/hematological features, e.g., hepatosplenomegaly and pancytopenia, are treatable by enzyme replacement therapy (ERT). Intravenous recombinant imiglucerase (Cerezyme; Genzyme-Sanofi, Cambridge MA, USA) has been safe and effective in >6,000 patients world-wide for >20 years. Since 2010 and 2012, respectively, two other intravenous ERTs, velaglucerase alfa (VPRIV; Shire, Lexington MA) and taliglucerase alfa (Elelyso; Protalix, Carmiel Israel), are available for naïve and switch-over patients; both are safe and effective in improving visceral and hematological features of GD. An alternative modality, oral substrate reduction therapy, is available: miglustat (Zavesca, Actelion, Allschwil Switzerland) or soon to be FDA approved eliglustat (Genzyme-Sanofi). Importantly, there are less common signs of GD e.g., neurological involvement (types 2 & 3), lung infiltration (to varying degrees in all types), heart valve calcifications (type 3c), and bone disease (types 1 & 3) which reflect unmet needs and hence difficult management decisions because ERTs do not cross the blood–brain barrier or reverse these life-threatening/debilitating signs. Although there are genotypes predictive of neurological involvement (e.g., L444P/L444P) and heart valve calcification (D409H/D409H), to date, there are no predictive markers for patients at risk for lung and/or bone involvement. A high index of suspicion for GD should accompany skeletal disease in the presence of one or more "classic" GD signs (but not only in Ashkenazi Jews), including unexplained osteopenia/osteoporosis in young adults, including males; bone "crises" not osteomyelitis-related; Perthes-like presentation; unexplained osteonecrosis of large joints; pathological fractures including of ribs; vertebral collapse in young adults; and the benign Ehrenmayer flask of the distal femur.

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World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2014): IOF Symposium Abstracts

IOF1
OSTEONECROSIS OF THE JAW: INTRODUCTION AND BACKGROUND

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An international taskforce on osteonecrosis of the jaw (ONJ) was formed in January 2012 with representation from national and international societies concerned with bone health, including the International Osteoporosis Foundation. The taskforce formalised a series of key questions relevant to the diagnosis and management of ONJ in oncology and osteoporosis patient populations. These included the definition and stage of ONJ; the aetiology and pathophysiology of the disorder; the availability of biomarkers to assess the disorder; its prevalence and incidence in different patient populations; the role of imaging in diagnosis and management; and available strategies for prevention and treatment. These questions and a summary of the current evidence were presented by the ONJ taskforce at a meeting in October 2012, following which consensus was achieved on each of the subsections of the critically appraised literature review and graded quality of evidence. In the osteoporosis patient population, the incidence of ONJ was estimated at 0.001 % to 0.01 %, only slightly higher than that in the general population. New insights into the pathophysiology included the effects of bisphosphonate and denosumab on gamma delta T-cells, monocyte and macrophage function, in addition to local infection, inflammation and necrosis. Advances in imaging include cone beam CT assessing cortical and cancellous architecture with lower radiation exposure, as well as MRI, isotope scintigraphy or PET. Preventive strategies include maintenance of good oral hygiene, interruption of antiresorptive therapy for those at high risk, and withholding of treatment until healing of the surgical site in patients receiving high dose antiresorptive therapy. Management continues to be challenging and is based on the stage of the disease, the size of the lesions, contributory drug therapy and comorbidities. The report presents current evidence-based recommendations for diagnosis, prevention and management from a multidisciplinary international perspective.

IOF2
PATHOPHYSIOLOGY OF ONJ

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The pathophysiological mechanisms underlying osteonecrosis of the jaw (ONJ) are unclear. Both infection and necrosis are present in ONJ lesions but the sequence in which these develop remains unknown. Dental disease is a well- established risk factor for ONJ and aggregates of bacteria and polymorphonuclear leukocytes are commonly seen; the presence of bacterial microfilms close to active osteoclastic resorption may contribute to bone necrosis. Adverse effects of bisphosphonates on oral keratinocyes may damage the integrity of the oral mucosa and increase the risk of infection. In addition, activation by bisphosphonates of gamma delta T cells may stimulate the production of pro-inflammatory cytokines and impair the immune response to infection.

The association of ONJ with potent anti-resorptive drugs and the increased risk with higher doses of bisphosphonates and denosumab indicate that suppression of bone turnover may contribute to its pathogenesis. There is some evidence from animal studies to support this contention, although ONJ is not a characteristic finding in other conditions associated with low bone turnover. Inhibition of angiogenesis has also been suggested to play a role. However, although bisphosphonates have anti-angiogenic properties and ONJ has been described in a few patients treated for cancer with anti-angiogenic agents normal vasculature has been reported in most histological studies of ONJ lesions. Finally, increased genetic susceptibility to the development of ONJ may occur, for example as a result of polymorphisms of the farnesyl pyrophosphate synthase or cytochrome P450 CYP2C8 genes.

IOF3

OSTEONECROSIS OF THE JAW: REPORT FROM THE INTERNATIONAL ONJ TASK FORCE

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The International ONJ Task Force was formed in January 2012 with representation from the following societies: Canadian Association of Oral and Maxillofacial Surgeons; Osteoporosis Canada; Canadian Dental Association; Canadian Academy of Oral and Maxillofacial Pathology and Oral Medicine; American Society of Bone and Mineral Research; European Calcified Tissue Society; International Bone and Mineral Society; International Society of Clinical Densitometry; International Osteoporosis Foundation; International Association of Oral and Maxillofacial Surgeons; and The Endocrine Society. The Task Force has formalized 10 key questions to be addressed in the diagnosis and management of ONJ in both oncology and osteoporosis patient populations.

A comprehensive literature review has been completed by the Task Force. The published literature has been critically appraised and graded based on the quality of evidence. The identified questions and a summary of the current evidence was presented and discussed in detail by the ONJ Task Force.

Funding for the ONJ Task Force has been received solely from the sponsoring societies.

Key areas of controversy were addressed by the Task Force and following consensus the full report will be presented. Aspects of the document are presented in brief.

1. How is ONJ defined and staged? It is recommended that the definition of drug-related osteonecrosis of the jaw be expanded to include history of exposure to bisphosphonates or denosumab in addition to the absence of prior radiation therapy of the jaw or local evidence of malignancy. It is recognized that ONJ may occur in the general population without prior drug therapy exposure and this has been documented to be a self-limited condition initially described as lingual mandibular sequestration and ulceration and more recently as oral ulceration with bone sequestration (OUBS). The incidence of OUBS in the general population is still not well defined. The components of ONJ diagnosis include: 1) an exposure history to bisphosphonates or denosumab, 2) exposed bone within the oral cavity for 8 weeks or longer, and 3) no history of prior jaw radiation therapy. Areas of exposed and necrotic bone may remain asymptomatic for prolonged periods from weeks to years. Signs or symptoms may occur before the development of clinically detectable osteonecrosis and include pain, tooth mobility, mucosal swelling, erythema, ulceration, and paresthesias. The clinical staging system is currently being revised and will reflect identification of ONJ at a preclinical stage.
2. Where are the ONJ lesions? ONJ lesions occur more commonly in the mandible than the maxilla (2:1 ratio) and are more prevalent in areas with thin mucosa overlying bony prominences such as tori, exostoses, and the mylohyoid ridge. Radiographic features of ONJ remain relatively non-specific. Plain film radiography is usually unremarkable in the early stages of the disease. The presence of localized or diffuse osteosclerosis or a thickening of the lamina dura on plain film imaging are preclinical features of ONJ.
3. Why does ONJ develop? The pathophysiology of osteonecrosis of ONJ is not well understood, but the need to explore mechanisms common to both denosumab and bisphosphonates is required. The sequence of events leading to the development of ONJ is unclear; in particular, it is unknown whether necrosis precedes or follows infection. Dental disease is a well-established risk factor for ONJ, implicating infection and inflammation in the pathogenetic process. Bacteria are known to stimulate bone resorption and hence the micro-organisms present may directly contribute to bone necrosis. Suppression of bone turnover may play a role in the development of ONJ, however, low bone turnover is not characteristically seen in affected tissue from ONJ patients. Bisphosphonates may also activate gamma delta T cells with altered production of cytokines and impaired immune response. Anti-angiogenic agents may contribute to the development of ONJ. Polymorphisms in the farnesyl pyrophosphate synthase or cytochrome P450 CYP2C8 genes may predispose individuals to develop ONJ.
4. Are biomarkers useful in identifying ONJ? Suppressed biomarkers of bone turnover may simply be a reflection of recent anti-resorptive treatment and the present data do not support low CTX as being useful in identifying individuals at risk of ONJ.
5. How common is ONJ? The majority of the cases of ONJ have occurred with the use of high-dose IV bisphosphonates in the oncology patient population. In individuals receiving high dose bisphosphonates or denosumab for oncology treatment, the incidence of ONJ appears to be 1–15 % and appears to be related to dose and duration of anti-resorptive exposure. The incidence of ONJ in the osteoporosis patient population ranges from 1 to 1500/100,000 person-years of exposure. It is recognized that ONJ does occur in the general population without prior anti-resorptive exposure.
6. What is the role of imaging in diagnosis and management? Imaging can be of value in identifying the presence of pre-clinical disease and those at risk of developing ONJ. Advances in imaging include cone beam CT enabling assessment of cortical and cancellous

architecture, periosteal bone reaction and sequestrum formation with relatively minimal radiation exposure. MRI, PET alone or in combination with CT and bone scanning are also useful imaging modalities in staging and guiding intervention.

7. Can ONJ be prevented and what is the role of drug interruption? Discontinuation of antiresorptive therapy is not necessary prior to dental procedures in low risk individuals. In those requiring extensive surgery and have clinical risk factors including diabetes, glucocorticoid therapy, immune deficiencies, etc., interruption of antiresorptive therapy may be indicated based on the clinical judgement of their physician and oral surgeon. Anecdotal evidence indicates that teriparatide may hasten healing and may be a useful treatment option in those with established ONJ. Detailed recommendations will be formalized for the oncology patient with appropriate imaging to guide management.
8. Who develops ONJ? What are the risk factors and co-morbidity? A number of risk factors including diseases and drugs have been identified which appear to increase the risk of ONJ.

Co-morbidities	Risk factors	Jaw bone interventions
History of malignancies	Glucocorticoid use	Tooth extraction
Smoking/COPD	Jaw bone interventions	Treatment of parodontitis
Rheumatoid arthritis	Poor oral hygiene	Tooth implantation
Diabetes	Chronic inflammations	Any osteotomy at the jaw
Thyroid disease	III-fitting dentures	Root canal treatment
	Antiangiogenic agents Bisphosphonates	
	Dinosumab	
Blood cell diseases		

9. How should ONJ be managed? There are no universally accepted treatment protocols. The majority of patients with ONJ can be managed conservatively with maintenance of good oral hygiene, elimination of dental and periodontal disease, topical antibiotic mouth rinses and systemic antibiotics. For non-responsive ONJ lesions, surgery is now an option. Experimental treatment includes topically applied ozone, bone marrow stem cell intralesional transplantation and addition of pentoxifylline and tocopheral to the antibiotic regimen.
10. Research and future directions: Over the past decade knowledge pertaining to pathophysiology of ONJ has increased however there is a need for more suitable animal models. The cellular mechanisms involved in oral wound healing and the influence of anti-resorptive medications need to be further explored. The effects of antiresorptive therapy on bone marrow cells including macrophages is not well defined. There is a clear need for improved diagnostic and prognostic factors for ONJ. Current therapeutic options are inadequate for the prevention and treatment of ONJ.

IOF4
UPDATE ON MANAGEMENT OF ONJ

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The aim of this update is to provide guidance when deciding how best to manage the patient with ONJ based on the most current evidence.

A current survey of the most relevant literature has been performed to modify existing recommendations as directed by better knowledge on the subject when it exists.

The mainstay of management for the majority of ONJ patients is following conservative measures. This means promoting and maintaining excellent oral hygiene and dental care. Specifically this includes managing dental caries and periodontal disease at one's dentist as well as regular professional cleanings every 3–6 months based on the individual patient's needs. The most important management however is the patient's responsibility for their own homecare.

For caries and periodontitis prone patients, chlorhexidine gluconate can be used as a mouth rinse either on a regular basis or as needed periodically. System antibiotics may be required for any acute infective situations such as but not limited to dental abscess, periodontal abscess, pericoronitis and other soft tissue infections. Treatment of problems of this nature should be dealt with swiftly and thoroughly once they are diagnosed. The ultimate goal should be to preserve and maintain the dentition, thus avoiding the need for minor surgery including extractions.

Surgical intervention was originally not promoted and as a matter of fact was suggested by some to be not very successful. However there are reports and many authors who have successfully managed patients with ONJ with surgery. More frequently in the literature as time passes are there series of patients treated surgically with successful outcomes. Specifically, ONJ lesions need to be resected beyond the visibly affected area which usually means resecting down to healthy appearing, bleeding bone and achieving tension free soft tissue closure over the wound.

There is no known definitive 'cure' for ONJ that is predictable and repeatable from one individual to another. Conservative therapy remains the mainstay of management however there is evidence to support surgical intervention when indicated with good success. Other adjunctive therapies are being trialed but there are no breakthrough treatments to date to replace conservative management.

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World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2014): Meet-The-Expert Session

MTE1
FRACTURE HEALING: FACTS AND FANTASIES

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Objective: To provide an overview of the cell and molecular biology of bone repair and regeneration and to interact with the audience in a Meet-the-Professor format to answer questions and develop discussion.
Material and Methods: Peer reviewed literature and recent experimental results will serve as the basis for the discussions.
Results: Bone repair and regeneration are among the most reliable and reproducible processes in the human body. They are also unique in that the healing occurs with bone as opposed to the formation of scar. The specific responses involved take place in the periosteum, external soft tissues, cortical bone and bone marrow and each of these can be up or down regulated depending on the mechanical strain environment. Thus, surgical treatment will influence tissue differentiation. While primary cortical bone healing and bone marrow healing contribute to fracture repair, most fractures sustained worldwide heal by a process of endochondral ossification. This means that the cellular and molecular events that drive chondrogenesis, calcification, remodeling of calcified cartilage and its replacement with woven and lamellar bone are key to the fracture repair process. The molecular events that govern these processes begin with cell-fate decisions driven by the expression of specific molecular markers. BMP-2 and GFD-8 are both expressed within 24 h after fracture; BMP-2 promoting osteogenesis and GDF-8 inhibiting myogenic growth. Specific wnt signaling molecules such as wnt 10b will prevent mesenchymal stem cells from following an adipogenic pathway and direct them into a chondro/osteogenic progression. Although numerous signaling molecules are involved in fracture healing, some are absolutely essential.
Conclusion: Work from our laboratory has demonstrated that fracture healing is completely dependent upon BMP-2. Similarly, angiogenic programs involving VEGF are essential for bone regeneration.
References: Tsuji K.et al. Nat Genet 2006;12:1424. Wan C et al. Proc Natl Acad Sci USA 2008;105:686.
Disclosures: Consultant/Speakers Bureau/Advisory Activities: Medtronic, Anika, Harvest, Novartis, Merck. Stock Ownership or Royalties: Medtronic, Biomineral Holdings, Healthpoint Capital, Implant Protection, Neostem.

MTE2
NEW MOLECULES AGAINST OSTEOARTHRITIS

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In 2014, the pharmacological treatment of osteoarthritis (OA) only relies on symptomatic drugs which are known to have either a low effect-size or a nonacceptable safety profile. This lack of efficacy leads to major unmet needs, especially in OA patients with comorbidities and/or with contraindication to surgery. In this session, we will first describe the evidence-based basis for future targeted therapies. Then, we will try to answer to these questions:
Should we expect using anti-osteoporotic drugs for OA in the future?
Should we expect using anti-cytokine therapies like anti-IL-1 or anti-TNF in the future?
Should we expect using targeted drugs for pain like anti-NGF in the future?
Are there any novel opportunities in the early-phase development?

MTE3
HORMONE REPLACEMENT THERAPY IN THE MALE

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Hypogonadism in adolescents interferes with full acquisition of peak bone mass and bone maturation. Profound hypogonadism acquire in adulthood results in high bone turnover and rapid bone loss, which can be prevented by antiresorptive therapy. Many men present with more moderate forms of hypogonadism, e.g., in the context of obesity, metabolic syndrome and type 2 diabetes, of glucocorticoid treatment, and of aging (i.e., late onset hypogonadism or LOH). Also these forms of hypogonadism are associated with less favorable evolution of bone mass and osteoporosis with increased fracture risk. Replacement therapy with testosterone (T) increases bone mass in hypogonadal men, with substantial gains in young hypogonadal men with still open growth plates, and more modest effects in adults and elderly. However, there are no studies powered to study fractures and antifracture efficacy of T treatment has not been documented.

According to guidelines T therapy should be considered only in men with established hypogonadism on the basis of consistent signs and symptoms of hypogonadism and unequivocally low serum T, and in absence of contra-indications. In situations with altered SHBG levels (obesity, aging, etc.) serum free T is a better marker of gonadal status than total T. In the tissues T can be 5-alpha-reduced to the more potent androgen dihydroT and, importantly, aromatized to estradiol. It has become increasingly evident that T-derived estrogens have many important physiological effects in men. In particular, effects of T on bone are for a substantial part mediated by estradiol. Therefore T, which can be aromatized, is the drug of choice for hormone replacement therapy in men. Many different treatment regimens have been applied and available information suggests that there might be differences as to their efficacy at the level of the bone, with somewhat lower effects reported for transdermal administration, possibly related to dosage. Indication for T- treatment is primarily to alleviate symptoms of hypogonadism (e.g., sexual symptoms) and this only in absence of reversible causes of hypogonadism. Because of lack of documented effect on fracture risk, osteoporosis as such is not an indication for T treatment. It has even been suggested that men with both symptoms of hypogonadism and severe osteoporosis should be treated with both T and specific osteoporosis medication.

MTE4
PREVENTION OF BONE METASTASES

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Objective: Many in vitro studies have described the effect of a variety of bisphosphonates to impede tumour cell adhesion, invasion, proliferation, matrix- metalloproteinase activity and to increase tumour cell apoptosis. The vast majority of evidence in animal models of metastases has suggested a major potential benefit following administration of various bisphosphonates. This presentation will address the evidence from human studies, predominantly in breast cancer, for the prevention or delay of clinically detectable bone metastases.
Material and Methods: A review of the literature of RCTs until early 2013.
Results: While results from early, relatively small controlled studies with older bisphosphonates in breast cancer were conflicting, there is now compelling evidence for benefit in postmenopausal women with a variety of agents—the benefits extend to distant, no-bone metastases and survival in some studies. The reasons for the dependency of effect on menopausal status remain to be elucidated. Whether it will be seen with other agents is not yet clear.
Conclusion: Antiresorptive therapy can play a major role in altering the natural history of bone and distant metastases in women with primary early breast cancer.

MTE5
RISKS/BENEFITS OF CALCIUM AND/OR VITAMIN D

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Optimal bone health depends on an adequate diet calcium intake of 1,000–1,300 mg per day and serum 25-hydroxyvitamin D (25OHD) levels of at least 50 nmol/L at the end of winter. Serum 25OHD levels Recently, controversy has arisen regarding the long-term safety of calcium supplements in both prospective observational and interventional studies. Some, but not all, studies found an association between calcium supplements and an increased risk of cardiovascular disease, particularly myocardial infarction. Meta-analyses of safety end-points from calcium supplement RCTs have shown small increases in relative risks for myocardial infarction (RR=1.24) and stroke (RR=1.20). However, no

increase in risk was seen with calcium supplement doses of ≤805 mg/d. Other studies have shown high total calcium intakes (diet and supplements) are associated with reduced cardiovascular events, including reduced carotid atherosclerosis and non-fatal cardiovascular events and stroke. All-cause mortality was also reduced in participants with high total calcium intakes. By contrast, only one study has shown high intakes of calcium (>1,400 mg/d) in women are associated with higher all-cause and cardiovascular mortality, but not death from stroke.

Vitamin D supplements are generally safe, with the most common toxicities being hypercalcaemia and hypercalciuria. However, recent prospective observational studies and RCTs have raised questions about the safety of higher serum 25OHD levels. Three studies have shown higher serum 25OHD is associated with an increased risk of prostate and pancreatic cancers. In two RCTs of intermittent high- dose vitamin D supplements there was an increased risk of fractures and falls in elderly postmenopausal women. In the first study of 9,440 elderly community-dwelling participants received an annual injection of 300,000 IU vitamin D2 or placebo annually for 3 years, women in the vitamin D group showed an increased risk of hip/femur fractures (HR 1.80). The second study of 2,256 elderly community- dwelling Australian women who received an annual oral dose of 500,000 IU vitamin D3 demonstrated a 15 % and 26 % increased rate of falls and fractures, respectively.

The greatest increase in falls occurred in the first 3 months after dosing. Therefore large annual doses of vitamin D are not recommended to treat vitamin D deficiency.

MTE6
BARIATRIC SURGERY AND BONE

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Obesity is an increasing public health problem globally, with the its prevalence (BMI above 30 kg/m2) estimated at 15–20 % amongst middle-aged individuals in Europe. Although the prevalence of individuals with BMI greater than 40 kg/m2 (termed "morbid obesity") is uncertain in Europe, in the United States it has been estimated to be 5 %. Many approaches to weight loss have been evaluated, but it is increasingly recognised that the most effective strategies for long-term weight reduction are those based on surgical treatment.

Surgery aimed at weight reduction (termed "bariatric surgery") comprises a group of related procedures, which may restrict the volume of food ingested (for example vertical banded gastroplasty and laparoscopic adjustable banding) or cause malabsorption (for example jejuno-ileal bypass and bilio-pancreatic diversion), or a combination of approaches. Both types of procedure appear to increase bone resorption and some may lead to an apparent reduction in BMD. The magnitude of the decrease in BMD is difficult to quantify, however, as reduction in adipose tissue may influence DXA-derived assessment of bone mineral. Mechanisms underlying a deleterious effect of bariatric procedures on bone may involve the reduction of positive factors such as estrogen and leptin from fat tissue; malabsorptive procedures may also lead to a reduction in calcium and vitamin D absorption, with consequent secondary hyperparathyroidism.

In this workshop, we will discuss the influence of bariatric surgery on BMD, bone turnover, and, most importantly, fracture risk. We will also consider potential mechanisms, and difficulties with the interpretation of BMD results in the context of weight loss. By the end of the workshop, participants should have a working knowledge of these subjects, which should inform their clinical practice and allow them to optimally assess such patients.

MTE7
INADEQUATE RESPONSE IN OSTEOPOROSIS THERAPY

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Lack of compliance to medication is the most common cause of inadequate treatment response to antiosteoporosis drugs. However, even under ideal conditions of clinical trials, in highly monitored and selected patients, some individuals fail in responding adequately to therapy.

Treatment failure has been recently defined by a working group of the IOF in terms of incident fractures while on treatment, lack of response in biochemical markers of bone remodeling and lack of BMD significant increments[1].

Different factors have been associated to this lack of response and, among them, an already advanced structural deterioration or vitamin D deficiency[2], poor physical function, higher risk of fracture as assessed by FRAX, falls, several comorbid conditions, current use of glucocorticoids, older age, PPI use and inflammatory arthritides have been identified as predictors of treatment failure[2–4]. The reasons for these findings need to be explored although interference with antiosteoporosis drugs, therapeutic ceiling of these agents, or

lack of specificity of the available drugs for some specific types of osteoporosis have been invoked. In any case, even though the percentage of affected patients is low, more specific, targeted strategies would be desirable to address these clinical situations.

References: 1. Osteoporos Int 2012;23:2769
2. J Bone Miner Res 2012;27:817 3. J Bone Miner Res 2014;29:268 4. J Bone Miner Res 2014;29:260

MTE8
PREVENTION OF GLUCOCORTICOID-INDUCED OSTEOPOROSIS

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Objective: Glucocorticoids are a common cause of secondary osteoporosis. Unfortunately while this is a well recognized cause of fractures, a significant diagnostic and therapeutic care gap remains.

Material and Methods: Relevant literature has been reviewed.

Results: Fracture Risk

In considering fracture risk, it is important to recognize that it is not just the use of glucocorticoids that increases the risk of fracture, but it is the underlying condition that often contributes to that risk. Traditional risk factors such as prior fracture, age and sex are equally important.

Sex and demographic differences

Glucocorticoid induced osteoporosis is often overlooked in men, however it is evident that men with underlying respiratory conditions requiring glucocorticoids are at increased fracture risk and benefit from preventative treatment. Controversy around preventative pharmacologic therapy continues in premenopausal women of childbearing age commencing glucocorticoid treatment. Randomized clinical trials suggest that fractures are infrequent in this population and seldom occur in the first year of therapy. Reduction of glucocorticoid dose as quickly as medically possible may be the best strategy. More evidence has been published regarding the prevalence and incidence of children on glucocorticoid treatment. Strategies for the prevention of fractures are being developed as our knowledge increases in this population.

Therapy

Glucocorticoids are recognized as causing fractures at higher bone densities than is seen in postmenopausal osteoporosis. As a result many have suggested treatment at a BMD of −1.5 or less. Traditionally adequate dietary calcium intake, vitamin D and exercise are recommended in all patients. Pharmacologic therapy in adults is recommended for those at higher risk for fractures. Pharmacologic therapies that have been shown to be efficacious in the prevention of fractures or improvement in BMD include etidronate, alendronate, risedronate and teriparatide.

Conclusion: In conclusion, glucocorticoid induced osteoporosis remains a significant risk for fracture. Under recognition and under treatment remains a problem. Randomized clinical trials demonstrating fracture efficacy for a variety of therapies have been done and guidelines have been developed regarding prevention and treatment strategies. All that remains is more aggressive implementation and adherence to these guidelines.

Disclosures: Amgen, Eli Lilly, Merck, Warner Chilcott.

MTE9
POSTMENOPAUSAL HORMONE THERAPY: RISKS AND BENEFITS

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Postmenopausal hormone therapy (PMHT), also called previously hormone replacement therapy (HRT) is used for the relief of menopausal symptom. The dosage has varied greatly throughout the last decades, as it has been reduced four to eight times. By the end of the 1990s, PMHT was mainly used to prevent chronic diseases such as osteoporosis, coronary heart disease and dementia, and large prevention trials were undertaken in this context. Following the initial negative reports of these trials, notably of coronary heart disease, stroke and breast cancer, use of PMHT dramatically decreased. Nowadays, considering the currently available data, it seems that an important distinction should be made between the treatment of climacteric symptoms in young, generally healthy, postmenopausal women and the prevention of chronic diseases in elderly women. PMHT seems to be beneficial and safe for postmenopausal symptomatic younger women, i.e., aged <60 years. Treatments with a high safety profile should be the preferred option, including low- dose PMHT, oestrogen-only therapy in women who have had a hysterectomy, and vaginal oestrogen therapy for women with atrophic vaginitis. Nonandrogenic progestin might have a reduced thrombotic and breast cancer risk, and transdermal oestrogen could have a reduced thrombotic risk. Nevertheless, PMHT should not be used for the prevention of chronic diseases in the elderly (i.e., >70 years old) owing to the increased risk of stroke and breast cancer in these patients.

MTE10
MANAGEMENT OF OSTEOPOROSIS IN LATIN AMERICA

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The best overall epidemiologic information focusing osteoporosis in Latin America was collected by an IOF task force in 2012 (IOF Latin America Audit). Data from 14 countries were analysed. In these countries the current percentage of the population ≥50 y lies between 13 and 29 %. By 2050, these estimations will increase from between 28 and 49 %. The percentage increase in the 70 and over population between 2011 and 2050 averages 280 %. The Latin American Vertebral Osteoporosis Study (LAVOS) included five countries in the region: Argentina, Brazil, Colombia, Mexico and Puerto Rico. An overall vertebral fracture prevalence rate of 14.77 % was found for all ages and countries combined. Of note, the vertebral fracture prevalence rate reached as high as 38 % in women 80 years and over. Data from Argentina revealed an annual rate for hip fractures as high as 488 per 100,000 for the over 50 population. New epidemiologic studies are in development. Access to DXA machines is limited to urban areas and private clinics in the majority of the region and machine availability estimates range from 1 to 10 per 1 million inhabitants. Brazil has the highest number of DXA machines (almost 1700). Currently only six of the countries in the region have an online FRAX calculator: Argentina, Brazil, Chile, Colombia, Ecuador and Mexico. Osteoporosis is considered a health priority in only three of the 14 countries—Brazil, Cuba and Mexico. Currently, In Argentina, Bolivia, Chile, Colombia, Costa Rica, Guatemala, Nicaragua, Panama, Venezuela, and Uruguay osteoporosis is not recognized as a major health problem and there are currently no governmental public awareness programs covering its prevention, diagnosis or management. Bisphosphonate therapies are widely available throughout the region with considerable variability in reimbursement policy. Other osteoporosis therapies such as SERMs, PTH, denosumab, strontium are also available but access is limited. Osteoporosis guidelines are available in nine of the 14 countries. Vitamin D studies performed mainly in Brazil and Argentina reveal an abundance of hypovitaminosis D throughout Latin America. The costs of hip fracture calculated in some countries are about (US$): Uruguay 3100, Chile 2000–7000, Argentina 3100, Brazil 3900–12 000, Guatemala 4000, Costa Rica 8000, Colombia 6500.

MTE11
MANAGEMENT OF OSTEOPOROSIS IN THE MIDDLE EAST

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Osteoporosis is defined as a skeletal disorder characterized by compromised bone strength predisposing to an increased risk of fracture (1). It will soon represent a major health problem in the Middle East, due to the increase of life expectancy (2). Despite countries in the Middle East being sunny, we observed a high prevalence of Vit D deficiency (2, 3). The projected increase in the number of hip fractures in 2050 is scary, as the number of the population over the age of 50 years will double (2,4,5). There is a discrepancy between the Middle Eastern countries in socioeconomic and health care level. A policy for the management of osteoporosis in ME in partnership with the decision makers, healthcare providers, scientists and CNS should be established.
The management should include (6,7):

- Assessment of the risk factors by applying FRAX and 1-min screening test
- Improving access to DXA Scan
- Assessment of Vit D status and development of Vit D supplementation strategy
- Improving access to treatment with different therapies available in the ME and improving reimbursement policy
- Assess and prevent frailty, sarcopenia and falls
- Improving post fracture rehabilitation
- Empowering patients through public awareness campaigns and fracture risk assessment knowledge, to prevent the first fracture
- Fighting heavy smoking and sedentary life style
- Increase awareness of health professionals and public
- Promoting epidemiological studies and hip fracture registries
- Involving the health authorities in all steps aimed at the management of the disease and promoting the recognition of osteoporosis as a priority in the health system
- Updating the existing guidelines for the prevention and management of osteoporosis

References: 1. National Institutes of Health Consensus Development Conference Statement March 27–29, 2000 2. The Middle East regional Audit- International Osteoporosis Foundation

3. The First Jordanian National Osteoporosis Record (FiJONOR)
4. The incidence of fragility (osteoporotic) hip fractures in Jordan (FiJoHip)
5. US Census Bureau July 17, 2003
6. Middle East and North Africa consensus on osteoporosis, J Musculoskelet Neuronal Interact 2007;7:131
7. Making the first fracture the last: ASBMR task force on secondary prevention, JBMR 2012;27:2039

MTE12
RESPONDERS IN OSTEOARTHRITIS TREATMENT

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Osteoarthritis is a clinical syndrome of failure of the joint accompanied by varying degrees of joint pain, functional limitation, and reduced quality of life due to deterioration of articular cartilage and involvement of other joint structures. Regulatory agencies require relevant clinical benefit on symptoms and structure modification for registration of a new therapy as a disease-modifying osteoarthritis drug (DMOAD). Different groups of experts convened to explore the current burden of osteoarthritis, review current regulatory guidelines for the conduct of clinical trials, and examine the concept of responder analyses for improving drug evaluation in osteoarthritis. They consider that the major challenges in DMOAD development are the absence of a precise definition of the disease, particularly in the early stages, and the lack of consensus on how to detect structural changes and link them to clinically meaningful endpoints. Responder criteria should help identify progression of disease and be clinically meaningful. The ideal criterion should be sensitive to change over time and should predict disease progression and outcomes such as joint replacement.

MTE13
ADVANCED BONE IMAGING IN OSTEOPOROSIS ASSESSMENT

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The skeleton is comprised of cortical and trabecular bone, each contributing to skeletal strength and to fracture resistance. The determination of skeletal status in health and disease, and its response to therapy and propensity to fracture have been primarily based on assessment of standard BMD (BMD) and mass (BMC) by areal or volumetric X-ray-based imaging techniques. While such BMD/BMC evaluations by DXA and QCT have clinical utility in detecting bone loss and diagnosing osteoporosis, they do not fully assess the impact of metabolic disorders or therapeutic interventions on the skeleton or adequately predict the risk of appendicular and axial fractures. Additionally, these standard bone density techniques have not achieved regulatory recognition as valid surrogates for fracture outcome.

As a consequence, there has been considerable interest in the examination of other factors beyond BMD associated with bone integrity and mechanical competence, including the macro- and microstructure and strength of both cortical and trabecular bone, and the basic composition of skeletal tissue. The analysis of bone morphology including microarchitecture and ultrastructure of the trabecular and cortical compartments has been accomplished using the remarkable, high- resolution imaging capabilities of advanced computed tomography (CT), μCT and magnetic resonance (MR) systems, combined with advanced image processing and computational approaches, including finite element analysis (FEA) for estimating bone strength.

These newer advanced imaging technologies now have been widely applied in preclinical and clinical research and have contributed enormously to our understanding of the complex relationships among bone density, mass, geometry, microstructure, strength and fracture propensity, across a range of axial and appendicular skeletal sites, and their variable cortical, trabecular and endosteal components. The skeletal consequences of aging, disease progression, and response to novel therapy have been extensively examined and considerably illuminated through application of these advanced bone imaging and analysis methods.

MTE14
MANAGEMENT OF OSTEOPOROSIS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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It is well-known that active rheumatoid arthritis (RA) is associated with generalized bone loss and with fractures. This negative effect on bone particularly occurs in patients with suboptimally treated RA, with persisting systemic inflammation (1); apart from that glucocorticoids (GC) might also have a negative effect on bone.

The etiology of osteoporotic fractures in patients with RA is multifactorial, including both bone-related (low BMI, familial

osteoporosis) and fall-related factors, and is also related to the severity of the underlying disease.

A patient will be discussed: a (Dutch) postmenopausal women, 71 years of age, with a wrist fracture 15 years ago. Length 165 cm, weight 65. Because of active RA, she starts with prednisone 10 mg/d and MTX. She is a smoker, no alcohol, no familial osteoporosis. T-score hip −1.5, T-score spine −1.4.

During the meeting we will discuss:

a) What is her relative risk for vertebral and nonvertebral fractures?
b) Why is her fracture risk elevated?
c) What is her absolute fracture risk?
d) Is there an indication to start with antiosteoporotic drug treatment?
e) Suppose you start with treatment to prevent future fractures: how much vitamin D do you prescribe? 800 IU per day or higher?
f) Suppose you start with antiosteoporotic drugs: which drugs are first and, eventually, second choice in RA patients?
g) How long do you continue antiosteoporotic treatment?

References: 1. Vis M et al. Osteoporos Int 2013;24:2541.

Disclosures: Speakers fee/Consultancy: Eli Lilly, Merck, Servier, Amgen, Novartis, Will Pharma, Takeda, Pfizer, Abbvie.

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World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2014): Poster Abstracts

P101
COMPARISON OF THE INTERNATIONAL REFERENCE VALUES OF BONE SPEED OF SOUND IN PEDIATRIC POPULATION: META-ANALYSIS

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Objective: To compare the international reference values of the speed of sound (SoS) assessed by multisite quantitative ultrasound (QUS) in tibia and radius in pediatric population comparing these values by age and by countries.

Material and Methods: We conducted a systematic review with meta-analysis of the studies published from 1965 to November 2013 on the reference values of QUS (Sunlight Omnisense) in newborn, infants and children. A sensitive search of the evidence was performed in PubMed, Embase, LILACS, ARTEMISA, Cochrane controlled trials register and Bandolier. We calculated de mean differences of SoS in tibia and radio between countries by gender and age. The results are presented in tables and forest plots to compare raw reference data between countries.

Results: Ten studies with a total of 6,250 patients were included in the meta-analysis. In the newborn population we found two studies Portugal and Israel that include subjects with a gestational age between 27 and 42 weeks, with a mean difference (Portugal - Israel [CI 95 %] m/s) of 23.62 [CI 95 % 6.29, 40.95] m/s. In pediatric population there were eight studies from Canada, México, Israel, Greece, Portugal and Turkey. There were no significant differences between SoS Israel reference values neither in tibia or radius in comparison of vs. Turkey, vs. Greece or vs. Canada ($p>0.05$). We found significant differences of the mean SoS (m/s) measurements in tibia in the comparison of Mexican references values with other countries (Mexico- Other [CI 95 %] m/s) as follows: Israel −105.29 [CI 95 % −140.05, −70.54], Portugal −115.14 [CI 95 % −164.86, −65.42], Greece −239.14 [CI 95 % −267.67, −210.62], Turkey −115.14 [CI 95 % −164.86, −65.42], and Canada −113.51 [CI 95 % −140.25, −86.77] ($p<0.001$).

Conclusion: This study confirms that there are differences between references values of QUS between countries. These differences are between Mexican versus European countries, but there are no differences between European countries.

P102
LOWER SCLEROSTIN IN ACQUIRED IMMUNE DEFICIENCY SYNDROME (LSAIDS)

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Objective: Determine the association of sclerostin levels to BMD changes in patients with HIV infection.
Material and Methods: Serum sclerostin levels, serum dickkopf 1, standardized BMD (sBMD) of lumbar spine and femoral neck, and bone turnover markers were measured for 30 HIV-infected treatment naïve subjects and compared to 65 healthy seronegative controls matched for age and sex.
Results: The mean of measured sclerostin was significantly lower in the HIV group than the control group (37.52 vs. 76.71 pmol/L; $p<0.001$). The HIV group also had a significantly lower BMD in the lumbar spine and femoral neck. The mean levels of serum osteocalcin, a bone formation marker, was significantly lower in the HIV than the control group (15.53 vs. 24.42 ng/ml; $p<0.001$). The HIV group had a mean CD4 count of 170.21 cells/mm^3 (AIDS range).
Conclusion: In patients with advanced HIV infection and low BMD, we hypothesised that depleted sclerostin levels could be part of the severely immunocompromised status caused by HIV infection.
References: Cain CJ, et al. J Bone Miner Res. 2012;27:1451.
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P103
TREATMENT OF UNSTABLE OSTEOPOROTIC FRACTURES OF PROXIMAL HUMERUS WITH LOCKING PLATES

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Objective: Almost 20 % of the proximal humeral fractures are unstable with absolute indications for surgical treatment. Good postoperative result requires surgical technique, which maintains local blood supply, with good reduction and stable fixation and ability for early rehabilitation. The persisting osteoporosis is challenging for treatment choice and expected results. Low profile locking proximal humerus plates (PHLP and S3) give a good opportunity for realizing of this conditions. The aim of the report is to represent our opinion and results of using proximal humerus locking plates in cases with moderate to severe osteoporosis.
Material and Methods: For period of 5 y (2005–2010) we have operated on 23 patients - 18 female and 5 male in average age 71 (62–83) y. Fractures distribution according to AO: 8 - A2.2; 5 - A3.1; 4 - B2.1; 3 - C2.1; 3 - C3.1. Surgical technique: Open reduction and internal fixation via deltopectoral approach. Soft tissue preservation. Stable fixation with locking plates - 10 type S3 (DePuy) and 13 type LPHP (Synthes).
Results: Follow-up was minimum 3 y. We made rating according to Constant Shoulder Assessment (CSA): 14 (60.9 %) excellent and good; 9 (39.1 %) satisfactory; 2 (8.7 %) poor results. AVN in 2 (8.7 %) patient. We have no observed infection and neurovascular complications.
Conclusion: Specially designed proximal humerus locking plates decrease complications connected with conventional plates in osteoporotic patients, indicated for surgical treatment. Angular stability allows early rehabilitation even in osteoporosis. Avascular necrosis of the humeral head depends on fracture type and local soft tissue damage.

P104
THE EFFECT OF GRAFT ORIENTATION IN OSTEOCHONDRAL AUTOTRANSPLANTATION OF EARLY STAGE OSTEOARTHRITIS

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Objective: To introduce the clinical results of arthroscopic osteochondral autotransplantation are greatly affected by surgical technique and graft orientation.
Material and Methods: From Nov 2005 to March 2011, 74 patients, 76 arthroscopic osteochondral autotransplantations were practiced. The Lysholm knee score and NRS scale was recorded initially and 3 months, 6 months, 12 months after the surgery. Follow up knee MR were done on 30 patients. The radiologic parameter, α angle and β angle was analyzed in the group.
Results: The mean Lysholm knee score improved from 64.43 to 91.1. The Pearson coefficient of the clinical results of

patients with α angle and β angle was −0.548, −0.792, respectively. P-value was 0.002 and 0.0001, respectively.
Conclusion: The surgical technique and graft orientation in the arthroscopic osteochondral autotransplantation is important parameter affecting clinical results of patients. β angle was stronger parameter to predict the clinical results.

P105
KNEE DEFORMITIES AMONG CHILDREN ATTENDING PRESCHOOLS IN KANDY EDUCATIONAL ZONE

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Objective: Knee deformities are frequently present in children of school going ages. Most commonly these deformities represent normal variations for the growth and development of the child. It needs no treatment except for observation and reassurance of the parents. If the condition worsens or persists into late childhood and adulthood then further action is needed in addition to cosmetic concerns as they are typically prone to injuries. Although there are many types of knee deformities, this study was based on bow legs, back knees and knock knees. This study was done to assess the common types of knee deformities and to find out the association between the development of the knee deformities with body weight, body height, obesity and gender in children attending preschools in Kandy Educational Zone.
Material and Methods: A preschool based observational analytical study was conducted in 32 preschools in Kandy Educational Zone in 2011. Students were screened for deformities using physical examinations which involved measuring body weight, body height, intercondylar distance, intermalleolar distance and knee hyperextension by means of weighing balance, measuring tape and goniometer.
Results: A total of 53 (12.184 %) had at least one type of deformity among 435 students screened. 26 (5.977 %) had back knees, among which 18 (4.138 %) had unilateral back knee and 8 (1.839 %) had bilateral back knees, 15 (3.448 %) had bow legs and 14 (3.218 %) had knock knees. The commonest presentation was back knees.
Conclusion: There was no association between gender and the development of these three types of knee deformities. Body weight, body height and obesity were associated with the development of knock knees whereas no association was found with back knees and bow legs.

P106
CHOLESTEROL LEVELS AND RISK OF HAND OSTEOARTHRITIS: THE CHINGFORD STUDY

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Objective: To examine whether serum cholesterol profile is associated with the incidence of hand osteoarthritis.
Material and Methods: Prospective population-based cohort involving the 277 women included in the Chingford cohort who: 1) completed year 11 of follow-up, 2) had no hand osteoarthritis at baseline, and 3) had measures available of total cholesterol (TC), HDL-cholesterol, LDL-cholesterol and tryglicerides (TG) as well as covariates (age, physical activity, BMI, classical risk factors, concomitants drugs, laboratory tests, menopause) at baseline. Main outcome: incident radiographic hand OA at any hand joint according to Kellgren and Lawrence criteria (grade ≥2) in year 11th of follow-up. Cholesterol variables were categorised into quartiles, and the association with outcome was modeled using multivariate logistic regression adjusted for the confounders listed above.
Results: 143/277 participants developed radiographic hand OA after 11 years of follow-up (cumulative incidence 51.6 %). HDL levels were inversely associated with the risk of developing hand OA, with adjusted ORs 0.33 [0.16–0.69], 0.47 [0.22–0.98], and 0.42 [0.19–0.95] for the 2nd, 3rd, and 4th quartiles compared to the first (reference group). Conversely, TG levels were directly associated (borderline significant) with such risk: adjusted OR 2.09 [0.99–4.44]. No relationship was found between baseline TC or LDL levels and hand OA risk.
Conclusion: In this population-based cohort of UK women, higher levels of HDLc appear to be protective against radiographic hand OA after 10 years of prospective follow-up. Conversely, higher levels of TGs seem to confer a higher risk of hand OA, although the association observed was of borderline significance. More research is needed to confirm these findings and to examine the excess risk.

P107
IMPACT EVALUATION OF A HIP FRACTURE PREVENTION DEVICE

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Objective: The second fracture of the upper part of the femur is associated to a dramatic increase of the mortality rate (from 20 to 50 % depending of the studies). Therefore, it is clearly important to prevent this second fracture. The purpose of this study is to evaluate the impact of a new prevention dedicated osteosynthesis implant (PDOI) on patient in terms of safety and effectiveness.
Material and Methods: The study was performed in an ongoing, prospective series of 15 PDOIs. To date, three patients were implanted. The PDOI was implanted into the contralateral hip during the same surgery time of fractured hip gamma nail implantation. Mean follow-up was 3 months. Clinical evaluation included the Oxford hip score, the WOMAC scores. Plantar pressure measurements were evaluated at 3 weeks and 3 months after the surgery using a Win-Pod (Medicapteurs).
Results: Mean Age and BMI of patients were 83±3 years and 25±9 kg/m^2, respectively. Mean duration of surgery was 43 min (range 35–58). Cement quantities were similar over the three patients (6–7 cc). At 3 weeks, comparison between the two legs' plantar pressures revealed no differences (50–50 %). Experiences of pain were comparable between the two legs (0.7 and 1 for the Gamma Nail and the PDOI, respectively). At 3 months, WOMAC scores for pain and functionality were 6 and 36, respectively, and an OHS score of 25. Experiences of pain were similar between the two legs (3 and 4 for the Gamma Nail and the PDOI, respectively). Concerning the planar pressures, results obtained were in favor of the PDOI compared to the Gamma nail (53 % vs. 47 %). No osteolysis or implant loosening was observed at the different follow-ups.
Conclusion: At 3 months, patients have maintained good physical health without any inconveniences, in the contralateral hip, caused by the implantation of the PDOI. Furthermore, patients tend to more bear their weight on the leg with the PDOI. These first results are very encouraging and suggest that PDOI did not cause additional troubles or pains to the patient.

P108
CORRELATION BETWEEN FUNCTIONAL EVALUATION, PAIN SEVERITY, FATIGUE AND IL-6 IN HAND OSTEOARTHRITIS

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Objective: To correlate functional evaluation, pain severity and fatigue with IL-6 in patients with hand osteoarthritis.
Material and Methods: 25 patients were selected according to EULAR recommendations for diagnosis of hand osteoarthritis (HOA). Patients were subjected to anthropometric measurements, clinical examination, functional assessment by chronic illness therapy fatigue scale (FACIT), pain severity assessment by VAS, determination of Australian Canadian Hand index (AUSCAN), determination of ESR, CRP, rheumatoid factor and uric acid (to exclude secondary causes of HOA), and measurement of IL-6. 15 healthy volunteers constituted the control group.
Results: IL-6 was significantly higher in patients than in controls group. There was positive correlation between IL-6 and VAS. There was positive correlation between IL-6 and AUSCAN index. There was positive correlation between IL-6 and FACIT.
Conclusion: Hand osteoarthritis has important functional consequences in terms of pain, reduced grip force, activity limitations and participation restrictions. IL-6 correlated significantly with VAS, AUSCAN and FACIT. IL-6 inhibitors may be recommended in treatment of HOA.

P109
IMPACT OF STRONTIUM RANELATE ON THE QUALITY OF LIFE IN PATIENTS WITH PROXIMAL FEMORAL FRACTURES

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Objective: Among fragility fractures, those of proximal femur have a huge impact on morbidity and mortality, significantly influencing the quality of life. The authors evaluate the impact of strontium ranelate on life quality so to see if this antiosteoporotic agent is beneficial or not.
Material and Methods: Two groups, total of 60 patients operated for proximal femoral fractures between 01.01.2011–01.01.2012 were prospectively analysed for quality of life using SF 36 questionnaire and the HAQ-DI (Health Assessment Questionnaire Disability Index) 6 months and 1 year after surgery; group 1 (36 patients) received strontium ranelate, group 2 (24 patients) had no associated treatment. The fractures were trochanteric and femoral neck and surgery consisted in osteosynthesis with DHS (23 patients), Gamma-nail (21 patients), arthroplasty (26 patients).

Results: Significant differences appeared between the two groups, with better results in group 1, regarding the physical component score, physical functioning, pain and general health components of the SF36 and HAQ-DI after 1 year, with no significant differences after 6 months. PCS was negatively correlated to HAQ-DI, no correlation regarding age and sex could be identified. Furthermore, there were no significant differences within the two groups regarding the type of fracture or the type of surgery.

Conclusion: The study reveals that strontium ranelate has direct effect on the outcome of proximal femoral fractures; whereas there is no direct correlation between DXA in the studied groups and quality of life, expressed by the two described tools. Significant improvement can be produced by adding strontium ranelate after surgical stabilisation, according to prescription. Due to the small number of cases, further randomised control trials are necessary in order to definitely describe the effect of antiosteoporotic treatment upon the quality of life of these patients.

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P110
THE CLINICAL AND RADIOLOGICAL CHARACTERISTIC OF PATIENTS WITH RHEUMATOID ARTHRITIS WITH FRACTURES OF PERIPHERAL BONES AND VERTEBRAE

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Objective: To present the clinical and radiological characteristic of patients with rheumatoid arthritis with fractures of peripheral bones and vertebrae.

Material and Methods: In this research it is included 106 women with RA, age 23–69 years. The X-ray morphometric analysis of vertebral deformations by the Genant method was performed. Radiological signs of RA progressing were determined by the Sharp/van der Heijde method at 67 patients. The BMD was assessed by DXA Hologic Discovery A at lumbar spine (L1-4), at hip neck and at nondominant hand.

Results: By existence or absence of peripheral fractures in anamnesis patients are distributed in two groups: with fractures (group 1) - 37(35 %) patients, without fractures (group 2) - 69(65 %). The mean age was comparable: 54.1±9.6 years in group 1, 51.1±10.6 years in group 2. The duration of RA in group 1 was 16.5±11.5 years vs. 11.6±9.1 years in group 2 ($p<0.01$). In group 1 - 15(40 %) patients had vertebral deformations, in group 2 - in 9(13 %) ($p<0.05$), steroids (>3 months) were received in 30(81 %) and 50(43 %) patients, respectively, the cumulative dose of steroids was higher in group 1 ($p<0.05$). The BMD in group 1 was lower at L1-4 and hand: 0.857±0.147 g/cm^2 vs. 0.935±0.117 g/cm^2, 0.433±0.104 g/cm^2 vs. 0.479±0.057 g/cm^2, respectively ($p<0.05$). At least in one of analyzed sites osteoporosis was revealed in 14(38 %) patients in group 1 and in 18(26 %) patients in group 2 ($p<0.05$). The quantity of erosions in group 1 amounted 61.2±64.1, in group 2–25.3±37.9 points, a total Sharp score 156.3±99.1 and 109.9±72.1 points, respectively ($p<0.05$); the index of vertebral deformations of thoracic spine was 0.74±0.13 and 0.79±0.03 points, respectively ($p<0.05$).

Conclusion: Every third patient with RA had fractures of peripheral bones, every fourth had vertebral deformations. Patients with peripheral changes had longer duration of disease, a higher cumulative dose of steroids, quantity of erosions and a total Sharp score, thus that osteoporosis (by BMD) was defined only in 38 % of patients.

P111
ANY ROLE FOR SERUM MAGNESIUM IN THE BLUNTED RESPONSE OF PARATHORMONE HORMONE IN EUCALCEMIC PATIENTS WITH HYPOVITAMINOSIS D?

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Objective: Hypovitaminosis D is not always accompanied by secondary hyperparathyroidism. Some patients may expressed blunted response of PTH. In the search of possible reason for the blunted response of the PTH, we reviewed the serum magnesium (S/Mg) level in patients with and without such response.

Material and Methods: The records of cohort of adults with hypovitaminosis D who also had their S/Mg concurrently estimated. Magnesium assay was carried out by enzymatic method (Architect, Abbott, N=1.6–2.6 mg/dl). Other parameters of interest were age of the patients, serum calcium, 25 (OH)D and PTH level. The patients were primarily, divided on the basis of the PTH response, i.e., with secondary hyperparathyroidism and others with blunted response.

Results: 198 patients aged between 14 and 74 years were diagnosed with hypovitaminosis D (25(OH) D, <30 ng/ml). Data for S/Mg were available for 65 patients (35 males & 30 females), 34(52.5 %) with secondary hyperparathyroidism

(>69 pg/ml) and 31 (47.5 %) with blunted PTH response (mean 106±25.6 vs. 51.7±11.6 pg/ml, p=0.0001). Their age was comparable in the two groups (44.3±13.9 vs. 43.1± 13.3 year), respectively, p=0.72. Likewise was the mean of S/Mg in the 2 groups (1.84±0.275 vs. 1.81±0.202 mg/dl), p= 0.64. Mild hypomagnesemia was documented in 3/34 patients with secondary hyperparathyroidism (9 %) vs. 4 in others with blunted PTH response (13 %), p=0.75. The mean value was 1.46 and 1.47 mg/dl, respectively. The mean of serum calcium was also comparable (9.37± 0.432 vs. 9.47±0.50 mg/dl), p=0.41. Borderline hypocalcaemia, however, was noted in 2 patients neither of whom had an associated hypomagnesemia. Finally, the mean of 25(OH)D was 15.3±6.23 in those with secondary hyperparathyroidism vs. 16.8±5.86 ng/ml in others with blunted response, p=0.31.

Conclusion: In this cohort of eucalcemic patients with hypovitaminosis D, the serum magnesium was not discriminatory hence, did not provide any clue towards the blunted response of the PTH.

P112
SIGNIFICANT FUNCTIONAL HYPOPARATHYROIDISM IN EUCALCEMIC PATIENTS WITH HYPOVITAMINOSIS D

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Objective: To assess the observation that some patients diagnosed with hypovitaminosis D were noticed to have normal levels of PTH in the UAE.

Material and Methods: We reviewed the records of cohort of 198 adults (14–74) including 100 males diagnosed with hypovitaminosis D assayed by chemiluminscent microparticle immunoassay for total 25 hydroxyvitamin D3 (25(OH)D). PTH was also assayed by chemiluminscent microparticle immunoassay.

Results: 51(25.5 %) patients were deficient. Apart from four patients, the rest were eucalcemic (mean of 9.41± 0.419 mg/dl). The mean 25(OH)D in deficient patients was 9.77±1.93 vs. 18.9±4.51 in the insufficient ones, p<0.0001. 81(41 %) of the group exhibited blunted response of the PTH to the hypovitaminosis D; <69 pg/ml, (15/51(29 %) with deficiency vs. 66/147(45 %) with insufficiency), p=0.068. The mean of 25(OH)D was not different in patients with blunted response and other with secondary hyperparathyroidism (16.8±5.02 (7.2–28.9 ng/ml) vs. 16.7± 5.90 (2.06–29.7 ng/ml), respectively, p=0.88. For the PTH, the mean was significantly higher in patients with secondary hyperparathyroidism (69.4–329, mean of 108 pg/ml±39.9) than in others with blunted response (29–68.4, mean of 55.4 pg/ml±10.6, $p\leq$0.0001). The mean of blunted PTH response, however, was not different between those with deficient (16) (56.8 pg/ml±8.7) and insufficient (66) patients (55.1 pg/ml±11), p=0.57. Both, the age factor and serum phosphorus were nondiscriminatory in patients with blunted and normal response of secondary hyperparathyroidism, respectively.

Conclusion: Significant blunted PTH response coexisted in these patients with hypovitaminosis D and eucalcemia regardless to the vitamin status. Such finding poses a challenge to the discriminatory role played by PTH and calcium values in classifying hypovitaminosis D patients. Moreover, repeating the PTH assay would not be feasible in the follow up of treated patients with the blunted response. Only the assay for vitamin D would be sufficient.

P113
SENSITIVITY/SPECIFICITY ANALYSIS AMONG RECOMMENDATIONS FOR BONE MINERAL DENSITY MEASUREMENT IN TAIWANESE 50 YEARS OLD AND OLDER MEN

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Objective: To evaluate the recommendations for BMD test in Taiwanese men.

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. Osteoporosis was defined as lowest T-score≤-2.5 at any sites, including lumbar spine(L1~L4), total hip, femoral neck. We made use of the database of the project to compare the positive predictive value of osteoporosis among the recommendations by National Osteoporosis Foundation (NOF), Osteoporosis Simple Tool for Taiwan (OSTAi), and National Osteoporosis Guideline Group (NOGG) for Taiwanese men. We also analyze the sensitivity/specificity of each recommendation by the receiver operating characteristic (ROC) curve and calculating area under the curve (AUC) to determine the more adequate recommendation for BMD test for Taiwanese men.

Results: A total of 2,562 Taiwanese men (mean age: 69.7 ±9.5 years) were enrolled in this study. Among these subjects, 422 met the definition of osteoporosis and 253 reported history of fragility fractures. According to the previous Taiwan study, we select −2 as the cutoff value in OSTAi. Based on the index score, the sensitivity/specificity of OSTAi recommendation was 0.656/0.644, compared to 0.924/0.247 (NOF), and 0.746/0.415 (NOGG), respectively. The ROC curve analysis, as illustrated in Fig, revealed AUC was 0.705 (95%CI (CI95):0.677–0.733), 0.586 (CI95:0.558–0.613), and 0.581 (CI95:0.552–0.610) for OSTAi, NOF, and NOGG, respectively ($P<0.001$, between each recommendation, except for NOF versus NOGG with $P>0.001$).

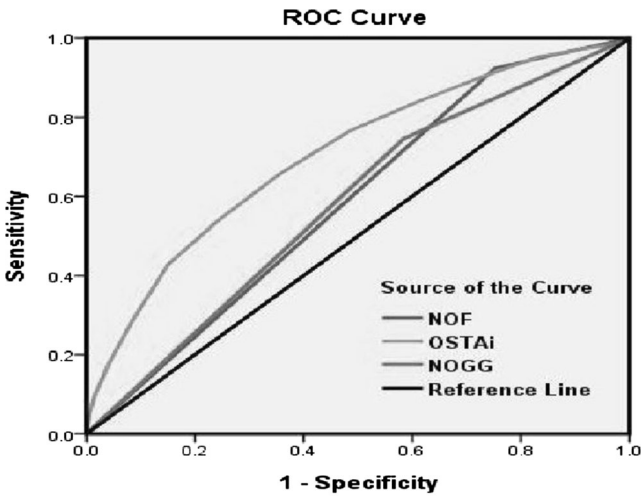

Fig. Area under the curve of each recommendation. NOF:National Osteoporosis Foundation, OSTAi: Osteoporosis Simple Tool for Taiwan, NOGG:National Osteoporosis Guideline Group.

Conclusion: Compared to recommendation by NOF or NOGG, OSTAi seems a better recommendation to screen for osteoporosis and BMD test in Taiwanese men.

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P114
INCIDENCE OF COLLES' FRACTURES IN PATIENTS WITH OSTEOPOROSIS: ANALYSIS OF DATA FROM THE "BONLINK" DATABASE

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Objective: The aim of this study is to determine incidence of fractures of distal part of radius (Colles' fractures) in correlation with BMD and age.

Material and Methods: Prospective study was performed from November 2011 to April 2013 and included 2,625 participants. Data were collected from two "Bonlink" databases from referent DXA centers in Serbia. Participants were referred for lumbar spine and hip DXA scan. Results were interpreted according to the current definition of osteoporosis. They were tested on presence of risk factors. Previous distal radius fracture was documented by radiograms or medical history. We considered the fractures sustained in a fall at the same level or a little trauma. Statistical analysis (descriptive statistics and central tendency) was performed using the program "Bonlink".

Results: The sample consisted of 97 % postmenopausal women and 3 % men, average age 63.89±8.18 years. Average BMD on lumbar spine was 0.818±0.14, femoral neck 0.614±0.23 and total hip 0.789±0.16. Of all participants 56.5 % suffered low energetic fracture. There were detected 586 vertebral and 964 nonvertebral fractures: hip in 7.8 % participants, forearm 52.2 %, humerus 13.1 %, and other fractures 27 %. Two or more fractures suffered in 11.6 % participants. Among nonvertebral fractures, half were Colles' fractures (52.2 %). Highest incidence of Colles' fractures, 52.7 % was among patients with BMD in osteopenic level, 38 % had BMD in osteoporotic level and 9.3 % had normal values. Incidence of Colles' fractures per age groups was as follows: in group 40–49 years was 48 fractures, 50–59 192, 60–69 -161, 70–79 50 and in 80–89 52 fractures.

Conclusion: The most common nonvertebral osteoporotic fracture is Colles' fracture and highest incidence is in patients with low BMD and in age 50–69 years. Forearm fracture often precedes other osteoporotic fracture. Adequate therapy started on time is very important and can reduce occurrence of osteoporotic fractures.

P115
INCIDENCE OF NONVERTEBRAL AND VERTEBRAL FRACTURES IN RELATION TO BONE MINERAL DENSITY: ANALYSIS OF DATA FROM THE DATABASE "BONLINK"

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Objective: To determine incidence of nonvertebral and vertebral fractures in relation of BMD.
Material and Methods: Study included 763 patients who were sent on DXA scan in Railway Healthcare Center, Belgrade during 2012. BMD was measured on lumbar spine and hip. Vertebral fracture assessment (VFA) was done in all participants. Results were interpreted according to current definition of osteoporosis. All participants were examined about presence of low energetic fracture (anamnesis, medical history, radiograms, VFA). Data were collected and analysed in Bonlink program. Descriptive statistics and central tendency were used in statistical analysis.
Results: Most of participants were women, 98 %, and just 2 % were men, average age 65.02±9.31 years. Out of all, 63 % had T-score on lumbar spine or hip at the osteopenic level, 32 % had T-score at level of osteoporosis, and only 5 % had normal value of T-score. Of the summary number of the participants, 49.9 % (381/763) had fractures, and from that number 46.2 % (176/381) had vertebral fractures, and 53.8 % (205/381) had nonvertebral fractures. Some participants had more than one fracture. The most common nonvertebral fractures were at the osteoporotic level 55.2 %, than at the osteopenic level 39.4 %, and 5.48 % had fracture with normal BMD. Unless, vertebral fractures are most common in the group of participants with BMD at the osteopenic level 50.5 %, then 45.1 % at the osteoporotic level of BMD, and only 4.4 % with normal value of BMD.
Conclusion: Measurement of BMD on lumbar spine and hip is the "gold standard" for detecting osteoporosis, but we should seek more for other risk factors in order to prevent further osteoporotic fractures.

P116
INCIDENCE OF FRACTURES IN RELATION TO RISK FACTORS PRESENCE: ANALYSIS OF DATA FROM THE DATABASE "BONLINK"

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Objective: The aim of this study was to determine incidence of fractures in relation to risk factors presence.
Material and Methods: Prospective study was performed during 2012 and included 763 subjects, average age 65.02± 9.31 years. They were referred for BMD testing on lumbar spine and hip in Railway Healthcare Center, Belgrade. Measuring was done on Hologic Discovery C device. All of them were previously examined on presence of risk factors: previous low energetic fracture, family history of hip fracture, smoking, alcohol intake, glucocorticoid therapy, low BMI, early menopause, rheumatoid arthritis, other diseases that can affect bone and >3 falls per year. Results were interpreted according to the current definition of osteoporosis. Data were collected and analysed in Bonlink program. Descriptive statistics and central tendency were used in statistical analysis.
Results: Sample was made from 98 % women and 2 % men. Average BMD on lumbar spine/hip was 0.728±0.09/0.724± 0.0988 and average T-score on lumbar spine/hip was −2.17± 0.830/−2.4±0.628. Among all participants, 49.9 %(381/763) had fracture on small trauma or accidental fracture. Incidence of fractures in relation to risk factors was presence of previous fracture 299, positive family history of fractures 134, smoking 193, alcohol intake 3, glucocorticoid therapy 15, low BMI 28, early menopause 117, rheumatoid arthritis 9, other diseases that can affect bone 12, >3 falls per year 11.
Conclusion: Most frequent risk factors in individuals with presence of fracture were previous fracture presence, smoking, positive family history of fractures, early menopause and BMI<18. Risk factors are very important in fracture risk assessment and we should actively look for them. Individuals with presence of risk factors should be send to DXA scan in order to start therapy on time in those who are in high risk to have fracture.

P117
EFFECT OF GLUCOCORTICOIDS IN DEVELOPMENT OF DECREASED BONE MINERAL DENSITY

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Objective: Glucocorticoid-induced osteoporosis, and thus increased risk of osteoporotic fractures, is one of the major side effects of glucocorticoids use. The aim of the study was to establish the effect of glucocorticoids in development of decreased BMD.
Material and Methods: Prospective study has been done between November 2011 and April 2013, encompassing 2,625 patients of both genders and various ages. The sample was obtained by merging databases from two reference osteodensitometric centers in Serbia, Special Hospital for Rheumatic Diseases at Novi Sad and Railway Healthcare Center at Belgrade. All subjects had their BMD measured at the lumbar spine and hip. Results were interpreted according to the valid osteoporosis definition. Patients were included after being on glucocorticoid therapy (doses ≥5 mg) more than 3 months. In statistical analysis, descriptive statistics, central tendency measures and chi-square test were used.
Results: From total sample, 97 % were females and 3 % males, with average age 63.89±8.18 years. Average BMD value at the hip was 0.789±0.16 with T-score −1.81± 0.83, and at the lumbar spine BMD was 0.818±0.14, with T-score −2.39±0.97. Glucocorticoid therapy was present in 9 % patients, with average treatment duration 2.19±0.89 years. Regarding relation between glucocorticoid therapy and BMD, a connection was found for both the hip and the lumbar spine (X^2=15.71; p=0.000 and X^2=11.96; p=0.000, respectively) with statistical significance of p<0.01.
Conclusion: Glucocorticoids bring to rapid decrease of BMD. Therefore, when prescribing glucocorticoid therapy it is necessary to prescribe simultaneous supplementation of vitamin D, and depending on glucocorticoids dose, also an antiresorption therapy in order to inhibit osteoclastic activity as prevention of osteoporotic fractures.

P118
STRUCTURAL ALTERATIONS INDUCED BY BOTULINUM TOXIN INJECTION IN JUVENILE VERSUS ADULT RAT MUSCLE

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Objective: To study and compare the effect botulinum neurotoxin type A (BoNT-A) injections on structural changes in juvenile and adult muscle.
Material and Methods: The present study was conducted in the Department of Anatomy, Faculty of Medicine, King Abdulaziz University, Jeddah, Kingdom of Saudi Arabia. This investigation examined 32 adults and 32 juvenile rats. Electron microscopy and immunohistochemical which included neurofilament immunohistochemistry techniques were used to perform the morphological study.
Results: The results showed that the use of BoNT-A injections induced morphological changes in the form of muscle fiber atrophy, disorganization of the muscle fiber structure, extension of nerve terminal sprouts, and formation of new neuromuscular junctions. The same set of structural changes took place in both groups. However, the time scale of these changes occurred earlier in juvenile rats than adult muscle.
Conclusion: The injection of BoNT-A leads to morphological changes in juvenile and adult rat muscle. These changes were found to be the same in both groups.
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P119
HANDS EXAMINATION IN ABSENCE OF HAND-RELATED COMPLAINTS: AN OUTPATIENT SURVEY

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Objective: Performing careful physical examination of the hands is an important exercise. A few clinicians, however, may be routinely employing it in their day-to- day practice. In an early survey, a reference to hand examination was made in only in 13 (8.5 %) of 148 randomly selected records of patients seen in the medical outpatient. This paper aims to assess the value of hand examinations of patients in clinical practice.
Material and Methods: 195 adult patients seen in internal medicine outpatient were examined for physical findings involving the hands. Their selection was based on the lack of hand-related complaints. Their age ranged between 16 and 86 years (average 47.8±14.2). 99 (51 %) were males.
Results: 90 (46 %) exhibited physical findings vs. 105 (54 %) who did not, p=0.15. In those with findings, 26/90 (29 %) had findings relevant to the underlying diagnosis or consistent with the complaint (group 1) vs. 64 (71 %) who manifested findings nonrelevant to the underlying diagnosis but formed a potential towards another diagnosis/es (group 2), p=0.0001.

A total of 95 findings were identified in those patients (ratio of 1.06: each patient) representing a wide spectrum of conditions (27 & 68) findings distributed in the two groups respectively, p=0.0001. Heberden's nodes and palmar erythema followed by clubbing and psoriatic rash were the most common findings. Hemorrhagic telangiectasia, tylosis palmaris, sclerodactyly, hands hyperpigmentation and palmar erythema provided clues and directed efforts to rule out potentially serious conditions. There was no gender difference in the distribution of the findings (46 in males vs. 44 in females, p=0.88). The clinical examination of the hands, therefore, may reveal physical findings with or without relevance to the underlying diagnosis in up to 46 % of the patients some of which may reflect significant disorders.

Conclusion: The hand examination remains a pivotal and integral instrument for a better assessment of patients in the clinical practice.

P120
CORRELATION BETWEEN OSTEOPOROSIS AND OSTEOARTHRITIS

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Objective: To find the correlation between osteoporosis and osteoarthritis by using Kellgren Lawrence (KL) grading for osteoarthritis and Singh and Maini Index for osteoporosis.

Material and Methods: 300 patients ageing above 45 years were assessed using KL grading for Osteoarthritis in the knee joint and Singh and Maini Index for Osteoporosis in the hip joint. The KL grading increases with increasing severity of osteoarthritis. The Singh and Maini Index decreases with increasing severity of osteoporosis. All the patients with any history predisposing them to secondary arthritis were excluded along with patients on long term use of corticosteroids. All cases were assessed by a single doctor so as to avoid interobserver variation. Both the KL grading and the Singh and Maini index were analyzed and compared with each other with the help of Pearson's coefficient of correlation.

Results: On comparing a total of 300 cases it is seen that osteoporosis is most commonly seen in postmenopausal females and also in the urban population; whereas osteoarthritis is seen most commonly in the rural population. There is a slight positive correlation between the KL grading and the Singh and Maini Index which indicates that osteoarthritis and osteoporosis are slightly inversely proportional to each other.

Conclusion: There is a slight inverse correlation between the severity of osteoarthritis and osteoporosis. This is comparable to studies which have correlated the BMD using DXA for osteoporosis and KL grading for osteoarthritis. KL grading and the Singh and Maini Index have never been compared. This study also indirectly points towards the uselessness of calcium supplementation in osteoarthritis as it has an inverse relationship with osteoporosis. Large scale studies are required to assess this comparison further, which is possible by using these simple screening techniques.

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P121
BONE MINERAL DENSITY AND FREQUENCY OF OSTEOPOROSIS IN NONMENOPAUSAL WOMEN WITH RHEUMATOID ARTHRITIS

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Objective: To quantify the BMD and to evaluate frequency of osteoporosis in nonmenopausal women. To examine variables associated with low BMD in patients with RA.

Material and Methods: Transversal study based on a group of 130 nonmenopausal women with RA. All the patients fulfilled the 1987 criteria of the American College of Rheumatology for RA diagnosis. The DXA method (Hologic QDR 2000) was used to measure BMD in the anteroposterior lumbar spine (L1-L4) and left hip, and clinical data were collected.

Results: The mean age of the patients was 38.4±8.2 years and the BMI was 25.2±5.8 kg/m^2. The median disease duration was 8.2±6.3 years. The mean disease activity score (DAS28) was 4.42±1.3, and mean Health Assessment Questionnaire score (HAQ) was 0.989±0.79. 91.2 % of our patients take an average of 6.2±4 mg/d of corticosteroids; whereas 82 % of our patients take DMARDs. The mean values of the spine and hip BMD are, respectively, of 0.927±0.13 g/cm^2 and 0.845± 0.13 g/cm^2, they're inferior to those of the control group which mean values are, respectively, of 0.983±0.11 g/cm^2 and 0.916±0.11 g/cm^2 (p<0.0002, p<9.10-6). The prevalence of osteoporosis at lumbar spine and hip are, respectively, 6.9 % and 12 %. Osteopenia occurred in 33.8 % at lumbar spine and 27 % at total hip. Bivariate analysis demonstrated that several factors such as BMI, disease duration, HAQ score, joint damage (modified Sharp score), and cumulative corticosteroid dose were correlated with low BMD at both measurement sites. However, multivariate analysis reveal that the low BMI were associated with low BMD at both hip and spine. In addition, disease activity and level of disability were an important determinant of hip BMD.

Conclusion: This study suggests the magnitude of the osteoporosis problem in female RA population and confirms the BMD reduction in RA, independently of the menopause and current use of corticosteroids.

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BONE MINERAL DENSITY CHANGES IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: Our aim was to determine BMD values, osteoporosis frequency and to analyse the risk factors that affect bone loss in rheumatoid arthritis (RA) patients.
Material and Methods: BMD was measured by DXA at lumbar spine and femoral neck in 45 female RA patients and 40 healthy age and gender matched control group. The correlations between BMD and age, disease duration, BMI, physical activity, disease activity (DAS28 score), functional status (HAQ score), rheumatoid factor (RF), erythrocyte sedimentation rate (ESR), C-reactive protein (CRP). We assessed clinical features and laboratory parameters.
Results: The mean BMD values were significantly decreased in RA patients compared to control group ($p<0.01$). Approximately 72 % of patients had osteoporosis and osteopenia. The rate of osteoporosis in RA patients was 36 % at lumbar spine and 35 % at femoral neck. The risk factors for osteoporosis was age, disease duration, physical activity and HAQ scores. The was no correlation between ESR, CRP, RF titers, DAS28 and BMD values.
Conclusion: Our findings demonstrated that age, disease duration, physical activity and HAQ scores in RA patients may be accepted as risk factors for bone loss.

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CHANGES OF MINERAL BONE DENSITY IN PATIENTS WITH RHEUMATOID ARTHRITIS TREATED WITH METHOTREXATE AFTER ONE-YEAR APPLICATION OF ETANERCEPT

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Objective: The reduction of BMD in rheumatoid arthritis (RA) starts early, proinflammatory cytokines are playing an important role in its emerging. To determine the effect of etanercept on BMD in patients with RA treated with methotrexate (MTX) after 1-year application.
Material and Methods: The study was conducted in the period of 1 year in 100 patients with RA, 86 women and 14 men, median age 57, with mean disease duration of 8.9 years, who had been treated with MTX for at least 3 years in the average weekly dose of 12.5 mg. Patients were monitored and divided into two groups. The first group consisted of 44 patients, 38 women and 6 men in whom beside MTX, etanercept was included in the weekly dose of 50 mg. The other group included 56 patients, 48 women and 8 men who continued taking MTX. The use of glucocorticoids was the excluding criterion for further monitoring. All patients at baseline and after 1 year had osteodensitometric examination (DXA) done using LUNAR review. BMD was measured at the lumbar spine (LS) and hips, expressed in absolute values (g/cm^2). Statistical analyses were done in statistical package for The Science 20.0 program.
Results: In the first group of patients the received initial value of BMD and DXA control finding, located on the LS (1.08 g/cm^2, 1.04 g/cm^2) and hip (0.868 g/cm^2, 0.846 g/cm^2), showed statistical difference ($t=4.43$, $p=0.000$) and ($t=4.14$, $p=0.000$). In the second group the received BMD values at LS (0.997 g/cm^2, 0.960 g/cm^2) and hip (0.834 g/cm^2, 0.815 g/cm^2) were statistically significant ($t=5.29$, $p=0.000$) and ($t=5.33$, $p=0.000$). Comparing changes in BMD in both groups of patients, patients who were only on MTX had a statistically significant decrease in BMD values.
Conclusion: Changed BMD values in patients treated only with MTX, after a year, was higher and showed a statistically significant difference, as well as when compared with the change in BMD in patients treated in combination with etanercept.

P124

OSTEOPOROSIS AND TYPE 2 DIABETES

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Objective: Determination of the correlation of type 2 diabetes with indices of BMD and biochemical indices of bone metabolism.
Material and Methods: The research group included 80 patients with a mean age of 52.1±0.2 years (ratio M/F=20/60) with type 2 diabetes hospitalized consecutive in the Department of Endocrinology Republican Clinical Hospital, Chisinau. In the control group there were 50 patients without diabetes but with other basic parameters. All patients were investigated clinically complex, anthropometric, causes the bone alkaline phosphatase was performed BMD and DXA lumbar region.
Results: The frequency of risk factors for osteoporotic fractures was significantly higher in the group of patients with type 2 diabetes. Alkaline phosphatase levels in patients with

type 2 diabetes was similar indexes the control group (176.2±11.34 vs. 185.5±13.7 nmol/l◦s, $p>0.05$). While the acid phosphatase as an indicator of bone resorption was significantly higher in the group with type 2 diabetes (114.64±6.58 vs. 82.4±6.0 nmol/l◦s, $p<0.05$). The average T-index in the lumbar region in patients with type 2 diabetes was −3.3±0.3 SD, and the control group −1.7±0.2 SD ($p<0.05$). In type 2 diabetic group the number of patients with low BMD corresponding to osteopenia and osteoporosis as T-index results made up 55 % and 21 %, respectively. The research group without diabetes these indices were 21 % and 9 % ($p<0.005$ for osteoporosis).

Conclusion: Data show increase indices of bone metabolism and a high frequency of detection of osteoporosis in women and men with type 2 diabetes.

P125
MORTALITY IN BRITISH HIP FRACTURE PATIENTS, 2000–2010: A POPULATION-BASED RETROSPECTIVE COHORT STUDY

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Objective: The aims of this study were to examine, over the last decade, secular trends in mortality within hip fracture patients and to compare this to mortality trends in the general population of the United Kingdom.

Material and Methods: A cohort study was conducted within the British Clinical Practice Research Datalink (CPRD). CPRD is the world's largest primary care ($n>5$ million). Data was linked to national death certificates data for 58 % of all patients. Patients with a first record of hip fracture (Jan2000–Dec2010; $n=31,495$) were matched to 4 controls ($n=116,649$) by age, sex, and practice. All patients were followed for death, and hazard ratios (HRs) were calculated. Analyses were adjusted for age, sex, disease and drug history, BMI, smoking status and alcohol use.

Results: The overall mortality rate was 22 % 1-year post hip fracture as compared to 7.8 % in controls. The 1-year mortality risk after hip fracture dropped from ≥2009 and was 14 % lower in the years <2009 (adj. HR 0.9, 95%CI: 0.8–0.9). The decline was attributable to secular changes in elderly patients and was greater for males. Respiratory infections were the significant component of the decrease in all-cause mortality after hip fracture in females, as were declines in cerebrovascular and malignant diseases in males. However, the mortality risk remained unaltered over the decade when this was compared to controls for both males (<2009 vs. ≥2009: adj. HR 1.0, 95%CI: 0.8–1.2) and females (adj. HR 1.1, 95%CI: 1.0–1.2).

Conclusion: The risk of death in the first year after hip fracture has declined over the last decade in the UK, with underlying comorbid contributors that differed between males and females. However, the difference in mortality risk between hip fracture patients and the general population remained unaltered. These observations highlight the need for the continued implementation of evidence- based standards for good hip fracture care to target potentially preventable complications and secondary fractures.

P126
SEVER DISEASE: AN IMPORTANT CAUSE OF HEEL PAIN IN CHILDREN: CASE REPORT

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Objective: Calcaneal apophysitis is the most common cause of heel pain in athletic children, typically occurring during a growth spurt and at the beginning of a new sport season. It was first described by Sever in 1912 and later was named Sever Disease (SD). Sever described a painful condition of the heel that occurs only in children and never after puberty.

Material and Methods: Case report: A 12-year-old male presented in physical therapy and rehabilitation outpatient clinic with 3 month history of bilateral heel pain which was aggravated by activity and shoe wear in the area where the Achilles tendon attaches to the heel. The pain was aggravated by activity and relieved by rest. He walked with a limping gait. Examination of the foot revealed marked tenderness at the posterior calcaneus of both side. Also bilateral subtalar joint ranges of motion were decreased in dorsiflexion, plantar flexion, inversion, and eversion. Radiograph revealed sclerosis and fragmentation within the calcaneal apophysis. MRI subsequently revealed changes in the metaphysis of the calcaneus and the apophyseal area consistent with bony bruising and microfractures.

Results: The desired outcome of physical therapy for a patient with SD is the patient's return to participation in all physical activities after the symptoms have resolved. For this to occur, the patient must be able to bear weight through the heel

without pain. Once the patient is no longer experiencing pain, a gradual return to activities can be undertaken.

Conclusion: In a child with heel pain, the differential diagnosis may include Achilles tendonitis, retrocalcaneal bursitis, calcaneal stress fractures, calcaneal cysts, osteomyelitis, and plantar fasciitis. Usually, these causes can be ruled out with a well performed clinical evaluation. SD is a common condition in the growing child. We present the clinical features of one such case found in our region.

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LSD1-MEDIATED DEMETHYLATION OF HISTONE H3 LYSINE 9 CONTRIBUTES TO INTERLEUKIN 1-INDUCED MICROSOMAL PROSTAGLANDIN E SYNTHASE-1 EXPRESSION IN HUMAN OSTEOARTHRITIC CHONDROCYTES

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Objective: Microsomal prostaglandin E synthase-1 (mPGES-1) catalyzes the terminal step in the biosynthesis of PGE2, a critical mediator in the pathophysiology of osteoarthritis (OA). Histone methylation plays an important role in epigenetic gene regulation. In this study, we investigated the roles of histone H3 (H3K9) methylation in interleukin-1β (IL-1)-induced mPGES-1 expression in human chondrocytes.

Material and Methods: Chondrocytes were stimulated with IL-1 and the expression of mPGES-1 mRNA was evaluated using real-time reverse transcriptase PCR. H3K9 methylation and the recruitment of the histone demethylase LSD1 to the mPGES-1 promoter were evaluated using chromatin immunoprecipitation (ChIP) assays. The role of LSD1 was further evaluated using the pharmacological inhibitors, tranylcypromine and pargyline.

Results: The induction of mPGES-1 expression by IL-1 correlated with decreased levels of mono- and dimethylated H3K9 at the mPGES-1 promoter. These changes were concomitant with the recruitment of the histone demethylase LSD1. Treatment with tranylcypromine and pargyline, potent inhibitors of LSD1, prevented IL-1-induced H3K9 demethylation at the mPGES-1 promoter and mPGES-1 expression, suggesting that LSD1 mediates IL-1-induced mPGES-1 expression via H3K9 demethylation.

Conclusion: These results indicate that H3K9 demethylation by LSD1 contributes to IL-1-induced mPGES-1 expression and suggest that this pathway could be a potential target for pharmacological intervention in the treatment of OA and possibly other arthritic conditions.

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PHOSPHO1: RECOGNITION OF ROLES BEYOND SKELETAL MINERALIZATION

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Objective: To determine if the ablation of the bone specific phosphatase (Phospho1, P1) confers protection against obesity and diabetes in mice.

Material and Methods: All experiments were carried out on wildtype (WT) and P1−/− mice. Calvarial osteoblasts were extracted in the standard manner for protein and mRNA analysis. Metabolic studies were conducted on 120 day male mice fed either a control (6.2 % fat) or high fat diet (HFD, 58 % fat) for 3 months.

Results: Esp (encoding the phosphatase OST-PTP) which controls hormonally active osteocalcin (GLU13-OCN) secretion, was 20-fold more highly expressed in P1−/− osteoblasts ($p<0.05$). Unexpectedly, serum levels of GLU13-OCN were normal suggesting an OCN-independent mechanism of P1 regulated energy metabolism. P1−/− mice were hypoglycaemic (WT 9.48±0.31 mmol/L, P1−/− 8.30±0.26 mmol/L; $p<0.01$) and showed improved glucose and insulin tolerance compared to WT mice ($p<0.05$). These observations were consistent with the finding of smaller (mg/g BW) subcutaneous (WT 4.51±0.37, P1−/− 2.79±0.42; $p<0.01$), mesenteric (WT 13.2±1.34, P1−/− 5.56±1.61; $p<0.01$) and epididymal (WT 13.7±1.81, P1−/− 6.96±0.58; $p<0.001$) fat deposits noted in P1−/− mice at necropsy and confirmed by MRI and CT. Remarkably, P1−/− mice resisted the pronounced weight gain (WT 38.0±1.54 g, P1−/− 32.4±1.26 g; $p<0.05$) and diabetes (WT 10.3±0.53 mmol/L, P1−/− 9.27±0.77 mmol/L; $p<0.05$) exhibited by WT mice when fed a chronic HFD, not explained by altered activity. Histology revealed smaller epididymal adipocytes, decreased fat content, decreased pancreatic islet number and increased mitochondria number in brown fat ($p<0.05$). However, no differences were observed in brown fat specific genes including Ucp1 suggesting canonical thermogenesis does not underlie metabolic protection.

Conclusion: Our findings indicate P1 deficiency improves the metabolic profile of mice in vivo and confers resistance to

obesity and diabetes most likely through a primary effect on bone metabolism/turnover.

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P129
ASSOCIATIONS BETWEEN VITAMIN C AND QUANTITATIVE HEEL ULTRASOUND AND SPINE FRACTURE RISK

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Objective: Vitamin C sufficiency may play a role in preventing osteoporosis and fractures via osteoblastic collagen synthesis[1], osteoblastogenesis[2] and osteoclastogenesis[3]. This study aimed to determine cross-sectional and prospective associations between intakes and plasma levels of vitamin C with heel ultrasound and spinal fracture risk in older British men and women.
Material and Methods: A random subcohort of 4,000 participants and 1,502 participants with fractures, including 202 spine fractures, were selected from the EPIC-Norfolk prospective cohort study (39–77 years). Vitamin C intake from foods was estimated using a 7-day diet diary and plasma levels with a fluorometric assay. Heel broadband ultrasound attenuation (BUA) and velocity of sound (VOS) were determined with a CUBA Clinical Ultrasonometer (McCue Ultrasonics, UK) at 18-months follow-up. After excluding those with incomplete data, adjusted BUA and VOS were assessed by quintiles (Qs) of intake (n=2323) and plasma levels (n=2077) using ANCOVA. Spinal fracture risk was calculated for intake (n=4142) and status (n=3643) using adjusted Cox proportional hazard ratios (HRs).
Results: The median follow-up was 12.6 years. VOS was significantly higher in Q4 (β 9.65 m/s, P=0.019) and Q5 (β 8.79 m/s, P=0.035) compared to Q1 of vitamin C intake in men, and BUA in women (Q4 β 2.56 dB/MHz, P=0.041; Q5 β 4.06 dB/MHz, P=0.001). The association across all quintiles of intake but not status was also significant (men VOS β 2.47 m/s, P=0.008; women BUA β 0.81 dB/MHz, P=0.004). Spinal fracture risk was not related to intake but those men in plasma Q4 had a significantly lower risk than Q1 (HR 0.26, 95%CI 0.10–0.69).
Conclusion: Higher vitamin C intake from foods is associated with higher heel ultrasound in men and women. Further work is needed to assess the preventive effects of vitamin C intake and status with spinal fracture risk.

P130
QUALITY OF LIFE IN PATIENTS WITH OSTEOARTHRITIS IN ASSOCIATION WITH AND WITHOUT TYPE 2 DIABETES ASSESSED BY QUESTIONNAIRE SF-36

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Objective: Impact on the quality of life at patients with osteoarthritis in association and without type 2 diabetes by questionnaire SF-36.
Material and Methods: To achieve the aim and objectives of the study a group of 80 patients with type 2 diabetes was selected (mean age of 58.1±0.2 years), in association with osteoarthritis. A second group of 80 persons, with osteoarthritis, was selected as a control group, which corresponded by age and sex with the study group. Patients in the studied groups were subjected to a detailed assessment using SF-36 questionnaire.
Results: Following analysis of SF-36 questionnaire results, according to patients responses, it was determined that the average physical activity performed by patients with type 2 diabetes, such as the possibility of self-service, walking distance 500 m, was 25.90±0.45, compared to group II, which was 27.22±0.26 (p<0.05). Reduced working capacity and the difficulties arising in relation to it, led to an average of 6.87±0.13 on the RP scale in patients with type 2 diabetes, compared to group II patients (8.93±0.02) (p<0.001). Somatic pain in group I patients showed a mean of 3.68±0.22, and 3.01±0.03 in group II (p<0.001). Worsening general health resulted in averages of 15.27±0.26 in group I, and 23.67±1.27 in group II (p<0.001). Social activity in group I patients showed averages of 6.03±0.13, and 7.68±0.05 in group II patients (p<0.001). Reduced activity and inattention in group I patients showed averages of 5.37±0.09, compared to group II (5.85±0.04). The state of anxiety and depression in patients with type 2 diabetes resulted in averages of 18.3±0.23, compared to group II patients (24.5±0.21) (p<0.001).
Conclusion: Thus, we conclude that type 2 diabetes and its osteoarticular complications significantly affect the patient's physical and psychoemotional status, providing a major contribution to the solitary physical and motor disorders.

P131
INCLUSION OF ANTHROPOMETRIC PARAMETERS IN THE CREATION OF REFERENCE CURVES FOR PEDIATRIC BONE MINERAL DENSITY AND BONE MINERAL CONTENT: IMPACT ON CLASSIFICATION OF BELOW-NORMAL INDIVIDUALS

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Objective: To assess the implication of including anthropometric variables in the creation of reference curves for areal BMD (aBMD) and bone mineral content (BMC) in pediatrics.

Material and Methods: Analysis of the DXA data collected as part of the BMD in Childhood Study (2012 boys and girls, 5–22 y old, 10,525 visits), resulting in aBMD and BMC observations at lumbar spine, hip, forearm and whole body. Multivariate statistics were used to rank order the independent variables age, sex, race, height, weight, percent body fat (%fat) and sexual maturity. Two different models were created for each aBMD and BMC parameter, the practical model with age, sex, race, height and weight, and the full model, adding %fat. We compared the number of subjects that fell below 2 standard deviations in our models with those below 2SD of the standard LMS model[1], which is based on age, sex and race, and of the height- adjusted Z-scores[2].

Results: 50–82 % of subjects identified as below normal (≤2 SD) based on the LMS model were not classified as below normal in our practical model. Using the full model, misclassification increased for all aBMD and BMC parameters, ranging from 49 % to 92 %. Height-adjusted Z-scores reduced misclassifications to 33–60 % in comparison to the practical model and to 41–73 % in comparison to the full model. For both models, misclassifications in comparison to the LMS model were worse for BMC than aBMD. As BMC is more influenced by bone size than aBMD, inclusion of height and weight in the model reclassifies small subjects away from the lower tail of the distribution, which is not done by the LMS model, which takes care of body size through the surrogate of age.

Conclusion: The traditional comparison of pediatric BMD and BMC data against age-, sex- and race-matched controls can be refined if anthropometric parameters are taken into account.

References: [1]Zemel BS et al., J Clin Endocrinol Metab 2011;96:3160. [2]Zemel BS et al., J Clin Endocrinol Metab 2011;95:1265.

P132
OSTEOPOROSIS SCREENING AND MANAGEMENT IN OLDER FALLERS PRESENTING TO HOSPITAL: PILOT EXPERIENCE WITH A DEDICATED GERONTOLOGY NURSE

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Objective: To evaluate effectiveness of a gerontology nurse in osteoporosis screening and management in older hospital fallers.

Material and Methods: We conducted a prospective audit-intervention-audit cycle based on standards of UK National Institute of Clinical Excellence guideline: "Osteoporosis: assessing the risk of fragility fracture". A gerontology nurse audited current practice over 2 months on all eligible orthopedic, cardiology inpatients and falls clinic patients aged 65 years or older in our hospital in South Australia. She then did osteoporosis and fracture risk screening, facilitated investigations, treatment and implemented an osteoporosis education program during a 2 month intervention period on recruited patients. Evaluation for compliance was done telephonically at 2 months.

Results: 43 patients were audited pre-intervention and 30 patients recruited post intervention. Both groups had comparable baseline demographics and mean Charlsons comorbidity index. FRAX risk scoring was done in 30/30 patients post intervention compared to 3/43($p<0.001$). Vit D and BMD testing was done in 27/30(90 %) and 18/30(60 %) post intervention compared to 22/43(51.1 %) and 5/43(11.6 %) ($p<0.001$). Appropriate osteoporosis diagnosis was made in 26/30(100 %) and antiresorptives started in 20/26(76.9 %) post intervention compared to 22/43(62.8 %) and 16/35(45.7 %) ($p<0.001$). Osteoporosis diagnosis was conveyed to GP in 26/26(100 %) post intervention compared to 22/35(62.8 %) ($p<0.001$). Screening, clinical investigations, diagnosis, treatment and clinical handover was lower in the ward areas compared to the falls clinic but improved post intervention across all areas.2 month follow up demonstrated

good compliance with osteoporosis education and 90 % adherence to antiresorptives.
Conclusion: This study confirms a major osteoporosis care gap that can be improved with a gerontology nurse focusing on osteoporosis management in older hospital fallers.
Disclosures: The investigator initiated study was supported by an educational grant from Novartis Inc.

P133
EFFECTIVENESS OF TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS PATIENTS AND RHEUMATOID ARTHRITIS PATIENTS WITH IBANDRONIC ACID

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Objective: The osteoporosis is concomitant disease for rheumatoid arthritis patients and occurs in postmenstrual period. A comparative 12 month research about effectiveness of ibandronic acid tablets, 150 mg per month was performed in which participated 62 patients with postmenopausal osteoporosis or rheumatoid arthritis.
Material and Methods: The patients were divided in two groups: group A consists of 34 postmenopausal women with osteoporosis and group B of 28 women with rheumatoid arthritis and secondary osteoporosis. The bone density of the lumbar spine is measured before the treatment with ibandronic acid and 1 year after that. The patients have taken ibandronic acid tablets, 150 mg per month for 1 year. They all have taken calcium supplement 1200 and vitamin D3, 1 μg daily. Inclusion criteria: postmenopausal osteoporosis patients and rheumatoid arthritis patients for whom the arthritis occurred at least 2 years before. Exclusion criteria: patients with endocrine disease and secondary osteoporosis, women with early surgical menopause.
Results: Baseline characteristics were similar between the groups in terms of age 63.6±4.2 years. In the beginning the BMD of lumbar spine was L1-L4 T-score (−2.56±1.32) for group A patients and L1-L4 T-score (−2.61±1.24) for group B patients. After 1 year of treatment the results are the BMD of lumbar spine for group A is L1-L4 T-score (−1.86±0.24), and for group B is L1-L4 T-score (−2.15±0.42). Comparing the obtained values a very significant statistical difference ($p>0.001$) was noticed.
Conclusion: The effectiveness of treatment with ibandronic acid of rheumatoid arthritis patients is lower than the effectiveness of treatment of postmenopausal osteoporosis patients under all other equal conditions and without concordant diseases lowering the BMD being present. Lower increase of the BMD was measured for rheumatoid arthritis patients compared to postmenstrual osteoporosis patients.

P134
PROGRESSIVE INCREASES IN HIP BONE MINERAL DENSITY (BMD) WITH DENOSUMAB TREATMENT COULD BE EXPLAINED BY CONTINUOUS MODELING-BASED BONE FORMATION

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Objective: DMAb is associated with progressive BMD increases with long-term administration up to 8 years despite persistently low bone turnover and evidence of limited iliac crest tetracycline labeling.[1] To test whether these BMD increases result from a non-remodeling dependent mechanism to accrue bone matrix, we examined fluorochrome labeling in proximal femur from ovariectomized (OVX) cynomolgus monkeys (cynos) treated with DMAb for 16 months (mo).
Material and Methods: Following OVX, mature 9+-year-old cynos were treated for 16 mo with vehicle ($n=20$) or 25 mg/kg/month DmAb ($n=14$). Fluorochrome labels were administered at 6, 12 and 16 month.
Results: Despite very low bone resorption and formation indices histologically and by markers,[2] DXA femur neck BMD with DmAb further increased from 5.9 % at 6 month to 11.3 % over baseline at 16 month. Proximal femur sections confirmed the low surface extent of label in the trabecular compartment. However, there was consistent and prominent labeling in the cortex, primarily on the superior endocortex (12/14 cynos) and inferior periosteal surface (11/14 cynos). These regions typically contained all 3 superimposed labels over smooth cement lines, spanning 6 to 16 month, suggesting that modeling-based bone formation progressed continuously during DmAb administration. Persistent modeling on a background of maximal suppression of remodeling could explain continued BMD and mass increases with DmAb in the cortical compartment at the hip, already suggested by increased mass and thickness in QCT images in clinical studies. Importantly this augmentation of bone mass occurred at biomechanically relevant sites on the superior and inferior aspects of the femur neck, and corresponded to bone strength increases.[3]
Conclusion: In cynos, continual modeling-based bone formation occurs during DmAb therapy. This is the first histological evidence of a potential mechanism for the clinical observations of progressive BMD increases with long-term DmAb at the hip.

References: [1] Papapoulos 2013, [2] Kostenuik 2011, [3] Ominsky 2011

Disclosures: Amgen/GSK

P135

CLINICAL RELEVANCE OF CHANGES IN HIP CORTICAL BONE PARAMETERS IN RESPONSE TO DENOSUMAB (DMAB) VS. PLACEBO (PBO) IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS <75 AND ≥75 YEARS OLD

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Objective: Cortical bone deterioration is an important contributor to the exponential increase in fracture risk in older women. Treatment efficacy data in such women are lacking. In FREEDOM, DMAb treatment improved both cortical and trabecular bone compartments, with significant gains in hip volumetric BMD (vBMD), cortical thickness and mass, and total hip strength. DMAb also robustly reduced hip fracture risk in older postmenopausal women with osteoporosis. To further explore these associations, we evaluated DMAb's effects on hip cortical bone parameters in women <75/≥75 years old.

Material and Methods: In FREEDOM, women received DMAb 60 mg or Pbo Q6M for 36 months (mo) and daily calcium/vitamin D. Hip QCT scans were obtained at baseline (BL) and 12, 24 and 36 month in a subset of women. Scans were analysed in a blinded-to-treatment manner to measure hip vBMD using MIAF, hip cortical thickness and mass using Bone Mapping, and hip strength using FEA. Analyses included subjects with observed data at BL and 36 month (n=36 DMAb; n=26 Pbo).

Results: In women <75 (n=40) and ≥75 (n=22), DMAb resulted in similar and significant increases in hip vBMD and cortical thickness and mass vs. both BL and Pbo at 36 mo ($p<0.02$), associated with significant increases in hip integral and cortical strength vs. BL in both age groups ($p<0.02$). Losses in measured parameters of hip cortical bone were observed in Pbo-treated women ≥75, in whom hip fracture risk is known to exponentially increase.

Conclusion: With DMAb treatment, hip vBMD, cortical thickness and mass, and resulting strength increased regardless of age (</≥75). Measured cortical parameters decreased in Pbo-treated women ≥75. Significant improvements in cortical bone parameters in women ≥75 with DMAb vs. Pbo and, perhaps more importantly, vs. BL may be particularly relevant as they occur when cortical bone is deteriorating and fracture risk is exponentially increasing. DMAb's positive effect on cortical bone may be a vital factor to reduce hip fractures in women at greatest fracture risk.

Disclosures: Amgen/GSK

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SECONDARY OSTEOARTHRITIS OF HIPS BY ACHONDROPLASIA: CASE REPORT

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Objective: Skeletal dysplasia represents a heterogeneous group of diseases, characterised by abnormalities of growth and remodeling of the cartilage and bone, affecting the skull, spine and extremities, in varying degrees; achondroplasia is the most common dwarfing condition having a prevalence of 1/25000 live births. 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 secondary osteoarthritis of hips by achondroplasia.

Material and Methods: We present the case of a female (42 years), hospitalised for gait disorders, mechanical pain of the thoracolumbar spine, hips and knees. Clinical findings: thoracic lumbar kyphosis, lumbar hyperlordosis, hip flexum bilateral, genu revurvatum bilateral, deficit at the level of the elbow extension (20°); height of this patient: 120 cm. Radiologic findings: degenerative changes of the thoracic-lumbar spine, osteoarthritis of hips developed lesions. The lumbar MRI examination: lumbar canal stenosis. The complex program of rehabilitation utilised pharmacological treatment; electrotherapy with antalgic and myorelaxant effect; sedative massage for the dorsolumbar spine; kinetotherapy for improvement of the gait.

Results: Physical and kinetics rehabilitation treatment improved pain - VAS score was reduced from 10 points to 7 points; the score of Tinetti Gait Scale has improved from 6 points to 9 points; ADL score improved from 40 points to 35 points.

Conclusion: Clinical and functional indices (pain, disability, gait parameters) has improved by physical and kinetics treatment.

References: Bombelli R, Structure and function in normal and abnormal hips, Springer, Berlin, 1993.
Winn J et al, Am J Med Genet A 2007;143:2502.

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SECONDARY OSTEOARTHRITIS OF HIP ASSOCIATED WITH CERVICAL AND LUMBAR DEGENERATIVE DISC: CASE REPORT

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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 secondary osteoarthritis of hips produced by dysplasia, associated with cervical and lumbar degenerative disc.
Material and Methods: We present the case of a 67 years old patient, hospitalised in our clinic for gait disturbances; mechanical pain at the cervicolumbar spine and for permanent pain in the lower limbs joints. In clinical-functional assessing of the patient we found vertebral static syndrome and vertebral dynamic syndrome intensely modified; at the hips: articular evaluation-flexion=70°, extension=0°, abduction=adduction=15°, internal rotation=external rotation=0°; muscular testing-gluteus maximus and medius 3, ilio-psoas 3-, quadriceps 3-, hamstrings muscles 3. Difficult walk with bilateral Trendelenburg, with support in walking frame. The complex program of rehabilitation utilised: pharmacological treatment; electrotherapy; massage; kinetotherapy for improvement the paravertebral muscles flexibility and hamstrings muscles, strengthening the abdominal muscles, gluteus muscles, quadriceps; improvement of the walk using a Canadian crutch.
Results: VAS score was reduced from 12 points to 9 points; the score of Tinetti Gait Scale has improved from 5 points to 8 points; moving capacity has increased, making possible walk out of the house, with limits; ADL score got after the rehabilitation program a slight improvement from 42 points to 36 points.
Conclusion: The rehabilitation program improved clinical and functional indices (pain, disability, gait parameters), without a significant influence on myoarticular testing.
References: Bombelli R, Structure and function in normal and abnormal hips, Springer, Berlin, 1993.
Sbenghe T, Kinesiology-Movement Science, Medical Publishing House, Bucharest, 2005.

P138

ANALYSIS AND EVALUATION OF RISK OF FALLING IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Objective: To study the relationship between osteoporosis and the risk of falling in postmenopausal women.
Material and Methods: 104 cases of postmenopausal women over 60, who take out-patient examination or treatment in our hospital, were divided into two groups by BMD results: 53 postmenopausal women with osteoporosis and 51 postmenopausal women without osteoporosis. The age, height and body weight were not significantly different, while a balanced examination was informed to get the risk of falling index.
Results: There is difference between two groups. The risk of falling index of osteoporosis group (49.8±3.938) was higher than nonosteoporosis group (38.16±2.916) (t=2.376, $P \leq 0.05$).
Conclusion: Postmenopausal women with osteoporosis are more likely to fall than non-osteoporosis women, which leads to the risk of osteoporotic fracture increased. Postmenopausal women with osteoporosis should pay more attention to balance training and prevent osteoporotic fractures caused by the occurrence of falls.

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AUDIT ON KNEE PAIN IN ACUTE REHABILITATION

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Objective:

- Ascertain knee pain prevalence in an elderly population in Plymouth, United Kingdom
- Aggressive pain relief escalation with intra-articular steroid and local anaesthetic when simple analgesia (paracetamol, topical NSAIDS[1]) not effective
- Knee aspiration and lab analysis of synovial fluid
- Allow patients with knee pain to rehabilitate less painfully

Material and Methods:

- Consecutive patients admitted to ward over 4 months were asked if they had knee pain
- VAS for pain (VASP) were obtained (0–10) and timed up and go test (TUAG) was performed by physiotherapist
- Simple analgesia offered

- Subsequently, second cohort of consecutive patients admitted to ward over 5 months were asked if they had knee pain
- VASP and TUAG done
- Simple analgesia given
- Patients with pain despite simple analgesia were offered knee aspiration and injection with steroids (80 mg traimcinolone) and local anaesthetic (5 ml 1 % lidocaine)[2,3]
- Knee aspiration attempt done; any synovial fluid tapped was sent to the laboratory for microscopy
- After 48 h, VASP and TUAG was repeated

Results:

- Cohort 1 had 227 consecutive patients. 6 %(14) had knee pain. Mean TUAG=82 second(s), VASP=7.0
- Cohort 2 had 382 consecutive patients. 8 %(34) had knee pain not improved by simple analgesia. Mean TUAG= 91.7 s, VASP=7.0
- 48 hours after injection, mean TUAG=53.5 s ($p<0.001$), VASP=2.2 ($p<0.001$) 27 %(9)
- aspirates show crystal arthropathy [18 %(6) pseudo gout, 9 %(3) gout], 15 %(5) pus cells, 15 %(5) no pus cells, no growth, 39 %(11) dry tap and 3 %(1) not sent

Conclusion:

- Knee pain prevalence in Plymouth acute care of the elderly ward is 6–8 %
- Pain significantly decreased by intra-articular steroid and local anaesthetic injection; enabling faster TUAG
- There is underdiagnosis of crystal arthropathy in the Plymouth elderly cohort

References:

1. NICE guidance OA knee (CG59)
2. Age Ageing 2013;42:151
3. Cochrane Database of Systematic Reviews, 2006: 2 "Intra-articular corticosteroid for treatment of osteoarthritis of the knee"

P140
IL-17 INHIBITS RAT OSTEOGENESIS BOTH IN VITRO AND IN VIVO

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Objective: Interleukin-17 (IL-17) is a set of proinflammatory cytokines produced by a subset of helper T cells. IL-17 is not only involved in the immune response of the tissue but also plays a role in bone metabolism. However, although the association of IL-17 has been extensively studied in osteoclast-mediated bone resorption, the role during osteoblast-mediated bone formation has rarely been explored.
Material and Methods: For in vitro evaluation of osteogenesis, rat calvarial osteoblast precursor cells were cultured for 14 days in osteogenic media in the presence or absence of 100 ng/ml IL-17. The osteogenic activities were observed by alkaline phosphatase staining and alizarin red staining. The mRNA expression of alkaline phosphatase, osteocalcin, and osterix was also measured using real-time PCR. To further test whether IL-17 affects bone formation in vivo, bone filling was examined by μCT and histological observation at 8 weeks after critical sized defects were made on rat calvaria.
Results: IL-17 significantly reduced the expression of alkaline phosphatase, osteocalcin, and osterix as well as alkaline phosphatase and alizarin red staining in vitro. IL-17 also significantly inhibited the filling of calvarial defects in vivo.
Conclusion: The negative effect of IL-17 on bone formation in a rat model may suggest a species-specific role of IL-17 on osteogenesis.
Acknowledgements: This work was supported by Biomedical Research Institute grant, Kyungpook National University Hospital 2013.

P141
DIAGNOSIS OF BONE LOSS IN WOMEN OF DIFFERENT AGES BY QUANTITATIVE COMPUTED TOMOGRAPHY

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Objective: Osteoporosis is an important health problem due to the high prevalence and the risk of complications arising. This disease is characterized by decreased bone mass, decreased bone strength and high risk for fracture. Diagnostic sign of osteoporosis is a decrease in BMD [1,2], which begins with the reduction of trabecular bone. In this regard, the definition of BMD in women of different ages by QCT is relevant and will assist in the prediction and early diagnosis of bone loss.
Material and Methods: Kemerovo State Medical Academy and Clinical Consultation and Diagnostic Center conducted a study of BMD by QCT in women of different age groups. Area of diagnostic interest were II-IV lumbar vertebrae (L2-L4). Investigated the trabecular and cortical parts of the

vertebrae. BMD was expressed in mgCa-HA/ml. The study involved 145 women aged over 20 years.
Results: Based on this study following data were obtained. In the I- th group (at the age of 20–29 years) total trabecular bone BMD L2, L3 and L4, respectively, was: 165.5, 168.5 and 182.6 mgCa-HA/ml.
In the II- th group (at the age of 30–39 years): 153.4; 154.8 and 160.8 mgCa-HA/ml. In the III- th group (at the age of 40–49 years): 137.4, 134.9 and 139.0 mgCa-HA/ml. In the IV- th group (over 50 years): 109.9, 105.9 and 111.8 mgCa-HA/ml.
Conclusion: According to the results of densitometry carried out by QCT revealed that the women surveyed moderate decrease in BMD occurs at the age of 30–39 years, a significant loss observed after 40 years of age ($p<0.05$).
References: 1. Official Positions of the International Society for Clinical Densitometry, October 2007, supersedes all prior «Official Positions» publications.
2. WHO Study Group "Assessment of fracture risk and its application to screening for postmenopausal osteoporosis", Geneva, Switzerland: World Health Organization, 1994.

P142
RISK FACTORS OF OSTEOPENIA IN THE ELDERLY FEMALE PATIENTS OF GERIATRIC CLINIC, BANGKOK HOSPITAL IN 2013

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Objective: To study the prevalence and risk factors of osteopenia in the elderly female patients attending Geriatric Clinic, Bangkok Hospital during January to June 2013.
Material and Methods: We searched for the medical records of all elderly female patients who visited the clinic and underwent BMD measurement during January to June 2013. The baseline characteristics including personal history, medications and laboratory parameters were collected. The BMD was measured by DXA at the hip and lumbar spine. The data were analyzed using SPSS version 19.0.
Results: Of 116 patients, the prevalence of osteopenia and osteoporosis were 50.9 % and 12.9 %, respectively. The prevalence of osteopenia at hip was 44.3 %, compared with 38.8 % at lumbar spine. Obese patients (69 % vs. 36.1 % in normal BMD and abnormal BMD groups respectively; $p=$ 0003), alcohol consumption (9.5 % vs. 1.4 %; $p=0.037$) were associated with a lower risk of abnormal BMD in a univariate. In logistic regression analysis, the protective factors of abnormal BMD were obese-group BMI (BMI>30), (odds ratio [OR] 0.16; 95%CI 0.05–0.47; $p=0.001$) and alcohol consumption (OR 0.07; 95%CI 0.01–0.78; $p=0.03$). Subgroup analysis of abnormal BMD at hip showed that the significant risk factor was advanced age (>65 years) (OR 2.25; 95%CI 1.07–4.74; $p=0.033$) while obese-group BMI was the protective factor (OR 0.22; 95%CI 0.09–0.55; $p=0.001$). Subgroup analysis of abnormal BMD at spine showed that advanced age was also the significant risk factor (OR 2.32; 95%CI 1.1–4.87; $p=0.027$).
Conclusion: The prevalence of osteoporosis and osteopenia are high in elderly female. Obese group has the benefit over the bone mass density and the major risk factor for low bone density is advanced age. Early screening and detection of low bone density will promote development and testing of medical interventions focusing on at-risk adults and will bolster effective osteoporosis preventive behaviors.

P143
ASSOCIATIONS OF GAMMA-GLUTAMYLTRANSFERASE ACTIVITY WITH BONE METABOLISM IN PATIENTS WITH HIP FRACTURE: PATHOPHYSIOLOGICAL AND CLINICAL ASPECTS

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Objective: To examine the relationship between serum γ-glutamyltransferase (GGT) activity and parameters of mineral and bone metabolism and its prognostic value for short-term outcomes in patients with osteoporotic hip fracture (HF).
Material and Methods: In 761 HF patients (mean age 82.3± 8.8 years, 75 % women) serum levels of GGT and other liver markers, 25(OH)vitamin D, PTH, calcium, phosphate, magnesium, parameters of bone formation (osteocalcin, OC, and bone specific alkaline phosphatase, BAP) and bone resorption (urinary N- terminal telopeptide of type 1 collagen corrected for creatinine, NTx/Cr), adiponectin, leptin, resistin, vitamin B12, folic acid, markers of iron metabolism and thyroid function were measured and clinical characteristics recorded.
Results: GGT was elevated (>128 U/L) in 7.5 % of patients. GGT was significantly and negatively associated with age ($r=-0.198$, $p=0.001$), OC ($r=-0.206$; $p<0.001$), NTx/Cr ($r=-0.179$; $p=0.004$), thyroxine (T4, $r=-0.185$; $p=0.002$), and positively with alanine aminotransferase (ALT, $r=0.371$; $p<0.001$), BAP ($r=0.302$; $p<0.001$), TSH ($r=0.116$; $p=$ 0.050), and vitamin B12 ($r=0.224$; $p<0.001$). In multivariate logistic regression after adjustment for age, sex, markers of liver function, mineral and bone metabolism, adipokines, alcohol consumption, diabetes and cardiovascular disease, OC ($p=0.006$), NTx/Cr ($p=0.007$), adiponectin ($p=0.034$), ALT ($p=0.002$) and age ($p<0.001$) were independent and significant determinants of serum GGT activity. Higher GGT levels (>30 U/L) were prevalent in men (OR=1.9, $p=0.016$),

patients with diabetes (OR=2.2, p=0.013), and alcohol overusers (≥3 times a week, OR=6.4, p=0.002). GGT >30 U/L on admission was an independent predictor of prolonged hospital stay (>20 days, OR=2.0, p=0.019).
Conclusion: In patients with HF serum GGT levels (within the physiological range) and parameters of bone remodelling are significantly associated. Higher GGT levels were predictive for prolonged hospital stay.

P144
HYDROLYZED COLLAGEN PROMOTES OSTEOBLASTOGENESIS AND PRESERVES BONE MASS IN OVARIECTMIZED MICE

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Objective: Collagen I is the main component of organic bone matrix. Its correct synthesis, folding and degradation are crucial for bone homeostasis. According to this pivotal role in bone structure, we investigated the potential health benefits of hydrolyzed collagen (HC) on bone using translational approaches.
Material and Methods: Translational approaches: from cell culture to preclinical trial.
Results: Regarding the influence of HC on bone forming cells in vitro, we first insured the absence of cytotoxicity of HC addition in culture media. As compared to BSA control conditions, HC even promoted pre-osteoblast proliferation. Then cells were tested for differentiation parameters in the presence of HC. HC from bovine origin resulted in a significantly higher alkaline phosphatase activity after 7 days of incubation when compared to its BSA control condition. This observation was supported by mineralization assays demonstrating that bovine HC enhanced Ca/P nodule formation in MC3T3-E1 cultures. To confirm these encouraging results, C3H/HeN mice were ovariectomized (OVX) to induce bone loss and were given, in parallel, HC enriched diets to determine whether HC intake may contribute to bone health by preventing decrease in BMD upon OVX. Diets were designed to contain 15 % casein, 17.5 % casein or 15 % casein plus 2.5 % HC from bovine origin. As expected, OVX induced a dramatic loss of BMD. However, HC fed OVX mice exhibited a significant higher BMD than OVX control mice, thus validating a protective effect of HC on bone health.
Conclusion: Finally, from an integrated point of view, our results further support the relevance of HC-based nutritional strategies in the management of osteoporosis prevention.
Disclosures: This work was partly funded by Rousselot SAS, Courbevoie, France.

P145
COMPLIANCE BETWEEN THE NEED FOR TREATMENT OF OSTEOPOROSIS AND RECOMMENDATIONS FOR TREATMENT IN REAL CLINICAL PRACTICE IN PATIENTS WITH RHEUMATOID ARTHRITIS (RA) IN RUSSIAN FEDERATION

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Objective: Fractures, which arise in consequence of generalized bone loss in RA, often lead to disability and death in patients. Timely made recommendation for the treatment of osteoporosis (OP) is an important aspect of clinical practice. We studied the compliance between the need for treatment of OP and recommendations for treatment in clinical practice in patients with RA.
Material and Methods: Inside of the cross-sectional retrospective study of a large cohort of patients with RA from 12 clinical centers in Russian Federation, 296 patients aged 41–89 years were selected. The threshold of therapeutic intervention was defined by FRAX and by our predictive model, which has been designed upon the basis of the statistical analysis of a wide range of clinical parameters to identify patients with RA with high risk of low-traumatic fractures.
Results: 262 (89 %) women and 34 (11 %) men were included the study. Women's average age was 64.2 yo, men's was 65.1 yo. OP was diagnosed in 22 % patients, 15 % patients had a history of low-traumatic fractures. 111 (38 %) patients had indications for the treatment defined by FRAX, and 94 (31 %) patients had by model for patients with RA. In the clinical practice the treatment for osteoporosis was recommended 27 % and 24 % patients, respectively. 185 (62 %) patients didn't have the indications for the treatment defined by FRAX, and 202 (68 %) did not have indications for the treatment defined by model, however, in the clinical practice the treatment was recommended 22 % and 24 % patients, respectively. 71 (24 %) patients received recommendation for the treatment of OP. Adherence of the therapy was 69 %.

Conclusion: Detected incompliance between the need for the treatment of OP in patients with RA and recommendation for the treatment in clinical practice, while adherence of the therapy was high. Introduction of FRAX or predictive model for allocation of group of patients with RA with a high risk of fracture in the clinical practice will contribute to a personalized approach to the treatment prescription.

P146
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 TM - GE Healthcare which is a heel water bath 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.

P147
TANDEM SPINAL STENOSIS: A 926 MULTIRACIAL ASIAN PATIENTS' PREVALENCE AND RISK FACTORS ANALYSIS

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Objective: Spinal stenosis is regarded as a consequence of degenerative osteoarthritis of the spine. Tandem spinal stenosis (TSS) is defined as concomitant spinal canal stenosis in both cervical & lumbar spines. The incidence of TSS ranges from 5 to 25 % in noncomparative, small cohort studies. We aim to compare the prevalence of TSS and its risk factors of development in a large multiracial Asian population.
Material and Methods: Retrospective review of midsagittal MRI spine images at a University hospital in 1 year. Spinal stenosis was defined as canal diameter of ≤10 mm, measured from the posterior cervical vertebra/disc wall to anterior surface of the corresponding lamina. Patients were divided into four groups, no stenosis, lumbar stenosis only, cervical stenosis only and TSS. Patients' demographics, race, comorbidities and lumbar radiological report data were examined.
Results: 926(479♂,447♀) patients with average age 50(20–96)yrs were studied. Cervical canal diameters in TSS patients were the narrowest among the 4groups with C2/3 disc: 11.6, C3/4:9.7, C4/5:9.4, C5/6:8.9, C6/7:10.0 and C7T1:11.4 mm. The incidence of TSS was 26.2 %. The prevalence of TSS in Chinese was 30.7 %, Indian 12.5 %, Malay 22.5 %. The TSS prevalence in patients with 1 level lumbar canal stenosis was 12.5 %, 2 levels 6.4 % and 3 levels 4.1 %. Multivariate analysis showed patients aged 40–59 year (p=0.000, Exp(B):5.8, 95%CI 2.8–12.0), aged >60 year (p=0.000, Exp(B): 10.5, 95%CI 4.8–22.9), Chinese race (p=0.008, Exp(B): 2.5, 95%CI 1.3–4.9), patients with 1 level lumbar stenosis (p=0.000, Exp(B): 63.3, 95%CI 29.2–137.3), 2 levels lumbar stenosis (p=0.000, Exp(B): 67.7, 95%CI 29.4–155.7) and 3 levels lumbar stenosis (p=0.000, Exp(B): 106.6, 95%CI 43.6–260.5) are significant risk factors for TSS development.
Conclusion: TSS is a highly prevalent condition with patients having the narrowest cervical canal measurements. The prevalence of TSS in Chinese is the highest. Patients of advanced age or increased levels of lumbar canal stenosis are at risk of developing TSS.

P148
AGE-RELATED CHANGES IN BONE QUALITY USING DXA AND HR-PQCT: A FIVE-YEAR LONGITUDINAL STUDY OF THE CALGARY POPULATION-BASED COHORT

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Objective: Age-related bone loss measured by DXA occurs at a rate of 1 % per year, but the age at which bone loss occurs varies with skeletal site and imaging modality. Age-related bone loss measured with HR-pQCT may differ from DXA. We compared subject-specific longitudinal age-related bone changes at different skeletal sites using two imaging modalities.

Material and Methods: Women (N=135, 60+ yrs) from the Calgary cohort of the Canadian Multicentre Osteoporosis Study (CaMos) participated in a 5-year follow-up study. Areal BMD (aBMD) at the femoral neck (FN) and total hip (TH) were obtained from DXA (Hologic) scans (left hip). The nondominant radius and left tibia were scanned using HR-pQCT (Scanco Medical). Total volumetric BMD (Tt.BMD), cortical BMD (Ct.BMD), trabecular BMD (Tb.BMD) and cortical porosity (Ct.Po) were assessed using standard and automated segmentation methods. Finite element analysis (FEA) estimated apparent bone strength. Repeated measures ANOVA and T-tests assessed change over time.

Results: Results are expressed as percentage change per year from 5-year data. DXA-derived aBMD decreased between 0.8 % (FN) and 1.0 % (TH) whereas HR-pQCT- derived Tt.BMD declined between 0.5 % (tibia) and 1.5 % (radius) ($p<0.05$). At the radius, Tb.BMD decreased 1.2 % and Ct.BMD 0.7 % ($p<0.01$). At the tibia Tb.BMD did not change ($p>0.05$) and Ct.BMD decreased by 0.9 % ($p<0.01$). The greatest change was in Ct.Po, which increased by 10.3 % at the radius and 6.5 % at the tibia ($p<0.01$). FEA results revealed a 0.6 % annual loss in radial bone strength ($p<0.05$).

Conclusion: Our 5-year longitudinal study of women 60+ yrs revealed that age- related changes differ according to imaging modality and skeletal site: more bone loss occurred at the radius than tibia. Whether this holds true for men will be the subject of our continued study, and we will further explore the use of HR-pQCT and FEA to relate these changes to fracture risk.

P149
HIP STRUCTURAL ANALYSIS OF ATYPICAL FEMORAL FRACTURES IN BISPHOSPHONATE TREATED WOMEN

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Objective: The aim of this study was to examine hip structural geometry parameters derived from DXA scans in Asian female atypical femoral fracture (AFF) patients and compare them with sex and age-matched controls.

Material and Methods: Thirty-one Asian female AFF patients were sex and age- matched to 31 femoral neck (NOF) and 31 intertrochanteric (IT) fracture patients. The parameters were generated from Thomas Beck's Hip Structural Analysis (HSA) program, which interprets DXA data into engineering metrics. The parameters analyzed were BMD, cross-sectional area (CSA), cross-sectional moment of inertia (CSMI), section modulus (SM), average cortical thickness (ACT), and buckling ratio (BR). The regions analyzed by HSA comprised of three cross-sections measured at the narrowest diameter of the femoral neck (NN), the intertrochanteric area (IT), and the proximal femoral shaft (FS). A 2-sample t-test was used to compare HSA parameters in the AFF group (n=31) with the control group (n=62), with statistical significance defined as $p<0.05$.

Results: AFF patients had significantly greater BMD, CSA, and ACT and lower BR at all three measured regions compared to sex and age-matched NOF and IT fractures. Femoral shaft section modulus was not significantly greater in AFF patients than controls.

Conclusion: AFF patients have better metrics of bone mineral mass and hip structural geometry at the NN and IT regions compared to sex and age-matched controls. These metrics support why AFF patients do not fracture at the NN or IT regions and are consistent with changes observed with prolonged bisphosphonate exposure. AFF patients have better bone mineral mass, but not hip structural geometry, at the femoral shaft, which is contrary to improvements at the FS region frequently observed with prolonged bisphosphonate exposure. Further research is needed to clarify the difference in femoral shaft section modulus between AFF patients and patients with prolonged bisphosphonate exposure.

P150
12-MONTH PERSISTENCE WITH DENOSUMAB (DMAB) 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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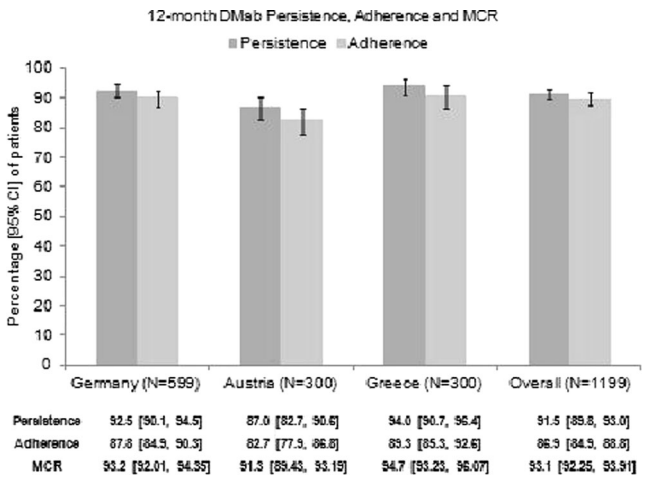
Objective: It is widely recognised that poor persistence to/adherence with PMO therapy leads to increased fracture risk[1] and less frequent dosing may contribute to better persistence/adherence[2]. We report medication-taking behavior of PMO women following receipt of their first DMAb injection in clinical practice.

Material and Methods: The study design has been described elsewhere[3]. The current pre-specified interim analysis included data as of August 2013, for patients in Germany, Austria and Greece. Belgium centers started enrolment later and did not have data available. 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)[3], adverse drug reactions (ADRs) and serious ADRs (sADRs).

Results: Of 1,200 women enrolled, 1,199 were included in the analysis. Baseline characteristics were consistent with those of a PMO population[4]. Overall, 12-month DMAb persistence and adherence were 91.5 % (95%CI: [89.8, 93.0 %]) and 86.9 % [84.9, 88.8 %], respectively, and mean MCR 93.1 % [92.25, 93.91 %] (Figure). ADRs and sADRs were reported for 3.8 % and 0.3 % of patients, respectively. There were 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 Germany, Austria and Greece, overall 12-month persistence to DMAb exceeded 90 %. ADRs/sADRs are consistent with those observed in other DMAb studies and will continue to be evaluated.

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Acknowledgements: Amgen/GSK

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BONE STRUCTURE IN PATIENTS WITH MYELOFIBROSIS

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Objective: In patients with myelofibrosis, osteosclerotic changes appear in the bone tissue as the result of growing and thickening of the bone trabeculae. (1) Despite this bone formation a recent nationwide population-based cohort study showed that patients with chronic myeloproliferative neoplasms (CMPN) in general have a higher rate and risk of hip fractures. (2) We conducted a cross-sectional study to evaluate bone structure MF patients using conventional DXA and HR-pQCT.

Material and Methods: 20 MF patients (10 men and 10 women) from department of haematology, Odense University Hospital, Denmark were included All patients meet the diagnostic criteria of primary myelofibrosis or myelofibrosis secondary to another CMPN according to WHO 2010-criteria with *International Classification of Diseases*, 10th revision. Areal BMD was assessed in the lumbar spine (L1-L4) and nondominant hip by DXA, and a 3D assessment of bone geometry, volumetric BMD, and microarchitecture of the nondominant distal radius and tibia were measured using a HR-pQCT scanner. Data are compared with healthy volunteers matched on age, sex, and height, in a 1:1 ratio. Blood samples were analyzed for procollagen type I N-terminal pro-peptide (PINP1), a marker for bone formation. Levels of PINP1 in 20 healthy blood-donors were used as reference. Data are presented as mean- values including 95%CI. Results from patients and controls are compared using t- test and the statistical significance level set at $p<0.05$.

Results: Mean age of the patients was 69.8 (95%CI: 66.3–73.4). The patients had higher BMD in spine 1.10 (0.93–1.08) vs. 0.93 (0.87–1.00), but not of the hip 0.93 (0.85–1.02) vs. 0.90 (0.82–0.98). HR-pQCT showed consistently increased bone mass, particular trabecular volumetric BMD, trabecular BV/TV, and trabecular number, although statistical significance was not reached. PINP was increased in patients.

Conclusion: This study demonstrated elevated level of PINP in MF patients indicating increased bone formation rate. The DXA and HR-pQCT results indicate that these patients have increased trabecular bone mass, but did not reach statistical significance. Myelofibrosis is a

rare disease and the number of patients included was small.

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P152
PROGRESSION OF IDIOPATHIC COXARTHROSIS: VITAMIN D ASPECT

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Objective: To define interrelation between changes in mineral and vitamin D exchange and idiopathic coxarthrosis progression.

Material and Methods: 30 patients with stage IV of idiopathic coxarthrosis according to Kellgren and Lawrence have been studied and compared with 30 healthy persons (control group), statistically standardized in age and gender. We have subdivided forms of idiopathic coxarthrosis into rapidly progressive (≤5 years from the beginning to the final stage of the disease), moderately progressive (from 5 to 10 years) and slowly progressive (>10 years). Insufficiency of vitamin D exchange has been verified according to Gomez classification (2003); the content of 25(OH)D, phosphorus and calcium, activity of total alkaline phosphatase and its isoenzymes in blood serum have been defined.

Results: For idiopathic coxarthrosis, notable is the 100 % prevalence of vitamin D disorders and 20.25 % of the severest vitamin D deficits. Rapidly progressive idiopathic coxarthrosis has shown 44.5 % cases of vitamin D deficiency, 55.5 % of vitamin D deficit; moderately progressive form of the disease demonstrated 82 % of vitamin D deficiency and 18 % of vitamin D deficit; slow progressing idiopathic coxarthrosis has shown 50 % of vitamin D deficiency, 12.5 % of vitamin D deficit and 37.5 % of vitamin D hypovitaminosis. Vitamin D supply in case of idiopathic coxarthrosis is closely connected with mineral metabolism and its disorders. Rapidly progressive form has shown significantly reduced ($p \leq 0.01$) coxarthrosis indicators of serum calcium, phosphorus, alkaline phosphatase and its isoenzymes (bone marrow and the gastrointestinal) and 25(OH)D, compared to slowly progressive form.

Conclusion: Signs of idiopathic coxarthrosis are: insufficiency of mineral and vitamin D exchange, usual for 100 % of patients. Progression of idiopathic coxarthrosis depends on the level of vitamin D production by human body.

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P153
PRESARCOPENIA, SARCOPENIA AND SEVERE SARCOPENIA AMONG IRANIAN ELDERLIES: THE FIRST EPIDEMIOLOGICAL REPORT

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Objective: The purpose of this study was to determine the prevalence of sarcopenia, the age related loss of skeletal muscle mass in Iranian older adults based on the definition by European working group on sarcopenia (EWGSOP).

Material and Methods: Using cluster random sampling, 300 participants (150 of each sex) were selected in Tehran, the capital of Iran. In each cluster, 2 individuals (1 male, 1 female) were invited through home interviews from the following age groups: 55–59, 60–64, 65–69, 70–74, and over 75. Skeletal muscle mass was measured by DXA. Appendicular skeletal muscle (ASM) was calculated as well. Muscle strength and performance were evaluated according to hand grip strength and 4-m gait speed. According to EWGSOP definition, individuals with abnormal ASM were considered as presarcopenic. Presarcopenic individuals with abnormal muscle strength or performance were considered sarcopenic. Participant with all three abnormal criteria were considered severely sarcopenic.

Results: The prevalence of presarcopenia, sarcopenia and sever sarcopenia in total population were 30 %, 18 % and 5.7 %, respectively. The prevalence of presarcopenia, sarcopenia and sever sarcopenia in female were 25.3 %, 15.3 % and 5.3 % compared to 52.7 %, 20.7 % and 14.7 % for male. An increase in the prevalence of sarcopenia was observed with age. This increase was more significant among the age group over 75 years old in both genders. The lowest prevalence of sarcopenia was observed in age group 65–69 for female and 60–64 for male.

Conclusion: This is the first study performed on sarcopenia in community-dwelling elderly Iranians. The prevalence of sarcopenia was considerable in Iranian elderly. Unlike studies in western populations, Iranian men suffered more from sarcopenia compared to women.

P154
FRAX TO EVALUATE THE FRACTURE RISK OF PEOPLE IN NANJING

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Objective: To evaluate the applicability and to predict fracture risk of different gender groups in Nanjing using the WHO released FRAX fracture risk assessment tool.
Material and Methods: 1,383 cases of people were grouped and the personal data including the risk factors were collected and entered the FRAX tool in Nanjing Research. Then 10-year fracture probability of hip and osteoporotic fractures were calculated, various aspects containing fracture history and BMD were compared.
Results: Fracture risk of female population is much higher than male, the probability of fracture risk of hip and body are simultaneously increased with age, and history of fractures is an important risk factor, With or without BMD values will affect the calculation of FRAX 10-year probability of hip fracture recurrence, 10-year fracture risk of recurrence of previous fracture population is much higher than people without fracture history. After excluding history of fractures, body and hip fracture prediction showed no significant difference with or without BMD.
Conclusion: Our research successfully established that FRAX tool can be effectively applied to fracture risk assessment in Nanjing, FRAX tool still has clinical significance even if without previous fracture history and BMD value, FRAX tool combined BMD have clinical value in patients with or without previous fractures.

P155
THE EFFECTS OF LEG POSITIONING ON SPINAL BONE MINERAL DENSITY MEASUREMENTS AND THE DIAGNOSIS OF OSTEOPOROSIS

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Objective: The aim of this study was to investigate which differences in leg positioning affect spinal BMD measurements and the diagnosis of osteoporosis.
Material and Methods: Subjects included 1,039 Japanese patients, 878 women and 161 men (mean ages: 67 and 71 years, respectively). Spinal BMD (L1-4) was measured using DXA with patients lying in two different positions; the standard lumbar scanning position, with patients supine on the scanning table with hips flexed and knees flexed over a 90º support pad (modified supine position) and supine (supine position). Predictive indices were calculated for spinal BMD DXA measurements acquired with patients in the supine position; these included sensitivity, specificity, and the likelihood ratio (LR) for a negative test (-). A diagnosis of osteoporosis was excluded for a LR(-) less than 0.2. Osteoporosis was defined as a BMD T-score of ≤ -2.5.
Results: For the modified supine and supine position during DXA scanning in women, BMD measurements were 0.911 g/cm^2 and 0.915 g/cm^2, respectively; in men they were 1.117 g/cm^2 and 1.124 g/cm^2, respectively. The difference in BMD between positions was 0.40 % (95%CI: 0.29, 0.51; $P<0.001$). The coefficient of variance (CV%) for BMD measurements was 0.66 %. Accordingly, the clinical equivalency of the spinal BMD results between the two positions was preserved. The sensitivity, specificity, and LR(-) of osteoporosis diagnosis following DXA scanning in the supine position was 94 %, 99 %, and 0.066, respectively, compared with results acquired using the standard position.
Conclusion: DXA measurements acquired with patients in the supine position slightly overestimated BMD vs. the modified supine position. However, this BMD overestimation is small and not significant. The clinical equivalency between positioning methods for DXA is preserved to the extent that osteoporosis can be reliably diagnosed in the supine position.

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COMMUNITY OSTEOPOROSIS AND FALL PREVENTION PROGRAM IN NORTHERN TAIWAN

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Objective: To determine the feasibility and effectiveness of an osteoporosis and fall screening plus referral program in Northern Taiwan.
Material and Methods: In 2013, seven community education campaigns on osteoporosis and fall prevention were conducted in Taipei City, New Taipei City, and Taoyuan County, Taiwan. Ten questions were tested before and after the education courses to determine the effectiveness of the program. Participants were screened with FRAX® and fall risk questionnaires (FRQ). High risk subjects (10-year probability of predicted risk ≥3 % for hip fracture, ≥20 % for major

osteoporotic fracture, ≥2 fall in previous year, or scored ≥4 on FRQ) were referred to hospitals for further osteoporosis and fall assessments and managements.

Results: Among 1,159 participants, 1,051 with complete data were analyzed. Mean age was 69.5±10.3 years with 82.8 % (n=870) women. Mean test score improved from 6.1±1.8 to 8.3±1.7 points (paired t-tests p<0.001) and 95 % were satisfied with the educational courses. Roughly 3/5 (61.8 %, n=649) were considered high risk. However, only 127 (12.1 %) were successfully referred for further managements. Among them, 53 (41.7 %) had clinical diagnosis of osteoporosis defined as having a fragility fracture or BMD T score ≤−2.5. Although 27 (21.3 %) received anti-osteoporosis medications, only 10 (7.9 %) were eligible for National Health Insurance reimbursements. Referred subjects had multiple fall risk factors including fall related chronic conditions (n=96, 75.6 %), taking high risk medications (n=109, 85.8 %), abnormal gait (n=44, 34.6 %), weak muscle power (n=48, 37.8 %), and balance problem (n=38, 29.9 %).

Conclusion: Community educational campaigns were welcomed and effective in improving osteoporosis and fall related knowledge. Even significant numbers of high risk individuals were screened out, relatively few actually accepted the referral for further managements. Efforts should be made to improve the referral efficiency.

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P157
IN MEN, SEVERE SPINE OSTEOARTHRITIS IS ASSOCIATED WITH ABDOMINAL AORTIC CALCIFICATION AND ALL CAUSE MORTALITY: THE MINOS STUDY

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Objective: We studied the association of spine osteoarthritis (OA) with abdominal aortic calcification (AAC) severity and its progression rate as well as with all-cause mortality in older men.

Material and Methods: A cohort of 766 men aged 50–85 year was followed up prospectively for 7.5 years (for AAC) and for 10 years (for mortality). Spine OA was assessed at six intervertebral spaces using Lane's score. Total score of each parameter was calculated as sum of its values for six intervertebral levels. AAC was assessed in the abdominal aorta using Kauppila's semiquantitative score. During the follow-up, 182 men died.

Results: After adjustment for confounders, the odds of severe AAC score (>6) increased with total disc narrowing score (OR[95%CI]=1.26 per SD increase [1.01–1.58]). After similar adjustment, the odds of AAC>6 were higher in the highest tertile of total disc narrowing score vs. the lowest tertile (OR=1.89 [1.04–3.42]). Osteophytosis and subchondral sclerosis were not associated with AAC severity. Prospective data on AAC progression were available in 613 men. In 148 men AAC was stable. After adjustment for confounders, the probability of AAC stability decreased with increasing total osteophyte score (OR=0.76 per SD increase [0.60–0.99]). The probability of AAC stability was lower in the highest tertile of total osteophyte score vs. two lower tertiles combined (OR=0.51 [0.30–0.86]). After adjustment for confounders (including AAC), total OA grade (HR=1.25 per SD increase [1.03–1.50]) predicted mortality. Both higher total OA grade and severe AAC contributed to the risk of death. After adjustment for confounders, men who had higher total OA grade and severe AAC had higher risk of death (HR=2.63 [1.48–4.65]) compared with men who had lower total OA grade and less severe (or absent) AAC.

Conclusion: In older men, severe spine OA is associated with greater AAC severity and greater risk of AAC progression. Severe OA and severe AAC contribute jointly and independently to higher all-cause mortality in older men.

P158
ASSESSMENT OF BONE MICROARCHITECTURE IMPROVES INCIDENT FRACTURE PREDICTION IN MEN: THE STRAMBO STUDY

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Objective: Areal BMD (aBMD) measured by DXA poorly identifies men at high fracture risk. We studied the value of HR-pQCT for fracture prediction in men.

Material and Methods: Among 821 men aged 60–87 followed up for 6 year, 70 men sustained fragility fractures. We calculated aBMD T-score using hip and distal radius aBMD in young men (STRAMBO) and hip aBMD in young women (NHANES).

Results: Most microarchitectural parameters were associated with fracture risk when adjusted for age, weight, prior falls and fractures (HR=1.25–1.94 per SD, p<0.05). After further adjustment for distal radius aBMD, low trabecular number (Tb.N) and more heterogeneous trabecular distribution (high Tb.Sp.SD) were associated with higher fracture risk (HR [95%CI]=1.94 [1.46–2.56] and 1.61 [1.25–2.08] per SD). In a similar model including hip aBMD, higher Tb.Sp.SD at

distal tibia was associated with higher fracture risk (HR=1.41 [1.06–1.86] per SD). In men with osteopenia at the hip and elevated Tb.Sp.SD (highest quartile), fracture risk was higher vs. men with normal hip aBMD (HR=2.77 [1.36–5.65]) and vs. osteopenic men with normal Tb.Sp.SD (HR=2.20 [1.10–4.41]). Their fracture incidence was close to that in men with the hip T-score<−2.5 (3.5 vs. 3.3 /100 p-yrs). The results were similar when hip aBMD in women was used to calculate T-score thresholds. In men with osteopenia and low Tb.N (lowest quartile) at distal radius, fracture risk was higher vs. men with normal aBMD (HR=2.34 [1.07–5.13]) and vs. osteopenic men with normal Tb.N (HR=3.05 [1.28–7.28]). Their fracture incidence was close to that in men with T-score<−2.5 at distal radius (3.2 vs. 3.3 /100 p-yrs). The results were similar for osteopenia and Tb.Sp.SD at distal radius. In osteopenic men with normal bone microarchitecture, fracture incidence was similar to that in men with normal aBMD.

Conclusion: Assessment of bone microarchitecture by HR-pQCT may improve fracture prediction in older osteopenic men.

P159
SERUM SCLEROSTIN IS HIGHER IN MEN WITH SEVERE OSTEOPHYTES AT THE SPINE: THE MINOS STUDY

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Objective: To analyze cross-sectionally the association between spine osteoarthritis (OA) severity and serum sclerostin level in older men.

Material and Methods: In 694 men aged 50–85 year, spine OA was assessed at six intervertebral spaces using Lane's score. Total score of each parameter was calculated as sum of its values for six intervertebral levels. Sclerostin level was measured in fasting serum (TECOsclerostin EIA, TECOmedical). BMD of total hip was measured by DXA (Hologic QDR1500).

Results: After adjustment for age, weight, 17ß-estradiol level and glomerular filtration rate, serum sclerostin level increased across quartiles of total osteophyte score (trend<0.001). Sclerostin level was 15 % (0.42SD, $p<0.001$) higher in the highest vs. the lowest quartile. After similar adjustments, sclerostin level increased with the increasing osteophyte grade (trend<0.001). It was 13 % ($p<0.005$) higher in men with severe osteophytes vs. men who had no or mild osteophytes. The link between osteophyte severity and sclerostin level was significant ($p<0.05$) after further adjustment for hip BMD, disc space narrowing and subchondral sclerosis. After adjustment for confounders, serum sclerostin increased across the quartiles of total disc space narrowing score (trend<0.001). Average serum sclerostin increased with the increasing grade of disc space narrowing (p for trend<0.005). However, all the associations between disc space narrowing and sclerostin levels lost significance ($p>0.23$) after additional adjustment for total hip BMD, osteophyte severity and subchondral sclerosis score. Men with subchondral sclerosis at ≥2 intervertebral levels had slightly higher sclerostin levels vs. other men ($p=0.053$). This trend became nonsignificant after adjustment for total hip BMD, osteophyte severity and disc space narrowing score ($p=0.88$).

Conclusion: In older men severe osteophytes, but not disc space narrowing or subchondral sclerosis, were independently associated with higher sclerostin concentration.

P160
RISK FACTOR PROFILE OF YOUNG HIP FRACTURE PATIENTS IN INDIA

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Objective: There has been a paucity of studies in young population with hip fracture and no such study was done in India. Therefore, this prospective study was performed to evaluate profile of risk factors of hip fracture in young patients.

Material and Methods: Over a span of 3 years, 51 patients of fragility hip fracture under 50 years of age were enrolled in this study. Background data and risk factors were evaluated to the preset proforma. Fasting venous samples were analyzed for 25-hydroxyvitamin D (25-OHD), intact PTH, alkaline phosphatase (ALP), calcium, and phosphorus.

Results: The mean age of hip fracture subjects below 50 years age was 46.27±12.78 which was comparable in both men and women. Only four of 51 study subjects were under 40 years of age. Of 51 subjects, 26 were men and 25 were women. Majority of men with hip fracture were smokers. All the women were nonsmokers. Sun exposure was found to be inadequate in majority of study subjects. Vitamin D deficiency was found in 39 out of 51 subjects accounting 76.47 % of total young population. Among vitamin D deficiency subjects, 21 were men and 18 were women. Mean 25-OHD was 12.22± 7.6 ng/ml in men and 10.97±7.3 ng/ml in women. Hyperparathyroidism was found in 28 (54.9 %) out of total 51 study subjects.

Conclusion: Majority of young patients with fragility hip fracture both men and women in India have vitamin D deficiency and secondary hyperparathyroidism. Therefore, vitamin D deficiency is a major risk factor along with smoking among men in young hip fracture patients from India. Further,

vitamin D intervention studies are needed for its role in prevention of hip fracture in young population.

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P161
FRACTURES AND CLINICAL OUTCOME IN HEMODIALYSIS PATIENTS

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Objective: Patients with endstage renal disease have increased risk for fracture. This high fracture rate is a consequence of accelerated loss of BMD. Various studies suggest a strong association between BMD and survival in patients with endstage renal disease. The aim of this study was to investigate contribution of factures to clinical outcome in hemodialysis patients.

Material and Methods: This prospective study enrolled 640 patients (334 men and 312 women) with stage 5 chronic kidney disease receiving hemodialysis who were then followed for a mean of 49 (range 16–122) months. Among 159 patients (77 men and 82 women) who had fractures, 54 (34 %) patients had fractures of axial skeleton (vertebra, hip, pelvis). Lumbar spine, femoral neck, and distal forearm BMD were measured by DXA. The Kaplan-Meier estimator of survival and the Cox proportional hazards model was used to calculate and determine the relations between mortality BMD and fractures.

Results: Patients were followed for 49 months, after which time 131 patients (20.5 %) died. The cause of death in 51 % patients were cardiovascular diseases. The Cox proportional hazards model was used to calculate and determine relations between mortality, BMD and fractures. We did not find any influence of BMD on all- cause mortality of hemodialysis patients. At the same time low BMD was strongly associated with cardiovascular mortality. We did not find any influence of peripheral fractures on mortality, and the same time axial fractures were strongly associated with cardiovascular ($p<0.001$) and all-cause mortality of hemodialysis patients ($p<0.01$).

Conclusion: Axial fractures are good independent predictors of cardiovascular and all-cause mortality in hemodialysis patients.

P162
THE STATUS OF SERUM VITAMIN D IN PATIENTS ATTENDING A PHYSICAL MEDICINE AND REHABILITATION DEPARTMENT IN TURKEY

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Objective: Deficiency of vitamin D is becoming a global public health problem. Vitamin D plays important roles in maintaining the balance of calcium and phosphorus metabolism and keeping normal BMD levels. Vitamin D status is affected by many factors such as geographical environment, physiological factors and lifestyle. The objectives of present study were to estimate the prevalence of vitamin D deficiency among patients attended in the outpatients clinic of Physical Medicine and Rehabilitation (PMR) department.

Material and Methods: This was a retrospective study of 999 patients who presented to the outpatient clinic of PMR between January 2011 and April 2013 were recruited consecutively into the study. Biochemical markers of patients were measured. Total 25(OH)D was measured from stored plasma specimens using liquid chromatography-mass spectrometry. Vitamin D deficiency was defined as serum 25(OH)D 20 ng/ml. Sociodemographic characteristics, lifestyle and dietary habits were obtained using questionnaires.

Results: The mean age of the participants was 60.2 (range: 18–97) and 88.7 % were women. The mean serum 25(OH)D level was 22.5 ng/ml and the prevalence of serum 25(OH)D level was in 54.1 % of all patients. The mean level of 25(OH)D in women was significantly higher than in men (22.9 ng/mL vs. 19.8 ng/mL, $p=0.019$). The participants aged 60 years and above have highest serum 25(OH) D levels (25.7 ng/ml vs. 18.4 ng/ml, $p=0.000$).

Conclusion: Mean serum 25(OH)D level was close to represent range considered to represent vitamin D deficiency. Participants aged 60 or older showed the highest mean values of serum 25(OH)D. Future studies are certainly warranted to understand the prevalence of vitamin D deficiency and influencing factors.

P163
ONE-YEAR DISEASE-RELATED HEALTHCARE COSTS OF INCIDENT OSTEOPOROTIC VERTEBRAL FRACTURES IN GERMANY

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Objective: Osteoporotic vertebral compression fractures (OVCF) are among the most common fractures related to osteoporosis. They have been shown to be associated with excess mortality, and meaningful healthcare costs. Costs calculations have illustrated the significant financial burden to society and national social security systems. However, information on disease-related costs of OVCF is not available for Germany. Therefore, the aim of the present study was to estimate the direct disease-related healthcare costs of OVCF in patients with newly diagnosed fracture in the first year after index in Germany.
Material and Methods: Claims data of a large German health insurance fund was used for the analyses. Patients older than 60 years with a new OVCF between 2006 and 2010 were studied retrospectively compared to a matched paired OVCF-free group. All-cause and fracture-specific medical costs were calculated in the 1-year baseline and the 1-year follow-up period. A Generalized linear model (GLM) was applied to estimate adjusted total follow-up healthcare cost.
Results: 2,277 pairs of matched OVCF and OVCF-free patients were included in the analysis. Baseline costs were higher in the OVCF group. Mean unadjusted all-cause healthcare cost difference in the first year following the index date between OVCF and OVCF-free patients was 8200 € ($p<0.001$). Of the difference, one-quarter was attributable to prescription drug costs and almost two-third to inpatient services. The regression model revealed that OVCF-related costs in the first year after the index date add up to 6490 € ($p<0.001$; CI: 5809 €–6731 €).
Conclusion: Despite limitations of this study, including specificity and sensitivity of claims-based diagnoses, and generalizability issues, our results are consistent with other studies and demonstrate that OVCFs are associated with significant excess costs. Against the background of the high and increasing incidence and prevalence of these fractures, the results emphasize the importance of research in this field.
Disclosures: This study was financially supported by Medtronic International.

P164
ATYPICAL FEMORAL FRACTURES ARE ASSOCIATED WITH HIGH CYCLIC TENSILE STRAIN REGIONS DURING WALKING

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Objective: Atypical femoral fractures (AFF) are rare low-energy stress fractures progressing from the lateral femur [1]. However, the aetiology of fracture onset is unclear. We tested the hypothesis that AFF onset is associated with the femur strain pattern during walking.
Material and Methods: Ten volunteers underwent a motion capture session and a computed tomography (CT) of the thigh region. A generic musculoskeletal model was scaled to the volunteers' anthropometry. Muscle and hip reaction forces were calculated using the scaled-generic models, the recorded skin-marker trajectories and ground reaction forces during walking. Hip reaction forces showed consistency with published measurements [2]. The femur finite element models were generated from the CT images using a well-established procedure [3] and subjected to the calculated muscle and hip reaction forces to calculate peak principal strains in 4 diaphyseal levels and 4 aspects (anterior, posterior, medial, lateral). The median principal tensile and compressive strains, during the walking stance phase for the 32 femoral subregions, were calculated and compared.
Results: The lateral femoral shaft was mainly loaded in tension throughout walking, reaching peak strain levels at the time of peak hip reaction force. The interparticipant average of the median tensile strain reached 1500 με in the lateral subtrochanteric region and 1000 με in the distal-lateral shaft. The interparticipant range of the median tensile strain in the lateral shaft ranged from 600 με to 2500 με.
Conclusion: AFFs are associated with high tensile strain regions occurring cyclically during walking, with the lateral-subtrochanteric region experiencing the higher tensile strain levels. Tensile strain levels vary among subjects and may explain individual susceptibility to AFFs. Subject-specific models may help discriminate patients most at risk for AFFs.
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P165
OSTEOPOROSIS IN SAUDI ARABIA: IS IT A PROBLEM?

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Objective: The goals of the present study are:
- Analysis of the Saudi Arabia osteoporosis prevalence.
- The future expectations of osteoporosis in Saudi Arabia. - Recommendations and advice.

Material and Methods: - General review about the prevalence of osteoporosis in Saudi Arabia.
- Assuming the expectation of osteoporotic cases in the future.
- Recommendations and guidelines for management of osteoporosis according to the population culture and food habits.
Results: - Currently, the population in Saudi Arabia is 25.7 million. 10 % of them >50 y.o. and 2 % of them >70 y.o.
- According to the Saudi Reference Data, the prevalence of osteoporosis is 28.2 % in females >50 y.o. and 37.8 % in males >50 y.o. The osteopenia is 43.8 % in females >50 y.o. and 54.1 % in males >50 y.o.
- We need to give a solution for this current and future problem.
- The causes of this high prevalence of osteoporosis are:
1. Low or deficiency of Vitamin D in children and adults
2. Sedentary lifestyle. Young people don't reach enough osseous stock.
3. Postmenopausal females don't receive replacement hormonal therapy
4. Bad food habits, with low levels of calcium 5. Less sun exposure due to a uniform culture
6. No well defined management program to osteoporosis
Conclusion: - Osteoporosis is a serious and increasing problem among Saudi Population.
- To overcome it, the Health Authorities should perform:
1. Programmes and activities to raise education, level of the awareness and prevention (guidelines, bulletins, workshops, etc.)
2. Well developed medicine management protocols with combination of The Saudi Osteoporotic Society

P166
PREVALENCE OF SARCOPENIA ACCORDING TO DIFFERENT DIAGNOSTIC TOOLS

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Objective: Sarcopenia can be defined as a progressive and generalized loss of muscle mass with either a loss of muscle strength or a loss of physical performance. Currently, there is no recommendation regarding the diagnostic tools to use to measure these three outcomes. In this cross-sectional study, we compared the prevalence of sarcopenia when using different diagnostic tools.
Material and Methods: To measure muscle mass, muscle strength and physical performance, we used for each outcome two different diagnostic tools. For muscle mass, we used DXA and Bio-impedance (BIA); for muscle strength, we used a hydraulic dynamometer (HD) and a pneumatic dynamometer (PD); for physical performance we used the Short Physical Performance Battery test (SPPB) and the walk speed (WS). Eight diagnostic groups were thereby established.
Results: A total of 200 consecutive subjects were recruited in an outpatient clinic in Liège, Belgium (62 % of women, mean age: 73.8 years). Prevalence of sarcopenia varied from 8.72 % (BIA-HD-WS) to 28.5 % (DXA-PD-SPPB) depending of the definition. Regarding muscle mass, it seems that BIA systematically underestimate muscle mass compared to DXA (mean of prevalence with BIA=13.4 %; mean of prevalence with DXA=21.4 %). For muscle strength, the pneumatic dynamometer diagnosed twice more sarcopenic subjects than the hydraulic dynamometer (mean of prevalence with PD=23.2 %; mean of prevalence with HD=11.6 %). Finally, a really small difference of prevalence was observed between the walk speed and the SPPB test (mean of prevalence with WS=17.3 %; mean of prevalence with SPPB=17.6 %).
Conclusion: Within the same definition of sarcopenia, prevalence of sarcopenia is highly dependent on the diagnostic tool used. It is necessary to reach a consensus on the recommended diagnostic tools to be used in order to make studies comparable.

P167
LITERATURE REVIEWAND META-ANALYSIS OF PERSISTENCE WITH ORAL BISPHOSPHONATES

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Objective: Treatment persistence is an important aspect of managing chronic illness. In this study, a literature review was conducted summarizing published data on retrospectively observed persistence with oral bisphosphonates (OBPs).
Material and Methods: A structured literature review of retrospective studies estimating persistence (consistent drug dispensing, without failing to refill within a study-specific time period, the permissible gap) with OBPs at 12 and 24 months was conducted using the PubMed database. The search included articles indexed before 22 November 2013 with an English abstract. Pooled estimates of persistence at 12 and 24 months were calculated using inverse variance estimation. In subgroup analyses, these estimates were grouped by weekly and daily administration and by region. The effect of persistence by varying the permissible gap was also analyzed.
Results: 663 unique articles were identified for title review. After applying exclusion criteria, 43 articles were included in the final review, with 41 and 18 reporting at least one estimate

of 12- and 24-month persistence, respectively. Persistence at 12 months varied from 10 % to 78 %, with a pooled estimate of 44.0 % (CI95: 44.0–44.1 %). Persistence at 24 months varied from 16 % to 46 %, with a pooled estimate of 37.8 % (CI95: 37.7–37.9 %). All studies comparing daily with weekly OBPs reported lower persistence with daily OBPs (12-month persistence pooled estimates: 35.4 % vs. 48.8 %). European studies reported higher 12-month persistence (pooled estimate: 46.7 %) compared to North American studies (pooled estimate: 43.8 %). Studies which varied the permissible gap reported a wider gap to be associated with higher estimated persistence.

Conclusion: There is a fairly large body of international evidence describing retrospectively measured persistence with OBPs. This meta-analysis shows that persistence with OBPs is low with only 44 % of patients persistent at 12 months and 38 % at 24 months.

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P168
CHARACTERISTICS OF POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS INITIATING DENOSUMAB IN BULGARIA

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Objective: Describe the characteristics of postmenopausal women with osteoporosis (OP) and reasons for initiating denosumab in routine clinical practice in Bulgaria.

Material and Methods: This retrospective study, conducted in 11 Bulgarian practices, included postmenopausal women ≥50 year old with a clinical diagnosis of OP, who initiated denosumab on/after Oct 2011 and received a 2nd injection within the next 7 months (and until Aug 2013). All study variables (e.g., age, prescribing rationale, etc.) were recorded as per routine clinical practice at 1st injection; no other study procedures were required. Continuous variables were summarized as mean±SD. For categorical variables, the number and percentage of subjects in each category were summarised.

Results: 222 women met the eligibility criteria with a mean age of 64.2±8.54 year; half (49.5 %) were <65 year old and only 13.1 % ≥75 year. Mean age at menopause was 48.1± 3.98 year. The most common reason for prescribing denosumab was a BMD T-score of <-2.5 (98.6 % of patients), reflecting local reimbursement criteria whereby denosumab is reimbursed in such patients. Other reasons were history of OP fracture (22.1 %), multiple risk factors for fracture (20.3 %) and failure of previous OP therapy (15.3 %). Mean BMD T-score was −2.7±0.71 at the femoral neck, −3.2±0.63 at the lumbar spine and −2.3±0.83 at the total hip. One-third of women (31.5 %) had received OP therapy prior to denosumab initiation. One-quarter (26.6 %) had experienced a previous fracture, with vertebral being the most common type (71.2 %) followed by hip fractures (6.8 %) and others (32.2 %, excluding hip). 2.7 % of women received vitamin D only, 5.9 % calcium supplements only and 35.1 % both.

Conclusion: Women initiating denosumab in Bulgarian clinical practice had a mean age of 64.2 year and a low BMD T-score (within the OP range) with or without other risk factors.

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P169
OXIDATIVE STRESS IN PATIENTS WITH OSTEOPOROSIS

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Objective: To assess the oxidative stress and total antioxidant status in patients with osteoporosis.

Material and Methods: Sixty female patients with positive DXA results whose ages range between 50 and 60 years old were enrolled in the study and were divided into 2 groups, osteopenia and osteoporosis. Another 30 apparently healthy females, age matched with the patients, were considered as a controls. Total antioxidant status (TAS) and malondyaldehyde (MDA) were measured in all groups. A pilot study was designed to compare the TAS and MDA between patients with osteopenia and osteoporosis, using the ranges of T-score between the medians of each group (−1.7 to −2.5 and −2.6 to −3.3,.respectively).

Results: The TAS values of both patients groups (1.59± 0.15 mmol/l and 1.05±0.37 mmol/l, respectively) were significantly lower than that of the control group (2.18± 0.26 mmol/l) ($p<0.001$). MDA values of both patients groups (osteopenia and osteoporosis) (1.20±0.43 μmol/l and 2.40± 0.66 μmol/l, respectively), were significantly higher than that of the control group (0.47±0.14 μmol/l) ($p<0.001$). The result of pilot study, showed no difference between these two selected values groups for TAS and MDA, (p-value <0.1 and 0.07) respectively.

Conclusion: The present study demonstrated that osteoporosis patients have higher levels of MDA and lower levels of TAS than the control group. There is no difference between osteopenia and osteoporosis regarding oxidative stress in the pilot study.

P170
JOINT USE OF VITAMINS D3 AND E PREVENTS BONE AND CARTILAGE DISORDERS CAUSED BY CORTICOSTEROIDS

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Objective: Biochemical and morphological study of vitamins D_3 and E effect with underlying use of corticosteroids on bone and cartilage tissue structural changes.
Material and Methods: The study used 68 Wistar rats in 4 series of experiments, 17 rats for each. The first group was control one, the second group received 0.5 mg of prednisolone, the third –0.5 mg of prednisolone and 100 IU of vitamin D_3, and the fourth –0.5 mg of prednisolone, 100 IU of vitamin D_3 and 0.726 IU of vitamin E. The agents were administered once daily intragastrically within a month. Calcium level, activity of total alkaline phosphatase and its isoenzymes and 25(OH)D content in blood serum have been determined. After sacrificing the rats pursuant to international ethical standards, bone tissue ash content and mineral components of the ash have been studied. Bone tissue was morphologically analyzed by conventional methods. The results have been statistically processed.
Results: Prednisolone leads to mineral exchange disorders, as evidenced by biochemical indications of calcium level in blood, increase of alkaline phosphatase and its isomers levels and reliable ($p<0.05$) reduction of 25(OH)D in blood serum. Combination of vitamins D_3 and E inhibits the negative effect of prednisolone and facilitates mineral exchange normalization, although mineral exchange indicators have not reached the levels of the control group at the end of the experiment ($p<0.05$). Morphological data confirmed the results of biochemical investigations. The rats, that received D_3 and E with underlying use of prednisolone mostly preserved their bone tissue and epiphyseal cartilage.
Conclusion: The study demonstrated that joint use of D_3 and E vitamins facilitates normalization of bone tissue mineral exchange, prevents bone tissue demineralization and reduces negative effect of prednisolone on bone tissue and cartilage functional and structural conditions.

P171
SERUM DICKKOPF1 (DKK1): RELATIONSHIP WITH BONE METABOLISM AND ATHEROSCLEROTIC DISEASE IN TYPE 2 DIABETES

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Objective: Type 2 diabetes (T2DM) is a risk factor for osteoporotic fractures and cardiovascular disease. The Wnt signaling pathways are involved in diverse developmental and physiological processes, including anabolic effects on bone and atherosclerotic disease (AD). Dickkopf-1 (DKK1) is a potent inhibitor of Wnt signaling. The aims of our study were to evaluate serum DKK1 levels in a cohort of T2DM patients and to analyze its relationships with bone metabolism and AD.
Material and Methods: Cross-sectional study including 73 patients with T2DM and 54 control subjects. Lumbar spine and femoral BMD were measured by DXA (Hologic QDR 4500). The presence of cardiovascular disease (cerebrovascular disease, peripheral arterial disease, coronary heart disease) was recorded. Intima- media thickness (IMT) was determined by Doppler ultrasonography (Toshiba PowerVision 6000) and aortic calcification by evaluation of lateral view conventional X-rays of the thoracic and lumbar spine according to the method described by Kauppila et al. DKK-1 was measured by quantitative sandwich ELISA developed by Biomedica (Biomedica Medizinprodukte GmbH and Co. KG, Wien, Austria), with an intra- and inter-assay variability were of 7 % and 9 %, respectively. Results were analysed using SPSS 15.0.
Results: There were no differences in DKK-1 according to group. In T2DM group, women had higher DKK-1 concentrations than men: 27.50±17.18 pmol/l vs. 19.41±9.22 pmol/l vs, $p=0.019$. T2DM with aortic calcifications had higher concentrations of DKK-1 27.89±17.13 pmol/l vs. 20.53± 11.45 pmol/l vs, $p=0.054$. In T2DM patients with cardiovascular disease DKK-1 concentrations were higher compared to patients without CV disease: 29.79±16.75 pmol/l vs. 21.47± 12.81 pmol/l vs, $p=0.043$. There was also a positive relationship between DKK-1 and FN BMD (r 0.305, $p=0.003$).
Conclusion: Our preliminary data show a relationship between DKK-1 and vascular disease and bone mass in T2DM.

P172
WHAT DOES MULTIPLICATION OF TIDEMARKS MEAN IN THE OVINE FEMORO-TIBIAL JOINT?

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Objective: One reported histological feature of OA is multiplication of tidemarks. Several studies in animals suggest that

multiple tidemarks are not necessarily associated with OA. The objectives of this study were to assess whether the number of tidemarks varies with age and histological changes associated with OA in a population of sheep with no clinical signs of OA.

Material and Methods: 74 knees from 37 Texel and Ile de France crossed ewes were assessed. There were 8, 15, 12 and 2 animals, respectively, in four categories of age (between 0–3 years old; 4–6; 7 and 8; ≥9). Osteochondral slabs were collected in 8 anatomical regions (axial and abaxial areas of the median part of medial and lateral tibial and femoral condyles). The OARSI criteria were used for histological evaluation of articular cartilage. The number of tidemarks was counted.

Results: The OARSI scores were the highest for the axial part of the medial femoral (mean 8.7, range 2–20) and tibial (mean 7.1, range 1–24) condyles. This study showed that multiplicated tidemarks were present in samples without cartilage defect (OARSI score for structure 0 and 1), up to a number of 6.7 in older sheep. The number of tidemarks increased significantly with age in samples without any cartilage defect up to 8 years. While considering all categories of age together, the number of tidemarks was not significantly different in samples with intact (OARSI structural score of 0 and 1) and with fibrillated or eroded (OARSI structural scores higher than 1) cartilage. There was no correlation between the number of tidemarks and the other subscores of the OARSI scale.

Conclusion: Our study showed that multiplicated tidemarks were present in normal cartilage and was not necessarily correlated to other histological changes seen in OA. This should be taken into account for histological assessment of cartilage of the ovine knee.

P173
BIOCHEMICAL COMPOSITION OF CARTILAGE WITH NATURALLY OCCURRING DEFECTS IN THE OVINE FEMORO-TIBIAL JOINT

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Objective: Biochemical changes of cartilage in OA include degradation of collagen network, loss of glycosaminoglycans (GAGs), and modification of water content. There is few peer reviewed information about biochemical changes in the ovine femoro-tibial (FT) joint model, especially in naturally ageing and deteriorating joints. The objectives of this study were (1) to assess whether cartilage composition varies with anatomical regions, age, and histological changes associated with OA;(2) to map the composition of the cartilage, in the ovine FT joint.

Material and Methods: We assessed 70 knees from 8, 15, and 12 ewes, respectively, aged from 0–3 years old, 4–6, and 7–8. Osteochondral slabs and cartilage samples were collected in 8 anatomical regions (axial and abaxial areas of the median part of medial and lateral tibial and femoral condyles). The OARSI criteria were used for histological evaluation. Cartilage samples were weighted before and after freeze drying to determine water content. GAGs content was measured by using the dimethylene blue assay, and collagen through the hydroxyproline assay.

Results: Water and GAGs contents were significantly higher in the medial condyle than in the lateral condyle both for the tibia and the femur. GAGs were significantly in higher concentration in axial regions than abaxial regions, while collagen tended to be higher abaxially. Though trends could be identified, there was no significant influence of age on biochemical content, except for the axial part of the medial tibial condyle where proteoglycans decreased with increasing age. Water content increased significantly with increasing OARSI subscore for structure, while contents in proteoglycans and collagen did not vary significantly. A map of biochemical contents was designed in function of age and histological score.

Conclusion: The current study provided useful reference data. Since cartilage has nearly no potential for healing, this study will be useful for research in early subclinical stages of OA in an ovine model.

P174
EFFECT OF ZOLEDRONIC ACID ON THE INCREASE IN THE THICKNESS OF THE FEMORAL NECK CORTICAL BONE

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Objective: Assess the impact of a single injection of zoledronic acid on thickness of cortical bone of the femoral neck.

Material and Methods: The study included 20 patients (women), the average age of which was 60.5 years they were divided into two groups: 10 - The study group received zoledronic acid 5 mg once after a hip fracture, and control group without the use of zoledronic acid. All patients of both groups received calcium and vitamin D. Using DXA date, we analyzed the hip geometric parameters by HAS software (Hologic Inc.). The HSA program uses mineral mass and dimensional date from conventional DXA images of the hip

to measure the structural dimensions of bone cross-sections corresponding to 3 thin regions traversing the proximal femur (the narrow-neck (NN) region, the intertrochanteric (IT) region, and the shaft region (FS)). A multivariate analysis was performed using the geometric variables statistically significant in the univariate analysis ($p<0.05$) by SPSS.

Results: Structural analysis of the femur showed that patients treated with zoledronic acid had significantly ($p<0.01$) increase in the thickness cortical bone of the femoral neck (NN). Average values in the group amounted to 0.171 g/cm^2, in the control group 0.162 g/cm^2.

Conclusion: Variation in the thickness of cortical bone measured by software HSA TM (densitometer Hologic) may serve as an additional criterion for evaluating the effectiveness of treatment of systemic osteoporosis.

P175

CAPABILITIES OF REFRACTIVE IMAGING ON THE SYNCHROTRON RADIATION SOURCE IN THE ASSESSMENT OF NEOGENESIS OF OWN BONE TISSUE IN BIOCOMPOSITE MATERIALS

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Objective: To explore the possibility of refractive imaging at the synchrotron radiation source to assess bone formation.

Material and Methods: As experimental animals used 93 females of white nonlinear rats who framed bone defect in volume 15–20 mm^3 in the field of a tibia diaphysis. Defect filling carried out on nondemineralized bone allografts. Experiment terms have made 90 days. For estimation of grafts reorganization were used the morphological and radiological methods including a refractive nondestructive testing on synchrotron radiation. At the synchrotron radiation source were evaluated radiological signs such as the presence and severity of periosteal reaction, the presence of endosteal sclerosis, restoration of the medullary canal and other. Next conducted morphological evaluation of bone formation in the area of tunable transplant. To determine the degree of correlation between the test signs used Cramer's coefficient, which ranges from 0 (no connection) to 1 (maximum bond), as well as the coefficient γ, which varied from −1 (feedback) to 1 (direct link). Determined coefficient p. SPSS, with a significance level of $p<0.05$.

Results: Revealed that for the prediction of the intensity of the process of bone formation has the greatest significance of radiological signs, as the restoration of the medullary canal. On the background of reduced medullary canal resulted in significant (49.0 %) or moderate (36.7 %) bone formation, and only 14.3 % of its features remained weak. If not restored medullary canal expressed (9.1 %) and moderate (27.3 %) bone formation is less common in most animals (63.6 %) of his symptoms were mild. Communication between radiologically determined by reduction of the medullary canal and bone formation was significant ($p<0.001$), a fairly strong (Cramer's=coefficient of 0.548) and direct ($\gamma=0.777$).

Conclusion: We prove that a marked recovery in refractive imaging medullary canal, with a probability of more than 80 % bone formation predicts moderate or severe intensity.

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CORRELATION BETWEEN GENETIC AND BIOCHEMICAL MARKERS IN BELARUSSIAN WOMEN WITH OSTEOPOROSIS

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Objective: Osteoporosis is a systemic skeletal disease characterized by loss of bone mass with increased susceptibility to fracture. It is considered to be a multifactorial disease with environmental and genetic factors interacting. Genetic factors play an important role in the pathogenesis of osteoporosis. Association analysis of candidate genes is an efficient way to identify the modest but real genetic effects of individual polymorphisms. In present study, we performed a control-case study in order to reveal whether a relationship exists between analyzed gene polymorphisms and risk of fracture in Belarussian postmenopausal women.

Material and Methods: A total of 54 women with severe postmenopausal osteoporosis (58.3±6.2 years) and 77 women of the control group without osteoporosis (56.7±7.42 years) were included in this study. DXA was used to measure BMD. Polymorphic sites in 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 polymerase chain reaction (PCR) analysis.

Results: The data shows that VDR *ApaI*, *BsmI* and LCT *T-13910C* polymorphisms are likely to influence the risk of postmenopausal osteoporosis and make the greatest contribution to its development in Belarusian population. For the bearers of *AA*-genotype of VDR *ApaI* gene polymorphism, the risk of osteoporosis was 3.3 times higher, and for *B*-allele bearers of VDR *BsmI*, the risk of osteoporosis was 2.6 times higher if compared to controls. A statistically significant correlation between VDR *ApaI* and VDR *TaqI* risk genotypes and BMD level was observed.

Conclusion: By the analysis, we revealed the genetic mechanisms, determining decrease of BMD, and gene polymorphisms, which can be considered as markers of predisposition to osteoporosis. Screening of these genetic markers in clinics may enable early identification of risk groups to perform preventive measures.

P177
IMPACT OF MENISCAL EXTRUSION ON THE PROGRESSION OF KNEE OSTEOARTHRITIS STRUCTURAL CHANGES AND THE EFFECTS OF TREATMENT: DATA FROM THE OSTEOARTHRITIS INITIATIVE PROGRESSION COHORT

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Objective: To determine, using data from participants enrolled in the progression cohort of the OAI, the effects of existing meniscal extrusion on the extent of cartilage loss and structural changes over time, and response to pharmacological treatment including the combination of glucosamine and chondroitin sulfate (Glu/CS).
Material and Methods: Knee osteoarthritis (OA) patients were stratified based on the presence/absence of medial meniscal extrusion at baseline and on whether or not they received conventional OA pharmacological treatment (analgesics/NSAIDs) and/or Glu/CS for 24 consecutive months. The main outcomes were knee structural changes including cartilage volume assessed by MRI and loss of joint space width (JSW).
Results: Participants reported taking (+; n=300) or not taking (−; n=300) OA treatment (analgesics/NSAIDs). Those with meniscal extrusion had more severe disease at baseline. In the −analgesics/NSAIDs group with meniscal extrusion, participants taking Glu/CS had significantly reduced loss of cartilage volume at 24 months in the medial tibiofemoral compartment (p=0.02) and lateral plateau (p=0.05). No effect of Glu/CS was observed in patients without extrusion. In the +analgesic/NSAIDs group without meniscal extrusion, those taking Glu/CS had significantly reduced loss of cartilage volume in the global knee (p=0.055), medial compartment (p=0.05), lateral plateau (p=0.007), and trochlea (p=0.04). No effect of Glu/CS treatment occurred in participants with extrusion. No significant reduction in JSW was found between those taking and not taking Glu/CS treatment.
Conclusion: This study confirms that combined administration of Glu/CS has significant protective effects on structure in knee OA. The presence of meniscal extrusion was found to be an important factor that can influence the drug effect on cartilage volume. X-rays were found to be much less sensitive than MRI at documenting the protective effect of treatment on structural changes.
Disclosures: Funded in part by Bioiberica. JPP, JMP: consultants for Bioiberica, shareholders in ArthroLab. JPR: consultant for ArthroLab. FA: employee of ArthroLab. CR: bursary from the Fondation du CHUM.

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RISK OF FALLS AND OSTEOPOROTIC FRACTURES AMONG WOMEN AGED 50 AND ABOVE

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Objective: To evaluate the frequency of falls and osteoporotic fractures among women aged 50 and above in 1-year prospective study.
Material and Methods: A cohort of 276 women (mean age 63±7) was randomly chosen among Moscow region population. The participants completed questionnaire for evaluation of the 10-year fracture risk (FRAX® tool) and performed Short Physical Performance Battery (SPPB). Telephone contact for registration of falls and osteoporotic fractures (OPF) was done in a year.
Results: 210 women (76 %) responded after 1 year passed, among them 65 women (31 %) were in a high 10-year fracture risk for any OPF. 35 of Subjects (17 %) reported about falls during the year after the exam, among them 24 (69 %) had already a history of falls during 1 year prior to the study. In a group of 175 women without falls only 25(14 %) had past history of falls (p<0.01). Mean SPPB at baseline was lower in patients who had falls than among those without falls (8.7± 2.4 vs. 9.5±2.3, respectively). Nine women (4.3 %) had OPF during the year: 7–with high FRAX and 2–with low FRAX value (11 % vs. 1.4 %, p=0.002). Fracture probability was 8.63 times higher in a high FRAX group comparing to the low-risk group (OR 8.63: 95%CI 1.5; 62.11). In a high-risk group fractures occurred more often among those who had history of OPF comparing to those who had high FRAX, but did not have OPF in the past (67 % vs. 17 %, p=0.002). Fractures in the past and high FRAX increased the risk of OPF in 11 times (OR 11: 95%CI 8.3; 32.5), falls in a year before baseline exam and high FRAX–in 5.25 times (OR 5.25: 95%CI 0.82; 42.4).
Conclusion: During the year each 6th woman aged 50 and above had at least one fall, among the fallers each 4th woman had a fracture. High FRAX, history of fractures and falls in the past can be a basis in Russia to start medical treatment of osteoporosis without making such an expensive medical survey as densitometry.

P179
CORRECTION OF VALGUS HINDFOOT DEFORMITY IN SUBTALAR JOINT CONTRIBUTES TO ANKLE JOINT PAIN RELIEF IN RHEUMATOID ARTHRITIS CASES

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Objective: We often see painful ankle joint destruction complicated with painful subtalar valgus deformity in rheumatoid arthritis (RA). For such cases, subtalar deformity was firstly corrected and fused, and then ankle joint pain has been observed.
Material and Methods: Two RA women were underwent correction and fusion surgery in subtalar and talonavicular joint, and/or calcaneal osteotomy with autograft and allograft bone. They had been using wheelchair because of severe painful destruction in ankle joint and hindfoot despite of TCZ (tocilizumab) biologics therapy. After surgery, teriparatide (PTH) administration and low intensity pulsed ultrasound (LIPUS) irradiation were performed to promote bone formation and strengthening in both cases, under keeping nonweight-bearing with BK casting. After 2 months later, partial weight bearing was started, and additional 2 weeks later full weight-bearing was started.
Results: Of course, both patients complained no pain in subtalar, (case 1: 15 months, case 2: 6 months after surgery), furthermore drastic pain reduction in ankle joint was also observed (VAS; case 1: 15 mm, case 2: 5 mm), consequently they could walk without any support. In addition, observation of X-ray picture of hip to calcaneus view (HC view) [1] revealed that loading axis of whole lower extremities passed more nearly to the center of ankle joint (case 1: 15 mm preoperative→6.5 mm postoperative, case 2: 21 mm preoperative→7 mm postoperative). In the varus/valgus stress view of X-ray picture, case 1 showed the instability in ankle joint, on the other hand, case 2 showed no instability.
Conclusion: Correction of valgus hindfoot deformity in subtalar joint causes the centralization of weight bearing line in ankle joint, so it has effect on not only elimination of subtalar pain, but also ankle pain relief. From this observation, there is a possibility to preserve ankle joint under RA tight control without ankle surgery.
References: [1] Haraguchi et al. J Jpn Soc Surg Foot 2010

P180
EVOLUTION OVER TWO YEARS OF FUNCTIONAL AND MOTOR ABILITIES AMONG NURSING HOME RESIDENTS

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Objective: The objective of this study was to observe the evolution, over a 2-year period, of functional and motor abilities among institutionalized elderly people.
Material and Methods: A total of 100 subjects were included in the study and followed prospectively for a 2-year period to assess the evolution of their functional and motor skills. The Tinetti test and a quantitative gait analysis performed by a triaxial accelerometer test were performed, in single and dual task, at the beginning and at the end of the study.
Results: The final tests were performed on 36 subjects (27 deceases, 20 physical disability, 12 refusals and 5 relocations). Patients who completed the final tests showed, at baseline, clinical characteristics significantly different from patients who did not carried out these tests for the dependence score of Katz (13.6±3.7 vs. 17.5±5.1, p=0.0001), the Tinetti score (21.3±3.8 vs. 17.5±4.5, p=0.00004) and step length (0.79±0.24 vs. 0.68±0.27, p=0.03). Gait speed (p=0.0003), step length (p=0.004) and coefficient of regularity of gait cycles (p=0.00002) decreased significantly between the beginning and the end of the study. Quantitative gait analysis, measured by dual task, showed a significant reduction in gait speed (p=0.00002) and regularity of gait cycles (p=0.03). The evolution of the Tinetti score, over a 2-year period, was not significant (p=0.38) but was significantly correlated with changes in step length (r=0.57) and regularity of gait cycle (r=0.75).
Conclusion: The degradation of some gait parameters is observed in elderly institutionalized patients followed for a period of 2 years. The evolution of step length and regularity of gait cycles is not correlated to the evolution of the Tinetti test. This test seems to be less sensitive to changes than certain parameters of quantitative gait analysis.

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PROGNOSTIC FACTORS OF DEATH AMONG NURSING HOMES RESIDENTS FOLLOWED PROSPECTIVELY FOR A PERIOD OF 2 YEARS

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Objective: The objective of this research was to determine the predictors factors of risk of death among nursing homes residents, followed prospectively for a 2-year period.
Material and Methods: A total of 100 institutionalized subjects were included in the study and were followed prospectively for 2 years. At the beginning of the monitoring period, demographics characteristics were collected and functional tests (Tinetti test) and motor analysis (quantitative gait analysis performed using a triaxial accelerometer) were performed.
Results: At the end of the study period, 27 deaths had occurred. The patients who deceased had, compared to subjects still alive, a BMI significantly lower (23.3±4.9 kg/m^2 vs. 26.5±5.3 kg/m^2, p=0.007), a dependence score of Katz significantly higher (18.3±4.9 vs. 15.3±4.9, p=0.009) and a score of Tinetti significantly lower (16.9±4.6 vs. 19.6±4.4, p=0.008). However, there was no difference between these two groups for gender, age, number of drugs consumed and the use of a walking support. In addition, 48.1 % of the deceased had a history of repeated falls against 24.7 % among the patients still alive (p= 0.01). After adjustment on potential confounding variables, only BMI was statistically significantly associated with the risk of death with an odds ratio of 0.86 (95%CI: 0.77–0.96, p=0.04).
Conclusion: A decreased BMI seems to be a predictor of risk of death among patients living in nursing homes. However, many confounding variables (strength, weakness, etc.) were not evaluated in this study and therefore these results should be interpreted with caution.

P182
RELATIONSHIP BETWEEN BODY MASS INDEX AND BONE MINERAL DENSITY IN SAUDI WOMEN ABOVE 40 YEARS WITH VITAMIN D DEFICIENCY

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Objective: 1) To find out the prevalence of vitamin D deficiency in Saudi women above 40 years of age. 2) To find out the association, if any, between BMD and BMI in Saudi women above 40 years of age who have vitamin D deficiency.

Material and Methods: The study was conducted in Arar central Hospital, Arar, Saudi Arabia. All patients were Saudi women residing in Arar and have completed 40 years of age. A questionnaire containing demographic data, habits, diet, exercise, medical history and drugs taken was given to the patients. The vitamin D level <50 nmol/l was considered as vitamin D deficiency as per the WHO definition. The BMI was calculated from height in cm. and weight in kg. The BMI was categorized as follows: <18.5 was considered underweight, 18.5–24.9 was considered normal and >30 as obese. BMD was measured at the femoral neck on the right side and left side and the lumbar spines L1-L4. To find out whether there is any significant association between BMD and independent factors like age, BMI and exercise, Fisher's exact test was used. The level of significance was fixed at P value <0.05.
Results: Among the 100 female patients selected, 82 % had vitamin D deficiency. The BMI was normal in only 6.1 % of the patients while 93.9 % of the patients were overweight or obese. Only 8.5 % of the patients were in the habit of doing exercise while 91.5 % of the patients were not doing any exercise. 80 % of the patients with normal body weight had low BMD while 50 % of the obese patients had normal BMD. Among the patients who did exercise 85.7 % had normal bone density, 14.3 % had osteopenia.
Conclusion: The results of the present study show that obesity is not a protective factor for BMD in women above 40 years of age. Exercise, smoking and calcium deficient diet are important factors related to the development of osteoporosis in Saudi women.
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P183
HIGH ADHERENCE TO DENOSUMAB THERAPY IN THE TREATMENT OF POSTMENOPAUSAL OSTEOPOROTIC WOMEN IN BULGARIA

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Objective: To assess medical adherence of women with postmenopausal osteoporosis to a long-term treatment with denosumab. Also the factors limiting the implementation of prescribed treatment with denosumab were analyzed.
Material and Methods: We included 112 postmenopausal women, age from 55 to 80 years, who had been switched to denosumab after different previous medication with bisphosphonates (95 oral and 17 intravenous). This open,

prospective, single- center study were has been to evaluated adherence terms of two-yearly injection- based treatment with denosumab 60 mg sc injections every 6 months in osteoporotic patients in routine clinical care setting. We describe whether positive feedback of OP patients based on measured BMD increases and good safety profile, have an impact on patient' real life medical adherence. The diagnosis osteoporosis was based on international accepted inclusion criteria were BMD value at DXA T- score -2.5 to −4.0 SD. The study was conducted over 36-month period (2011–2013).

Results: Patients received denosumab within 24 months took a greater medication adherence, in detail: compliance after 12 months was 95.9 %; after 24 months - 97.3 %; persistence after 12 months was 92.6 %; after 24 months - 81.4 %; adherence after 12 months was 90.2 %; after 24 months - 78.8 %. The patient medical adherence dropped out because 21 patients gained DXA T-score<−2.5, and other 3 because of health economic problems.

Conclusion: Postmenopausal women with osteoporosis a vastly high degree of medical adherence to treatment to denosumab was found. After 12 and more after 24 months medication adherence was reduce from treated patients which pass in osteopenia.

P184
DIAGNOSIS OF VERTEBRAL FRACTURE WITH DXA IMAGE IN POSTMENOPAUSAL WOMEN

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Objective: In order to improve the diagnosis of vertebral fracture, vertebral fracture assessment and bone densitometry were done for the postmenopausal women at the same time.

Material and Methods: VFA and bone densitometry were performed for postmenopausal women aged >50 year. The effects of BMD, age and menopause duration on vertebral fracture were analyzed.

Results: Vertebral fractures were present in 59 of 217 (27.2 %) patients. Vertebral fracture rate was 21.6 % in 125 patients with normal BMD or osteopenia and 34.8 % in 92 patients with osteoporosis ($p<0.05$). Vertebral fracture rates increased with age and was 12.5 %, 25.6 % and 44.8 %, respectively, in the patients aged 50–59 year, 60–69 year and >70 year ($p<0.05$). Vertebral fracture rates increased with duration of menopause and were 14.6 %, 20.7 % and 45.5 %, respectively, in the patients with menopause duration of 0–9 year, 10–19 year and >20 year.

Conclusion: Vertebral fracture is a common and severe complication of osteoporosis in the postmenopausal women. It often occurs earlier than hip fracture and increases the risk of new vertebral and hip fractures. The drug therapy can effectively reduce the risk of new fracture. Early detection of vertebral fracture is important, but the underdiagnosis is worldwide. DXA VFA improves the detection of vertebral fracture and is lower cost, less radiation and greater patients convenience than standard spine radiographs. The vertebral fractures were underdiagnosed in 69 % patients before DXA VFA in our series and were present in the patients with normal BMD or osteopenia. The vertebral fracture rate was higher in the postmenopausal women with lower BMD, advancing age and long duration of menopause. The T-score of <−2.5 SD and fragile fracture are frequently used as intervention threshold. The detection of vertebral fracture is good for the patients to start the therapy for osteoporosis. We recommended that VFA was performed with BMD test for postmenopausal women in first check and in check for monitoring the response of the therapy.

P185
FREQUENCY OF POLYMORPHISMS IN CANDIDATE GENES FOR OSTEOPOROSIS VDR, ESR1, LRP5, OPG AND SOST IN PATIENTS FROM CENTRAL MORAVIA, CZ: PART I

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Objective: In cohorts examined for osteopenia and osteoporosis in different time intervals from 2011 to 2013, we examined the following polymorphisms: VDR- BsnI(G>A), ESR1-(PvuII(T>C) LRP5-(Val667 Met) LRP5-(Ala I 330 Val), OPG 1181G>C, SOST (10565ins/delGGA). In a totally independent cohort we examined a composition according to type Apo E.

Material and Methods: 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 hydrolysation and FRET probes on LC 480 II(Roche). Clinical characteristics: These cohorts are with primary osteoporosis or osteopenia. Probands with secondary osteoporosis or with skeleton damaging medications were excluded. These were composed of female population including children, age was not considered. Average age of all cohorts was 58.5 years.

Control cohort had 80 probands, average age 59 years. Male population was not evaluated.
I. *n*=2127 polymorphisms VDR, ESR 1
II. *n*=1624 polymorphisms VDR, ESR 1, LRP5(Val667Met), LRP5(Ala I 330Val)
III. *n*=457 polymorphisms VDR, ESR, OPG, SOST
IV. *n*=780 according to type Apo E
V. *n*=80 controls with no polymorphisms, with no symptoms of osteoporosis
Results: Cohort III: VDR - MUT 62 - 13.56 % ESR1 - MUT 110 - 24.07 % OPG - MUT 104 - 21.89 % SOST- MUT 78 - 16.42 % (MUT - mutated polymorphism, complete results of all cohorts in the poster)
Conclusion: The occurrence of polymorphisms which have an influence on skeletal phenotype in the examined population is biologically and statistically very important. The most frequent are heterozygote forms. The importance of this finding is also intensified by the fact that this is a population we commonly meet at our clinics. In the second part of the research the cohort was examined to follow the frequency of combinations of individual polymorphisms. Here we paid attention only to mutated polymorphisms.

P186
FREQUENCY OF COMBINATIONS OF MUTATED POLYMORPHISMS IN CANDIDATE GENES FOR OSTEOPOROSIS VDR, ESR1, LRP5, OPG AND SOST IN PATIENTS FROM CENTRAL MORAVIA, CZ: PART II

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Objective: In the examined cohort for osteopenia and osteoporosis we examined the following polymorphisms: VDR-BsnI(G>A), ESR1-(PvuII(T>C) LRP5-(Val667 Met) LRP5-(Ala I 330 Val), OPG 1181G>C, SOST (10565ins/delGGA). In this work only mutated polymorphisms were processed.
Material and Methods: 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 hydrolysation and FRET probes on LC 480 II(Roche). Clinical characteristic of the cohort: These cohorts are with primary osteoporosis or osteopenia, we gradually examined a given number of polymorphisms, their types and combinations. Probands with secondary osteoporosis or with skeleton damaging medications were excluded. These cohorts were composed of female population including children, age was not considered. Average age of all cohorts is 58.5 years. The control cohort had 80 probands, average age 59 years. Male population was not evaluated.
Results: III. cohort *n*=457 frequency of combinations VDR, ESR, OPG, SOST
VDR-ESR 15 - 3.15 % VDR-OPG 28 - 5.89 % VDR-SOST 8 - 1.68 % ESR-OPG 17 - 3.57 %
ESR-SOST 21 - 4.42 %
IV. cohort *n*=457 more frequent combinations of mutated polymorphisms
VDR-ESR1- LRP5 (AlaI 330 Val) -0
VDR-ESR-LRP5 (Val667 Met) -0
VDR-ESR1 - OPG 7 - 1.47 %
VDR-ESR1 - SOST 0
VDR-ESR1- OPG-SOST - 3 - 0.67 % (Complete results in the poster.)
Conclusion: Based on the results it is possible to state that biologically significant combinations of mutated gene polymorphisms are formed by mutated polymorphisms VDR-ESR-OPG or SOST. The high frequency of OPG or SOST combinations is relevant; these are genes with an impact on the controlling axes of bone tissue metabolism RANK/RANKL/OPG. The statistic importance of the influence these mutations make on the bone phenotype is elaborated mathematically in the third part of this report.

P187
BONE MICROARCHITECTURE ASSESSMENT BY TRABECULAR BONE SCORE IN PATIENTS WITH SYSTEMIC SCLEROSIS

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Objective: Trabecular bone score (TBS) is a novel software application for bone quality assessment, in addition to BMD measurement. Objective is to examine the microarchitectural bone status by TBS in SSc patients and its relation to BMD and clinical features of the disease.
Material and Methods: The cross-sectional study included 40 female SSc patients. The parameters of lumbar spine BMD and total body (lumbar spine BMD and T-score and BMC - bone mineral content) were examined by DXA on Hologic Discovery device, TBS analysis was carried out by Insight TBS® - MedImaps. Demographic data and clinical characteristics of SSc patients were collected from the EULAR Scleroderma Trials and Research minimal essential data set database. SSc activity was determined

using Valentini's questionnaire (SSAS). We examined the correlation between the TBS and demographic and clinical characteristics of the patients.

Results: The average age of the patients was 57.22 (36–73.2±8.69) years, postmenopausal 37/40, duration of disease 9.06 (1–26±6.8) years, BMI 24.42 (17.5 to 37.1±4.3). Diffuse disease subtype (dSSc) had 19/40 (47.5 %), limited (lSSc) 21/40 (52.5 %). The most frequent clinical features were Raynaud phenomenon, sclerodactily, digital ulcers, esophageal dysfunction, joint contractures, dyspnea, etc. Average disease activity as by SSAS=6.5. Spine BMD was 1.03±0.321 g/cm^2, TBS 1.364±0.034, whole bone mineral content 2.25±0.03 kg. There was no statistically significant correlation between the BMD, BMC and TBS. TBS was inversely correlated with the age and use of GC (r=−0.330, −0.385, p=0.03), while positively correlated with SSc activity, presence of digital ulcerations and calcinosis (r= 0.342, 0.341, −0.367, respectively; p<0.05).

Conclusion: Lower TBS values are associated with age and the use of steroids in the treatment. Higher TBS values are associated with the presence of digital ulcers, calcinosis and higher disease activity.

P188
RELATION AMONG BONE PHENOTYPES AND GENE POLYMORPHISMS FOR VITAMIN D RECEPTOR (VDR) AND ESTROGEN RECEPTOR ALPHA (ESRA) 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 polymorphisms of these genes. In our work we studied 2 polymorphisms.

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. We studied 2 polymorphisms: in gene for VDR BsmI (rs1544410,G>A), in gene for ESRα PvuII (rs2234693,T>C). Osteological parameters were then compared with frequency of genotype occurrence. BTM as osteocalcin (OC) and 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 phenotypes are: BMD, laboratory parameters of calcium phosphate metabolism (Ca, P), BTM (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 BB SNP Bsml: 0.864 g/cm^2 vs. 0.896 g/cm^2 (p=0.05). Next we proved a significantly lower BMD in the neck of the proximal femur for genotype pp SNP Pvull: 0.742 g/cm^2 vs. 0.771 g/cm^2 (p<0.05). In individuals with a BB and pp genotype combinations the lowered BMD is also significantly lower, approximately by 17 %.

Conclusion: Our observations show a slight but statistically significant difference in an amount of bone phenotype BMD expression in observed polymorphisms Bsml and Pvull. In combinations of these selected genotypes the effect of lowered BMD is increased. This proves a theory of mutual interactions of individual genotypes.

P189
STATISTICAL SIGNIFICANCE OF INDIVIDUAL MUTATED POLYMORPHISMS VDR, ESR1, OPG, SOST AND THEIR COMBINATIONS IN PATIENTS FROM CENTRAL MORAVIA, CZ: PART III

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Objective: In the examined cohort for osteopenia and osteoporosis we examined the following polymorphisms: VDR - BsmI, ESR1-PvuII, OPG - 1181G>C, SOST - 10565ins GGA and their combinations for osteological parameters in patients with osteoporosis and osteopenia.

Material and Methods: 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 hydrolysation and FRET probes on LC 480 II(Roche). Clinical cohort were composed of female population from 45 to 79 years. The control cohort had 63 probands. The total cohort n=213.

Examined osteological parameters: Examined BMD L- of spine and proximal femur (iDXA GE Lunar) markers for bone metabolism OC (osteocalcin) and CTX, Vitamin 25OHD3, PTH, Ca (total calcium).
Results: Statistical method: The normality of data distribution was verified using the Kolmogorov-Smirnov test. The data were analyzed using a one-way ANOVA. A Fisher's least significant difference (LSD) procedure was used for all post hoc pairwise comparisons (Statistica Version 10.0, Stat-Soft, Inc., Tulsa, Oklahoma, USA). The level of significance was set at 0.05. For statistical processing we used groups where $n>8$.

Table. Significant differences among measured groups

Parameter significant differences
BMD_P 2×8*, 3×8*, 6×8^, 7×8^
BMD_K 1×6*, 2×6*, 3×6*, 4×6*, 6×7^, 1×8*, 2×8**, 3×8**, 7×8^
CTx 3×7^, 4×7^
PTH 3×8*
Ca 5×8^

Legend: 1 - ESR; 2 - OPG; 3 - SOST; 4 - VDR, OPG; 5 - ESR, OPG; 6 - ESR, SOST; 7 - OPG, SOST; 8 - control; **$p<0.01$; *$p<0.05$; ^$p<0.10$

Conclusion: We can find statistical significance of influencing basic osteological parameters even in this smaller statistical cohort. This conclusion gradually contributes to an approval for an introduction of some gene examinations in the context of individual genomic and personalized medicine in the field of osteology.

P190
PREVALENCE OF 25-HYDROXYVITAMIN D DEFICIENCY IN PEDIATRIC POPULATION OF BELARUS CAPITAL CITY

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Objective: Vitamin D deficiency is more and more prevalent worldwide whereas current data show that optimal levels should be >30 ng/mL. The aim of this study was to assess vitamin D status in health children aged 5–17 years living in metropolis.
Material and Methods: Biomarkers of phosphate/calcium metabolism, among them 25-hydroxyvitamin D (25(OH)D), were measured in a prospective cohort of 114 children (55 boys, age 12.1±3.4, 59 girls age 11.4±3.8), all patents were divided in age groups: 5–9, 10–13, 14–17. A 25(OH)D deficiency was defined by a 25(OH)D level below 20 ng/mL and an insufficiency by a level between 20 and 29 ng/mL.
Results: The mean level of 25(OH)D in patients population was 32.5±9.3 ng/mL. The levels of it were not differ among boys (33.7±10.0 ng/mL) and girls (31.7±8.4 ng/mL) ($p>0.05$). Overall, 7 % ($n=8$) of the pediatric population of the big city were 25(OH)D deficient and 31.6 % ($n=36$) insufficient. The levels of 25(OH)D among age group: in boys 5-9y -33.5±8.5; 10–13y −31.5±8.3, 14–17y −36.5±12.7 ng/mL ($p>0.05$ among groups), in girls 5–9y −35.9±8.8; 10–13y −30.1±6.6, 14–17y −27.8±7.7 ng/mL (p5-9/10-13<0.05, p5-9/14-17<0.05). In age 14–17y 25(OH)D was significantly lower in girls compare with boys ($p<0.05$). 70.6 % 14–17y girls were 25(OH)D deficiency or insufficiency.
Conclusion: 25(OH)D deficiency and insufficiency is common in the general pediatric population of Belarus capital city, with more frequency in girls at 14–17 years.

P191
DETECTION OF VERTEBRAL FRACTURES IN DXA VFA IMAGES

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Objective: For the improvement of the diagnosis of the vertebral fractures, the BMD examination and lateral image of thoracolumbar spine were taken through the DXA for the assessment of the vertebral fractures.
Material and Methods: BMD of hip and lateral image of thoracolumbar spine were taken through DXA for the 204 patients aged >50 year. There were 184 females and 20 males. There were 85 patients between 50–60 year, 60 between 61–70 year, and 59 patients aged >70 year. The vertebral fracture assessment was performed.
Results: There were 98 fractured vertebrae in 54 of 204 patients (26.5 %). The vertebral fracture rate was 16.5 % in the patients aged 50–60 year, 16.7 % in the patients aged 61–70 year and 50.8 % in the patients aged >70 year. The vertebral fractures were present in 3 of 24 patients (12.5 %) with normal BMD, 19 of 97 patients (19.6 %) with osteopenia and 32 of 83 patients (38.6 %) with osteoporosis. The vertebral fractures increased with advancing age and lower BMD.
Conclusion: The vertebral fractures are the most common osteoporotic fracture and are the hallmark of osteoporosis. It increases with age and with decreased BMD. It is a strong predictor of fracture risk. Presence of a vertebral fracture has 5-fold increased risk of new vertebral fracture and 2-fold increased risk of hip fracture. Effective therapies can reduce

new fractures. The detection of vertebral fractures are critically important, but many studies show that vertebral fractures are often not diagnosed and only 30 % of vertebral fractures come to medical attention. Modern DXA image allows for vertebral fracture assessment at the time of a bone densitometry test. The vertebral fracture rate was 26.5 % in our series and 64.8 % patients with vertebral fractures were not diagnosed clinically before DXA VFA. The vertebral fractures increased with advancing age and decreased BMD. DXA VFA is effective, rapid, safe and practical. We recommend that DXA VFA was performed with bone densitometry test for the patients aged >50 year who took the BMD test for the first time.

P192
RISK FACTORS FOR FALL AND EMERGENCE FRAGILITY FRACTURE

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Objective: Osteoporotic fractures are a significant cause of morbidity in the elderly population. The aim of the study was to determine fall risk factors and emergence fragility fractures in women.
Material and Methods: The survey was conducted on a sample of 124 women, 63 years old, treated at the Clinical Center of Vojvodina, Serbia. Fall risk factors were assessed with the fracture risk assessment and the Morse fall scale.
Results: The average age of menopause at 48 years, most of them were born, but they are not breastfed. Fracture previously had 56 % of respondents. Only 20 % had a family history of hip fracture. Arthritis rheumatoid had 26.7 % and secondary osteoporosis 20 %. Cognitive impairment (45.6 %), visual impairment (38.7 %), and depression (10 %) were the observed fall risk factors. Corticosteroid taken 46.7 %, antidepressants 10 %, and cytostatics 3.3 %. The most number of patients had DXA findings in the range of osteopenia. According the Morse scale to fall more than 2/3 of the respondents (73.6 %) had moderate and high risk for a fall.
Conclusion: Early menopause, osteoporotic fractures in the past, use of corticosteroids, cognitive and visual impairment, the influence of the increased risk of falls and the occurrence of fragility fractures. Fracture risk assessment and Morse scale may be helpful to assess risk factors.
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P193
HISTORY- AND PHYSICAL EXAMINATION-BASED MODEL SHOWED GOOD DISCRIMINATION ABILITY IN FRACTURE PREDICTION

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Objective: To identify the predictors of fracture in Chinese individuals with low BMD and develop a fracture prediction model based on parameters and measurements from history and physical examination findings.
Material and Methods: All Southern Chinese subjects referred for management of low BMD from 2008 to 2012 were recruited for analysis. Systematic assessments including a VAS for back pain and thorough investigations were performed in the first visit. The occurrence of incident osteoporotic fracture was determined by subjects' yearly self-reports and data retrieved from the hospital's computer medical system. Subjects with and without fractures were compared. Variables with statistically significant difference in univariate analysis were further assessed in a multiple logistic regression model. Area under the receiver operating characteristic (ROC) curve was calculated to assess the discrimination ability of the model constructed by the independent predictors.
Results: 1,702 subjects were included for analysis. 949 female (56 %) and 753 male (44 %) were included in the study. The mean age of the subject was 63.4±8.7 years and median duration of follow-up was 3 (interquartile range: 1–4) years. Among the study subjects, 70 cases (4.1 %) developed new low-trauma osteoporotic fracture (spine: 24, 1.4 %; hip: 10, 0.6 %; distal radius: 8, 0.5 %; others: 28, 1.6 %). Logistic regression analysis showed that loss in body height (OR: 8.14, $P<0.001$) and VAS for back pain (1.62, $P<0.001$) were the independent predictors for incident fractures. These two predictors were added to age, gender and BMI, which were of clinical relevance, to form the final model. The area under the ROC curve of this model was 0.88.
Conclusion: Prediction model based on clinical measures showed good discrimination ability for incident fractures. It would be of clinical significance in triaging patients with low bone mass for appropriate treatment.

P194

SAFETY OF ZOLEDRONIC ACID IN POST-MENOPAUSAL WOMEN WITH OSTEOPOROSIS: A SINGLE CENTER OBSERVATIONAL ONE-YEAR STUDY

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Objective: In clinical trials treatment with zoledronic acid (ZOL) was reported to induce acute phase reaction in about 15 % of patients after the first infusion. This study was aimed to evaluate the incidence of adverse events (AE) in the regular clinical setting.
Material and Methods: 215 consecutive patients received IV ZOL 5 mg, of them 52 patients had repeated infusion of ZOL. AE were reported by patients using a detailed form during 10 days after the infusion.
Results: Women aged 69.7±9.59, (45–100) were included in the study. 151 (70 %) patients were previously treated with: alendronate 65 pts (43 %); raloxifene 9 (5.96 %); risedronate −31(20.5 %); teriparatide 23(15.2 %); tibolone (0.7 %); calcium supplements 133 (61.9 %); vitamin D 147 (68 %). Any AE were reported in 136(63.3 %) and 32(61.5 %) patients: fever 69 (50.7 %) and 10 (31.3 %), $p=0.024$; bone/joint pain/headache 129 (94.8 %) and 0, $p<0.0001$; weakness 109 (80.1 %) 20 (62.5 %), $p=0.05$; muscles pain 106 (77.9 %) and 10 (31.3 %), $p=0.04$; uveitis 2 (1.47 %) and 0 after the first and second dose respectively. AE duration was 2–5 days with no correlation to prior treatments. Previous fractures were reported in 114 (53 %) patients. There were 5 (2.3 %) new fractures: 3 hip; 2 ramus pubis.
Conclusion: Incidence of the acute phase reaction in the study was higher than previously reported with a significant decrease after the second dose.

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PREVALENCE OF KNEE AND DIGITAL OSTEOARTHRITIS IN WOMEN IN DOUERA CITY (ALGIERS): A POPULATION-BASED STUDY

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Objective: To determine prevalence of clinical and radiological knee and digital osteoarthritis in women of 50 years old and more in the locality of Douera (Algiers).
Material and Methods: A cross-sectional epidemiological study using a stratified sampling approach to select women in the locality of Douera, a semi-urban district. All subjects completed a questionnaire. Standard radiographs of hands and knees were performed by a single operator along with a bone densitometry (Hologic QDR 2000). Criteria of the American College of Rheumatology (ACR) and radiological Kellgren and Lawrence grade for knee osteoarthritis (grade≥II) and of Kellgren and Moore for digital osteoarthritis were adopted. The functional status was assessed by functional indices WOMAC and Lesquene for knee osteoarthritis and Dreiser index for digital osteoarthritis.
Results: 400 women were included in this study. The prevalence of knee osteoarthritis is estimated at 21 % (95%CI: 16–26 %), the mean age was 64.6±9.23 years; 19/84 (22.6 %) lived in rural areas and 90 % were unemployed. Mean BMI: 30.07±5.99 kg/m^2. All women were postmenopausal. Mean age of menopause was 46.6±5.29 5 years. Densitometric osteoporosis was found in 30 women (35.7 %), osteoarthritis known and treated in 69 % of cases. Mean algo functional WOMAC indices and Lesquene were, respectively, 26.07±16.12 and 10.07±4.87. Digital osteoarthritis was found in 127 women (31.7 %, 95%CI: 29.7–33.7 %) with a mean Dreise index of 3.2±4.80. Risk factors associated with the occurrence of osteoarthritis were: age ($p<0.0016$), BMI ($p<0.040$) and diabetes type II ($p<0.05$).
Conclusion: Knee and digital osteoarthritis seem common and serious in our study, the prevalence is comparable to estimates from studies in other populations. These risk factors should be validated by a larger study.

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VERTEBRAL OSTEOPOROTIC FRACTURES ACCORDING TO DIFFERENT MEASUREMENT SITES

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Objective: The aim of this study was to evaluate the correlation between BMDs measured at different sites and the frequency of vertebral fractures.
Material and Methods: We studied 130 menopausal women (aged 45–83, 61.9±9.35). Age at menopause ranged from 43 to 58 years (47.9±5.06) with a postmenopausal duration of 14.27±9.19 years. BMD was measured by DXA at the distal forearms (DTX-200 Osteometer-Denmark), and the hip and lumbar spine using a Lunar DPX-L device. Vertebral fractures (VF) were examined using thoracic and lumbar radiography.
Results: T-score reference values were found in 24(18.5 %) patients in the dominant (D) forearm, 30(23.6 %) in the

nondominant (ND) forearm, 11(10 %) at the spine, and 9(20 %) at the hip. Osteopenia was found in 63(48.5 %), 65(51.2 %), 53(47 %), and in 28(62 %), respectively. Osteoporosis was found in 43(33.1 %), 32(25.2 %), 49(43 %) and in 8(18 %), respectively. VF at the thoracic and lumbar spine were registered in 35 % of patients. VF were found in patients with: T-score reference values in the D forearm in 22.5 %, in the ND forearm 28.9 %, at the spine 9.1 %, and at the hip 11.8 % of cases; osteopenia in the D forearm in 42.5 %, 47.4 %, 36.4 %, and in 58.8 % of the patients, respectively; osteoporosis at the D forearm in 35 %, 23.7 %, 54.5 %, and in 29.4 % of the patients, respectively. In patients with reference values of T-score in forearm and hip, we noticed a T score in all categories at the other measurement sites ($p<0.05$). Reference T-score results at lumbar spine were in correlation with values measured at other skeletal sites ($p>0.05$).

Conclusion: The reduction of BMD varies with the choice of measurement sites. Using a unique T-score for different sites presents additional difficulties in the diagnosis of osteoporosis by DXA. VFs were noticed in all categories of reduced BMD at all measurement sites, with the highest percentage in patients with osteopenia at the hip and forearm, and osteoporosis at the lumbar spine.

P197
OSTEOPOROSIS IN PATIENTS WITH GOUT

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Objective: Evaluation of patients with the metabolic syndrome and gout assessment of BMD in men.

Material and Methods: We studied 75 patients with gout (diagnosis established according to the 1987 ACR criteria), of which 61 patients had chronic gout and 14 patients–acute gout. The age of patients ranged between 25 and 76 years. Patients were surveyed from 2007 to 2012. Disease duration varied between 1 and 35 years. All patients were duly assessed (age, weight, waist circumference, BMI), laboratory tests (general analysis of blood, uric acid in serum and in urine, lipidogramma, creatinine clearance, blood glucose, C-reactive protein) and instrumental examinations (X-rays of the affected joints, joint ultrasonography BMD absorptiometry with DXA of the lumbar spine and proximal femur). The metabolic syndrome was defined according to the International Diabetes Federation criteria.

Results: The patients have been divided into 2 groups: those with gout associated with metabolic syndrome and gout without metabolic syndrome. The share of patients who had metabolic syndrome was 44 % in the study group. Age, weight, waist circumference, blood glucose, triglycerides, C-reactive protein, expressed as mean±SD were higher in the group with metabolic syndrome. Percentage of patients with hypertension was higher in the group with metabolic syndrome. Spine and femur BMD was significantly higher in patients with metabolic syndrome. Statistically, C-reactive protein was not significantly different between the two groups.

Conclusion: Statistical analysis showed that in the first group, BMD was higher in patients with the combination of gout and the metabolic syndrome than in the second group. Obesity affects the synthesis of estrogen and testosterone, which in turn has direct effects on BMD.

P198
HIGH BONE IRON CONTENT IS MORE PROMINENT THAN HIGH SERUM FERRITIN IN PREDICTING LOW BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WITH HIP FRAGILITY FRACTURES

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Objective: We investigated and compared the association between femoral head bone iron content and BMD, based on the data from 202 postmenopausal women with hip fragility fractures.

Material and Methods: This is a retrospective clinical study from the date of Second Affiliated Hospital of Soochow University, including 202 postmenopausal women with hip fragility fractures aged 56–93 years. BMD was measured using DXA. The bone tissue iron content was measured by ICP-MS. The iron of bone tissue was stained by Prussian blue.

Results: Initially, we divided the subjects into eight age groups with the interval of 5 years old. During aging, BMD values at all measured sites decreased and serum ferritin concentrations increased meanwhile. Simultaneously, concurrent but inverse changes occurred between femoral head bone iron content and BMD values. Multiple regression analysis showed that serum ferritin was inversely associated with BMD values at only one site of five measured sites, while femoral head bone iron content was inversely associated with BMD values at four sites of five measured sites. Furthermore, when we divided these women into bone iron content quartiles, the odds for prevalent osteoporosis were 5.798-fold (95%CI=2.328–14.438) higher in subjects in the highest quartile compared with those in the lowest quartile. In

addition, bone iron Prussian blue staining confirmed the bone iron content in the corresponding quartile.

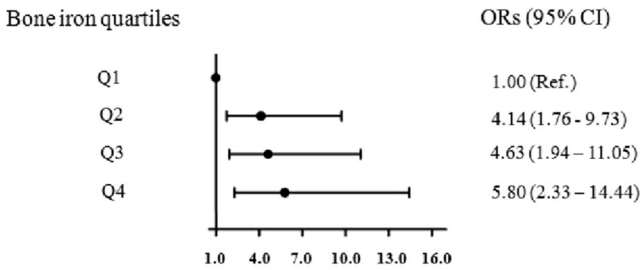

Fig. 1 Odds ratios (ORs) and 95% confidence intervals (CIs) for osteoporosis according to bone iron quartiles after adjustment for confounders.

Conclusion: The bone iron content is associated with BMD, and the association maybe more prominent than that between serum ferritin and BMD.

P199
SELF-REPORTED HEALTH AND BONE MASS IN ADOLESCENTS: FINDINGS FROM THE TROMSØ STUDY- FIT FUTURES

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Objective: Previous studies have suggested relationships between self-reported health (SRH) and BMD among older adults, but far fewer data are available in younger populations. Here we report associations between SRH and BMD among Norwegian adolescents participating in the Fit Futures study.
Material and Methods: In 2010–2011 more than 90 % of all first year comprehensive school students in the Tromsø region (a total of 1,038) attended the Fit Futures study, an expansion of the Tromsø study. BMD at total hip, femoral neck and total body was measured as g/cm^2 by DXA (GE Lunar prodigy). Lifestyle variables were collected by self-administered questionnaires and interviews, including the question 'how do you in general consider your own health to be?' Respondents were asked to indicate excellent, good, neither good nor bad, bad or very bad as their answer. The analyses included 464 girls and 484 boys aged 15–18 years.
Results: Boys rated their health slightly, but significant above girls (p=0.004). A higher number of comorbid conditions were associated with lower SRH among girls (p=0.030), but not among boys. Increasing obesity was inversely associated with SRH (p<0.001 and p=0.002 for boys and girls, respectively), but underweight adolescents also scored lower than counterparts of normal weight. Higher levels of leisure physical activity were associated with better SRH in both sexes (p<0.001). On univariate analysis, total hip, femoral neck and total body BMD were all positively associated with SRH in boys (p<0.001, p<0.001 and p=0.005, respectively), while we saw relationships between SRH and femoral neck and total body BMD in girls (p=0.005 and p=0.018). In both sexes these relationships turned out non-significantly in multiple regression models that included BMI and physical activity.
Conclusion: Self-rated health is associated with BMD in Norwegian adolescents, and this relationship is partly explained by BMI and physical activity.

P200
IS FRACTURE RISK IN PATIENTS WITH OSTEOPOROSIS AND RHEUMATIC DISEASES INFLUENCED BY POPULATION CHARACTERISTICS?

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Objective: To evaluate a method that can predict osteoporotic patients' quality of life taking into account their population-based characteristics. The study hypothesis was to use FRAX-Austria in order to calculate osteoporosis risk in the western Romanian population for a more accurate prediction. FRAX-Romania was designed after assessing the southern Romanian population. Instead, the western Romanian population is more related to the Austrian one.
Material and Methods: 217 patients with most common rheumatic diseases and osteoporosis were included and evaluated in a 2-year study using both FRAX algorithms for Romania and Austria: group I- 131 patients suffering of rheumatoid arthritis, group II- 29 patients with other inflammatory rheumatic diseases and group III- 57 patients with osteoarthritis.
Results: For all of the study patients the 10-year probability of a major fracture and the risk of a major osteoporotic fracture of the femoral neck in the next 10 years were significantly higher when using FRAX-Austria (23.38±14.01 %; 13.65±12.03 %) compared with FRAX-Romania (13.09±8.72 %; 7.63± 7.47 %). For each group the risk of a major osteoporotic fracture and the probability of a major osteoporotic fracture

of the femoral neck were also significantly higher when using FRAX-Austria.

Conclusion: Patients with rheumatic diseases and osteoporosis are at risk to develop osteoporosis-related fractures in the next 10 years no matter what FRAX model was used. When applying both algorithms on the western Romanian population we noticed an increased risk of fracture for FRAX-Austria. Different FRAX algorithms should be applied in concordance with features of populations belonging to regions of the same country. Osteoarthritis and inflammatory rheumatic diseases such as ankylosing spondylitis, systemic lupus erythematosus, fibromyalgia, increase the risk of developing osteoporosis. Besides rheumatoid arthritis, these rheumatic diseases should be included as osteoporotic risk factors.

P201
ROLE OF REHABILITATION IN PREVENTING RADICULOPATHIES DUE TO OSTEOPOROTIC VERTEBRAL COMPRESSION FRACTURES

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Objective: To establish a correlation between BMD and quality of life. Another objective is to point out the importance of a long-term rehabilitation in increasing the BMD and quality of life in patients with radiculopathies due to osteoporotic vertebral compression fractures. BMD score is expressed by T-score measured by DXA, and quality of life is measured by Health Assessment Questionnaire (HAQ).

Material and Methods: The 2-year study included 134 patients, aged between 54 and 87 years, diagnosed with radiculopathies due to vertebral compression fractures. Ninety-eight of the patients were women and 36 patients were men. The average T-score was −3.14±0.7. The patients were divided into two groups according the therapy. Group 1 followed a complex medical treatment (antiosteoporotic therapy with bisphosphonates, antalgics, nonsteroidal anti-inflammatory drugs and trophic products). Group 2 patients followed the same medical treatment combined with a rehabilitation program (10 daily sessions every 6 months and a home adapted exercise program, as well as a thoracolumbar orthosis). All patients were assessed at the beginning of the study, after 1 year and after 2 years measuring total T-score and HAQ score.

Results: The group 2 patients had a statistically significant improvement of BMD at 1-year and 2-year assessments ($p<0.001$; T0 score=−3.21; T1 score=−2.06; T2 score=−1.68) in comparison to group 1 patients. In group 1 there was also a significant increase of BMD but with a high risk of fracture ($p<0.001$; T0 score=−3.19; T1 score=−2.78; T2 score=−2.63). In both groups, HAQ scores were correlated with T-scores.

Conclusion: BMD influences quality of life in patients with radiculopathies due to osteoporotic vertebral compression fractures. The medical treatment associated with a rehabilitation program and home adapted physical activities is absolutely necessary in order to increase the BMD and to improve the overall quality of life.

P202
QUALITY OF LIFE IN PATIENTS WITH SECONDARY HIP OSTEOARTHRITIS AND OSTEOPOROSIS WHO FOLLOWED A TOTAL HIP REPLACEMENT

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Objective: To assess the general health status in young and adult patients diagnosed with secondary hip osteoarthritis and osteoporosis who followed a total hip replacement and antiosteoporotic treatment.

Material and Methods: 27 patients with secondary hip osteoarthritis and osteoporosis were included into the study. The patients had severe hip osteoarthritis due to avascular necrosis and needed a total hip replacement. After the surgery they also started medical antiosteoporotic treatment with bisphosphonates. The patients were between 21 and 56 years old (mean age 41.3±11.8 years). They were assessed before surgery, postoperatively after 6 weeks and after 6 months using the EuroQoL Quality of Life Scale (EQ-5D and EQ VAS). DXA scores were recorded preoperatively and 6 months postoperatively.

Results: 23 patients completed the study. There were significant improvements in EQ VAS at intermediate and final assessments (EQ VASinitial: 87.61±13.63; EQ VAS 6 weeks: 42.91±12.47; EQ VAS 6 months: 28.94±9.33). Regarding the EQ-5D scale, the most important improvements were found in the dimensions mobility, usual activities and pain/discomfort. There were significant correlations between pain/discomfort dimension of EQ-5D and DXA scores both at the beginning and at the end of the study. There were also significant correlations between mobility and usual activities dimensions of EQ-5D and DXA scores at preoperative evaluation.

Conclusion: Total hip arthroplasty and anti-osteoporotic treatment with bisphosphonates lead to significant improvements in quality of life and DXA scores, as well as in pain relief in patients with avascular hip necrosis and osteoporosis. Postoperatively, it is necessary an extensive period of follow-up (at least 1 year) in order to

establish possible correlations among the dimensions of EQ-5D and DXA scores.

P203
IS THERE A CORRELATION BETWEEN METABOLIC CONTROL AND VITAMIN D STATUS IN TYPE 2 DIABETES PATIENTS ON ORAL ANTIDIABETIC DRUGS?

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Objective: To describe the correlation between serum 25(OH)D levels and metabolic parameters in Bulgarian type 2 diabetes patients on oral antidiabetic drugs.
Material and Methods: One hundred 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, respectively. Complete patient history was taken and physical examination (body weight, waist circumference, blood pressure) was performed. Body composition was measured on a leg-to-leg body impedance analyzer (TBF-215, Tanita Corp., Tokyo, Japan). Serum levels of vitamin D were measured as 25-(OH) D Total (Immunotest, Roche Diagnostics, Switzerland). Serum and 24 h urine creatinine were analyzed on a Cobas Integra analyzer, together with glycated hemoglobin A1c, fasting plasma glucose, cholesterol profiles and triglycerides. Correlation analysis was performed on a SPSS 13.0 for Windows platform and included 10 possible curves. The data were analyzed post hoc separately for men and women as well as subdivided into tertiles of vitamin D levels.
Results: The mean serum 25-OH-vitamin D levels were 23.8± 12.1 nmol/l in women and 33.3±20.0 nmol/l in men. We were unable to find any statistically significant correlation between serum 25(OH) vitamin D and fasting plasma glucose, glycated hemoglobin A1c, total cholesterol, HDL- and LDL-cholesterol, triglycerides, systolic/diastolic blood pressure. A very weak positive association was seen with body weight and a stronger one with% fat mass. The subanalyses (men vs. women or according to tertiles of vitamin D) did not produce any additional information.
Conclusion: The influence of vitamin D on the metabolic control in type 2 diabetes might be so weak on an individual level, that it could be demonstrated only in large epidemiological surveys.

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P204
THE STUDY OF BONE'S MINERAL DENSITY IN HYPERTHYROIDISM

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Objective: Hyperthyroidism represents a complex of clinical manifestations inducted by the presence of excessive thyroid hormones at tissular level and also at receptor level. The illness is considered the fourth cause for the endocrine osteoporosis. In hyperthyroidism is affected the trabecular bone and also the cortical one and the mechanism seems to be inducted in the growth of resorption by acceleration of local turnover. Aim was identification of hyperthyroidism cases, evaluation of thyroidal hormone status and the study of BMD.
Material and Methods: In the study, were included 32 cases with hyperthyroidism, aged between 22 and 54, of that: Basedow's goiter (12), multiheteronodular toxic goiter (17), Plummer toxic adenoma (3). In every case were studied: total and free serum thyroxine (T4 and FT4), total and free triiodothyronine (T3 and FT3), thyroid-stimulating hormone (THS), titre of antibodies for peroxidase and thyroglobulin. Thyroidal echo was 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 evaluated by DXA.
Results: Osteodensitometry highlighted the presence of osteoporosis in all cases with Graves-Basedow Illness, Plummer toxic adenoma and in 7 cases with the multiheteronodular toxic goiter (41.1 % from total cases).
Conclusion: 1. For all cases with hyperthyroidism is necessary a hormonal, immunological and osteodensitometry evaluation.
2. The inclusion of synthesis antithyroidal therapy, beta blockings and immunosuppressants in association with antiresorptive medication, contribution of bone mass growth and reduction of fragility fractures incidence.

3. Hyperthyroidism is affecting the trabecular bone and cortical one and the mechanism seems to be bound by the resorption through acceleration of local turnover.

P205
EVALUATION OF BIOCHEMICAL MARKERS OF BONE TURNOVER IN HYPOGONADOTROPH HYPOGONADISM

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Objective: The sexoidoprive osteoporosis represents a process dependant of the deficit or the absence of one or all sexoide hormones. The bone, being a sexualisable organ, is following exactly the process of general sexualisation of the organism, in its growth and reshuffle. The modification of bone mass during the osteogenesis is recognizing three phases: growth, consolidation and diminution of it. This phasing process of physiological game of bone mass is directly proportional with gonad's functional capacity.
Material and Methods: The study was made in 15 cases with hypogonadotroph hypogonadism of which: hypopituitary dwarfism with sexual infantilism (3 cases), adiposogenital syndrome (8 cases), insufficiency primary pituitary tumor (2 cases), secondary pituitary insufficiency of GnRH deficit (2 cases-brothers). Were evaluated hormones on gonadotrope axis and biochemical markers of bone turnover: osteocalcin and crosslaps. BMD was appreciated by DXA.
Results: Highlighting the low values of hormones on gonadotrope axis is pleading for hypogonadotroph hypogonadism. The 2 cases with hypogonadotroph hypogonadism of hypothalamic cause were a positive response at simulation test with gonadoliberin. Were highlighted low values for biochemical markers of bone turnover of all cases included in the study but the osteodensitometry infirmed the presence of osteoporosis of 4 cases with adiposogenital syndrome of which the Z- score was suggestive for osteopenia.
Conclusion: The work is suggesting 2 major objectives in therapeutically strategy of osteoporosis/osteopenia of cases with hypogonadotroph hypogonadism: 1. The precocious diagnosis of gonadal insufficiency in the purpose of adopting some prophylaxis measures of bone modifications, since from prepubertal stage, pubertal or postpubertal for assuring the stabilization or growth of bone mass corresponding to sex and age. 2. Is associated the substitution estroprogestative/androgenic with antiresorptive or proformation medication.

P206
EVALUATION OF 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 was done on 24 cases with gonadal dysgenesis with ages between 12 and 30 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 was appreciated by DXA.
Results: It was highlighted osteoporosis on 12 cases (50 %), osteopenia in 8 cases and the remaining patients (4) biochemical markers and BMD were in normal limits.

Conclusion: 1. The study of biochemical markers of bone turnover and BMD is obligatory for all cases with gonadal dysgenesis.
2. The precocious diagnosis of osteoporosis/osteopenia is claiming the hormonal substitution specifically to clinical form which represent the therapeutically attitude from the main intention.
3. Hormonal substitution in association with therapeutically means specific to bone remineralisation is preventing the apparition of fragility fractures.

P207
MULTIPLE VERTEBRAL FRACTURES IN PATIENT WITH UNRECOGNIZED HYPOPARATHYROIDISM (PHPT): CASE REPORT

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Objective: In spite of the fact that hypoparathyroidism usually increases bone density, many studies suggest that PhPT has a great impact on bone structure which could not be necessarily detected by BMD measurements.
Material and Methods: Male patient, age 64, normal BMI, came into our clinic with pain in thoracic and lumbar spine with sudden onset after minor fall. He had history of several brain strokes and hypertension, without anamnestic risk factors for osteoporosis. Radiography of spine showed multiple vertebral fractures (vTh8-vL4), wedge type. We prescribed pain killers, spine orthosis and started investigations. Additional findings eliminated malignancies. Laboratory findings showed no presence of inflammation and hematological abnormalities, normal levels of serum proteins, alkaline phosphatase, phosphorus, liver, kidney, thyroid functions, and low normal levels of total calcium 2.2 mmol. We started vitamin D and calcium supplementation and per oral weekly bisphosphonates and ordered: DXA, bone turnover markers, PTH, 25OHD and MRI of spine but our patient did not perform those tests for another 6 months.
Results: When he finally came to control visit he was walking with minimal pain in spine. DXA results showed normal BMD of hip and spine 0.970 g/cm^2, normal values of osteocalcin and crosslaps, low ionized calcium 1.0 mmol/l, insufficient 25OHD 60 ng/ml and unmeasurable low levels of PTH, below 5 μg/l. MRI of spine confirmed just vertebral fractures. We discontinued bisphosphonates and referred patient to endocrinologist who confirmed hypoparathyroidism and continued therapy with calcitriol and calcium supplements.
Conclusion: We concluded that his previous brain strokes were probably unrecognized hypocalcaemic crisis but causes of increased vertebral fragility and good response on osteoporotic therapy remains unclear, probably due to vitamin D supplementation. Some studies suggest that vertebral fragility occurs in PhPT despite normal or even high BMD.

P208
IMPORTANT ASPECTS OF GROUP COHESION WHICH LEAD TO PERSONALITY STRENGTHENING IN ART THERAPEUTIC WORKSHOPS FOR PATIENTS WITH OSTEOPOROSIS AT OSTEOLOGY ACADEMY IN ZLIN

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Objective: In connection with our previous theoretical studies where we referred to psychological needs of patients with osteoporosis and means of art therapy for dealing with depressive states, we present here our findings related to group cohesion and strengthening of mutual cooperation in group art therapy. This report has a descriptive and explorative character and is composed to show a positive outcome of group art therapy on personal growth in women patients with osteoporosis. We follow the ability to find determination for solving problems connected with the illness, strengthening of the sense of belonging and better self- esteem.
Material and Methods: Group characteristics: Four groups of 6–8 female members, aged from 56 to 80 years. Regular, one-weekly 2-h sessions, in a period of 6 years. The way individual members of the groups are involved: common collaboration on artwork, individual solutions of artwork assignments and collective interaction with feedback, expression of emotions, confidence in problem solving, acceptance of others, focusing on making constructive personal changes.
Results: We were able to observe gradual changes in group dynamics from strive for cohesion through regulating tension to balanced cooperation. Our findings proved that cohesion is a demonstration of mutual relations and powers which affect the group members in a way that they strive for sustaining of their group. Group tension is a moving power which supports individual members strives for change in their attitudes to illness and for change of other psychological factors related to the treatment.
Conclusion: Based on our observations we point out the importance of group art therapy for women with osteoporosis which leads to better coping with the situations related to the osteoporosis treatment. Members of the group mutually support their will to change the current life situation, to change their previous attitude to the chronic illness and start being more active in their approach to medical treatment.

P209

CONCEPTUAL FRAME OF PSYCHOTHERAPY FOR PATIENTS WITH OSTEOPOROSIS FROM A POINT OF VIEW OF CLINICAL PSYCHOLOGY

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Objective: It is known that most of the chronic diseases are accompanied with scepticism, anxieties and depressions. Reactions to the illness are, next to the actual state and its duration, also based on patient's personal characteristics, frustration tolerance, resilience and coherence. Accumulation of depressive symptoms is also one of the risk factors of increased injury rate. Clinical psychology aims to understand individual links between psychic and somatic state of a patient in adaptation to an illness, motivation for treatment, finding personal integrity and looking for life meaningfulness. 1. Detailed specification of psychotherapeutic care concept and its effective factors related to characteristics of osteoporotic patients' personalities and their specific vulnerability to depressive states. 2. Research for comorbidity of osteoporosis and depression.
Material and Methods: Qualitative analysis of research realised in years 2012 and 2013 at Osteology Academy (Art therapy as a therapeutic and preventive care for mental stability of a patient with osteoporosis and Assessment of needs of patients with developed osteoporosis as a prerequisite for mental health care). Qualitative analysis of research related to comorbidity of osteoporosis and depression.
Results: Development of depression and anxiety symptoms is connected with a level of unfulfilled needs which was in our research probe significantly related to the treatment. Patients require and expect to obtain some level of independence, some physical, mental and social abilities. Restrictions which the patients experience in connection with the osteoporotic illness are closely related to the quality of life which may be partly compensated with psychological care.
Conclusion: Psychological care can be arranged at several levels: 1. Work targeted to adaptation.
2. Work with developmental themes or tasks of late adulthood, early old age and old age, i.e., periods of generativity and integrity. 3. Work focused on a relation to person's body. 4. Psychological work with pain.

P210

POSSIBLE INVOLVEMENT OF BFGF PRODUCTION IN WOUND HEALING OF CHRONIC BURSITIS AFTER INTRABURSAL INJECTION OF OK-432

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Objective: In view of a tissue adhesive effect of OK-432, which originally developed for the treatment of malignant tumors, on lymphangioma, we examined a therapeutic effect of OK-432 as a nonoperative treatment for chronic bursitis.
Material and Methods: Twenty-eight patients with chronic bursitis were entered into this study. After aspiration of the contents in the bursa, we injected 5 KE of OK-432 dissolved in 2 ml of saline for 3 ml of bursal aspirate, followed by a compressive dressing for 3–5 days. The OK-432 treatment was repeated in the patients who did not show successful results. Further, we collected bursal fluid from 6 patients before and after the injection of OK-432 and followed time-dependent changes of concentrations of pro-inflammatory cytokines, IL-1α, -β and TNF-α, and basic fibroblast growth factor (bFGF) by enzyme immunoassay.
Results: The number of mean treatment of OK-432 was 1.4 times. We achieved complete wound healing in 27 patients (96 %). The only failure case was a rupture of the bursa. Additionally, transient skin necrosis was observed as complications in 2 patients. All cytokines and bFGF were not detected before the injection of OK-432. In contrast, OK-432 injection resulted in a marked increase in contents of the pro-inflammatory cytokines, which reached a peak level on day 1 and gradually decreased. On the other hand, bFGF level rose to a peak level on day 3 after the injection, and then declining gradually.
Conclusion: Pro-inflammatory cytokines, IL-1 and TNF-α, are the potent inducers of bFGF which plays an important physiological role in tissue regeneration and wound healing. Sequential production of pro-inflammatory cytokines and bFGF in this study was attributable to OK-432. Consequently, our data suggest that the production of bFGF mediated by OK-432 promotes wound healing of the bursitis.

P211

EARLY DIAGNOSIS OF ATYPICAL FEMORAL FRACTURE USING DXA BY EXTENDING LENGTH OF FEMUR IMAGE

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Objective: Atypical femoral fractures (AFF) are associated with prolonged bisphosphonate therapy. A major feature of AFF is a localised periosteal reaction: described as a "beaking" appearance if a fracture line is visible, or as a "flaring" appearance if a fracture line is not visible. McKiernan demonstrated that AFF could be visualised on DXA by extending image length. We sought to evaluate the utility of DXA in the diagnosis of AFF.

Material and Methods: Patients over age 50 years, who were taking bisphosphonates therapy in excess of 5 years, had an extended hip scan performed bilaterally. BMD was measured at spine and hip bilaterally using a Hologic Discovery Model A or C. The extended femur scan was performed in array mode; the default setting of 15.3 cm was extended to 22 cm. If an abnormality was noted on the outer aspect of the femur, then patients were referred for plain radiograph of pelvis with imaging of lateral femurs.

Results: An abnormality was suspected on the DXA image in 19 of 257 (7.4 %) of subjects. On radiograph, 7 (2.7 %) showed no abnormality, 7 (2.7 %) showed evidence of AFF, and 5 (2.0 %) showed an additional abnormality (an osteochondroma, an abnormal lucency, and 3 cases of cortical thickening). Of the 7 cases with incomplete AFF, 5 had a periosteal flare and 2 had a visible fracture line. The latter 2 patients both had thigh pain; so they underwent prophylactic intramedullary nail insertion in order to prevent complete femoral fracture.

Conclusion: In a prospective survey of 257 patients over age 50 years on bisphosphonate therapy for over 5 years, we found that 7 (2.7 %) had evidence of AFF with 2 patients needing prophylactic intramedullary nail insertion. It is feasible to use DXA as a means of detecting AFF early. We have now switched to single-energy imaging. This mode gives superior image quality, views the full extent of the femur, and is much faster. It is now easier and more accurate to use DXA as a means of diagnosing AFF early.

References: McKiernan FE, J Clin Densitom 2010;13:102.

P212
DETERMINATION AND MODULATION OF TOTAL AND SURFACE CALCIUM-SENSING RECEPTOR EXPRESSION IN MONOCYTES IN VIVO AND IN VITRO

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Objective: Expression of the calcium-sensing receptor (CaSR) has previously been demonstrated in human circulating monocytes (HCM). The present study was designed to measure CaSR expression in HCM and to examine its potential modulation by pro-inflammatory cytokines, Ca2+, vitamin D sterols in U937 cell line.

Material and Methods: Twenty healthy volunteers underwent blood sampling with subsequent isolation of peripheral blood mononuclear cells (PBMC) at 3 visits. Flow cytometry analysis (FACS) was performed initially (V1) and 19 days later (V2) to examine intra- and intersubject fluctuations of total and surface CaSR expression in HCM and 15 weeks later (V3) to study the effect of vitamin D supplementation. In vitro experiments were conducted to assess the effects of pro-inflammatory cytokines, calcidiol, calcitriol and Ca2+ on CaSR expression in U937 cell line.

Results: By FACS analysis, more than 95 % of HCM exhibited cell surface CaSR staining. In contrast, CaSR staining failed to detect surface CaSR expression in other PBMC. After cell permeabilization, total CaSR expression was observed in more than 95 % of all types of PBMC. Both total and surface CaSR expression in HCM showed a high degree of intra-assay reproducibility (<3 %) and a moderate intersubject fluctuation. In response to vitamin D supplementation, there was no significant change for both total and surface CaSR expression. In the in vitro study, U937 cells showed strong total and surface CaSR expression, and both were moderately increased in response to calcitriol exposure. Neither total nor surface CaSR expression was modified by increasing Ca2+ concentrations. Total CaSR expression was concentration dependently decreased by TNFα exposure.

Conclusion: CaSR expression can be easily measured by flow cytometry in human circulating monocytes. In the in vitro study, total and surface CaSR expression in the U937 cell line were increased by calcitriol but total CaSR expression was decreased by TNFα stimulation.

P213
MAINTENANCE THERAPY WITH GLUCOSAMINE SULFATE FOR PATIENTS WITH OSTEOARTHRITIS OF THE HIP

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Objective: Osteoarthritis of the hip 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. Three year research is made for the effect of the maintenance therapy with glucosamine sulfate (GS) and nonsteroidal anti-inflammatory drugs (NSAIDs) for 179 patients with the osteoarthritis of the hip.

Material and Methods: The patients are divided into two groups. The first group of 87 patients is treated 4 months per year with 1,500 mg GS daily and NSAIDs if it becomes necessary and the second group of 92 patients is treated only with NSAIDs. 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 osteoarthritis of the hip by Lequesne.

Results: At the end of the third year the pain under VAS in the first group increased with 9.6 mm and for the second group– with 14.7 mm in comparison to the initial values. Algofunctional Index by Lequesne at the end of the third year increased with 1.87 points for the first group and with 2.91 for the second group. Comparing the obtained values, a very significant statistical difference ($p>0.05$) was noticed.
Conclusion: The maintenance therapy with GS 1,500 mg daily of patients with osteoarthritis of the hip 4 months per year is more effective than the treatment only with NSAIDs.
References: Lequesne MG, J Rheumatol. 1997;24:779.

P214
BIGLYCAN: AN INFLAMMATORY PLAYER IN OSTEOARTHRITIS

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Objective: Biglycan is major extracellular matrix (ECM) protein classified as damage-associated molecular pattern or alarmin that is released in high amounts into the synovial fluid of osteoarthritis (OA) patients as consequence of the continuous degradation of articular cartilage. Our aim was to study if biglycan in its soluble form is able to induce a catabolic response in chondrocytes from OA patients.
Material and Methods: Cartilage of tibial plateaus samples from total knee arthroplasty operations from 12 OA patients were macroscopic evaluated following the guidelines of the French Society of Arthroscopy (SFA). Isolated cartilage explants ($n=96$) were selected from two macroscopic categories: Grade I and Grade IV. Cartilage explants were stimulated with sBG (10 μg/ml) for 48 h. Messenger RNA levels of cytokines, cartilage matrix molecules, MMPs and TLRs were determined with RT-PCR. Proteoglycan content was quantified through safranin O staining intensity of paraffin-embedded (FFPE) cartilage explants.
Results: Soluble biglycan caused a significantly in situ up-regulation of catabolic markers (MMP-9, ADAMTS-4, ADAMTS-5, CAT-K and IL-6). The catabolic response was dependent in the stage of OA. Interestingly the anabolic marker COL-II was upregulated in Grade I cartilage explants, while in Grade IV COL-II was downregulated. Stimulation with soluble biglycan cause a dramatic 55 % reduction of proteoglyan content in OA cartilage.
Conclusion: The current results show for the first time that soluble BG is a powerful inflammatory alarmin able to elicit an in situ catabolic response in chondrocytes from human OA cartilage. This study also demonstrates that chondrocytes from low degraded OA cartilage (Grade I) have a stronger catabolic response than chondrocytes from highly degenerated OA cartilage (Grade IV) to sBG stimulation.
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P215
THERAPEUTICALLY ATTITUDES DIFFERENTIATED IN OSTEOPOROSIS FROM LATE PUBERTY

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Objective: The late spontaneous debut of the puberty after 16 years old is labelled as being late puberty and is rising to the practitioner difficult problems of etiologic diagnosis. In late puberty are some perturbations of the entire organism and the alteration of sexualisation process is remaining the major manifestation. An inclined factor for osteoporosis from the late puberty is represented by organism's failure to obtain an optimal bone mass during the growth and teenage period as a consequence of primary ovarian and testicular insufficiency, secondary, congenital or obtained (pre- and postpubertal). Identification of cases with delay of spontaneous debut of puberty until 16 years old and evaluation: hormonal on gonadotrope axis, cytogenetic, imagistic.
Material and Methods: Were selected and included in the study 18 patients with age between 17 and 19. The repartition by clinical forms was: Klinefelter Syndrome (6 cases), functional deficit of GnRH (2), cromofob hipofizar adenoma (4), functional adipose-genital syndrome (6 cases). Paraclinical investigations palette were pointed on: hormonal exploitation (LH,FSH, estradiol, progesterone, testosterone, PRL, TSH, FT4), cytogenetic (karyotype, Chromosomal band, Barr chromatin), imagistic (standard cranial X-ray and carpal regions for bone age, CT, RMN). The measuring of mineral bone density was realised by DXA.
Results: Osteodensitometry highlighted the presence of osteoporosis at 70 % from the cases included in the study and the rest of patients (6 with functional adipose- genital syndrome) T-score and Z were suggestive for osteopenia (−1.70 at 2.30 SD).

Conclusion: 1. For all cases with late puberty is imposed the hormonal evaluation, cytogenetic, imagistic and osteodensitometry.
2. Estroprogestive hormonal substitution or androgenic in association with antiresorptive/proformation medication is contributing at bone mass growth and reduction of fragility fractures incidence.

P216
DETERMINATION AND MODULATION OF TOTAL AND SURFACE CALCIUM-SENSING RECEPTOR EXPRESSION IN MONOCYTES IN VIVO AND IN VITRO

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Objective: Expression of the calcium-sensing receptor (CaSR) has previously been demonstrated in human circulating monocytes (HCM). The present study was designed to measure CaSR expression in HCM and to examine its potential modulation by pro-inflammatory cytokines, Ca2+, vitamin D sterols in U937 cell line.
Material and Methods: Twenty healthy volunteers underwent blood sampling with subsequent isolation of peripheral blood mononuclear cells (PBMC) at 3 visits. Flow cytometry analysis (FACS) was performed initially (V1) and 19 days later (V2) to examine intra- and intersubject fluctuations of total and surface CaSR expression in HCM and 15 weeks later (V3) to study the effect of vitamin D supplementation. In vitro experiments were conducted to assess the effects of pro-inflammatory cytokines, calcidiol, calcitriol and Ca2+ on CaSR expression in U937 cell line.
Results: By FACS analysis, more than 95 % of HCM exhibited cell surface CaSR staining. In contrast, CaSR staining failed to detect surface CaSR expression in other PBMC. After cell permeabilization, total CaSR expression was observed in more than 95 % of all types of PBMC. Both total and surface CaSR expression in HCM showed a high degree of intra-assay reproducibility (<3 %) and a moderate intersubject fluctuation. In response to vitamin D supplementation, there was no significant change for both total and surface CaSR expression. In the in vitro study, U937 cells showed strong total and surface CaSR expression, and both were moderately increased in response to calcitriol exposure. Neither total nor surface CaSR expression was modified by increasing Ca2+ concentrations. Total CaSR expression was concentration dependently decreased by TNFα exposure.
Conclusion: CaSR expression can be easily measured by flow cytometry in human circulating monocytes. In the in vitro study, total and surface CaSR expression in the U937 cell line were increased by calcitriol but total CaSR expression was decreased by TNFα stimulation.

P217
BONE AND NEUROPSYCHIC DISPLAYS IN GRAVES' DISEASE

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Objective: Graves' disease is the most frequent form of thyrotoxicosis, predominant at females with an autoimmune pathogenisis. Bone and neuropsychic modifications from thyrotoxicosis are mostly determinate by the increase of the sensibility of these structures at catecholamines (thyroid hormones) and also by the modifications of bone and cerebral metabolism.
Identification of cases with Graves' disease, clinical and biological objectification of thyrotoxicosis diagnosis, identification of nervous and psychic clinical manifestations, evaluation of BMD by DXA.
Material and Methods: Were studied 12 cases with clinical diagnosis of Graves' disease and were made the following paraclinical investigations: FT4 and TSH dose, thyroidal echo, exoftalmometry, EKG, EEG, EMG and DXA.
Results: The most important nervous manifestations were represented by: impatience, exaggerated sensibility, rapid thinking process, repetitivity, agitation in gestures, tachykinesia, neglected writing, and sleeping insomnia. As psychical disorders were identified: emotional liability, irritability, anxiety, depression, euphoria, confusion. At 9 cases the T-score had values of −3.2 to −4.1 SD al lumbar spine level and also at femoral cervix.
Conclusion: 1. Neuropsychic disorders are frequent in thyrotoxicosis.
2. Bone manifestation are represented by hyperalgic osteoporosis, spinal subsidence, scapulohumeral periarthritis.
3. The therapeutically onset is differentiated by rapport with evolutive stage: medicines, surgical, isotopic by following the efficiency criteria (clinical and biological).

P218
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. 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, which motivates the approach of this subject.
Material and Methods: The study was performed on 52 patients whose ages ranged from 20 to 40 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 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, gonadotropic hormones were above the normal upper limit between 210 and 385. BMD measurements revealed the presence of osteoporosis in 24 cases which represents 45.1 % of all cases investigated, BMD values correlate with biochemical markers of bone turnover.
Conclusion: 1. 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.
2. Estrogen-progesterone substitution is the main and first treatment in premature ovarian failure to prevent osteoporosis, metabolic and visceral complications.
3. Patients with osteoporosis will receive antiresorptive agents or proformative medication to prevent fragility fractures.

P219
TREATMENT OF IBANDRONIC ACID 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 menopause one. Gonadal insufficiency diagnosis and its etiology, BMD evaluation, adopting differentiated therapeutically measures by rapport with the evolutive stage of bone mass deficit (osteoporosis/osteopenia) and with hypogonadism etiology.
Material and Methods: Were included in the study 63 cases with hypogonadotropic or hypogonadotropic hypogonadism with ages 14–31. 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) and pharmacological therapy (report difference with hypogonadism etiology in association with antiresorptive agent - ibandronic acid in 150 mg doses at 30 days).
Results: Osteoporosis was confirmed at 32 cases and at 9 subjects, T-score suggestive for osteopenia. The efficiency of the treatment with ibandronic acid, after 12 months of administration, was observed at 85 % of cases with osteoporosis at lumbar spine level and also at femoral cervix level. It was observed an increase of BMD with 4.2 % at lumbar spine level and with 2.1 % at femoral cervix level.
Conclusion: 1. The study is confirming the efficiency of ibandronic acid on BMD at lumbar spine level and also at femoral cervix level.
2. The differentiate therapeutically study is imposing the association of antiresorption medication with bone remineralisation and gonadic/gonadotropic hormones in report with hypogonadism etiopathogeny.

P220
NEW WAY TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS

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Objective: Development of more effective method of treatment of postmenopausal osteoporosis among women having androgenic deficiency.
Material and Methods: Treatment of osteoporosis with natural hormones has a number of disadvantages. We propose treatment with drone brood hormones (Russian Patent No 2497533, 2498811). We investigated 81 women in the age of 49–77 with postmenopausal osteoporosis, having cavities in trabecular bones. Diagnostics was carried out on the basis of clinical, biochemical, radiographical methods. Hormonal profile was determined on the base of ELISA method. Women were divided into two comparison groups. The first group (39 women) received calcium citrate 250 mg, vitamin D_3

150 IU and drone brood 50 mg - 2 tablets in the morning and 2 tablets in the evening during 10 months. The second group (42) received the same medicine on the same scheme and dosage but without drone brood. All patients were investigated before and after 10 months course of treatment, including determination of BMD and measurement of bone cavities by X- ray absorption osteometry method. The area of cavities and their dynamics were calculated by means of mathematical image processing with use of Delphi language.

Results: After treatment the concentration of testosterone in blood serum among the women of first group increased from 1.1±0.4 to 2.5±0.6 nM/l ($p<0.05$). The X- ray osteometry picture showed positive changes among 29 patients showed positive changes (74±8 %), incl. reduction of cavities among 19 (49.4±7 %) and closing of cavities among 10 women (25.6±7 %).

In the second group positive changes 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: Drone brood hormones stimulate endogenous production of androgens, bone mineralization and closing of bone cavities. It ensures the more effective treatment of postmenopausal osteoporosis.

P221

VITAMIN D STATUS IN LATVIAN POPULATION: RESULTS FROM LABORATORY DATABASES

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Objective: Vitamin D deficiency is much more common than previously thought, especially in the Northern latitude countries. The aim of the study was to evaluate vitamin D ($25(OH)D_3$) status among adults in one of the Northern European country - Latvia.

Material and Methods: Retrospective study (May 2007–November 2011) included data of 7,869 pts from two electronic databases (Central Laboratory Ltd and E. Gulbja Laboratory Ltd). Sufficient level of $25(OH)D_3$ was defined as >30.0 ng/ml, insufficiency as 20.0–29.9 ng/ml and deficiency as <19.9 ng/ml. To determine the differences of seasonal $25(OH)D_3$ concentration, astronomical seasons were applied. All interval data were presented in median values with interquartile range (IQR).

Results: A total of 7,022 females and 847 males were studied. Females were older than males (60 (IQR, 69–51) yrs vs. 56 (IQR, 67–40) yrs, $p=0.001$). The median serum $25(OH)D_3$ level in the study population was 18.7 (IQR, 26.1–12.1) ng/ml. Females had higher $25(OH)D_3$ level than males: 19.0 (IQR, 26.3–12.2) ng/ml vs. 17.8 (IQR, 25.6–12.0) ng/ml, $p=0.018$. Sufficient level of $25(OH)D_3$ was seen in 17.0 % of the study population, insufficient level in 29.0 % and 37.5 % had $25(OH)D_3$ deficiency, but 16.5 % of the study population had severe deficiency (<10.0 ng/ml). In the age group 18–49 year $25(OH)D_3$ level was 19.0 (IQR, 26.9–12.0) ng/ml, in the age group 49–69 year $25(OH)D_3$ level was 19.0 (26.1–12.7) ng/ml. Patients older than 70 year had a lower level $25(OH)D_3$ - 18 (IQR, 26.0–11.6, $p=0.016$) ng/ml, but there was no difference between females and males in this age group ($p=0.571$). Analyzing seasonal periods 2007–2011, $25(OH)D_3$ level in winter was 14.0 (IQR 19.2–9.3) ng/ml, and in summer it was 22.0 (IQR, 29.7–15.0) ng/ml ($p<0.001$), but in spring $25(OH)D_3$ level was 15.0 (IQR, 22.3–9.3) ng/ml and in autumn it was 22.9 (IQR, 30.2–16.1) ng/ml ($p<0.001$).

Conclusion: Vitamin D insufficiency and deficit were common in the study population regardless of gender, season and age, especially in people older than 70 years.

P222

PREDICTION OF FRAGILITY FRACTURE BEYOND 10 YEAR BY DXA IN WOMEN: THE OFELY STUDY

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Objective: Low BMD is a major determinant of fragility fractures (Fx), but its very long term prediction is poorly documented.

Material and Methods: In the OFELY study, we analyzed the risk of Fx over 20 year, and specifically beyond 10 year, in women aged 40 year and more at the inclusion ($n=867$, mean age 59±10 year), according to baseline BMD obtained by DXA, clinical risk factors and the FRAX score.

Results: During a median (IQ) follow-up of 19.9 (2.9) yrs, 245 women sustained one or more incident fragility Fx. Women who sustained Fx beyond 10 years (Fx 10–20, $n=109$) were younger and had lower values of FRAX compared with those in the first 10 years (Fx 0–10, $n=136$). After adjusting for age, Fx 10–20 had greater grip strength and spine BMD and used more often HRT, compared with Fx 0–10 ($p=0.01$ to 0.03). Parental hip Fx was associated with an increased risk of Fx 10–20 but contrasting with Fx 0–10, the risk of Fx 10–20 was not associated with age, previous Fx and FRAX except in women younger than 70 year. Each SD decrease of BMD at the spine, femoral neck, total hip and ultradistal radius was associated with an increased risk of

fragility Fx over 20 year with odds ratio [95%CI] of 1.65 [1.37–1.99], 1.48 [1.20–1.82], 1.62 [1.32–1.97] and 2.15 [1.69–2.71], respectively, after adjustment for age, prior Fx, parental hip Fx, falls and treatment at baseline or during follow-up (HRT, bisphosphonates, etc.). Moreover, the risk of Fx 10–20 was also significantly increased with adjusted OR of 1.37 [1.08–1.73], 1.32 [1.02–1.72], 1.39 [1.08–1.79] and 1.82 [1.35–2.48]. Women with osteoporosis had an increased risk of both Fx 0–10 and Fx 10–20 compared with women with normal BMD, whereas osteopenia was not associated with a higher risk of Fx beyond 10 years.

Conclusion: In conclusion, low BMD in women aged 40 year or more is significantly associated with an increased risk of fragility fracture over 20 year. Beyond 10 year, the prediction conferred by baseline BMD was better than that from clinical risk factors.

P223

LONG-TERM REPLACEMENT WITH VITAMIN D IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM AND VITAMIN D DEFICIENCY

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Objective: To evaluate the safety of vitamin D replacement in patients with vitamin D deficiency and primary hyperparathyroidism.

Material and Methods: Observational clinical study of 55 consecutive patients from our osteoporosis department, mean age 62.6 years, diagnosed with mild primary hyperparathyroidism (mean PTH 162 pg/ml; mean Ca 10.88 mg/dl) and vitamin D deficiency (mean 25OHD 12.86 ng/ml), and treated with 1,000 IU of vitamin D daily for 2 years. Osteoporosis (some of the patients were on treatment with bisphosphonates) and nephrolithiasis were present in 80 % and 50 % of patients, respectively. Data were collected before and after 6 month, 1 and 2 years of treatment on serum calcium, 25OHD, intact PTH (iPTH), calciuria, phosphorus, alkaline phosphatase, nephrolithiasis and fractures. The control group consisted in 100 age- and BMI- matched individuals with osteoporosis.

Results: The prevalence of severe vitamin D deficiency (<10 ng/ml) was much higher in PHPT patients (45 %) than in controls (22 %). Following daily treatment with 1,000 IU of vitamin D serum 25OHD increased significantly, from a baseline of 12.89 ng/mL to 20.44 ng/mL (p=0.006) after 1 year and to 22.87 ng/ml (p=0.0005) after 2 years. The increase in serum 25OHD was inversely related to its initial concentration (r=−0.673) and the slope was similar with non-PHPT patients. Post-treatment unadjusted serum calcium decreased slightly at 1 year (10.28 mg/dL vs. 10.88 mg/dL; P=0.0006) and 2 years (10.35 mg/dl). The small calcium difference in PHPT patients became statistically insignificant in paired values at 2 years. iPTH levels decreased significantly at both 1 year (109.1 pg/ml) and 2 years (100.7 pg/ml). Creatinine remained stable in all patients, and no new cases of nephrolithiasis or fractures were reported.

Conclusion: Replacing vitamin D in mild primary hyperparathyroidism is safe, does not increase serum calcium and significantly reduces iPTH levels.

P224

THE PREVALENCE OF ANAEMIA IN HIP FRACTURE PATIENTS: AN OBSERVATIONAL STUDY

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Objective: The blood loss sustained during hip fracture repair can be significant and is associated with a high risk of postoperative anaemia. Anaemia may exacerbate cardiac and pulmonary conditions suffered by this aging population leading to increased morbidity and mortality. Our objective was to assess the prevalence and severity of anaemia throughout hospital admission in patients admitted with a fractured neck of femur.

Material and Methods: Data for haemoglobin levels of 100 consecutive patients admitted to the acute hip fracture ward in a UK district Hospital were collected from a computer blood system. Patients' haemoglobin levels (in g/L) were collected; on admission, post operatively and predischarge. The WHO guidelines for diagnosis of anaemia were used for analysis: <120 g/L for females and <130 g/L for males; severe anaemia (<80 g/L), moderate (between 80 and 100 g/L), mild (below normal range but >100 g/L).

Results: Sample: 100 hip fracture patients, 65 % females. Average age: 80 year. Table 1 shows the prevalence and severity of anaemia throughout hospital stay. Average haemoglobin reductions of 26.4 g/L postoperatively and 12.9 g/L on discharge were recorded compared to admission levels. At discharge, 65 patients had a haemoglobin drop of at least 10 g/L compared to their admission level, 35 suffered a 20 g/L reduction or greater.

Table 1,the prevalence and degree of anaemia throughout hospital stay

Degree of Anaemia	On Admission	Post Operatively	On Discharge
Mild	41	33	55
Moderate	9	46	24
Severe	0	15	0

Conclusion: Anaemia on admission is common in hip fracture patients. Postoperative anaemia following hip fracture repair is also common, especially moderate anaemia. At

discharge, high percentages of patients remain anaemic with some suffering substantial reductions in their haemoglobin compared to admission. Further analysis to assess the effect of anaemia on morbidity, mortality and length of stay is required.

P225
EVALUATION OF PERIPHERIC VERTIGO IN POSTMENOPAUSAL OSTEOPOROTIC CASES OVER 65 YEARS OLD

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Objective: To assess the peripheric vertigo in cases who was over 65 years old postmenopausal women and had vertigo and balance disturbance.
Material and Methods: Cases who had T-score of ≥−2.5 by DXA was accepted as osteoporosis. 48 osteoporosis cases over 65 years and had vertigo was included to study. They were evaluated at ENT clinic and vestibular tests were performed. Age, attack frequency and duration, DXA scores, diagnosis, and treatment protocols were analyzed.
Results: The mean age of the cases was 69.8±6.2. Duration of the complaints was 2.4±1.5 years. 33 cases had less than 6 attacks per year, 17 cases had one attack per month, 8 cases had one attack per week, 2 cases had one attack per day. 35 cases had attacks lasting less than a minute, 9 cases had vertigo up to 15 min and 3 cases had attacks <1 h. Only 1 patient had attacks lasting 24 h. The mean DXA score was −2.9±0.3. 34 cases were diagnosed as benign paroxysmal positional vertigo and 6 cases had vertebrobasillary insufficiency. Moreover, 2 possible Meniere's disease, 1 benign intracranial hypertension, and 5 psychological vertigo were detected.
Conclusion: Benign paroxysmal positional vertigo was the most common reason of vertigo in the cases who were over 65 years and had osteoporosis.

P226
IMPACT OF BONE MARROW LESION ON THE PROGRESSION OF KNEE OSTEOARTHRITIS IN THE SEKOIA STUDY

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Objective: Osteoarthritis (OA) is a common degenerative joint disease that affects around 80 % of those aged over 75 years. Many factors appear to influence progression, the rate of which is very variable. Established factors include sex, obesity, and prior knee injuries. While imaging of OA was traditionally achieved using radiographs, more recently, a role has been established for MRI. In this study we examined the relationship between bone marrow lesions (BML) visualised using MRI and subsequent progression of knee OA, using the placebo arm of a randomised controlled trial of a therapy for OA.
Material and Methods: 559 men and women over 50 years with clinical knee OA (K&L 2–3) were recruited to the placebo arm of the SEKOIA study (98 centre; 18 countries). Minimal tibiofemoral joint space on plain radiograph of the knee was assessed by two independent readers at baseline and yearly follow-up (up to 3 years). In a subset of 176, serial knee MRIs were performed. Individuals with a BML of grade 2 or above at the tibiofemoral joint at baseline were classified as BML positive. Relationships between joint space and risk factors were assessed using linear regression.
Results: The mean (standard deviation (SD)) age of study participants was 62.8(7.5) years. 73 % were female and the mean(SD) BMI at baseline was 29.8(5.1). Just over one third of those studied had BMLs (38.6 %). The prevalence of BMLs did not differ significantly by age or BMI. On average, joint space reduced by −0.18(0.30) and −0.13(0.23) mm/year in men and women, respectively. Those with BMLs had a significantly higher level of annualised joint space narrowing (JSN), with the relationship remaining robust after adjustment for age, sex and K&L grade; β(95%CI) -0.10(−0.18,−0.02) mm/year. Age, sex, and baseline K&L grade did not influence rate of JSN.
Conclusion: The rate of JSN was similar in men and women. BMLs on knee MRI predicted rate of radiographic JSN. This relationship was independent of age, sex, and baseline K&L grade.
Disclosures: C. Cooper has received honoraria and consulting fees from Amgen, Eli Lilly, Medtronic, Merck, Novartis and Servier. F. Petit-Dop and P. Belissa are employees of Servier.

P227
AN OBSERVATIONAL STUDY INVESTIGATING SERUM CREATININE LEVELS IN HIP FRACTURE PATIENTS

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Objective: Kidney dysfunction is common in the elderly and has been proven to have an association with increased hip fracture incidence. Our objective was to assess the renal function of hip fracture patients throughout their hospital stay using serum creatinine levels as the marker of renal function.

Material and Methods: Data on serum creatinine levels was collected from records for 100 consecutive patients admitted to a hip fracture ward in a UK district Hospital. Patients' serum creatinine levels were recorded; pre-admission (from previous blood tests), on admission and before discharge. Laboratory specific creatinine reference ranges were used for analysis; 44–80 μmol/L (females), 62–106 μmol/L (males). Comparisons were made between levels pre-admission to discharge (PA-DC) and admission to discharge (OA-DC).

Results: 100 hip fracture patients, 65 % females. Average age: 80 years. Table 1 shows creatinine levels in hip fracture patients. The average creatinine reduction PA- DC was 10.2 μmol/L, OA-DC it was 19.7 μmol/L. A creatinine reduction of over 20 μmol/L was noted in 26 patients OA-DC but in only 11 patients PA-DC.

Table 1, serum creatinine levels in hip fracture patients

Creatinine Level	Pre-admission	On admission	On discharge
Low	11	10	18
Normal	61	51	67
High	28	39	15

Conclusion: This study suggests substantial percentages of patients presenting to hospital with a hip fracture have some degree of renal impairment as defined by a high creatinine level. Many of these patients' creatinine levels normalise during their hospital stay. The greatest reductions in creatinine were observed between admission and discharge; this suggests a substantial number of patients have acute kidney injury on admission. As such, reversible causes of renal impairment should be actively sought and treated. The contribution of renal impairment to postoperative outcomes and bone fragility needs further investigation.

P228
EFFECTS OF SPACEFLIGHT ON SUBCHONDRAL BONE AND ARTICULAR CARTILAGE HEALTH: ARE THEY GOOD NEIGHBORS?

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Objective: The skeletal system is constantly exposed to mechanical loading here on Earth, and lack of loading has drastic effects in skeletal muscles atrophy and bone density loss. However, little is known about the possible effects of microgravity on articular cartilage of the synovial joints, and more importantly, how the changing subchondral bone can affect the adjacent cartilage integrity. Changes in subchondral bone density are commonly associated with cartilage degradation in osteoarthritis (OA), and therefore, crosstalk between the two tissues could lead to progress of pathological conditions. Understanding the molecular mechanisms involved in bone and cartilage mechanotransduction in response to microgravity is crucial to identify potential therapeutic targets to develop critical countermeasures to prevent skeletal degradation during spaceflight.

Material and Methods: Primary chondrocytes were exposed to simulated microgravity using a rotating wall vessel bioreactor. Morphological changes of the actin cytoskeleton were evaluated using confocal microscopy. Sclerostin (SOST) expression levels were examined in chondrocytes exposed to simulated microgravity and compared to levels expressed by control chondrocytes under normal gravity conditions. ELISA was used to measure secreted sclerostin expression in the media.

Results: Wnt signaling has been shown to be an important mechanisms in bone mechanostransduction in unloading conditions. Our data also shows changes in Wnt signaling in response to simulated microgravity in cartilage, however, Wnt activation and inhibitions have opposite effects on adjacent bone and articular cartilage tissues, and therapeutic targeting against Wnt inhibitors to prevent bone loss needs to be further investigated.

Conclusion: This is the first study to integrate the interactions of articular cartilage and bone in spaceflight conditions to assess synovial joint integrity, and to investigate specific signaling pathways and mechanisms that result in bone resorption and cartilage degradation.

P229
EXCELLENT ADHERENCE TO 6-MONTHLY DENOSUMAB INJECTIONS DUE TO POSITIVE FEEDBACK BASED ON 6 AND 12 MONTHS BMD INCREASES AND RARE ADVERSE EVENTS IN PATIENTS WITH DIFFERENT FORMS OF OSTEOPOROSIS

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Objective: About 50 % of osteoporosis patients discontinue bisphosphonate (BP) therapy within the first year of treatment.

Denosumab's (Dmab) longer dosing interval with its s.c. administration every 6 months might result in a better adherence than BP treatment regimen.

Material and Methods: In an open prospective observational investigator-initiated trial in routine clinical practice we studied whether a medical explanation of treatment results 6 and 12 months after the first Dmab injection focussing on significant BMD increases, no or only mild and probably not drug related AEs and improvement in back pain have effects on patients' drug perception and future adherence with further Dmab injections. We included 142 patients (69 with postmenopausal, 42 with male, and 32 with GC-induced osteoporosis).

Results: Overall, 93 % of patients reported no negative changes in their health condition after two injections of Dmab, and only 7.0 % reported AEs. These were all mild to moderate and obviously not drug related. The significant DXA mean BMD increase rates for all patients at month 6 were +4.7 % at the lumbar spine (LS) and +2.1 % at the total hip (TH), and at month 12 +7.8 % at the LS site and +3.7 % at the TH area, respectively. There were only 5 vert. and 4 nonvert. fractures during the 142 patient years follow-up. The back pain score measured by VAS 0–10 decreased in all 3 groups significantly after 6 and 12 months. This clinical effect together with the scarcity of AEs and the positive feedback of a rapid BMD increase at both sites resulted for 141 (99 %) patients after 6 months and 139 (97 %) after 12 months in a willingness to accept a further injection.

Conclusion: Our results indicate that the convenient treatment regime together with back pain improvements, very rare adverse events and the consistency of rapid and highly significant BMD increases after 6 and 12 months of Dmab therapy used as a positive reinforcement had a significant, positive impact on patients' adherence to continue with the 6-monthly s.c. Dmab injections.

P230

ALTERED COLLAGEN FIBERS DEPOSITION IN SYNOVIAL JOINTS OF DIABETIC RATS' MODEL INDUCED BY STREPTOZOTOCIN

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Objective: To analyze synovial collagen (COL) fibers in a model of rat diabetic joints induced by streptozotocin and their correlation with the temporal evolution of the diabetes.

Material and Methods: Twenty diabetic Wistar rats induced by 35 mg/kg streptozotocin infusion were divided in 2 groups: G1 (n=10) was euthanized after 2 week and G2 (n=10) after 2 month of induction. Control groups (C1=10 and C2=10) received saline. The experimental protocol complied local animal experimentation rules and was approved by our ethics committee. After euthanasia, weight, blood glucose and plasmatic anticarboximetilisin were analysed. Knee synovial tissues were included in paraffin, histological sections stained with HE and the amount of total collagen, COL I, COL III and COL V were evaluated by 4-hydroxyproline analysis, picrosirius red staining, immunofluorescence and image analysis.

Results: Blood glucose was significantly increased in diabetic groups vs. controls (p<0.005), whereas weight of diabetic animals reduced compared to controls (p<0.001). Higher quantities of COL were observed by 4-hydroxyproline analysis in G2 vs. C2 (p<0.005), similarly for G1 vs. C1 but without statistical significance. Morphologic analysis demonstrated substitution of the subsynovial layer fat by fibrotic tissue in diabetic groups with important deposition of collagen fibers around small vessels. Histomorphometry analysis revealed increased amount of coarse collagen fibers (22.70± 8.20) with reduction of fine collagen fibers in G2 (16:29± 6:10 %) vs. C2 (14:45±5:39 %, 21:39±6.14, respectively, p<0.05), similarly to G1 vs. C1 but not significantly. The analysis of COL I, III and V were statistically higher in G2 vs. C2 (p<0.05), though not significant in G1 vs. C1.

Conclusion: The morphologic changes observed in synovial tissues from diabetic rats and increased amount of COL fibers deposition in this structure reinforce the concept that COL fibers deposition and remodeling may be relevant for the pathogenic pathway progression in diabetic patients joints.

P231

BONE MASS IS DETERMINED BY NUTRITIONAL STATUS AND PHYSICAL ACTIVITY IN MALE BUT ER A PVU II GENOTYPE OUTWEIGH IN FEMALE IN COMMUNITY-INDWELLING KOREAN ELDERLY

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Objective: To determine the stiffness index (SI) and gender-specific factors that can be related to SI including gene polymorphisms vitamin D receptor gene (Bsm I) and two estrogen receptor (ER) α genes (Xba I and Pvu II) in a Korean elderly cohort.

Material and Methods: Data were collected from two nearby senior centers in Seoul, South Korea, in January and February 2009. We investigated socio demographic/lifestyle factors, nutritional status/nutrient intakes, and gene polymorphisms, with relation to the SI.

Results: Of the initial 307 subjects, a total of 261 men and women aged ≥65 years participated in this study. The mean SI

was significantly higher for the men than the women ($p<0.001$). In multiple regression analysis, among elderly men, age ($\beta=-0.306$, $p<0.001$), physical activity ($\beta=0.243$, $p=0.003$), and nutritional status ($\beta=0.181$, $p=0.026$) were significant predictors of SI. Among the elderly women, age ($\beta=-0.252$, $p=0.002$), drinking alcohol ($\beta=-0.241$, $p=0.003$), education level ($\beta=0.234$, $p=0.005$), and PP or Pp genotype of ER α gene Pvu II ($\beta=0.206$, $p=0.011$) were significant predictors of SI. Low SI was common in both elderly men and women. Gender differences in factors other than age can be linked to low SI. In the men, nutritional status and physical activity were more important factors whereas alcohol consumption, educational level, and genetic polymorphism were significant factors predicting low SI in the women.

Conclusion: These gender different lifestyles and nutritional status should be factored into the development of health education programs for osteoporosis prevention in the elderly.

P232
COMBINATION AND SEQUENTIAL THERAPY FOR SEVERE OSTEOPOROSIS

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Objective: •Concomitant administration of a single infusion of intravenous zoledronic acid (5 mg) with daily subcutaneous teriparatide (20 μg) yielded larger, more rapid increments in both spine and hip BMD than either agent alone.
•Cotreatment with zoledronic acid also prevented the PTH induced increase in cortical porosity, thus strengthening the cortex, and increased hip BMD beyond values achieved with PTH alone.
Material and Methods: My own experience:
•Zoledronic acid infused from 2009 to 2012 August in >300 Patients
•Reinfusions done in 100 patients till date
•PTH cases 235 (since 2005) and 73 PTH cases initiated in 2013 which is highest globally in the clinical experience
•Combination PTH followed by ZOL acid 50 patients
• Sequential ZOL acid followed by PTH 100 patients
When do I use combination therapy?
•Age more than 65 years
•BMD T score<−3.5
•Impending fractures hip and spine
•Postoperative implant failure due to severe osteoporosis
•In rheumatoid arthritis cases
Sequential therapy ZOL acid followed by PTH
My protocol:
•ZOL 5 mg infusion
•ZOL infusion followed by PTH For 2 years
•2nd dose of ZOL acid at first and second year depending upon requirement of the patient
Results: •BMD increased in all patients
•No secondary fracture observed
•Combination treatments were well tolerated
•PTH followed by ZOL acid now extending up to 6–9 years
PTH followed by Zoledronic acid:
• Since 2009
•After PTH all cases put on ZOL acid - minimum duration 3 years
Conclusion: •These observations in the combination group likely result from
•PTH-induced increases in osteoblastic activity, together with
•Zoledronic acid-induced reductions in bone remodelling and cortical porosity
•Combination therapy might therefore be appropriate treatment for patients at with very low hip BMD, high risk for hip and other fractures, rheumatoid arthritis or patients in whom rapid response is required.

P233
BASELINE CHARACTERISTICS OF A PROSPECTIVE OBSERVATIONAL STUDY IN CZECH REPUBLIC (CZE) AND SLOVAKIA (SVK) TO DESCRIBE MANAGEMENT OF PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS (PMO) RECEIVING DENOSUMAB (DMAB) IN ROUTINE CLINICAL PRACTICE

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Objective: Describe the characteristics of PMO women initiating DMAb in clinical practice in CZE and SVK.
Material and Methods: The study enrolled PMO women in CZE and SVK who had received their first DMab injection in the previous 8 weeks. Data recorded as per standard clinical practice is collected for 2 years after enrolment, with no additional procedures required. Study outcomes include patient characteristics and clinical osteoporosis (OP) management. We report baseline data.
Results: As of July 2013, 600 patients had enrolled across 32 centers (300 patients per country). In both countries, patients

had multiple co-morbidities (mean [SD] number: CZE, 4.0 [2.3]; SVK, 3.2 [2.1]). In CZE, mean (SD) age was 69.0 (8.7) yrs and mean BMD T-scores −2.7 (1.0) and −2.0 (1.3) at the lumbar spine (LS) and total hip (TH), respectively. Two-thirds (67 %) of patients had a history of OP fracture; 85 % had received PMO therapy prior to enrolment, mostly within 12 months of enrolment (80 % of all patients) and predominantly bisphosphonates (BPs). Two- thirds (66 %) of patients had received oral bisphosphonates (oBPs) and 7 % had received intravenous (IV) zoledronate and/or IV ibandronate. In SVK, mean (SD) age was 64.3 (8.6) yrs and mean BMD T-scores −2.6 (0.8) and −1.3 (0.9) at the LS and TH, respectively. Thirty percent of patients had a history of OP fracture; 49 % had received PMO therapy prior to enrolment, mostly within 12 months of enrolment (40 % of all patients) and predominantly BPs. Approximately one-third (31 %) of patients had received oBPs and 11 % had received IV zoledronate and/or IV ibandronate.

Conclusion: These baseline data provide valuable information regarding patients initiating DMAb in routine clinical practice in CZE and SVK. Differences in local reimbursement guidelines may explain the differences in patient characteristics observed between the 2 countries. Future data from this study will provide additional insights regarding the clinical management of OP in these countries.

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P234

DRUGS RELATED BONE LOSS: A CASE/NONCASE STUDY IN THE FRENCH AND SPANISH PHARMACOVIGILANCE DATABASES

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Objective: To identify the drugs associated with bone loss in the French or Spanish pharmacovigilance databases (FPVD or FEDRA, respectively).

Material and Methods: Spontaneous reports of bone loss (i.e., "osteoporosis", "osteopenia", "increased bone resorption", "osteomalacia", "osteolysis", "bone atrophy", "osteoporotic fracture", "bone loss", or "bone decalcification") registered in FPVD and FEDRA between 1982 and 2012 were analyzed. All suspected drugs were extracted and coded by ATC. Reporting Odds ratios (ROR) and 95 % confidence intervals were calculated for drugs with more than 3 reports in the FPVD or 2 in the FEDRA.

Results: 304 and 51 cases were retrieved from FPVD or FEDRA, respectively. Drugs most frequently connected with bone loss in both databases were glucocorticoids, drugs for HIV infection, anticonvulsants, antidepressants, antacids, and immunosuppressants or drugs for cancer. The case/noncase analysis disclosed increased risk of bone loss with glucocorticoids for systemic/dermic or respiratory use, antivirals for HIV infection, misoprostol, low molecular weight heparins, etetrinate or acitretine, immunosuppressants, antagonists of sexual hormones for cancer treatment, bisphosphonates, anticonvulsants and antipsychotics. Patients on misoprostol or immunosuppressants were also frequently co-exposed to glucocorticoids, which was not the case for the rest of the drugs.

Conclusion: Bone loss was associated with exposure to several drugs, many of whom are well known causes of osteoporosis in FPVD and FEDRA. Significantly increases risk of bone loss with retinoids was herein observed in a small number of cases, which warrants further exploration.

P235

CIRCULATING PERIOSTIN: A NOVEL SERUM MARKER OF CORTICAL BONE STRUCTURE IN HUMANS

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Objective: Periostin is a matricellular protein, which is mainly expressed by periosteal cells and osteocytes. We previously reported that circulating periostin levels (cPostn) correlate with periosteal bone formation and cortical thickness (CtTh) independently of bone turnover in mice treated with PTH. In the present study, we investigated the relationship between cPostn and bone structure in humans.

Material and Methods: We measured cPostn, bone turnover markers, aBMD, trabecular and cortical (Ct) parameters at the distal radius and tibia by HR-pQCT in 242 healthy women and 59 men, aged 64.9±1.4SD years. To test the association between cPostn and bone parameters, we divided the subjects into 3 tertiles of cPostn, and applied an ANCOVA. Multiple regressions were used to assess the relation between cPostn, BMD, microstructure and turnover markers.

Results: Mean cPostn was 1633±410 ng/ml (min 814, max 3,490 ng/ml). cPostn was higher in men than women (+8.6 %, $p<0.01$), whereas P1NP and CTX were lower in men than women (−20 % and −21 %, $p<0.01$). Distal radius total bone area, Ct.area and perimeter were higher in the highest vs. lowest tertile (+6.4 %, +7.7 % and +3.8 %, $p<0.05$; $p=0.12-0.34$ after adjustment for gender). BV/TV was higher in the highest tertile (+12.4 % vs. low tertile, $p<0.01$) and disappeared after sex- adjustment. cPostn positively correlated with Ct.area and Ct. perimeter of distal radius ($r=0.12$, $p<0.05$, both) and tibia ($r=0.15$, $p<0.05$, both). These correlations remained significant after adjusting for P1NP, CTX or whole body BMD, but

not for gender. There was no difference in whole body, spine and proximal femur aBMD, PTH, P1NP and CTX between tertiles. Separate analyses per tertile in men and women indicated similar, but nonsignificant trends.
Conclusion: These results recorded in a homogeneous population of healthy 65-year old subjects indicate a positive correlation of cPostn with cortical bone structure, independently of bone turnover markers as previously observed in mice, but likely through a sex-dependent effect.

P236
12-MONTH PERSISTENCE WITH DENOSUMAB THERAPY AMONG OSTEOPOROTIC WOMEN IN THE CANADIAN PATIENT-SUPPORT PROGRAM

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Objective: To evaluate persistence with denosumab (DMAb) among women with osteoporosis participating in the Canadian patient-support program (ProVital).
Material and Methods: DMAb is an injectable therapeutic option for osteoporosis that is administered subcutaneously every 6 months. ProVital, a support program in which patients voluntarily enrol, provides next injection reminder calls and educational material. A retrospective database analysis of patient-reported outcomes was conducted among osteoporotic women aged ≥50 who enrolled in the ProVital program and received their 1st DMAb injection between August 2010 and June 2011. To achieve 12-month persistence, patients had to receive their 2nd injection no more than 6 months + 8 weeks following the 1st.
Results: A total of 1,676 patients (mean age 74 year) were included. At baseline, 43 % of patients reported previous fractures; 13 % had a parent with a fracture; 14 % had arthritis; 2 % had secondary osteoporosis; 10 % used glucocorticoids; 79 % used a bisphosphonate previously; 51 % had private and 37 % public drug coverage. The 12-month persistence was 82 % (1367/1676). Of the 1,676 patients, 1,419 received a second DMAb injection (mean 192, min 120, max 852 days apart). In a multivariate regression model, characteristics that predicted persistence were private medication insurance, no glucocorticoid use, and residence in Quebec. Among patients who discontinued DMAb (136), the most common reason was adverse events (69 patients).
Conclusion: The 12-month persistence with DMAb among patients enrolled in the ProVital program was over 80 %.
Disclosures: MA is an employee of and shareholder in Amgen, and VP and ME are former Amgen employees. VW and LB are employees of Optum contracted by Amgen. The following relate to Amgen: AP, AK, WB, DK, JA received research funding. AP, AB, AK, WB, DK, JA, FT were consultants. AP, WB, JA, DK, FT were speakers. DK, AB, AK, FT were advisors. AP, AK, DK received honoraria.
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P237
ELBOW ARTHROPLASTY IN COMPLEX OSTEOPOROTIC FRACTURES

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Objective: Osteoporotic elbow fractures (EF) represent a challenge. Open reduction and internal fixation is hard to achieve due to poor mechanical bone proprieties, for this reason elbow arthroplasty (EA) is increasingly popularity in case of comminuted fractures of the distal humerus and is associated with a rapid recovery of elbow motion. The aim of this study is to evaluate clinical outcomes of our series.
Material and Methods: From September 2007 to March 2013 we performed 30 EA in 29 patients; 25 females and 4 males. All patients had poor bone quality with a distal humeral fracture or a complex EF or a terrible triad of the elbow. The surgical approach used was a universal posterior incision with triceps preservation. At each follow-up we performed x-rays of the elbow and a clinical evaluation with the Mayo Elbow Performance Score.
Results: Mean age was 72 years (range 45–94); we reported an isolated distal humeral fracture in 15 cases; a complex EF in 10 and a terrible triad of the elbow in 5. In 2 cases was necessary using a homologous bone graft. In 28 cases a total EA (18 Coonrad-Morrey TEA Zimmer; and 10 Latitude TEA Toriner); one patient received an hemiarthroplasty (Latitude humeral component) and in another case a custom-made prosthesis was implanted (LINK). In 2 cases a supplementary osteosynthesis was performed. Good to excellent functional results were reported in 24 cases (80 %) and only in 6 cases fair and poor results were recorded:3 traumatic periprosthetic fractures, one prosthesis loosening due to an insufficient stem cementation and 2 superficial infections treated with antibiotics. Despite poor biomechanical properties of the osteoporotic bone in elderly patients, our results seem to be slight superior to than reported in literature, this can be probably attributed to the surgical approach that preserves both the olecranon and the triceps extensor mechanism.

Conclusion: In case of complex osteoporotic EF we prefer use EA with a triceps preserving approach.

Disclosures: The study was supported by a grant of laboratoire Servier.

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STRONTIUM RANELATE TREATMENT IMPROVES BONE MATERIAL LEVEL PROPERTIES AND MICROARCHITECTURE OF 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. We previously reported that microstructure and material level properties contribute independently to the increase in bone strength of rats treated with strontium ranelate for 2 years, as evaluated by μCT-based finite element analysis. We investigated the effects of strontium ranelate (SrRan) treatment on bone material level properties of transiliac bone biopsy and on bone microarchitecture from postmenopausal osteoporotic patients in three studies.

Material and Methods: In a longitudinal study, 84 paired biopsies were obtained at baseline, and after 6 or 12 months of treatment with 2 g/day SrRan. In SOTI/TROPOS studies 3 paired biopsies were obtained at baseline and after 36 months of treatment. Elastic modulus, hardness and working energy were blindly analyzed by nanoindentation at the level of the interstitial bone of the cortex and of trabecular nodes under humid conditions. Parameters of microarchitecture were evaluated μCT (Scanco Medical). Values correspond to differences expressed in percent between 2 paired biopsies. Significance of differences are evaluated by Student's unpaired t-test,* <0.05, ** $p<0.01$, *** $p<0.001$.

Results:

Treatment period	0-6 months	0-12 months	0-36 months
n	20	22	3
Modulus Cortex	3.85±7.21	13.56±4.52***	21.84±20.81*
Hardness Cortex	4.64±5.07	14.91±4.29***	48.65±22.84***
Modulus Cancellous	7.25±3.17*	5.95±2.77*	7.23±9.99**
Hardness Cancellous	9.43±4.02*	6.66±3.76	20.59±10.14***
Cortical thickness	8.91±4.78	8.57±6.63	17.90±10.38
Trabecular thickness	9.47±6.07	2.04±6.78	51.01±19.18*

Conclusion: Overall, these results detected in 90 human biopsies indicates an early improvement of bone material level properties followed by later changes on bone microarchitecture in bone specimens collected in patients treated with SrRan. Both effects could contribute to increase of bone strength and to fracture risk reduction. These results suggest different kinetics of SrRan action on bone microarchitecture and bone material level properties.

P239
ILIOCOSTAL IMPINGEMENT SYNDROME/FLANK AND BACK PAIN IN OSTEOPOROSIS/OSTEOPENIA: SUCCESSFUL MANAGEMENT THROUGH SPINAL PROPRIOCEPTIVE EXTENSION EXERCISE DYNAMIC (SPEED) PROGRAM

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Objective: With bone loss spinal deformities develop subsequent to the repetitive strain beyond biomechanical competence of the spine. Among the complications related to Kyphosis we will address flank pain or iliocostal impingement syndrome. There is a paucity of literature on the management of this syndrome. Some of the recommended interventions include injections or bracing.

Material and Methods: Forty patients with osteopenia or osteoporosis with flank or back pain or both who had not responded to common interventions were included. AP and lateral spine x-rays were obtained on all patients. Radiographs revealed kyphosis with reduced space between lower ribs and the ilium. All had neurological and musculoskeletal evaluations. They were all instructed in a home exercise program, with emphasis on back extensor muscle strengthening in addition to education on the use of a weighted kyphoorthosis (WKO) to be worn 20–30 min twice to three times daily until the patient could perform back exercises without pain.

Results: Before enrolment all had a trial of WKO, if their pain was reduced they were included in the study. Considering the geographic location 16 were available for follow up assessment and x-ray studies at 1 month while the remaining 24 were reviewed upon data from their routine annual visits. No new compression fractures were seen. This group showed statistically significant improvement in pain scale ($P=0.001$), height, back strength, level of physical activity ($P<0.001$)/quality of life.

Conclusion: Proprioceptive re-education of posture through application of WKO is effective for static reduction of kyphosis and facilitation of back extension exercise program. This method is based on spinal facet joint proprioceptive reeducation and kyphosis reductions.

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P240
COMPLEX ASSESSMENT OF OSTEOPOROTIC FEMALES WITH DEGENERATIVE LUMBAR SPONDYLOLISTHESIS

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Objective: Females will develop osteoporosis and degenerative spondylolisthesis (DS) over males. DS is a common pathologic entity of the lumbar spine. In most females will develop osteoporosis and degenerative spondylolisthesis (DS) over cases of this complex type pathology, certain muscles of males. DS is a common pathologic entity of the lumbar spine. In most cases of this complex type pathology, certain muscles of the back that stabilize the spine are reflexively inhibited and do not spontaneously recover, even if patients are pain free with a return to daily activity levels. First, we investigated the incidence of DS at L4-L5 level in females with osteoporosis and low back pain (LBP). Second, we assessed the thickness of the erector spinae (ES) muscle in these patients and evaluated the correlation between thickness difference in three different trunk postures and functional parameters.
The back that stabilize the spine are reflexively inhibited and do not spontaneously recover, even if patients are pain free with a return to daily activity levels. First, we investigated the incidence of DS at L4-L5 level in females with osteoporosis and low back pain (LBP). Second, we assessed the thickness of the erector spinae (ES) muscle in these patients and evaluated the correlation between thickness difference in three different trunk postures and functional parameters.
Material and Methods: 48 LBP females with osteoporosis and DS at L4-L5 were enrolled in this observation study. Frontal (AP) and lateral lumbosacral regions were radiological evaluated. Clinical and functional parameters were collected by a physiotherapist and an US examination was performed by a physiatrist within 72 h of the clinical examination. We performed ultrasonography to measure the thickness of the ES muscle at L4 and L5 level in maximum flexion, neutral posture, and maximum extension. All collected clinical and imagistic data were statistically analyzed.
Results: There was significant correlation between the degree of anterior slippage of L4 on L5 and bone density (T-score DXA exam). Multivariate analysis showed that thickness differences between flexed and neutral, and flexed and extended maximally positions were correlated statistically with functional parameters.
Conclusion: A relationship between transitional the degree of slippage in DS females with vertebral osteoporosis has been established. Though sacralization and anterior slippage of L4 on L5 are associated with stability of that segment, pain is more likely to arise in correlation with the erector vertebral muscle status. Visual observation of the image during contraction indicates that US may be a valuable biofeedback tool.

P241
CORRELATION BETWEEN METABOLIC STATUS AND REHABILITATION PARAMETERS IN KNEE OSTEOARTHRITIS PATIENTS

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Objective: Osteoarthritis of the knee (OAK) is reported to be a major health problem worldwide. OAK has been linked not only to obesity but also to other metabolic factors. The adaptation of rehabilitation program to the metabolic status of patient is important for the maintaining of an optimal functional status. The aim of this randomized and controlled study was double: 1) to establish the correlation between the metabolic risk factors and the severity of knee osteoarthritis process, 2) to assess the efficacy of comprehensive rehabilitation program associated with viscosupplementation.
Material and Methods: 56 patients with OAK were randomly assigned into studied group (SG - 30 patients) and control group (CG - 26 patients). All patients were completed assessed (clinical, functional, lab and imagistic). SG performed a rehabilitation program (medication, physical therapy and kinetotherapy) followed by joint injection with hyaluronic acid. CG stayed at home and followed their individually prescribed drug therapy. Patients were assessed at baseline (week 0), after 2 weeks and during follow-up period at 16 weeks. We monitored the following outcomes: pain (VAS), BMI, serum level of glucose, lipoprotein profile, and WOMAC scale.
Results: The severity of OAK was correlated with the presence and number of the risk metabolic factors. Comparing the two group differences, the SG was superior to CG in pain reduction and in physician's global assessment at all time points. Significant improvement in pain and WOMAC scores were found at week 2 and week 16 in the SG compared to baseline.
Conclusion: Our study demonstrated the superiority of rehabilitation program that included the viscosupplementation compared to drug therapy in the treatment of patients with OAK. The superior efficiency of pain and quality of life in the metabolic syndrome patients that followed a complete rehabilitation program confirm the medical data about the chondrocytes disturbances in metabolic syndrome.

P242
OSTEOGENIC DIFFERENTIATION AND MINERALIZATION OF ADULT MESENCHYMAL STEM CELLS ISOLATED FROM HUMAN PERIODONTAL LIGAMENT

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Objective: Periodontal ligament (PDL) is a dynamic connective tissue embedded between the cementum and the alveolar bone; its role is to anchor the tooth root within the jaw, cushioning mechanical load that precede from mastication. Since mesenchymal stem cells have been isolated from PDL (PDLSCs), they are supposed to have a great potential in regenerative dentistry for repairing bone defects, caused by periodontal diseases. Aim of the study was to isolate PDLSCs and to evaluate their osteogenic potential analyzing the alkaline phosphatase (ALP) activity and the mineralization process.

Material and Methods: Two primary cultures of PDLSCs, obtained from extracted healthy human third molars, were induced towards the adipogenic phenotype with the adipogenic medium (AM) (Ham's F12 Coon's modification medium, 10 % FBS, 1 μM dexamethasone, 10 μM bovine insulin, 0.5 mM isobutylmethylxanthine, 100 μM indomethacin, 1 % antibiotics). The osteoblastic phenotype was induced with the osteogenic medium (OM) (Ham's F12 Coon's modification medium, 10 % FBS, 10 nM dexamethasone, 10 mM β-glycerophosphate, 50 μg/ml L-ascorbic acid 2-phosphate, 1 % antibiotics). The phenotypes were assessed from 4 to 21 days by cytochemical staining (Oil Red O or Fast Blue BB/naphthol AS-MX) and microscopic observations. The ALP activity and Ca^{2+} deposition were quantified by fluorometric assay.

Results: With AM, accumulation of intracellular lipid-filled droplets after 21 days was observed. With OM, significant increments of ALP activity at 4 days (+104 %) and 7 days (+86 %) vs. control were observed, and then ALP decreases, while mineralization increases at 14 days (+316 %) and 21 days (+814 %), as demonstrated by a great deposition of Ca^{2+} vs. control.

Conclusion: Preliminary data suggest PDL as an optimal source of stem cells that can be used for bone regeneration in dentistry. Studies are in progress to evaluate the effect of bioactive factors that could facilitate the process.

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P243
SERUM LEVELS OF PROCOLLAGEN TYPE 1 AMINO-TERMINAL PROPEPTIDE (P1NP) AND RISK OF HIP FRACTURE IN ELDERLY WOMEN. THE HORDALAND HEALTH STUDY

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Objective: Background: The usefulness of bone turnover markers as determinants of fracture risk in osteoporosis needs further investigations, and IOF/IFCC recommends the bone formation marker procollagen type 1 amino-terminal propeptide (P1NP) to be used in studies to clarify its utility in clinical use. Aim: To investigate the relation between serum P1NP levels and the risk of subsequent hip fractures in elderly women with, and without BMD.

Material and Methods: A case-cohort study was performed in a cohort of 1,817 women born 1924–1927 participating in a health study covering western parts of Norway from 1997 to 1999. In a subsample of about 60 % of the women, baseline total hip BMD was measured by a DXA (Lunar Expert-XL). Information on incident hip fractures was obtained from computerized discharge diagnoses records from the hospitals serving the region. P1NP was measured in frozen serum samples obtained at baseline in all women who suffered a hip fracture, and in a randomly collected subcohort of 9 % of the total cohort. P1NP was determined by Multigamma radioimmunoassay kit (Orion Diagnostica). The current analyses include women not medication known to influence on the P1NP level, and with valid BMD and P1NP measurements. The final data set included 72 women, without a hip fracture, from the subcohort, and 80 women with a hip fracture. Cox proportional hazards regression adapted for the case-cohort design was performed with penalized splines of P1NP and with tertiles of serum P1NP as explanatory variables. The lowest hazard ratio (HR) was observed in the 2nd tertile, which was used as reference. All analyses were adjusted for age by method.

Results: Serum P1NP levels ranged from 13 to 124 ng/mL (median 44 ng/mL). Unadjusted spline analysis revealed no significant relation between P1NP and the risk of hip fracture. Compared to the 2nd tertile of P1NP, HR for hip fracture in the 1st tertile was: 1.26 (95%CI: 0.60–2.65), and in the 3rd tertile: 1.69 (95%CI: 0.53–2.53). Adjusted for baseline BMD, a significant higher risk was seen in the 1st tertile of P1NP, compared to the 2nd tertile (HR: 3.37 (95%CI: 1.24–8.61), p=0.012).

Conclusion: A weak relation between P1NP and hip fractures was found in the unadjusted analyses. Adjusted for BMD, the current analyses revealed low P1NP to be a risk factor for hip fractures. The mechanisms causing high fracture risk among those with the lowest P1NP levels remain to be elucidated.

P244
GENDER DIFFERENCES IN VITAMIN D STATUS AND PARAMETERS OF CALCIUM AND BONE METABOLISM

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Objective: Vitamin D deficiency is widespread in most of the world and is associated with low sun exposure and low vitamin D intake. Our goal was to identify the gender differences in the levels of 25(OH)D and parameters of calcium and bone metabolism.

Material and Methods: The study included patients (n= 163, 30M/133F; mean age 48.5±18 years) in which levels of total 25(OH)D (Liaison, DiaSorin) and PTH were measured during autumn period (September–October). In selection of patients we used exclusion criteria: presence of primary hyperparathyroidism, secondary or tertiary hyperparathyroidism on the background terminal chronic renal failure, hypercortisolism, blood creatinine level of >100 mmol/l or GFR <60 ml/min/1.73 m^2, intake of active vitD metabolites within 1 month prior the blood test. Our lab takes part in the international program of external control and standardization of vitD in the blood (DEQAS, UK).

Results: In males, levels of vitD were significantly lower than in females (16±5.9 vs. 20±8.5 ng/ml, respectively) despite the fact that males were generally younger (mean age 42±18.5 vs. 51±17.8 years old, respectively). There was a noticeable trend to higher levels of PTH in men (62.6±40 vs. 52.1±30 pg/ml, respectively), but the differences were not confirmed statistically. Differences between the groups by other parameters were not identified. Correlation analysis noted a similar negative association between vitD and age in both sexes, the relationship of vitD with total Ca, P, PTH, OK, CTX were unidirectional, but statistically significant only in women, which can be explained by fewer men in the study group. At the same time correlations of vitD and ionized calcium were reciprocal in men (r=0.60) and women (r=−0.19).

Conclusion: VitD levels significantly lower in men than in women, with gender-related reciprocal relationship between vitD levels and blood ionized calcium.

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P245
PREDICTORS OF SECOND FRACTURE WHILE ON TREATMENT WITH ORAL BISPHOSPHONATES: A MULTINATIONAL RETROSPECTIVE COHORT STUDY

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Objective: To identify predictors of inadequate response to oral bisphosphonate therapy, defined as the incidence of ≥2 fractures while on treatment among incident oral bisphosphonate users with high refill compliance (≥80 %).

Material and Methods: Data from computerized records and pharmacy invoices were obtained from SIDIAP (Catalonia, Spain) and Danish Health Registries (Denmark) for all incident users of oral bisphosphonates in 2006–2007 and 2000–2001 respectively. Exclusion criteria were: Paget disease, age <40 years, anti- osteoporosis treatment in the previous year, and suboptimal refill compliance (<80 %). Fine and Gray survival models accounting for the competing risk of therapy

cessation were used to identify predictors of ≥2 fractures while on treatment after 6 months of treatment initiation.
Results: 7,449/21,385 (34.8 %) and 7,885/13,949 (56.5 %) were compliant oral bisphosphonate users in Catalonia and Denmark respectively. Significant predictors of ≥2 fractures while on treatment in Catalonia and Denmark were older age, and history of recent fracture. Sub-hazard ratios (SHRs) for each of the predictors in each of the datasets are reported in Figure 1.

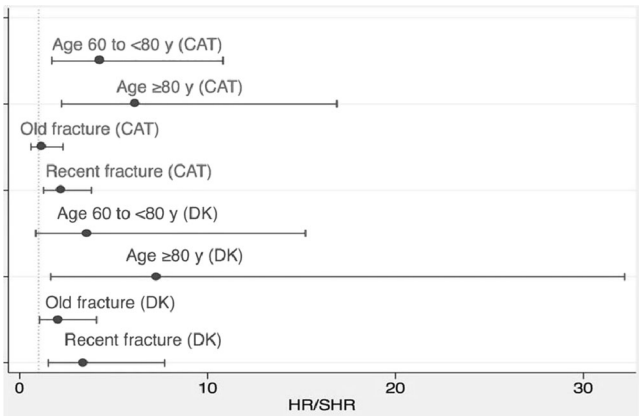

Figure 1. SHR for the identified key predictors of ≥2 fractures while on treatment in Catalonia, Spain (CAT) and Denmark (DK).
Conclusion: Older age and recent fracture history are predictors of inadequate response as confirmed in two separate cohorts. Monitoring strategies and/or alternative therapies should be considered for these patients.

P246
PREVALENCE OF VITAMIN D DEFICIENCY IN TWO BULGARIAN TOWNS–ROUSSE AND SANDANSKY (IN THE NORTH AND SOUTH PART OF THE COUNTRY)

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Objective: Bulgaria is situated between 41°N and 44°N and the climate is characterized by four seasons with different elevation of the sun over the horizon. The aim of the study was to determine the seasonal changes in the 25(OH)D levels in subjects with confirmed winter vitamin D deficiency 25(OH)D <25 nmol/l in two Bulgarian cities–Rousse in the north and Sandanski in the south of the country.
Material and Methods: Thirty subjects from each city (total 60, 43 women and 17 men) had 25(OH)D measured in spring, summer and autumn. Three age groups were defined: 20–44 (n=29), 45–59 (n=20) and ≥60 (n=11).
Results: No differences were found between the two cities in the prevalence of vitamin D deficiency in the four seasons except summer. The prevalence of low 25(OH)D was significantly lower in spring, summer and autumn vs. winter (all p>0.05). In the elderly women in Rousse the deficiency was sustained at all measurements. The prevalence of D deficiency did not differ between the genders. The men from both towns and age groups and the young and middle-aged women from Sandanski had no deficiency in the summer. No deficiency was found in spring and autumn among the young and middle-aged subjects with the exception of the young men in Sandanski. It could be speculated that the latter related to in-house occupations.
Conclusion: No difference was found between the northern and southern cities. Sun exposure in both towns is not sufficient to ensure the recommended 25(OH)D levels in round the year. Probably other factors such as occupation or air pollution play a role in the cities.

P247
C.O.D.E. STUDY: CONNECTIONS BETWEEN OUTCOMES OF OSTEOPOROTIC FRACTURES, DEPRESSION, DELIRIUM & DEMENTIA IN THE ELDERLY

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Objective: To evaluate the functional recovery after hip fragility fracture in persons with major depression, delirium and cognitive impairment.
Material and Methods: All participants underwent neuropsychological and physical functioning assessment during hospital stay and at 3-, 6- and 12-month follow-up. The

baseline evaluation includes Mini Mental Scale Evaluation (MMSE), Geriatric Depression Scale (30-GDS), Cognitive Assessment Method (CAM), Mini International Neuropsychiatric Interview (MINI) Plus; Barthel Index, for assessing ability to perform daily living activities; Cumulated Ambulation Score (CAS), to evaluate functional recovery in the 1st, 2nd–3rd day after surgery. Additional tests were performed at follow-up including Short Physical Performance Battery (SPPB).

Results: The study sample consists of 442 patients (106 men and 336 women) aged 83.4±7.47 years. Depressive symptoms and cognitive impairment increased suddenly after hip fracture. Interestingly, the incidence of cognitive impairment and the severity of cognitive symptoms decreased while the incidence of depression and the severity of depressive symptoms increased during the follow-up. The occurrence of depressive symptoms during hospital stay was inversely associated with early motor recovery in the 1st, 2nd and 3rd day after surgery. The onset of delirium and cognitive impairment did not affected early motor recovery. Major depression and dementia were associated with a poorer functional recovery and a higher level of disability. Major depression was also associated with poor early motor recovery.

Conclusion: Persons affected by major depression or dementia experience poor functional recovery after fragility hip fracture and develop high level of disability. An early intervention on recovery motivation and an early mobilization are very important in fractured persons with depression and/or cognitive impairment. Appropriate interventions on mood and cognitive symptoms may be useful to improve the process of functional recovery.

P248
SOME FEATURES OF SKELETAL DETERIORATION FOLLOWING OVARIECTOMY ARE A DIRECT CONSEQUENCE OF ESTROGEN LOSS WHILE OTHERS ARE RELATED TO PHYSICAL INACTIVITY

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Objective: Ovarian failure is accompanied by major decreases in motor activity (MA). As mechanical loading has a vital role in skeletal health, our aim was to determine to what extent were decreases in MA contributing to ovariectomy (OVX) induced bone losses.

Material and Methods: Thirty-two Wistar rats were OVX or sham-operated (SHAM) and housed in standard (OVX+C; SHAM+C) or cages with running wheels (OVX+VR; SHAM+VR) where they could exercise ad libitum. At 36 weeks all animals were sacrificed. Bone turnover markers were assayed in the serum by ELISA. Both femurs were harvested for assessment of bone geometry, proximal and distal metaphysis trabecular and cortical bone microarchitecture by histology, mineralization degree by atomic absorption spectroscopy and biomechanical properties by compression of the femoral head. Differences were determined by one-way ANOVA.

Results: Running distance was 10-fold lower in OVX+VR compared to SHAM+VR. Although reduced MA and sex steroid deficiency (SSD) resulted in decreases in trabecular bone volume, decreases in trabecular number were mostly associated with the direct effect of SSD while decreases in trabecular thickness were mostly associated with reduced MA. Changes in cortical bone were mostly influenced by MA while bone turnover rate and bone tissue mineralization degree were primarily affected by SSD, even though they were further aggravated by sedentary behavior. SSD was also the main contributor for increases in femur length while femoral neck length seemed to be influenced equality by both sedentary behavior and SSD. Notably, differences in femoral neck mechanical properties resulted mostly from differences in physical activity.

Conclusion: Both the direct effects of SSD and the significant decreases in MA observed following OVX seem to affect the femur material and structural properties somewhat independently, contributing both in an additive way to OVX induced bone fragility.

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P249
CAPTURE THE FRACTURE BY SMS: A SWISS FEASIBILITY STUDY

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Objective: Only a small percentage of patients who suffer from osteoporotic fractures get an antiosteoporotic drug treatment after their hospital stay. The aim of this study was to test the feasibility of an SMS reminder program and its impact on patient awareness and drug treatment.

Material and Methods: 4 centres in Switzerland (Zurich, St Gallen, Basel, Bern) participated. Patients with osteoporotic fractures over the age of 50 were asked to participate und got a reminder to see their GP after the hospital stay. The FRAX score was calculated according to the risk profile in each patient and the medical recommendation was based on the treatment guidelines according to the SVGO society. Six months after the SMS reminder patient were asked about the impact of the reminder on the patient and the GP. The project

was supported by the SVGO and the Qualitouch Foundation for HC.

Results: More than 737 patient were asked to participate. About 28 % of patient participated. The main reason for nonparticipation was that elderly patients had no mobile phones or were not able to use the SMS system. Only a small percentage of patients has got an antiosteoporotic drug treatment 6 months after the fracture. One of the main reason for the nonfunction of the SMS reminder system was mild to severe cognitive impairment in elderly osteoporotic patients.

Conclusion: Elderly osteoporotic patients with fractures and signs or symptoms of cognitive impairment should get a parenteral antiosteoporotic treatment (iv or sc) as the SMS reminder system does not work to enhance patient and doctors awareness in this category of patients.

Disclosures: SVGO and Qualtitouch Foundation

P250
WRITING A GRANT

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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* whenever 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 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 your 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, timing and suitability of soil, growth of food? From this information the reviewer can start to understood your project, and so will you start to understand more 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 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, 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.
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.
Significance: This should be written in clear terms that convey how the results influence longevity, or 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'.
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

P251
HIGHER RESPONSE WITH BONE MINERAL DENSITY (BMD) INCREASE AND BONE TURNOVER REDUCTION FOLLOWING TREATMENT WITH MONTHLY INJECTABLE IBANDRONATE (IBN) FOR PATIENTS (PTS) WITH OSTEOPOROSIS IN THE MOVER STUDY

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Objective: The randomised, double-blind MOVER study compared the efficacy and safety of monthly iv IBN with daily oral risedronate (RIS) in pts with primary osteoporosis. We showed that greater total hip BMD increases with IBN at 6 months were associated with lower risk of new vertebral fractures [IOF 2013: Abst 1096]. Here we assess responder rates for pts with BMD increases in the IBN 1 mg/month group and also describe a nonresponder group.
Material and Methods: Ambulatory pts ≥60 year with fragile bone fracture, BMD of the lumbar spine L2-L4 or proximal femur <80 % of the young adult mean and 1–5 vertebral fractures in Th4-L4 were enrolled. Non-responders were defined by BMD increases (≤3 % L2-L4 or ≤0 % total hip, ≤0 % femoral neck) and uCTX reductions (≤50 %) from baseline to 1 year.
Results: 1,265 pts were randomised to receive iv IBN 0.5 or 1 mg/month + oral daily placebo, or oral RIS 2.5 mg/day (licensed Japanese dose) + monthly iv placebo. Cumulative incidences of new/worsening vertebral fractures over 3 year were 19.9 % (95%CI 15.6–24.1), 16.1 % (95%CI 12.2–19.9) and 17.6 % (95%CI 13.6–21.6), respectively. The hazard ratio for new/worsening vertebral fractures was 0.88 for IBN 1 mg vs. RIS (95%CI 0.61–1.27; primary endpoint), showing both IBN doses to be non-inferior to RIS. BMD significantly improved from baseline after just 6 months. At 1 year, responder rates for pts with BMD increases were similar in all treatment groups. After 3 year, responder rates were highest with IBN 1 mg at all sites. There were a small number of nonresponders in the IBN 1 mg group: 10 pts with ≤0 % total hip BMD increase and ≤50 % uCTX reduction from baseline had lower 25OHD levels than responders, but no differences in kidney function, L2-L4 BMD or BTM baseline values.
Conclusion: Higher responder rates were reported with iv IBN 1 mg/month than with RIS at 3 year. A very small number of nonresponders in the IBN 1 mg group had lower 25OHD baseline levels than responders; comparison with RIS will be further examined.
Disclosures: Supported by Chugai Pharmaceutical.

P252
WAYS TO REDUCE OSTEOPOROSIS TREATMENT GAP IN ROMANIA

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Objective: In Romania the overwhelming majority of individuals at high risk of fracture are untreated (86 %; 94 % in men and 83 % in women). The aim of this study was to identify the causal factors and possible remedies, in the context of economic crisis.
Material and Methods: A panel from Romanian Society of Osteoporosis and Musculoskeletal Diseases was asked to audit the framework of clinical practice of osteoporosis in Romania, the availability and provision of logistical resources, the national guidelines, education and proficiency in osteoporosis by family doctors.
Results: Several factors were identified that contributed to the high treatment gap. The cost of medical intervention in Romania is high in relation to GDP and even higher in relation to the health care spend. Another barrier to treatment is that reimbursement is only granted where the prescription is issued by a specialist. National guidelines are available but they are not implemented and updated. The currently accepted criterion for treatment of osteoporosis in Romania is a BMD T-score≤−2.5 SD, which is also the reimbursement threshold for medical intervention and reimbursement of osteoporosis agents is about 50 %. There is limited access to DXA and moreover, the reimbursement for DXA is less than the cost of DXA which imposes its own financial constraints on individuals. There are also incompatibilities between recommendations for risk assessment or treatment with reimbursement policy. FRAX-based assessment and intervention thresholds are available but not implemented. For example, guidelines recommend the use of FRAX which is not provided for in reimbursement provision and specific treatments are recommended but not reimbursed. General practitioners are not familiarized with risk assessment based on FRAX.
Conclusion: Adjusting existing policies in agreement with the current strategy of absolute risk assessment would be a good low cost first step in addressing the high treatment gap.

P253
IMPACT OF SEASON AND COMORBIDITY ON HIP FRACTURE INCIDENCE. A NOREPOS STUDY

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Objective: Seasonal variation in hip fracture incidence has been reported in several studies. The link of this variation to comorbidity is unknown. The aim of this study was to examine the seasonal variation in hip fracture incidence in Norway, related to age, gender and comorbidity.
Material and Methods: Our analyses were based on the NOREPOS Hip Fracture Database with hip fractures (139,913) in Norway between 1994 and 2008. Additional diagnosis and surgical procedure codes were used to identify incident fractures. Charlson index (0–2), a comorbidity measure, was calculated based on additional diagnoses. Winter was defined as December, January and February and summer as June, July and August. Negative binominal models were used in the analyses. The population at risk was based on data from Statistics Norway. We also performed analyses by gender and three age groups: 50–64, 65–79 and >80 years.
Results: 136,140 fractures were eligible for the study (72.5 % women). In men, we found an age-adjusted relative risk of 1.40 (95%CI: 1.36–1.45) in winter compared to summer. This ratio was 1.26 (95%CI: 1.23–1.28) in women. June had the lowest proportion of fractures in both genders, while January and December were the peak months. Both genders had seasonal variation in all age groups, but less distinct with increasing age. We found a significant interaction between season and comorbidity. After adjustments for age and gender, winter versus summer incidence was 1.41 (95%CI: 1.30–1.52) in those with no comorbidity (Charlson index=0), 1.28 (95%CI: 1.19–1.39) in those with some comorbidity (Charlson index=1), and 1.18 (95%CI: 1.09–1.28) in those with most comorbidity (Charlson index=2).
Conclusion: This study demonstrates a clear seasonal variation in hip fracture incidence, present in all subgroups by gender, age or comorbidity. Interestingly, the seasonal variation was most pronounced in those with least comorbidity. The considerable seasonal variation should be taken into account when planning healthcare services.

P254
COMPARATIVE EVALUATION OF KNEE AND ANKLE STRENGTH IN PATIENTS WITH KNEE OSTEOARTHRITIS AND HEALTHY CONTROLS: A PILOT STUDY

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Objective: Osteoarthritis is characterized by joint pain, local tenderness, limited motions, crepitation, effusion and various degrees local inflammation without systemic findings. The aim of this study was to compare the knee and ankle strength values of patients with osteoarthritis and those of healthy controls.
Material and Methods: Six female patients with a mean age of 66.17±13.73 years and seven female healthy volunteers with a mean age of 57.14±12.5 years were recruited in the study. Knee (flexion/extension) and ankle (plantar/dorsiflexion) strength measurements were performed by an isokinetic dynamometer (Biodex System 3). Peak torque/body weight values were taken into the statistical analysis.
Results: Neither the knee nor the ankle measurements were found to be different between the two groups ($p>0.05$).
Conclusion: It seems that further analyses involving wider group of individuals are warranted for better estimation of comparative knee and ankle strength in patients with osteoarthritis.

P255
BONE STATUS IN PATIENTS WITH ANOREXIA NERVOSA AND RELATIONSHIP WITH BIOCHEMICAL FINDINGS AND FINDINGS AT PSYCHIATRIC INTERVIEW

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Objective: To investigate bone status and biological mechanisms involved in the negative impact of anorexia nervosa (AN) on osteogenesis.
Material and Methods: A cross-sectional study was conducted based on a Danish clinical database established at Department of Psychiatry, Aalborg University Hospital. The database includes biochemical data, bone scans (DXA) as well as general health and medical information during the period 2009–2011. A total of 30 AN patients who underwent bone scans were included in the study.
Results: AN patients had a mean Z-score around −1.5 to −1.6 in lumbar spine and total hip, respectively. Hip Z-score decreased with duration of disease, and a positive correlation between serum 25-hydroxyvitamin D level and spine Z-score but not hip Z-score was seen. BMD did not seem to change with time since diagnosis. Additionally, a negative correlation between serum 25-hydroxyvitamin D levels and serum total alkaline phosphatase levels was found. A serum 25-hydroxyvitamin D level below 50 nmol/l was associated with increased alkaline phosphatase levels.
Conclusion: Disease duration was the main predictor of bone status rather than clinical measures including BMI and biochemical measures. This implies that long term disease duration should be a main factor in selecting patients for referral to DXA. Moreover, results from this study indicate normal osteoblastic response to malnutrition.

P256
RECOMMENDATIONS FOR OSTEOPOROSIS MANAGEMENT AND FRACTURE PREVENTION FOR THE FRAIL ELDERLY IN LONG-TERM CARE (LTC)

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Objective: Clinicians practicing in LTC face unique challenges caring for frail elderly individuals including multiple comorbidities, polypharmacy, and end of life care, but practice guidelines typically do not address this population. Guidance regarding the management of osteoporosis and fracture prevention in LTC, a high risk population, is needed.
Material and Methods: The GRADE approach was used. A survey of LTC physicians informed key questions and outcomes. Interviews with resident representatives and a literature review informed values and preferences. The quality of evidence, benefits and harms, costs, resident values and preferences, and available resources were considered when making recommendations.
Results: For residents at high risk for fracture, we suggest multifaceted interventions that are individually tailored to reduce the risk of falls and fractures, and we suggest balance, strength and functional training exercises only when part of a multifaceted intervention. We recommend hip protectors. We recommend vitamin D_3 supplements daily (800–2000 IU) and calcium supplementation up to 500 mg daily if unable to meet recommended dietary allowances through food. We recommend the following therapeutic agents: alendronate, risedronate, zolendronic acid, or denosumab. Teriparatide is a suggested option. We suggest raloxifene and etidronate not be used.
Conclusion: These are the first guidelines developed for the care of osteoporosis and fracture prevention in LTC using GRADE. In LTC, strategies to prevent fractures and falls must consider resident values and preferences, comorbidities, life expectancy, and quality of life.
Disclosures: Dr. Alexandra Papaioannou has received grants/research support from Amgen, Eli Lilly, Merck and Warner Chilcott. Dr. Papaioannou has been on a speakers bureau and received honoraria from Amgen, Eli Lilly, and Merck. Dr. Papaioannou has received consulting fees from Amgen, Eli Lilly and Merck and is an employee of McMaster University. Nancy Santesso, no conflicts. Dr. Suzanne Morin, has received grants/research support from Amgen. Dr. Morin has received consulting fees for Amgen, Merck and Eli Lilly. Dr. Morin has been on speakers bureau and received honoraria from Amgen and Eli Lilly. Dr. Angela Cheung has received grants and honorarium from Amgen, Eli Lilly, Merck. Dr. Richard Crilly, no conflicts. Dr. Lora Giangregorio has received grants/research support from Merck. Kerry Grady, no conflicts. Dr. Robert Josse has been an advisory board member, received speaker honoraria and/or research grants from Lilly, Amgen, Novartis, Warner Chilcott, Merck. Dr. Susan Jaglal, no conflicts. Ravi Jain, no conflicts. Dr. Sharon Kaasalainen, no conflicts. Dr. Andrea Moser, no conflicts. Laura Pickard, no conflicts. Carly Skidmore, no conflicts. Dr. Hope Weiler, no conflicts. Dr. Susan Whiting, no conflicts. Dr. Jonathan Adachi, has participated in clinical trials for Amgen, Eli Lilly, Merck, Novartis. Dr. Adachi has been on a speakers bureau, received honoraria and consulting fees from Amgen, Eli Lilly, Merck, Novartis, Warner Chilcott. Dr. Adachi is an employee of McMaster University.
Acknowledgements: We would like to thank our consensus panel of 50 LTC stakeholders across Canada.

P257
RHEUMATOID ARTHRITIS AND FATIGUE

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Objective: To define the profile of tired patients with rheumatoid arthritis (RA) and the influence of treatment, to analyze the consequences of fatigue, and to determine the relevant criteria to assess the fatigue.
Material and Methods: • 155 cases, 85 % were women, mean age 58 years, seen by 18 rheumatologists (Rh).
• 2 control groups: RA not tired and tired patients without RA.
• Average duration of history of RA: 10 years.
• Degree of severity: light 12 %, moderate 67 %, severe 21 %.
• Progressive nature: low 32 %, moderate 57.5 %, aggressive 10.5 %.
• ESR average of 18 mm, mean CRP 8.4.
• 48 % have two DMARDs, 28 % have 1, 24 % 3 or 4.
• 81 % are under MTX, 15 % under biotherapy, 49 % under steroids.
• 20 % have another cause of fatigue.
Results: • 66 % of RA patients studied are tired vs. 47 % in the French population and 42 % in the rheumatologic patient data base. 67 % spontaneously evoke their fatigue.
• At D0, 77 % of patients have pains, 43 % are disabled.
• VAS pain=44 mm, VAS handicap=46 mm, VAS fatigue= 47 mm.
• In 72 % of cases RA was already tired, sometimes at treatment discontinuation (12 %) or at the introduction (15 %). Fatigue is the main complaint (38 %).
• It is linked to RA (68 %) and runs in parallel to it (70 %).
• It is more intense and permanent than ordinary fatigue and occurs without cause.
• It increases the recovery time (85 %), affects household chores (79 %), resulting in daytime sleepiness (60 %).
• It is more physical than moral, but often it is both (64 %).
• 69 % of cases are sad, 63 % unmotivated, and 37 % depressed.
• Fatigue affects spare-time (71 %) then work, sex, social life.

• Of 10 criteria, three are relevant to evaluate the fatigue: VAS fatigue >50 mm, recovery time extended by at least 50 %, no tiring cause.
• At 3- associated criteria, there is correlation between the degree of fatigue, its evocation, evolution of RA, high CRP.
• At 2 criteria with anemia, handicap, VAS pain, need to nap, lack of activities.
• There is a parallelism between fatigue and previous RA, elevated ESR, disease flare, decreased muscle strength, lack of energy and mainly improvement thanks to biotherapy.
• Not tired RA are not very aggressive and frequently with MTX alone or biotherapy.

Conclusion: RA tired is often progressive and with elevated ESR. Fatigue is both physical and moral. It is permanent, unusual, intense and debilitating and fades to the introduction of MTX and/or biotherapy.

P258

IMPACT OF DEMOGRAPHIC CHARACTERISTICS ON BONE MICROARCHITECTURE INDEX (TBS) IN HEALTHY WOMEN IN MENOPAUSE

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Objective: To assess whether age, duration of menopause, body weight, height and BMI affect TBS in healthy, postmenopausal women.

Material and Methods: A cross-sectional study included 257 healthy menopausal women, with TBS score measured at the lumbar spine. Subjects with risk factors known to affect bone microarchitecture (using steroids, previous fractures, systemic disease, excessive use of alcohol and cigarettes, and the use of drugs with a negative impact on bone metabolism) were excluded. Statistical analysis was performed in SPSS.

Results: The average age of patients was 64.3±7.9 years. Menopause occurred in 49.5 (37–60) years. and lasted an average of 15.9±9.5 years. The average body weight was 69.4±13.0 kg. Body height 159.8±6.7 cm, and BMI 27.2± 4.9. Average TBS was 1.223±0.101. We found a significant negative correlation between age and TBS (ρ=−0.218, p<0.01), between the duration of menopause and TBS (r= −0.187, p<0.01), whereas the correlation between the age at the time of menopause and TBS was not significant (ρ=0.085, p=0.172). A significant negative correlation was observed between TBS and the body weight (r=−0.222, p<0.01), and the TBS and the BMI (r=−0 268, p<0.01).

Conclusion: The value of the bone microarchitecture index (TBS) decreases with age, duration of menopause, with an increase in body weight and BMI. Body height, and age at the time of onset of menopause did not correlate with TBS.

P259

THE PHARMACOKINETICS OF ODANACATIB 50 MG ARE NOT AFFECTED BY SEVERE RENAL INSUFFICIENCY

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Objective: Odanacatib, a selective cathepsin K (CatK) inhibitor, is in development for the treatment of osteoporosis. Approximately 10 % of the clearance of odanacatib is believed to be due to renal elimination. This study was done to determine the effect of severe renal insufficiency on odanacatib pharmacokinetics, pharmacodynamics, and tolerability.

Material and Methods: In this open-label, single-dose study, odanacatib was orally administered to subjects (age: 40–79 years) with severe renal insufficiency (defined as a Cockcroft Gault creatinine clearance of <30 mL/min) and healthy control subjects (creatinine clearance ≥90 mL/min), matched for age, gender, and BMI. Plasma and urine samples were collected for the analysis of odanacatib concentrations and biomarkers at predose and at specified time points over 15 days postdose. An analysis of covariance (ANCOVA) model was used to analyze odanacatib $AUC_{0-\infty}$ on log scale. The $AUC_{0-\infty}$ geometric mean ratio (GMR) was determined to evaluate the similarity of pharmacokinetics between the two groups based on the 90 % CI for the GMR contained within the comparability bounds of (0.40, 2.50). C_{max} was analyzed in a similar fashion. Summary statistics were computed for T_{max} and apparent terminal $t_{1/2}$. Bone biochemical markers (serum NTx and urine NTx/Creatinine) were also assessed to evaluate pharmacodynamics; a linear mixed effect model was used for the analysis of these parameters. Adverse events (AEs) were monitored throughout the study and evaluated for severity and relation to study medication at study visits.

Results: The GMRs (90 % CI) for $AUC_{0-\infty}$ and C_{max} were 1.62 (1.17, 2.24) and 1.47 (1.19, 1.80), respectively. The geometric mean half-life for odanacatib 50 mg was 74.2 h subjects with renal impairment and 80 h in the healthy matched controls. At 168 h postdose, least square (LS) mean (95%CI) serum NTx values were −36.5 (−47.30,−23.38) [renal impairment] and −43.2 (−53.39, −30.76) [healthy]; LS Mean (95%CI) urine NTx/Cr values were −59.3 (−65.81, −51.51) [renal impairment] and −43.4 (−52.83, −32.08) [healthy]. There were no serious AEs or discontinuations due to AEs. Mild headache was the most common drug-related AE and was reported in

one patient in the renal impairment group and one patient in the healthy control group.

Conclusion: There were no meaningful differences between subjects with severe renal impairment compared with healthy-matched controls in odanacatib 50 mg pharmacokinetics, as assessed by comparison of $AUC_{0-\infty}$ values, or its pharmacodynamics, as assessed by change from baseline in serum NTx and urine NTx/Cr. Odanacatib 50 mg was generally well tolerated in patients with severe renal impairment.

Disclosures: SAS, CL, SZ, RW, JS, AM are employees of and own stock in Merck & Co., Inc, the study sponsor. DS, NW, AH are employees of Celerion, which was contracted by Merck to run the study. HA, WS, and TM were investigators and received research support from Merck.

P260
SHINY AND NEW: UPTAKE AND PERSISTENCE WITH NON-ORAL OSTEOPOROSIS MEDICATIONS IN ONTARIO, CANADA

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Objective: Two non-oral osteoporosis drugs were added to the public drug formulary in Ontario, Canada in the last decade: annual zoledronic acid in 2006 (modified in 2012) and semi-annual denosumab in 2012. We aimed to describe the use and persistence of these new drugs since formulary addition.

Material and Methods: We used Ontario administrative claims data to identify new users of zoledronic acid and denosumab from formulary entry through to 2013. Descriptive characteristics of prescribing physicians and patients were summarized. The number of new patients and new prescribing physicians were plotted by month and examined over time. Time series analysis was used to examine the impact of the formulary change to zoledronic acid in 2012. Persistence with index therapy and switching to different therapies was examined over time.

Results: We identified 1,508 zoledronic acid users (86 % female, mean age=77) treated by 630 physicians (27 % specialist) and 16,736 denosumab users (97 % female, mean age=79) treated by 2,904 physicians (12 % specialist). More denosumab users had prior oral therapy (55 % vs. 34 %), yet fewer received BMD testing (20 % vs. 33 %). In comparison to zoledronic acid (<5 new prescribers and patients), uptake of denosumab was rapid (>450 new prescribers and >1,200 new patients) in the first 2 months on the formulary. Time series analysis identified a significant increase in zoledronic acid use following a modification to the limited use criteria. We identified that 57 % (zoledronic acid) and 55 % (denosumab) patients persisted beyond the first year, and 30 % of zoledronic acid patients persisted for 3+ years.

Conclusion: Zoledronic acid and denosumab may be enticing options to improve persistence with osteoporosis therapy. Over half of patients received doses beyond the first year, and more than a third received prior oral therapy. A provincial formulary modification that broadened access criteria for zoledronic acid in 2012 significantly increased prescribing.

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VITAMIN D SUPPLEMENTATION AFTER BARIATRIC SURGERY: IS 30 MICROGRAM DAILY ENOUGH? A TWO-YEAR FOLLOW-UP AFTER GASTRIC BYPASS OR SLEEVE GASTRECTOMY

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Objective: Poor vitamin D status in the obese is well documented. After bariatric surgery vitamin D deficiency can become even worse. Optimal vitamin D supplementation dose in the bariatric patients is not known.

Material and Methods: We assessed serum $25OHD_3$ concentration at one and 2 years control in 216 severely obese patients (67 % female, mean age 48 years, mean BMI 49 kg/m^2) who underwent either gastric bypass (GBP, $n=137$) or sleeve gastrectomy (SG, $n=79$) at Helsinki University Central Hospital, Finland, between 2008 and 2010. The mean preoperative weight was 142 kg (range 92–220). All patients received a prescription of cholecalciferol 30 μg daily at hospital discharge and at 1 year control. Serum $25OHD_3$ was determined by the HPLC method published earlier (Turpeinen et al. 2003).

Results: The mean weight loss at 1 year control was 24.0 % (range 4.2–42.9 %) in the GBP group and 21.6 % (1.8–43.6 %) in the SG group, $p=0.04$, and at 2 year control 24.3 % (3.6–46.7 %) and 22.2 % (−2.1–50.9 %), $p=0.16$, respectively. At 1 year control, the mean $25OHD_3$ was 62.3 nmol/l (21–122) after GBP and 63.8 nmol/l (13–110) after SG, $p=0.27$ and at 2 year control 63.8 (14–148) and 72.1 (24–149), respectively, $p=0.03$. At 1 year control, serum 25OHD3 was below 50 nmol/l in 37 (27 %) of the GBP patients and in 24 (30 %) of the SG patients, $p=0.64$, and at

2 year control in 24 (18 %) and 10 (13 %) of the patients, p= 0.44, respectively. Below 75 nmol/l at 1 year control was 109 (80 %) of the GBP patients and 56 (71 %) of the SG patients, p=0.18, and at 2 year control 99 (78 %) and 41 (59 %), p= 0.005, respectively.

Conclusion: In these bariatric patients using daily 30 μg vitamin D supplementation, vitamin D status was suboptimal if level of 75 nmol/l is used as a threshold, but satisfactory if 50 nmol/l is considered optimal for bone health. The GBP patients are at a higher risk for vitamin D deficiency than the SG patients.

References: Turpeinen U et al. Clin Chem 2003;49:1521.

P262

HIP FRACTURE INCIDENCE IS MUCH HIGHER IN HONG KONG CHINESE WOMEN THAN BEIJING CHINESE WOMEN DESPITE HIGHER BONE DENSITY IN HONG KONG WOMEN: MAJOR IMPLICATIONS FOR HIP FRACTURE PREVENTION

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Objective: Hong Kong has the highest incidence of hip fracture in Asia, while mainland China still has very low incidence of hip fracture. However, it has been predicted there will be a major epidemic of hip fracture in China. The objective of the current study is to compare the BMD at the hip between a large population sample of Hong Kong and mainland Chinese women, so that insight can be gained into the etiology of hip fracture.

Material and Methods: 7,130 ambulatory Hong Kong Chinese women and 7,037 mainland Chinese women living in Beijing (aged 50–96) were recruited from the community. They volunteered for the study. BMD was measured by Lunar Prodigy Advance Whole Body Bone Densitometers. Cross calibration was carried out by a phantom. The prevalence of osteoporosis was calculated according to the World Health Organization criteria. BMD at the total spine and femoral neck were adjusted for age, height and weight and compared between the 2 populations.

Results: According to published data, the incidence rate of hip fracture was 465/100,000 in Hong Kong Chinese women and 229/100,000 in Beijing Chinese women. The prevalence of osteoporosis at the total hip in our study was 24.8 % in Hong Kong Chinese women and 20.0 % in Beijing Chinese women, but these did not account for difference in weight and height. After adjustment for age, height and weight, the BMD of Hong Kong Chinese women was 2.8 % higher at the hip and 1.5 % higher at the femoral neck than Beijing Chinese women. This implies that BMD is a poor measurement of bone strength, and also that there are many extraskeletal factors causing hip fracture.

Bone Mineral density at the total hip (g/cm²) of Beijing and Hong Kong Chinese women

	Beijing	Hong Kong
No adjustment	0.85	0.799 *
Adjusted for age, height and weight	0.813	0.835 *

* P<0.001 by ANCOVA

Conclusion: The difference in hip fracture incidence between Hong Kong Chinese and Beijing Chinese women cannot be explained by difference in BMD. Further research should focus on better measurement of bone strength in Chinese women, as well as extraskeletal factors for hip fracture, so that recommendations can be made to prevent the imminent epidemic of hip fracture in mainland China.

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PRDX2 AS A POSSIBLE PATHOLOGIC MEDIATOR OF HIP OSTEOARTHRITIS REVEALED BY PROTEOMICS

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Objective: To understand the molecular mechanisms of hip OA and identify pathologic mediators and biomarkers, we examined the proteomic profile using two- dimensional difference gel electrophoresis.

Material and Methods: We examined surgical specimens of femoral head samples from 20 patients with hip disease (10 OA cases and 10 with femoral neck fractures) who underwent surgery at the Juntendo University Hospital consecutively from February 2007 to August 2009. Frozen samples of cartilage and subchondral bone tissue were used for the proteomic analysis, and were available as a learning set in 16 cases, including 8 OA-hip and 8 N-hip samples. A Western blot analysis was performed on 20 cases, consisting of the learning set (16 cases) and the validation set (four additional cases, including two OA-hip and two N-hip samples).

Results: We identified 32 protein spots demonstrating a statistical difference in intensity between femoral heads with hip OA (OA-hip) (8 cases) and those from normal hips (N-hip) (8 cases) (p<0.01). We found that peroxiredoxin-2 (PRDX2) had the highest p-value (p=0.00016) and fold difference ratio (6.22) in 32 spots. Two of the 32 spots that derived from PRDX2 had a higher intensity than that found in the N-hip samples. We employed an SDS-PAGE/Western blotting test to further examine the relationship of PRDX2 expression with the OA-hip and N-hip samples, and showed that PRDX2 expression was higher in the N-

hip samples in comparison to the OA-hip samples ($p<0.0001$). We used an SDS-PAGE/Western blotting test to verify our findings in 4 additional OA-hip ($n=2$) and N-hip samples ($n=2$). The samples showed that the N-hip samples had higher expression of PRDX2 in comparison to the OA-hip samples.

Conclusion: These results establish PRDX2 as a possible pathologic mediator candidate for OA.

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GRAND 3 - THE GERMAN RETROSPECTIVE COHORT ANALYSIS ON NONADHERENCE IN OSTEOPOROTIC PATIENTS: PERSISTENCE-ANALYSIS OF FEMALE PATIENTS TREATED WITH DENOSUMAB (DMAB)

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Objective: To be effective, osteoporosis therapy must be taken according to the prescribed dosing regimen. A retrospective claims analysis reported low persistence with oral and intravenous bisphosphonates (BPs) at 12 and 24 months: 8.5 %, 23.6 % and 35.0 % for daily, weekly and quarterly administration; and 4.7 %, 9.3 %, 13.1 % and 36.0 % for daily, weekly, quarterly and yearly administration, respectively[1,2]. We present persistence data for patients treated with DMAb (subcutaneously once every 6 months) in Germany; 12- and 24-month data from this study have been reported previously[3].

Material and Methods: This retrospective analysis evaluated the IMS®LRx-data (06/2010–10/2013; covering filled prescriptions of statutory health insurances [SHI] in Germany). DMAb naïve women aged ≥45 year who had received their initial prescription between 06/2010 and 10/2011 were included. Outcome measures were persistence at 12, 18, 24 & 30 months, defined as receiving follow-up DMAb prescriptions within 30-, 60- and 90-day grace periods after the previous injection.

Results: The analysis included a total of 6,159 patients. Using a 30 day grace period, approximately 70 % of patients were persistent at 12 months, 60 % at 24 months and 43 % at 30 months.

Table. Persistence rates using grace periods of 60 and 90 days were similar to those for a 30-day gap.

Time	No. of patients	Persistence with different grace periods		
		30 days	60 days	90 days
12 months	4,558	70.9%	74.0%	76.0%
18 months	4,056	63.9%	68.5%	68.3%
24 months	3,640	57.4%	59.1%	59.9%
30 months	2,842	42.9%	42.9%	42.9%

Conclusion: Persistence to DMAb was higher than reported previously for BPs. This improved persistence may lead to better outcomes, including increased fracture risk reduction.

References: [1]Hadji et al., ECCEO 2013 (BEST); [2]30-day refill gap for weekly and quarterly administration; 90-day gap for yearly administration; [3]Hadji et al., ECCEO 2013 (GRAND3)

Acknowledgements: Amgen/GSK

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PATIENTS WITH OSTEOPOROSIS WHO REMAIN AT HIGH RISK FOR FRACTURE DESPITE BENEFIT OF PRIOR BISPHOSPHONATE TREATMENT: A DANISH PERSPECTIVE

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Objective: To estimate the proportion of osteoporosis patients who remain at a high risk for fracture despite being compliant to bisphosphonate treatment.

Material and Methods: This case-control study is based on Danish national health registry data, including data on all hospitalizations, ICD-10 code at admission, and performed tests. Furthermore, results from BMD scans were collected from three of the five Danish regions, and aggregated with data from the registries.

The patient group of 2,406 patients (66.3 % women and 33.7 % men) was identified as:

- Age ≥ 50 years
- First bisphosphonate prescription date between 01.01.1996 and 31.12.2008, defined as index date
- ≥12 months pre- and ≥36 months post-observational data
- A medication possession ratio ≥80 % for 24 months post index
- ≥1 claim of BMD test OR a fracture 12 months prior to 30 days after index date

'High risk' patients were defined as having the following outcomes despite compliance for 24 months:

- A fracture at 24–36 months following index OR
- BMD T-score<−2.5 at 24–36 months after index OR

Any drop in BMD between index and 24–36 months A total of 352 high risk patients were identified, and served as cases. The remaining 2,054 served as controls.

Results: The proportion of high risk patients despite benefit of prior bisphosphonate treatment in Denmark is 14.6 % (14.3 % for women and 15.2 % for men). T-scores were significantly different at both index and follow-up between cases and controls ($p<0.001$). High risk patients were more likely to smoke (OR: 2.5, $p<0.001$), have lower plasma calcium and/or vitamin D (OR: 3.4, $p<0.001$), and were more frequently diagnosed with anorexia nervosa (OR: 5.9, $p=0.045$). Furthermore, the high risk patients had a significant higher Charlson score ($p=0.014$).
Conclusion: In Denmark, 14.6 % of the osteoporotic patients remained at high risk for fracture despite persistent bisphosphonate treatment. Although these patients may have benefited from their therapy, alternative treatments could be considered for such patients.
Disclosures: This study was supported by an unrestricted grant from Merck & Co. AD Jorgensen is an employee of MSD Denmark. A Krishna is an employee of Merck & Co. P Vestergaard: Travel grants from Novartis, Amgen, Servier, and Eli Lilly.

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CLINICAL AND SONOGRAPHIC ASSESSMENT OF THE EFFECTIVENESS OF COLLAGEN INJECTIONS GUNA MDS IN PATIENTS WITH PARTIAL THICKNESS ROTATOR CUFF TEARS OF THE SHOULDE

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Objective: To evaluate the effectiveness of Injectable collagen GUNA MDs regarding pain, functioning and restoration of periarticular tissues of the shoulder in patients with partial thickness tears (PTT) of the rotator cuff (RC). Musculoskeletal ultrasonography (US) is an approved imaging technique for diagnosis of the RC pathology and monitoring of therapy.
Material and Methods: We studied 22 patients with painful shoulder and sonographic proved PTT of the RC. Clinical assessment included demographic and clinical data, a VAS for pain (0–100) and Shoulder Function Assessment (SFA) scale (0–70) on the baseline and on the 60th day. Evaluations of the efficacy according to the patient and the physician were performed. All patients had US of both shoulders with Mindray M5 scanner with multifrequency linear transducer (7.5–10 MHz). We applied a combination of GUNA MD-Shoulder and GUNA MD-Muscle into the subacromial space in a total course of treatment 8 weeks. Physical therapy was not administered during the follow-up period.
Results: Pain was significantly reduced. There was a statistically significant improvement of SFA Index. 75 % of patients gave a very good and good assessment of efficacy, which coincided with the opinion of the physician. 78 % of patients had a complete recovery or improved structure of the RC on second visit which was proved by sonography.
Conclusion: Injectable collagen is an innovative approach with regenerative effect in the treatment of PTT of the RC. GUNA MDs significantly reduced pain and increased functional activity of the shoulder, thereby increasing the quality of life. No adverse events were registered during the treatment.
References: 1. Naredo E et al. Ann Rheum Dis 2002;61:132.

P267
PTH TREATMENT INDUCES WNT10B EXPRESSION IN HUMANS LYMPHOID CELLS

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Objective: Intermittent PTH treatment reduces vertebral fractures risk in osteoporotic patients. The mechanisms trough which PTH acts are not completely understood, it has been observed to activate Wnt pathways in osteoblasts (OBs). Activation of this pathway induces OB proliferation, differentiation and prevents apoptosis. Recently it has been demonstrated an increased expression of Wnt10b by T cells during intermittent PTH, whereas there is no increase in Wnt10b during continuous PTH infusion in mice. In order to evaluate if PTH acts on lymphoid cells by increasing Wnt10b expression also in humans, we measured this molecule at baseline and after PTH treatment in osteoporotic subject and in patients affected by primary hyperparathyroidism before and after surgery.
Material and Methods: We enrolled 40 women with postmenopausal osteoporosis, patients were randomly assigned to therapy for 18 months with: 1-84 PTH 100 μg plus calcium 1,200 mg and vitamin D 800 UI daily, or with calcium 1,200 mg and vitamin D 800 UI daily and return for control visit and exams at 3, 6, 12 and 18 months of therapy. We also enrolled 20 patients affected by primary hyperparathyroidism and subjected to surgical parathyroidectomy; patients were evaluated at baseline and 1 month after surgery. Real-time PCR for WNT10b was performed on peripheral blood lymphoid cells after red blood cells lysis.
Results: Our data show an increase in WNT10b expression by lymphoid cells that was maximum (more than 20-fold) after 6 months of treatment, after 18 months WNT10b returned to basal expression. The WNT10b curve acts similarly to the osteocalcin one. In patients treated with calcium and vitamin D alone no increase in WNT10b was observed. Also in

patients affected by hyperparathyroidism there was no difference in WNT10b before and after surgery.
Conclusion: Our data suggest an effect of intermittent, but not continuous PTH on the expression of WNT10b by lymphoid cells, this could be one of the mechanisms trough which PTH treatment increases OB formation and function.

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INFLUENCE OF DEGENERATIVE DISORDERS ON THE LUMBAR SPINE BMD AND TBS WITH AGE: THE COHORT OSTEOLAUS

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Objective: After menopause, typically, the values of lumbar spine (LS) BMD and TBS decrease with age. In practice, we are often faced with values of LS BMD "relatively" high for the age, which can lead to erroneous interpretations (reassuring diagnosis, therapeutic gain). Preliminary studies have shown that osteoarthritis (oa) does not influence TBS. The aim of this study was to measure changes in LS BMD and TBS values in women 50–80 years, taking into account the impact of fractured vertebrae (VFx) and oa (Voa).
Material and Methods: The 1,502 women 50–80 years old included in the cohort OsteoLaus (Lausanne, Switzerland) have had LS BMD and TBS, and VFA. 46 exams were not interpretable. All exams were analyzed independently by two experts following the guidelines of the ISCD, excluding in particular VFx (2.7 % of participants) and vertebra with >1 SD difference with the vertebra immediately adjacent (Voa 16.2 %).
Results: We included 1,456 women: age 66.7±11.7 years, BMI 25.7±4.4. The correlation between BMD and TBS was low (r^2=0.16). Participants were divided into six age groups: 50–55 years (n=175 gr1), 55–60 (n=229, gr2), 60–65 (n=342, gr3), 65–70 (n=325, gr4), 70–75 (n=215, gr5) and 75–80 years (n=169, gr6). BMD was artificially increased from 1.2 to 3.3 % on average according to the gr before excluding VFx and Voa (p<0.001). TBS did not change after excluding VFx and Voa (<0.1 % to 0.3 %, ns). The correlation (Vfx and Voa excluded) between age and BMD was −0.03, between age and TBS +0.34. BMD (Vfx and Voa excluded) was for the six age gr: 0.955±0.140 g/cm^2, 0.923±0.158, 0.906±0.158, 0.915±0.166, 0.914±0.165 and 0.934±0.187, respectively. Loss between 52.5 and 77.5 years was 2.16 %, or 0.09 %/year with a loss of 0.51 %/year from 52.5 to 62.5 years, followed by a gain of 0.21 %/year between 62.5 and 77.5 years. The change in BMD between two consecutive age gr was significant only between gr1 and gr2 (p<0.02). TBS (Vfx and Voa excluded) was for the six age gr: 1.357±0.093, 1.318±0.100, 1.292±0.091, 1.272±0.097, 1.257±0.103 and 1.236±0.099, respectively. Loss between 52.5 and 77.5 years was 8.96 %, or 0.36 %/year with a loss of 0.48 %/year between 52.5 and 62.5 years and 0.29 %/year between 62.5 and 77.5 years. Changes in TBS between 2 consecutive age gr was still highly significant (p<0.02 - p<0.0001). These results are confirmed and more pronounced in a sub-analysis including only women with Voa (with and without exclusion of Voa).
Conclusion: This study confirms the low correlation between LS TBS and BMD. It shows a double interest in TBS, particularly in the older population: 1) on average, TBS is not affected by fractures or oa disorders, 2) while BMD increases after 65 years (moderate degenerative disorders cannot be excluded from the analysis), TBS continues to decline. For the LS evaluation, TBS should play a leading role not only for diagnosis but also for treatment monitoring in view of its independence to osteoarthritis.
Disclosures: Didier Hans: Shareholder of medimaps group

P269
PHYSICAL FITNESS IN CHILDREN TREATED WITH GROWTH HORMONE BY JUMPING MECHANOGRAPHY: LEONARDO GROUND REACTION FORCE PLATFORM

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Objective: Growth hormone therapy is efficient in growth retardation caused by Turner syndrome (TS) and growth hormone deficiency (GHD). However it is unknown, if increasing of body size is accompanied by adequate increasing in muscle function. The aim of this study was evaluation of changes in physical fitness in children with GHD and TS after start of growth hormone therapy.
Material and Methods: The study group comprised of 25 children with GHD (11.2±2.9 year) and 8 girls with TS (9.2±2.1 year). Measurements were done before start of growth hormone therapy and after 3, 6 and 12 months of therapy. Physical fitness was evaluated basing on single two leg jump. Leonardo (Novotec Medical GmbH, Germany) was used. Leonardo measures dynamics of ground reaction forces and calculates two parameters: Efficiency and Esslinger Fitness Index, expressed as Z-scores. ANOVA with repeated measurement was used for analysis of the data.
Results: Before start of the treatment, mean (SD) in children with GHD was −0.99 (1.62) for Efficiency Z-score and −1.88 (1.42) for Esslinger Fitness Index Z-score; and −2.87 (1.14) and −1.52 (0.65) in girls with TS, respectively. In children with GHD, mean change after 12 months of therapy was 0.28 (n.s.) for Efficiency Z-score and 0.47 (p<0.005) for Esslinger Fitness Index Z-score. In girls with TS mean changes were 1.12

($p<0.05$) and 0.41 (n.s.), respectively. In children with GHD after start of growth hormone therapy Efficiency increases as fast as in reference data and Esslinger Fitness Index increases even faster than in reference data. On the contrary, in girls with TS, Efficiency increases faster than in reference data and Esslinger Fitness Index increases as fast as in reference data.

Conclusion: The data suggests that growth hormone therapy significantly attains to catch up of physical fitness.

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MARKERS OF BONY METABOLISM IN PEOPLE WITH POSTINFARCTION CARDIOSCLEROSIS

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Objective: To assess the state of osseous tissue and markers of bony metabolism (MBM) in patients with postinfarction cardiosclerosis.

Material and Methods: Group I included 16 healthy individuals (62.3±6.05 years), group II - 29 patients with postinfarction cardiosclerosis (62.9±5.46 years). Structural and functional state of osseous tissue was assessed by means of ultrasound densitometry of calcaneus using a Sahara device (Hologic, USA). Serum level of the marker of bony tissue formation–osteocalcin (OC) and the marker of resorption β-crosslaps was determined by the immunoenzymatic method on analyzer «Eleksys 2010». Blood plasma calcium (Ca) and phosphorus (P) levels were estimated of the spectrophotometer. Statistical analysis was done using Statistica 7.0.

Results: Extrapolated index of calcaneal BMD was in group I 0.516±0.11 g/cm^2, in group II - 0.462[0.397; 0.510] g/cm^2 and differed ($p=0.018$) between the groups by Median test ($\chi^2=5.6$). T-score parameter in group II was lower ($p<0.05$; $\chi^2=9.01$) than in group I and was −1.1[−1.8;−0.8]. Parameters of ultrasound densitometry of calcaneus by T-score in group II corresponding to osteopenia were in 59 % and corresponding to osteoporosis - only in 7 %. OC amounted to 14.7± 5.14 ng/ml in group I, and to 17.03±7.83 ng/ml in group II, β-crosslaps was 0.214[0.182; 0.349] ng/ml and 0.354± 0.17 ng/ml, respectively. The values of MBM didn't differ between the groups ($p>0.05$). There was a strong correlation between OC and β-crosslaps ($R=0.86$; $p<0.05$), in all the subjects their values were either within normal limits or reduced and only one patient had elevated β-crosslaps. The groups didn't differ by levels of Ca and P.

Conclusion: Thus, in patients with postinfarction cardiosclerosis findings of ultrasound densitometry of calcaneus by T-score most often evidence osteopenia, rarely osteoporosis. Assessment of the MBM (OC, β-crosslaps) in cases when T-score parameters correspond to norm and osteopenia is less informative.

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INTERRELATION OF BONE MINERAL DENSITY WITH EROSIVE CHANGES AT HAND JOINTS MRI IN PATIENTS WITH EARLY RHEUMATOID ARTHRITIS

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Objective: To assess changes in BMD in patients with early rheumatoid arthritis (ERA) and how the BMD is related to the erosive changes of wrist MRI.

Material and Methods: The study involved 56 patients with ERA who had suffered of articular syndrome for 1 year (9.3± 2.4 months). Clinical and laboratory studies included: DAS28, ESR, RF, anti-CCP, anti-CMV tests. Hands were radiographed at baseline. Distal radius and lumbar spine BMD were assessed by DXA "Challenger" (DMS). MRIs of the patient's dominant wrists were obtained using 1.5T MRI "Magnetom Espree".

Results: The DXA showed bone loss in patients with ERA. When analyzing the lumbar spine osteoporosis was found in 3 patients and osteopenic syndrome was identified in 21 patients. In the study of the distal radius the more substantial bone loss was established: osteoporosis was diagnosed in 12 patients, osteopenic syndrome in 32 patients. The BMD decrease at the distal radius correlated with DAS28. As for BMD of the lumbar spine, only the correlation with DAS28 was found. Bone erosions were identified with standard radiography in 12 patients. Detection of erosions on radiographs correlated with the presence of synovitis hand joints, clinically established, DAS28, seropositivity for the three antibodies. MRI of the dominant wrist revealed the next MR symptoms: swelling of the bone marrow in 54 patients, synovitis in 40, erosion in 34. MRI detected the erosions 2.8 times more cases than the conventional radiography. Erosion was confirmed in patients with a high rate of DAS28, in seropositive cases, and those with the synovitis. Strong correlation between BMD of the distal radius and the presence of erosions detected by MRI, and lumbar spine BMD and erosions was established.

Conclusion: The BMD changes can be predicted early by the development of erosive process in ERA patients. The early loss of a wrist bone measured in the first year of the disease using the DXA is an independent predictor of erosive progression.

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ATYPICAL FEMORAL FRACTURE RISK FACTORS: A POPULATION-BASED CASE-CONTROL STUDY

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Objective: To identify risk factors for atypical femoral fractures (AFF) in women enrolled in a large integrated health care organization.

Material and Methods: This population-based case-control study included women aged ≥45 years with a qualifying fracture between 2007–2011 and ≥6 months enrolment in the health plan prior to index. Each physician-validated AFF case was matched 1:1 on index date and medical center to two control groups: 1) other subtrochanteric/diaphyseal fractures (SUBTROCH), and 2) "classic" femoral neck or intertrochanteric hip fractures (HIP). Potential risk factors included demographic characteristics, clinical factors, bisphosphonate (BP) use, and other pharmacologic exposures up to 3 years prior to index.

Results: 115 AFF cases were matched to 107 SUBTROCH and 115 HIP control subjects. Compared to SUBTROCH, younger age (median age 70 vs. 80 years, $p<0.01$), Asian race (vs. White, OR 13.0; 95%CI 3.1–54.8), osteoporosis diagnosis prior to index (OR 2.5; CI 1.2–4.9), active use of BPs at index (OR 6.4; CI 3.0–13.4) were independent predictors of AFF status. AFF risk increasing monotonically from OR 5.8 (CI 1.9–17.2) for BP use <4 years to OR 13.3 (CI 4.2–42.2) for use ≥8 years (p for trend<0.01). Compared to HIP, younger age (median age 70 vs. 83 years, $p<0.01$), Asian race (vs. White, OR 11.7; CI 3.6–37.9), osteoporosis diagnosis prior to index (OR 2.1; CI 1.1–3.9), active use of BPs at index (OR 6.8; CI 3.2–14.2), and longer duration of use of BPs (median 6.6 vs. 2.4 years, $p<0.01$) were independent predictors of AFF status. AFF risk increased from OR 3.3 (CI 1.3–8.8) for <4 years of BP use to 10.5 (CI 3.6–30.8) for ≥8 years use (p for trend<0.01).

Conclusion: AFF subjects appear to differ from those with other hip/femur fractures by age, race, and patterns of BP use prior to fracture. As investigation into the pathophysiology of AFF continues, our findings may provide insight into the role of potentially modifiable risk factors such as BP use.

Disclosures: Study funded by Amgen, Inc.

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THE IN VIVO ROLE OF BONE SPECIFIC EPHB4 RECEPTOR OVEREXPRESSION IN OSTEOARTHRITIC SYNOVIAL MEMBRANE

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Objective: Osteoarthritis (OA) is characterized by joint destruction including synovial membrane inflammation and abnormalities including fibrosis. Members of the ephrin family, the EphB4 receptor and its specific ligand ephrin-B2, were found to positively impact OA subchondral bone and cartilage[1,2]. An in vivo study[3] on overexpression of EphB4 in bone (TgEphB4) demonstrated a protective effect on subchondral bone and cartilage during OA. We further investigated, in vivo, the effect of TgEphB4 on synovial membrane during OA.

Material and Methods: Knee OA was surgically induced (DMM) in 10-week-old male TgEphB4 and wildtype (WT) mice. Synovial membrane evaluation was performed at 12 weeks postsurgery, and factors including fibrotic markers and signaling molecules were determined.

Results: Data demonstrated a significant decrease in synovial membrane thickness ($p\leq0.02$), procollagen type I ($p\leq0.01$), and fibrin ($p\leq0.04$) in DMM-TgEphB4 compared to DMM-WT. The expression levels of the fibrotic markers connective tissue growth factor (CTGF, $p\leq0.02$), smooth muscle actin α (SMAα, $p\leq0.03$) and serum cartilage oligomeric matrix protein (COMP, $p\leq0.03$) were significantly reduced in DMM-TgEphB4 compared to DMM-WT. Although TGF-β was decreased in the DMM-TgEphB4 mice, statistical significance was not reached. However, the level of TGF-β signaling profibrotic members, TGFR1/ALK1, pSmad-1 and a member of the heat shock protein family, HSP90β, known to play a crucial role in enhancing TGF-β signaling, were all significantly decreased ($p\leq0.04$) in DMM-TgEphB4.

Conclusion: This is the first in vivo evidence that protecting the subchondral bone prophylactically reduces the severity of structural and pathological changes in synovial membrane during the OA process. Moreover, overexpression of bone- specific EphB4 in mice prevents the development and/or progression of fibrosis in OA synovial membrane. This study stresses the in vivo importance of subchondral bone structure/biology in OA joints.

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NOVEL DIAGNOSTIC TOOL: IN VIVO BONE STRONTIUM QUANTIFICATION, RECENT DEVELOPMENTS

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Objective: To present a novel diagnostic tool suitable for the *in vivo* bone strontium measurement and it application for monitoring osteoporotic patient treated with strontium based medications.
Material and Methods: The in vivo X–ray fluorescence (IVXRF) based diagnostic tool, with I-125 brachytherapy seeds as an excitation source and a lithium drifted silicon detector, is in clinical use for the in vivo measurement of strontium [1,2].
Results: The IVXRF was successfully used to measure non-invasively patients self- administrating strontium citrate over 4 years [1,2]. The system was sufficiently sensitive to detect initial strontium levels in all subjects and to demonstrate increases in bone strontium even during the first week of administration.
Conclusion: This noninvasive, in vivo and painless diagnostic tool could be used for both clinical use and research into the long term effects of strontium in healthy and osteoporotic patients. As strontium bone levels continue to rise after years of its administration, the importance of monitoring patients over a long-term period and the issue of correcting for BMD test scores in such individuals becomes essential. Consumption of strontium medications and supplements for more than 6 months affects BMD scores for years following the intake, such that BMD scores are falsely increased [3]. Hence, the IVXRF based diagnostic tool emerges as a promising novel diagnostic tool to measure and monitor bone strontium levels, at even lower risk than the conventional BMD method, along with allowing for the correction of BMD scores in patients treated with strontium based medications or supplements.
References: [1] Moise H et al. Bone 2012;51:93. [2] Moise H et al. Bone 2014;doi: 10.1016/j.bone.2014.01.002. [3] Blake GM & Fogelman I. J Bone Miner Res 2006;21:1417.

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QUALITY OF LIFE IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS

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Objective: To investigate the quality of life of patients with postmenopausal osteoporosis and to compare it with the quality of life of women in the control group (with hypothyreosis) by using a questionnaire to measure the quality of life of patients with osteoporosis (Qualeffo-41), which consists of 41 questions grouped into five domains: pain, physical function, social function, general health perception, and mental function.
Material and Methods: This is a clinical prospective study conducted in two parallel groups of patients. The first group consisted of 100 patients having a diagnosis of osteoporosis (T-score ≤ -2.5 SD). Diagnosis using DXA in the office osteodensitometry (Discovery™ bone densitometer), Clinical Center, Kragujevac. The second group includes 30 patients with hypothyroidism (control group) and normal bone density findings (T-score to −1.6).
Results: Between the two groups of women with osteoporosis and hypothyroidism there was statistically significant higher values Qualeffo-41 questionnaire on quality of life, in all aspects of testing (pain, physical function, social function, general health perception, and mental function) ($p<0.001$). In the domain of pain, physical function, social function, general health perception the results were worse in the group of patients with osteoporosis indicating poorer quality of life in these areas, while in the field of mental function quality of life was worse in the control group.
Conclusion: The overall conclusion is the result of this study showing that osteoporosis itself leads to lower quality of life as measured by Qualeffo-41.

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VASTUS MEDIALIS MUSCLE FAT CONTENT AS ASSESSED BY MAGNETIC RESONANCE IMAGING (MRI) IS A RISK FACTOR FOR KNEE OSTEOARTHRITIS PROGRESSION: RELEVANCE IN A CLINICAL TRIAL

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Objective: Recent osteoarthritis studies propose vastus medialis (VM) muscle surface as a variable associated with cartilage volume loss (CVL) over time. However, such muscle area may also include a significant proportion of fatty infiltration (%Fat) which may influence the knee mechanics/metabolism. We contrasted the muscle %Fat with CVL and changes in bone marrow lesions (BMLs) assessed by MRI using data from a recent randomized clinical trial in knee OA[1].

Material and Methods: A subgroup of 143 patients from the ATP population of a 2-year randomized clinical trial evaluating the impact of licofelone vs. naproxenand having MRI acquisitions at baseline and 2 years were studied. MR images of the VM (mm^2) were evaluated semi-automatically and VM %Fat by a fully automated software.

Results: The average %Fat/VM surface area was 6.3±3.9 %. In the VM, the median baseline %Fat (5.1 %) was chosen to separate patients with high vs. low fat content. Female (p=0.004), higher BMI (p=0.0012), and disability (WOMAC function, p=0.04) were associated with a higher %Fat. Change at 2 years in %Fat was univariately strongly associated with an increase in the BML score in the global knee (p=0.0002) and CVL in the global knee (p=0.01), lateral compartment (p=0.02), plateau (p=0.01), and medial plateau (p=0.03). No correlations were found between %Fat change and change in symptoms over time. Multivariate analyses correcting for age, gender, BMI, and meniscal damage revealed correlations with %Fat for the CVL of the global knee (p=0.011), plateau (p=0.012), medial plateau (p=0.019), and condyle (p=0.027). Importantly, %Fat change was independently and strongly associated with BML change (p<0.0001). All the above changes were found irrespective of the treatment the patients had during the clinical trial.

Conclusion: These data demonstrated, for the first time, that the %Fat in the VM was strongly associated with CVL and the occurrence and progression of BMLs.

References: [1]Raynauld JP et al. Ann Rheum Dis 2009;68:938.

Disclosures: JPR: consultant for ArthroLab. JPP, JMP: shareholders in ArthroLab. FA: employee of ArthroLab.

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THE EVALUATION OF THE TRYPTOPHAN AND KYNURENINE PATHWAY IN OSTEOPOROTIC HIP FRACTURES

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Objective: Different studies suggested that the degradation of tryptophan could be formed around the inflamed surface and speculated on the altered expression of indolamine 2,3-dioxygenase (IDO) which might cause the inhibition of inflammatory cascades and prevent or slow down the tissue damage. This research was aimed to evaluate the differences of kynurenine/tryptophan pathway and their relation to bone metabolism.

Material and Methods: The study group were included 62 patients with osteoporotic hip fracture; 41 female-21 male, mean age was 76.26±6.65–77.28±7.32 years. Twenty-four of them (Group 1) had collum femoris fractures and 38 of those (Group 2) had intertrochanteric fractures of hip. All fractures were due to low energy trauma, simple falls. BMD measurements were done with Lunar DXA. The measurements were performed on the intact side of the hip and measurements were obtained as femoral neck, wards, trochanteric and total BMD values. Measurement of tryptophan and kynurenin (Kyn) levels were done by HPLC with UV detection. The eluate was monitored by the programmed wavelength detection setting at 360 nm for Kyn and at 278 nm for Trp. The ratio of kynurenine and tryptophan concentrations was calculated to estimate the activity of IDO.

Results: All BMD values were in agreement for osteoporosis and no significant differences between the two groups. The mean and standard deviation values for Kyn and Trp levels in Group 1 (2.657±0.829, 24.990±8.773, respectively) and in Group 2 (2.344±0.803, 30.800±11.902, respectively) were not different. However the ratio of Kyn and Trp concentrations for Group 1 was 118.20±50.81 and for Group 2 is 83.60±34.81 and it was statistically significantly different (p=0.011).

Conclusion: The increased degradation of tryptophan and the ratio of kynurenine/tryptophan may indicate the immune activation and the increased macrophage IDO activity of a low energy trauma induced osteoporotic hip fracture.

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DENOSUMAB THERAPY FOR THE TREATMENT OF PERSISTENT OR RELAPSED HYPERCALCEMIA OF MALIGNANCY (HCM)

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Objective: HCM, caused primarily by tumor-induced bone resorption, is often treated with intravenous (IV) bisphosphonates (BisP). HCM may persist or relapse despite such therapy. Denosumab binds to RANK ligand (RANKL) to inhibit osteoclast-mediated bone resorption.

Material and Methods: In this single-arm, open-label study, patients (pts) with HCM (corrected serum calcium [CSC] >12.5 mg/dL) despite IV BisP treatment ≥7 and ≤30 days before screening, received subcutaneous denosumab 120 mg on days 1, 8, 15, and 28, then every 4 weeks. The primary endpoint was the proportion of pts with CSC ≤11.5 mg/dL within 10 days of denosumab initiation.

Results: The study enrolled 33 pts (64 % men; mean age 60 years; 76 % with advanced solid tumors, 39 % with bone metastases [BM]), with a median (25th, 75th percentile [Q1, Q3]) follow-up of 56 (18, 79) days. Median (Q1, Q3) baseline CSC was 13.7 (13.2, 14.2) mg/dL; 19 pts (58 %) had HCM symptoms. Median (Q1, Q3) time from last BisP treatment to first dose was 17 (13, 22) days. By day 10, 21 pts (64 %) reached CSC ≤11.5 mg/dL, including 7 of 13 pts (54 %) with and 14 of 20 (70 %) without bone metastases. Over the course of the study, 23 pts (70 %) reached CSC ≤11.5 mg/dL. A complete response (CSC ≤10.8 mg/dL) occurred in 12 pts (36 %) by day 10 and in 21 pts (64 %) over the course of the study. In pts who reached CSC ≤11.5 mg/dL, the estimated median duration of response was 104 days. The most frequently reported serious adverse event were hypercalcemia (5 pts, 15 %) and dyspnea (3 pts, 9 %) Two pts had isolated episodes of CSC levels ≤8.0 mg/dL; no pts had CSC <7.0 mg/dL. No osteonecrosis of the jaw was reported.

Conclusion: In pts with HCM despite recent IV BisP treatment, 64 % of pts responded to denosumab within 10 days. The sustained duration of response observed is a favorable outcome in this population. No unexpected safety findings were identified. Denosumab may offer a new treatment option for HCM.

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FLAVONOL INHIBITS FORMATION OF OSTEOCLASTS IN CULTURE SYSTEM RATHER THAN FLAVANONE

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Objective: Polyphenol have been reported to have physiological effects with respect to alleviating diseases such as osteoporosis and osteopetrosis. We recently reported that the olive polyphenol hydroxytyrosol accelerates bone formation both in vivo and in vitro (Eur J Pharmacol 2011;662:78). The present study was designed to evaluate the in vitro effects of flavonoid, such as flavonol and flavanone, on the formation of multinucleated osteoclasts in culture system.

Material and Methods: Multinucleated osteoclasts were formed from the mouse splenic cells by coculture system with ST2 cells stimulated by 100 nM vitamin D_3. Osteoclastic cells were fixed and stained for TRAP activity. TRAP-positive multinucleated cells (five or more nuclei) were counted under a microscope. We used fisetin, quercetin, and rhamnetin as flavonol and hesperetin, naringenin, and sakuranetin as flavanone in this study.

Results: Fisetin, quercetin, and rhamnetin at 10 μM completely inhibited the formation of multinucleated osteoclasts. By contrast, the weak inhibition of osteoclast formation were observed with hesperetin, naringenin, and sakuranetin at 10 μM.

Conclusion: These results suggested that the hydroxyl group at carbon 3-position of flavonol might play a critical role on inhibition of osteoclast formation.

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IDENTIFYING THE CUTOFF POINT OF SUPPRESSION OF EXCESSIVE PTH SECRETION: METHOD OF FINDING THE POINT OF CORRELATION CHANGE

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Objective: Serum 25(OH)D is the best indicator of the status of vitamin D (vitD), but target levels of vitD in the blood are still represent a matter of debate. Taking into the consideration the difficulties of standardization of assays for vitD, the priority arrears of the research are the development of a method-dependent reference values with the use of biomarkers for vitD sufficiency. One such widely recognized biomarker is the correlation of vitD with PTH, the main characteristic of which is the "loss" of the correlation, i.e., no increase in PTH (and associated mobilization of calcium from the bones) after reaching a certain concentration of vitD, the determination of which defined our goal.

Material and Methods: The study included patients (n=163, 30M/133F; mean age 48.5±18 years) in which levels of total 25(OH)D (Liaison, DiaSorin) and PTH (Elecsys, Roche) were measured during autumn period (September–October). In selection of patients we used exclusion criteria: presence of primary hyperparathyroidism, secondary or tertiary hyperparathyroidism on the background terminal chronic renal failure, hypercortisolism, blood creatinine level of more than 100 mmol/l or GFR less than 60 ml/min/1.73 m^2, intake of active vitD metabolites within 1 month prior the blood test. Our lab participates in the international program of external control and standardization of vitD in the blood (DEQAS, UK).

Results: Threshold of vitD to "plateau" the secretion of the PTH was 24.8 ng/ml, which separated the correlations between logPTH and vitD, R=−0.31 (p<0.02) and R=0.04 (p=0.04), with also a statistically significant difference between the coefficients of correlation in groups on either side of this threshold point at the level p<0.05.

Conclusion: Thus, the threshold value of vitD in the blood to suppress excessive secretion of PTH in the group of generally healthy patients was found to be 24.8 ng/ml.

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SUSTAINED P1NP SUPPRESSION WITH MONTHLY 150 MG RISEDRONATE TREATMENT OF POSTMENOPAUSAL WOMEN WITH LOW BONE MASS DURING 1 YEAR TREATMENT ANALYSIS AND EVALUATION OF RISK OF FALLING IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Objective: It is to evaluate response of risedronate 150 mg once a month on P1NP, a highly specific marker of bone formation and its correlation with another high specific marker of bone resorption, C telopeptide after 1 year treatment in women with low bone mass. This two measurements has been suggested by IOF and IFCC as a reliable, specific and reproducible bone markers.

Material and Methods: N-terminal propeptide of procollagen type I (P1NP) and serum β-crosslaps (CTx) were evaluated in 80 postmenopausic Venezuelan women with low bone mass (T-score <−1.5) either at lumbar spine(LS) or femoral neck(FN) (Lunar Prodigy Advance, CV 1.5 %). P1NP and CTx were measured on fully automated Cobas e411 (Electro-chemiluminescent immunoassay analyzer).

Results: Age was 59.8±8.3, age of menopause 46.8±6.3, 26 % had received HRT for a mean of 2.99 years. BMD increased at lumbar spine 3.58 % and 3.45 % at femoral neck. P1NP reduction was: 46.3 % and 54.3 % at 3 and 12 months. Serum P1NP decreased more than 10 % in 94.7 % and 95.8 % of patients at 3 and 12 months, respectively.

	Initial	3 months	12 months	p
DMO LS gr/cm2	0.889±0.1		0.918±0.1	<0.000
DMO FN gr/cm2	0.768±0.08		0.794±0.08	<0.000
Ca serum (mg-dl)	9.66 ± 0.37	9.72 ± 0.38	9.66±0.41	ns
P serum (mg-dl)	3.82 ± 0.46	3.78 ± 0.41	3.91±0.43	ns
Creat serum (mg/dl)	0.93 ± 0.1	0.86 ± 0.1	0.88±0.14	ns
Alkaline phosphatase (UI)	49.8 ± 13.4	42.6 ± 11.5	36.05±9.06	<0.000, initial vs 3 and 12 mo <0.000 3 vs 12 mo
P1NP (ng/ml)	59.06 ± 22.3	31.01 ± 17.8	25.19±14.32	<0.000, initial vs 3 and 12 mo <0.000 3 vs 12 mo
CTx (ng/ml)	0.45 ± 0.18	0.21 ± 0.14	0.22±0.13	<0.000 initial vs 3 and 12 mo ns 3 vs 12 mo
Urinary Ca/creat	0.19 ± 0.1	0.17 ± 0.1	0.15±0.07	ns

Conclusion: Risedronate 150 mg once a month suppressed bone remodeling into normal premenopausal reference range measured by 46.3 % reduction on P1NP at 3 months and 54.3 % at 12 months. CTx decreased 48 % and 42 % at 3 and 12 months, respectively. Serum P1NP decreased more than 10 % in 94.7 % and 95.8 % of patients at 3 and 12 months, respectively. BMD increases 3.58 % at lumbar spine and 3.45 % at femoral neck. Our data support the use of changes in P1NP as a good indicator of effectiveness during, early 3 months or sustained 12 months,

treatment of postmenopausal women with low bone mass with risedronate 150 mg once a month.

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VITAMIN D STATUS IN A POPULATION HOSPITALISED IN OUR CLINICAL SERVICE

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Objective: Vitamin D3 is a major factor in bone metabolism. Vitamin D deficiency has been recognized as a pandemic with a myriad of health consequences. Vitamin D deficiency is more common than expected, particularly among adolescents, women, the elderly or people who live in northern regions. Our aim was to determine plasma levels of vitamin D3 in patients admitted in our clinical area for various endocrine pathologies and postmenopausal osteoporosis.

Material and Methods: We evaluated the status of vitamin D3 by measurement of serum 25-hydroxyvitamin D3 ($25OHD_3$) in 176 patients admitted to our clinical sector between January–August 2013. The age of patients ranged from 4 to 87 years. Of this total, 59.6 % patients were in postmenopause and the diagnosis of osteoporosis has been shown from 45.16 % of them using the DXA determination. Serum $25OHD_3$ concentration was measured by chemiluminescence assay with minimum detection limit of 3.0 ng/ml. Vitamin D3 insufficiency has been defined for the serum levels <20 ng/mL(<50 nmol/L) and Vit. D3 deficiency <10 ng/mL(<25 nmol/L).

Results: We found a high prevalence of both vitamin D deficiency:17.14 % and insufficiency:57.86 % in our study population. The mean serum level of 25OHD3 was 16.90 ng/mL. In our study, vitamin D deficiency was observed in: −16.47 % postmenopausal women, −19.05 % patients with osteoporosis, −10 % children and adolescents. Vitamin D insufficiency was observed in: −43.53 % postmenopausal women, −61.9 % osteoporotic patients, −40 % children and adolescents. 50 % of children and adolescents were presented vitamin D levels between 20 and 30 ng/ml but, none of them had vitamin D levels >30 ng/ml. Vitamin D sufficiency >30 ng/mL was observed only at 5 % of all study population.

Conclusion: In our study, we have demonstrated insufficiency, deficiency in vitamin D3, illustrating this through in a sample of patients hospitalized in our service of Endocrinology. That is an important clinical problem in the world.

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VIOLATION OF CALCIUM-PHOSPHORUS METABOLISM AND CALCIUM-REGULATING HORMONES (CRH) AS A MAJOR DETERMINANT OF OSTEOPOROSIS WHICH ASSOCIATED WITH LIVER CIRRHOSIS (LC)

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Objective: To determine violations of mineral metabolism, concentration of calcium regulating hormones, as well as to establish influence of disturbances in these systems of osteoporosis associated with LC.

Material and Methods: We observed 172 patients with LC, the average age 49.3±7.7 years. There were 108 (62.8 %) men and 64 (37.2 %) women. BMD was determined by DXA "Challenger" (DMS, France). We also determined the serum concentration of calcium and phosphorus, urinary excretion, the level of PTH and 25(OH)D.

Results: We found significant violations of calcium-phosphorus metabolism, changes in the CRH, and reduced BMD in patients with LC, but the severity of the imbalance depended on the severity of the disease and correlated with the main laboratory criteria of liver dysfunction. We observed decrease serum concentration of total and ionized calcium, as well as expressive tendency to hypercalciuria. The concentration of 25(OH)D was 9.88±4.36 ng/ml (in control 26.76± 9.27 ng/ml; $P<0.01$). The level of deficit depended on the degree of liver dysfunction. In the case of compensated of LC the level of 25(OH)D was 12.93±5.42 ng/ml and decompensated—4.53±1.22 ng/ml (a decrease of 2.8 times). The received results emphasize that abnormal liver function significantly affects formation of 25(OH)D. PTH was elevated in a majority of patients. Serum concentrations of PTH were on average 82.2±5.3 pg/ml in patients with LC. It significantly changed at different degrees of disease activity and severity of hepatocellular insufficiency. The PTH was 39.8±3.1 pg/ml in compensation stage, 89.8±4.2 pg/ml in subcompensation, 103.2±11.7 pg/ml in decompensation.

Conclusion: Thus, in patients with LC, violations of mineral metabolism with emergence of resistant hypocalcemia, and lack of active vitamin D metabolites, as well as development

of secondary hyperparathyroidism, especially in severe liver dysfunction, are observed. These patients are diagnosed with grave osteoporosis.

by numerous factors. In patients with osteoporosis incidence of knee OA was lower compared to women with normal BMD.

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CLINICAL FEATURES OF KNEE OSTEOARTHRITIS (OA) DEPENDING ON THE STATE OF BONE MINERAL DENSITY (BMD)

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Objective: The aim of the study was to determine the relationship between the frequencies, clinical characteristics of patients with knee OA with different BMD.
Material and Methods: The study included 103 women with established osteoarthritis of the knee, the average age was 67.6±9.8 years. BMD and degree of bone loss was determined by DXA at the "Challenger" (MSD, France). For clinical assessment of the joints, Leken's index, range of motion, pain index according to the verbal scale of pain, functional index were determined. Knees were radiographed at baseline.
Results: The incidence of tibio-femoral and patella-femoral OA was significantly lower in women with osteoporosis than in women with normal bone. Thus, when the probable osteoporosis tibio-femoral OA (TFOA) was diagnosed in 53.3 % of patients, patella-femoral OA (PFOA)–in 13.3 %. At the same time in women with a normal bone state knee OA of sites was diagnosed in 78.6 % and 53.6 %, respectively. In case of identifying the osteopenic syndrome TFOA was diagnosed in 64.4 % of women and PFOA–in 15.8 %. We have not established the relationship between radiographic OA and bone loss. In patients with OA of the III stage, osteoporosis and normal bone tissue are discovered with approximately equal frequency. Analysis of the anthropometric characteristics revealed significant differences in BMI. In women with osteoporosis, BMI was significantly lower than in patients with normal bone mass. Patients with osteoporosis have longer duration of osteoarthritis; their Leken's index is more pronounced and their joints functional impairment is of a higher degree. There is a relationship of correlation ($r=-0.76$; $P<0.01$) between the functional index and BMD.
Conclusion: The study revealed that in patients with knee OA of various disorders, marked state of bone tissue and the degree of reduction in BMD are determined

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RECOGNITION OF OSTEOPOROSIS RISK FACTORS IN HIP FRACTURE PATIENTS: FIRST DATA FROM LATVIA

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Objective: Osteoporosis (OP) and its related fractures are highly prevalent condition worldwide with known risk factors. The aim of the study was to analyze recognition of OP risk factors in patients with hip fractures.
Material and Methods: Retrospective medical record analysis of patients (pts) attended to Riga 2nd Hospital specialized in traumatology and orthopaedics. All pts included in the study were admitted to hospital in 3 year period (08.12.2009–19.12.2012) and had a hip fracture as a result of low energy trauma. OP risk factors such as gender, age, habits, comorbidities, medication, including glucocorticosteroid (GCs) use, previous fracture were analyzed. All interval data were presented in median values with interquartile range (IQR).
Results: A total of 888 pts medical records were analyzed: predominantly females (73.1 %) older than males 80 (IQR, 86–72) yrs vs. 72 (IQR, 80–61) yrs ($p<0.001$). Such risk factors were recognized: previous fracture–14.8 % (more than one fracture 9.2 %), smoking–12.5 %, alcohol abuse–7.7 %. Totally 24.4 % of all pts had comorbidities increasing risk of OP (28.0 %–chronic obstructive pulmonary disease or sarcoidosis, 9.9 %–diabetes mellitus, 8.7 %–chronic kidney disease, 1.5 %–rheumatoid arthritis, 0.7 %–gastrectomy). Only 1.4 % ($n=12$) of all pts used GCs in long-term. Medication increasing risk of OP (e.g., anticonvulsants, proton pump inhibitors) used 6.2 % ($n=55$) of all pts. Almost half of the pts had at least 1 OP risk factor, 30.6 % of pts had 2 risk factors, 9.2 % had 3 risk factors, 2.5 %–4 risk factors and 0.3 %–6 risk factors. Only in 2.8 % ($n=25$) pts OP diagnosis was found in medical records and 2.5 % ($n=22$) pts had recommendations for further OP evaluation or treatment.

Conclusion: Although most often cause of hip fractures is low BMD, especially in elderly, OP risk factors not always are recognized in Latvia and, as a result, there are future fractures, chronic pain and disability.

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EXAMINATION OF BONE MINERAL DENSITY AND FAT MASS IN TYPE 2 DIABETES MELLITUS POSTMENOPAUSAL WOMEN

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Objective: The metabolic processes occurring in diabetic postmenopausal women could produce deviations in tissue distribution and affect the components of body composition. Several studies indicated that postmenopausal diabetic women have a high risk of osteoporotic fractures. Nevertheless the data relating to BMD in this category of patients are rather contradictable. The central distribution of body fat as a predictor of cardiovascular diseases is important for clinicians to accurately measure. The aim of the study was to assess BMD and features of fat mass distribution in women with type 2 DM in comparison with nondiabetic women of similar age and BMI.
Material and Methods: We examined 205 women with type 2 DM (mean age: 58.32±7.32 year, the duration of DM: 11.03±5.34 year, age of manifestation: 48.63±8.97 year, BMI: 32.34±5.16, HbA1c: 9.2±1.7 %) and 68 age-, BMI- matched controls. The investigation involved anthropometry of patients (height, weight, BMI, waist circumference), general clinic examination and DXA (including BMD measuring at femoral neck and lumbar spine and body composition program).
Results: BMD (g/cm^2) was statistically lower in diabetic patients both at spine (1.01±0.16 vs. 1.13±0.15, $p<0.05$) and at femoral neck (0.81±0.164 vs. 0.92±0.153, $p<0.05$) in comparison with controls. Fat mass distribution parameters in type 2 DM patients and controls were: Total Body: 38.67±7.31 % vs. 37.24±6.73 % ($p=0.24$); Android: 45.06±7.56 % vs. 44.23±8.34 % ($p=0.005$); Gynoid 39.60±8.04 % vs. 40.68±7.54 % ($p=0.201$); Trunk/Total: 0.57±0.05 vs. 0.51±0.07 ($p<0.001$);(Arms+Legs)/Total: 0.67±0.18 vs. 0.87±0.28 ($p<0.001$).
Conclusion: The results of study revealed the prevalence of central (android) distribution of body fat among postmenopausal women with type 2 DM in comparison with nondiabetic patients. Also the data confirmed bone loss manifestation in type 2 DM postmenopausal women both at spine and at femoral neck.

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LIFESTYLE INFLUENCE AND INCIDENCE OF OSTEOPOROSIS IN THE SEASHORE AREA OF ROMANIA

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Objective: Evaluation of lifestyle and secondary factors and involvements in osteoporosis incidence in postmenopausal women from an area of Romania with a high level of sunny days by year.
Material and Methods: The study included 984 postmenopausal women, hereupon was evaluated BMD by DXA and appreciated the T- and Z-scores (by WHO criteria). In September it was evaluated the serum level of calcidiol (25-OH-vitamin D). The patients answered to a questionnaire about menopause, risk factors and lifestyle.
Results: Medium age was 61.5±8.2 years. 503 women (48.7 %) were diagnosed with osteoporosis (T-score>−2.5), 414 with generalized osteoporosis (82 %) and 89 with segmentary osteoporosis (18 %). 491 patients (38 %) were with osteopenia (T- score between −1/−2.5) and 38 women without osteoporosis (BMD normal). The age of menopause onset was 44.1±1.8 years at women with osteoporosis, 47.3±1.4 years at osteopenia and 49.4±1.4 years at women without osteoporosis. The sun exposure was 25±4.1 days in women with osteoporosis and 29±9.6 day in women with osteopenia. 102 patients (20.2 %) with osteoporosis taken calcium and vitamin D and 46 (4.5 %) had secondary causes of osteoporosis. The results of questionnaire denoted that only 97 patients (9.7 %) of women with osteoporosis and osteopenia had physical activity after menopause, 353 patients (35.5 %) made periodical investigations and 143 patients had fractures.
Conclusion: The incidence of osteoporosis and osteopenia is higher and underestimated, probably, at women from seaside area of Romania. The age of menopause onset is under the medium value from women of European Community. There is a negative correlation between Z-score and years from beginning of menopause. The serum level of calcidiol (25-OH-vitamin D) was slightly elevated although the number of sunny days was around 50 % per year. Periodical medical investigations, medical access information and level of education were superior to women without menopause.

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OSTEOPOROSIS IN PATIENTS WITH TOTAL HIP ARTHROPLASTY

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Objective: The objective of the study is to evidence the role of BMD in the rehabilitation of patients with total hip arthroplasty.

Material and Methods: The study, a representative sample analysis, was carried out at the Department of Medical Rehabilitation of the "Iuliu Haţieganu" UMPh Cluj- Napoca, in the period June–December 2009. The study inclusion criteria were met by a number of 58 patients aged between 30 and 83 years with uni- and bilateral cemented and uncemented total hip endoprostheses. A standard study protocol was elaborated, which included the measurement of BMD in the spine and both hips, using DXA, with the Lunar Prodigy Advance osteodensitometer, the software for orthopedic prostheses being available. The device used en. Core 11.X programs and computers with the Windows XP Professional operating system, allowing to determine bone mineral content BMC (grams) and BMD (g/cm^2) in seven different areas around the endoprosthesis, known as the Gruen zones. The patients were clinically evaluated using two scales: the Oxford Hip Score and Qualeffo-41. Statistical calculations were performed using the SPSS13.0 and Microsoft Excel applications.

Results: The two scores were significantly correlated ($p<0.005$) with the diagnosis made based on DXA examination and with the type of hip endoprosthesis (cemented or uncemented); they were higher in the case of low BMD (osteopenia/osteoporosis) and cemented endoprostheses.

Conclusion: Low periprosthetic BMD values delay the rehabilitation of patients with total hip endoprostheses. The lower the BMD levels in the entire skeleton, the less favorable the postoperative evolution, which also limited the quality of life of these patients.

References: Lou XF et al. Zheijang Univ Sci B 2007;8:76.

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HYALURONIC ACID "OSTENIL TENDON" IN PARTIAL THICKNESS TEARS OF THE SUPRASPINATUS TENDON: CLINICAL AND SONOGRAPHIC ASSESSMENT

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Objective: To determine the efficacy of hyaluronic acid (HA) injections Ostenil Tendon concerning pain, functional activity of the shoulder and tendon recovery in patients with partial thickness tears (PTT) of the supraspinatus tendon (SSP). The accuracy of ultrasonography (US) for diagnosis of PTT of the rotator cuff, benefit of performance of US-guided procedures and monitoring of therapy have been proved.

Material and Methods: 23 patients with painful shoulder and sonographic proved PTT of the SSP were included. A pain diary with a ten point VAS, Shoulder Function Assessment (SFA) scale (0–70) and questionnaires of the efficacy according to the patient and the physician were evaluated. US examination was provided by Mindray M5 scanner with multifrequency linear transducer (7.5–10 MHz). Ostenil Tendon 40 mg/2.0 ml was injected around the affected tendon once a week for a total of two injections. All applications were performed under US control.

Results: Pain was significantly reduced after the first injection and this effect was maintained until the end of the observational period. SFA Index was significantly improved. 76 % of patients gave a very good and good assessment of the efficacy, which coincided with the opinion of the physician. 77 % of patients had a complete recovery or improved structure of the SSP which was US demonstrated.

Conclusion: HA Ostenil Tendon led to a relatively rapid and sustained relief of pain and increased functional activity of the shoulder. US proved repair process of the tendon structure and gliding of the SSP as a result of lubricating and viscoelastic properties of the HA. No adverse events were observed. Injections under US control were accepted favorable by the patients.

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PROXIMAL FEMUR FRACTURE PATIENTS FEATURES IN A FLS IN BRAZIL

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Objective: To describe the features of patients who have had proximal femur fractures (PFF) in Prevrefrat–a FLS in Rio de Janeiro, Brazil.

Material and Methods: 63 patients with minimal trauma PFF have been followed from February 2011 to November 20013. The patients features, fractures, risk factors, associated diseases, BMD values, seric vitamin D levels, and incidence of new fractures are reported.

Results: 57 women and 6 men, from 51 to 95 years old had a minimal trauma PFF. The main fracture was transtrochanteric (30), femoral neck (29) and subtrochanteric (4). 3 women had bilateral fractures. 18 patients had only the PFF. 23 had one more fracture and 22 had two or more fractures. 38 patients had prior vertebral fracture. After DXA scan 49 were classified as osteoporosis and 14 as osteopenia. 44 patients had

vitamin D insufficiency or deficiency, 30 had arterial hypertension and 6 had diabetes. 45 prior fragility fractures, 19 early menopause and 11 with parent fractured hip were the more frequent fracture risk factors. All patients received calcium and vitamin D supplementation. Sixty-two patients received zoledronic acid 5 mg and 1 patient with stage 4 kidney disease received denosumab 60 mg. 3 patients had flu-like symptoms. All patients had 100 % of treatment adherence. No new fractures occurred. In all patients, there was no decrease in height.

Conclusion: In most cases the patients with minimal trauma proximal femur fracture had a previous fragility fracture. In such a group of patients with high risk of new fractures (1), we prefer not to use oral drugs due to historical poor adherence (2). No new fractures occurred using zoledronic acid and denosumab.

References: 1. Johnell O et al. Osteoporos Int 2004;15:175. 2. Landfeldt E et al. Osteoporos Int 2012;23:433

Disclosures: Speaker: GSK, Sanofi Aventis, Servier, Novartis Advisory board: Servier, Novartis

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CASE REPORT: OSTEOPOROTIC VERTEBRAL FRACTURE

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Objective: Osteoporosis is the most frequent metabolic bone disease characterized by: reduction of bone mass, alteration of bone architecture, deterioration of the quality of bone, and increase of the risk of fracture. The frequency of osteoporotic vertebral fractures reported by the literature varies between 33 and 85 %; of these, 25–33 % have a clinical manifestation when they occur. The case report brings into discussion the case of a patient in whom vertebral fracture was the first clinical manifestation of osteoporosis.

Material and Methods: Patient LP, aged 57 years, presented to our service in April 2013 for marked pain in the dorsolumbar spine, with onset 3 weeks before, causing her immobilization in bed. Of the patient's personal history and life conditions, we mention the onset of menopause at the age of 39 years, and smoking for approximately 25 years, 20 cigarettes/day. The objective examination of the patient at the time of presentation: BMI=23 kg/m^2, spontaneous pain on the percussion and mobilization of the dorsolumbar spine, without dural or neurological signs. Dorsolumbar spine X-ray, vertebral CT and the measurement of BMD using the method of DXA allowed to make a positive diagnosis and to initiate adequate antiosteoporotic treatment.

Results: Any change in the shape, size, outline or structure of a vertebral body should be interpreted in a clinical context. The majority of osteoporotic fractures are located in the thoracic or thoracolumbar region; an osteoporotic fracture above T7 is unusual and the suspicion of malignancy should be eliminated.

Conclusion: After 2 weeks of treatment (strontium ranelate 2 g/day and vitamin D3), we obtained am important improvement of symptomatology, and 4 weeks after the initiation of treatment, the patient resumed most of her daily activities.

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ALVEOLAR BONE LOSS AND BONE METABOLISM IN PREMENOPAUSAL WOMEN

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Objective: Premenopause period is characterized by a significant reduction in secretion of estrogen in a woman's body, which leads to the disturbance of bone metabolism. The aim of this study was to investigate the features of periodontal tissue statement, alveolar process and bone metabolism in premenopausal women.

Material and Methods: The 94 patients were selected on two groups: main group (54 women 40–49 years old, mean age 46.7±2.3 years) in premenopause, control group (40 patients 20–39 years old, mean age 31.4±3.4 years). Clinical and radiographic (panoramic X-Ray) conditions of periodontal statement were evaluated. Metabolic processes of bone tissue were evaluated by the serum levels of calcium related hormones (calcitonin PTH) and biochemical marker of bone remodeling such as deoxypyridinoline (DPD) in urine.

Results: In premenopausal period the rate of alveolar bone loss in premenopausal women group 2.53±0.3 mm was statistically significantly ($p<0.05$) higher compared with the control of 1.09±0.4 mm. Increased secretion of PTH in women in premenopause period is 45.49±2.12 compared with control of 38.33±1.92. Inhibition of secretion of calcitonin 1.02±0.43 compared to control 3.2±0.34. Unbalanced of remodeling processes reinforcing the resorption process deoxypyridinoline 8.62±0.43 nmol was statistically significantly ($p<0.01$) higher compared with 6.36±0.41 nmol. Inhibition of the bone formation 18.96±1.54 mmol/l was statistically significantly ($p<0.05$) higher compared to control 2.01±2.21 mmol/l..

Conclusion: Homeostasis violation of calcium related hormone reduced secretion of calcitonin and increased parathyroid hormone, misbalanced of the bone tissue remodeling processes, accelerated the rate of resorption and oppression

bone forming are a risk factor for resorption of alveolar bone and reduce the height of it.

References: 1 Lim S et al Lancet 2012; 2 Johnell O et al J Bone Miner Res 2005.

P293
WORLDWIDE QUANTITATIVE IMPACT OF BONE MINERAL DENSITY ON HIP FRACTURE INCIDENCE

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Objective: As part of the Global Burden of Diseases Study 2010 the Musculoskeletal Expert Group analysed the worldwide burden of low BMD as a risk factor for fractures using Comparative Risk Assessment (CRA) methodology[1]. Estimates on the influence of population BMD levels on the hip fracture incidence by world region are presented.

Material and Methods: A systematic review was done through MEDLINE, EMBASE, CINAHL, CAB abstract, WHOLIS, and SIGLE to search for population based studies with BMD at femoral neck (FNBMD) measured with DXA, which was analysed as a continuous variable. Age- and sex-specific values of FNBMD (mean and SD) in g/cm^2 were extracted, standardized and pooled using a Bayesian meta-regression tool, DisMod-MR, for population aged 50 years and over. The CRA methodology was used to estimate the proportion of fractures attributable to sub-optimal BMD, using the Potential Impact Fraction (PIF). The sex- and age-specific 90th percentile FNBMD from NHANES III was used as the theoretical minimum exposure risk distribution. From the authors of a previous meta-analysis[2] we obtained estimates of the gradient of risk of hip fracture (RR/SD) for BMD Z scores based on the combined data for men and women, and converted the RR/SD values into RR/0.1 g/cm^2 values. The PIFs were estimated for 21 world regions for 1990, 2005 and 2010, and expressed on a 0–1 scale. Results for 2005 are shown.

Results: There were large differences across regions. Lowest PIFs were found in North Americans aged 80–84 years both for males (0.412) and females (0.140), while highest PIFs were found in Sub-Saharan West Africans aged 55–59 years for females (0.871) as well as males (0.859). In general PIFs decreased with age more in females than in males.

Conclusion: The potential impact of BMD on hip fracture incidence varies widely among world regions. Influence of BMD on fracture risk decreases with age, particularly in women.

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VITAMIN D AND PATIENTS WITH PRIMARY HYPERPARATHYROIDISM (PHPT): HOSPITAL BASED STUDY IN LATVIA

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Objective: Vitamin D deficiency is more frequent condition in PHPT patients (pts) than in the general population. There is worsening of PHPT when vitamin D deficiency coexists. Vitamin D deficiency may worsen manifestations of PHPT by contributing more pronounced parathyroid gland proliferation. The aim of this study was to analyze vitamin 25(OH)D_3 level in PHPT pts in tertiary care multiprofile hospital in Latvia.

Material and Methods: Hospital based case control retrospective study analyzed medical records of pts admitted to the hospital in 4.5 year period (01.01.2009–30.06.2013). The statistical data were processed using SPSS 16.0. All the data were presented in the mean value with standard deviations. Normal range for calcium was defined 2.1–2.6 mmol/L, for PTH - 12.0–72.0 pg/mL, for phosphorus - 0.8–1.6 mmol/L, for alkaline phosphatase - <117.0 U/L. Vitamin sufficient concentration defined as >30.0 ng/ml, insufficiency as - 29.9–20.0 ng/ml and deficiency as <19.9 ng/ml.

Results: There were 176 medical records of 140 pts, 37 % of whom had their 25(OH)D_3 assessed. Study included 94.2 % females and 5.8 % males. Females were older than males, 62.4±12.1 and 56.7±3.8 year, respectively (p=0.09). Pts calcium level in the study population was 2.9±0.4 mmol/L, PTH level - 288.7±365.7 pg/mL, phosphorus level - 0.9±0.3 mmol/L, alkaline phosphatase - 88.6±39.3 U/L. Pts vitamin 25(OH)D_3 level was 15.5±8.9 ng/mL, female - 15.4±9.1 ng/mL, male - 17.7±7.4 ng/mL (p=0.64). For females aged up to menopause (n=5) vitamin 25(OH)D_3 level was 3.7±0.7 ng/mL, postmenopausal (n=44) - 16.7±8.6 ng/mL (p=0.002). A higher level of vitamin D was in postmenopausal females, presumably it could be explained by vitamin D supplementation.

Conclusion: Vitamin 25(OH)D_3 deficiency was found in all pts with PHPT in all groups.

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EFFECTS OF PHYSICAL THERAPY IN THE REHABILITATION OF PATIENTS WITH ARTHROSIS OF THE HIP

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Objective: To present the importance of physical therapy in the rehabilitation of patients with arthrosis of the hip. Coxarthrosis is one of the most common degenerative rheumatic diseases of the peripheral joints. It is characterized by chronic pain and limited mobility and they are major sociomedical problem. Arthritis is more common after the age of 40 and more frequently in women.
Material and Methods: In the period January–October 2013 in DZ Nis treated 80 patients, 52 women and 28 men, mean age 58 years, with a treatment duration of 14 days. Coxarthrosis was diagnosed history, clinical and radiographic findings. In the first group (40 patients) applied the IMP, IFS and kinetic therapy, while the other (40 patients), IFS and kinetic therapy. Assessment of treatment was performed on the basis of measurements of the volume turns into the hip, gross motor strength (GMS) pelvifemoral muscles and the subjective experience of pain (VAS).
Results: In all patients there was an improvement, but the range of motion in a statistically significant only in the first group. Abduction with 20° increased to 35° of flexion with stretched knee to 50° to 70°. The measurement of the extension is no statistical significance. GMS muscle actuator of the hip, in the first group increased with 2^+ to 3^+. When it comes to pain according to the VAS scale improvement was present in both groups, but the statistical significance of first group ($p<0.05$).
Conclusion: Physical therapy consisting of IMP, IFS and kinetic therapy, increases the range of motion of the affected the hip, strengthens muscle strength, reduces pain and provides the functionality of the diseased hip and disposed of orthopedic treatment.

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UNMASKING OF PAGET'S DISEASE AFTER THE INTRODUCTION OF TERIPARATIDE TREATMENT

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Objective: Paget's disease is the focal disorder of bone metabolism characterized by accelerated rate of bone remodeling, resulting in overgrowth of bone at single or multiple sites and impaired integrity of affected bone. The majority of patients with Paget's disease are asymptomatic. The diagnosis in such patients is usually made incidentally following the routine chemistry screen showing elevated serum concentration of alkaline phosphatase (AP) of bone origin or an imaging study obtained for other reasons that shows Pagetic changes in bone. Bisphosphonates are the most widely used antiresorptive agents for Paget's disease and are now considered the first-choice treatment.
Material and Methods: Case report: A 65-year old woman with primary osteoporosis.
Results: Raloxifene was started in 2003. The treatment failed, as new OP fractures of the vertebras TH 8, TH 11 and L4 were confirmed in 2008. Raloxifene was stopped and risedronate introduced. New vertebral fractures were confirmed in 2010 (TH 1 and TH 5). Teriparatide was suggested, but the patient disagreed, so strontium ranelate was started. In 2011, patient decided to take teriparatide, and it was first introduced in November 2011. From 2003 to 2011, no signs of secondary causes of bone disease were confirmed. At the first follow up visit in May 2012, elevated AP was first noticed, and this was confirmed 1 month later. The comprehensive diagnostic procedures were performed. With all tests done we confirmed the elevation of bAP and enhanced radionuclide uptake to the skull and the right distal femur. Subsequently performed plain radiography suggested the osteolytic lesions of the skull. Teriparatide was discontinued and zolendronic acid (ZA) initiated. After one course of the ZA treatment AP normalised and the lesions on bone scintigraphy and bone radiography disappeared.
Conclusion: Teriparatide treatment is able to unmask the underlying Paget's disease. Regular determinations of AP are mandatory during the entire course of teriparatide treatment.

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TEN YEARS OF HIP FRACTURES IN ITALY: FOR THE FIRST TIME A DECREASING TREND IN ELDERLY WOMEN

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Objective: We aimed to evaluate hospitalization rate of femoral neck fractures in the elderly Italian population over 10 years.

Material and Methods: We analyzed national hospitalizations records collected at central level by Ministry of Health from 2000 to 2009. Age- and sex-specific rates of fractures occurred at femoral neck in people ≥65 years old. We performed a subanalysis over a 3-year period (2007–2009), presenting data per 5-year age groups, in order to evaluate the incidence of the hip fracture in the oldest population.

Results: We estimated a total of 839,008 hospitalizations due to femoral neck fractures between 2000 and 2009 in people ≥65, with an overall increase of 29.8 % over 10 years. The incidence per 10,000 inhabitants remarkably increased in people ≥75, passing from 158.5 to 166.8 (+5.2 %) and from 72.6 to 77.5 (+6.8 %) over the 10-year period in women and men, respectively. The oldest age group (people >85 years old) accounted for more than 42 % of total hospital admissions in 2009 (n=39,000), despite representing only 2.5 % of the Italian population. Particularly, women aged >85 accounted for 30.8 % of total fractures, although they represented just 1.8 % of the general population. The results of this analysis indicate that the incidence of hip fractures progressively increased from 2000 to 2009, but a reduction can be observed for the first time in women ≤75 (−7.9 % between 2004 and 2009).

Conclusion: Incidence of hip fractures in Italy are continuously increasing, although women aged 65–74 years old started showing a decreasing trend.

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EVALUATION OF THE ROLE OF VITAMIN D RECEPTOR (VDR) GENE POLYMORPHISMS IN TYPE 1-ASSOCIATED BONE DISORDER

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Objective: Low BMD and fracture risk are associated with type 1 diabetes (T1D). Vitamin D receptor (VDR) polymorphisms have been suggested to be associated with the diabetic complications. Therefore, the aim of study was to assess the association between VDR single nucleotide polymorphisms (SNPs) in type 1 diabetic patients and low BMD.

Material and Methods: We studied 66 T1D patients (28 men and 38 women; mean age 31.23±841; duration of the disease 13.40±7.41; HвA1c 8.25±0.95 %). BMD was measured by DXA. QIAamp DNA Blood Mini Kit (Qiagen, USA) was used to purify DNA from whole blood, gene polymorphisms were detected in PCR-RFLP (restriction fragment length polymorphism) analysis. The following restriction enzymes were used to determine the appropriate polymorphism: VDR-FOKI - FokI (BseGI), VDR-ApaI - ApaI.

Results: The presence of the mutant allele VDR-FokI was detected in 79 % of cases (in 41 % cases as heterozygotes and in 38 % as homozygotes). VDR- ApaI SNPs was found in 77 % of cases (in 50 % cases as heterozygotes and in 27 % as homozygotes). There was a significant prevalence of low bone mass among carriers individuals with VDR-FokI SNPs (30.7 % vs. 14.2 %, p<0.001) and individuals with VDR-Apal SNPs (31.37 % vs. 26.6 %, p<0.001).

Conclusion: The results of the study reflect the high frequency of VDR (FokI, ApaI) SNPs and a significant decrease in bone density in these individuals. VDR gene polymorphisms seem to play a major role in influencing on bone loss in T1D.

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TOTAL BODY BONE DENSITYAND FAT/LEAN MASS DISTRIBUTION IN TYPE 1 DIABETIC PATIENTS

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Objective: There is epidemiological evidence that reduced amount and a decline in the quality of muscle mass associated with an increased risk of fracture. The aim of the study was the examination of total body bone density (TBBD) and the components of body composition in type 1 diabetes mellitus (DM) patients.

Material and Methods: We studied 66 type 1 DM patients (28 men and 38 women; mean age 31.23±8.41; duration of the disease 13.40±7.41; HвA1c 8.25±0.95 %). The research involved anthropometry of patients, general clinic examination, glycated hemoglobin test, DXA performed on "Prodigy Lunar" using a program "total body" and "body composition".

Results: TBBD (g/cm^2) (1.156±0.10 vs. 1.194±0.084, p<0.01) and total Z-score (−0.15±0.94 vs. 0.72±0.63, p<0.001) was statistically lower in diabetic patients in comparison with controls. Fat mass distribution parameters in type 1 DM patients and controls were: Total Body: 29.63±12.80 % vs. 30.01±9.68 % (p=0.32); Android: 29.68±12.14 % vs. 29.90±12.7 % (p=0.50); Gynoid 36.50±13.34 % vs. 36.98±10.88 % (p=0.09); A/G Ratio: 0.80±0.29 vs. 0.87±0.28 (p=0.022); Trunk/Total: 0.46±0.87 vs. 0.48±0.08 (p=0.68); (Arms+Legs)/Trunk: 1.078±0.15 vs. 1.26±0.18 (p=0.009); Total Body Lean mass: (49963.42±2849.845 g vs. 44057.80±9932.179 g, p<0.001).

Conclusion: The data confirmed low total body bone density in type 1 DM patients. There are changes in total body fat mass and lean mass among patients with type 1 DM. Thus mechanisms responsible for the formation of healthy bones require further research.

P300

ORAL HEALTH ATTITUDES AND PRACTICES AMONGST PATIENTS WITH OSTEOPOROSIS IN UNITED KINGDOM

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Objective: Many patients with osteoporosis are elderly and oral health is an important aspect of patient care especially in patients on bisphosphonates. Our aim was to determine oral health attitudes and practices in patients with osteoporosis receiving bisphosphonates.

Material and Methods: A questionnaire study was conducted after informed consent on cognitively intact patients diagnosed with osteoporosis who were attending hospital osteoporosis clinic and received bisphosphonate treatments.

Results: 200 patients age range 50–95 years (average 70 years) 75 % female. Patients receiving treatments were alendronate (80 %), risedronate (10 %), ibandronate (4 %), zoledronate (6 %). One hundred percent considered care of teeth is important. Ninety-two percent considered cleaning of teeth daily is important. Twenty percent considered they do not need regular specialist dental care. Ninety percent thought tooth loss is normal consequence of ageing. Ninety percent considered tooth loss has an association with osteoporosis. Thirty-two percent felt access to dental services was a barrier towards improving oral health. Twenty percent used dentures. Sixty-five percent had visited dentist in last 1 year. Fifty percent regularly visit dentist twice a year. Ten percent were not registered with a dentist. Fifty-nine percent clean their teeth twice daily. Eighty percent had informed their dentist about osteoporosis medications. Ten percent were aware of rare side effect of jaw osteonecrosis.

Conclusion: This large study shows that most elderly have favourable attitudes towards improving their oral health. But there are gaps in patients knowledge and there is suboptimal dental access, behaviour and practice amongst a large number of patients. Further education and improved provision of facilities for dental care is needed.

P301

FACTORS ASSOCIATED WITH LOW BONE MINERAL DENSITY IN PATIENTS WITH ANKYLOSING SPONDYLITIS

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Objective: To assess the prevalence of low BMD and association between BMD on the hip and the lumbar spine and osteoporosis risk factors as well as parameters of disease activity, functional status and spine mobility in patients with ankylosing spondylitis (AS).

Material and Methods: Our study included 62 patients (49 males, 9 females), mean age 39.3±11.7 years, with diagnosis of AS (modified New York criteria). Mean age at disease onset was 25.5±8.7 years and mean disease duration was 13.9±8.2. BMD was measured using DXA on the hip and the lumbar spine. Low BMD was defined as T-score≤−1 including osteopenia and osteoporosis. Clinical (Bath AS Functional Index-BASFI, Bath AS Disease Activity Index-BASDAI, Bath AS Metrology index-BASMI) and laboratory data (erythrocyte sedimentation rate-ESR and C reactive protein-CRP) were collected. The data of risk factors for osteoporosis were also collected (use of corticosteroids, disease modifying anti-inflammatory drugs (DMARD), nonsteroidal anti-inflammatory drugs (NSAID), smoking, BMI).

Results: Osteoporosis on the hip and the lumbar spine was found in 14.5 % and 3.2 % patients, respectively, while osteopenia was found in 45.2 % patients on the hip and 24.2 % patients on the lumbar spine. There was significant inverse correlation between hip BMD and age at disease onset (p=0.032), BASFI (p=0.017) and BASMI (p=0.001), while lumbar spine BMD was in inverse correlation only with ESR (p=0.045). Patients treated with corticosteroids had significantly more often osteoporosis (p=0.003). No significant correlation between BMD and smoking, use of NSAID, DMARD, disease duration, BASDAI, CRP and BMI was found.

Conclusion: In patients with AS low BMD is found more frequently on the hip and is associated with corticosteroid use. No relation with other risk factors for osteoporosis was found. Decreased BMD was associated with decreased functional ability (measured by BASFI) and back mobility (measured by BASMI).

P302

INFLUENCE OF DISEASE ACTIVITY ON PAIN INTENSITY, FATIGUE AND GENERAL HEALTH

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Objective: To estimate the influence of disease activity on pain intensity, fatigue and general health in patients with rheumatoid arthritis.

Material and Methods: The study included 95 patients with RA, according to ACR/EULAR criteria, 2010. There were 76 women and 19 men. The average age was 58.8 years, and the

average duration of the disease was 10.4 years. Disease activity was measured by an index DAS28SE. Pain, fatigue, and general health represented by VAS. In relation to disease activity, patients were divided into three groups: Group I DAS28SE <3.1- low disease activity; group II DAS28SE 3.2–5.1 - moderate disease activity and group III DAS28SE >5.1 - high disease activity. For statistical analysis of the data we used the analysis of variance (ANOVA), t-test.

Results: The patients with high disease activity-Group III had significantly worse values of pain intensity estimated by VAS scale 65.28±12:43 compared to patients with moderate disease activity Group II 39.2±18.54, $p<0.001$ and compared to patients with low disease activity 8.68±6.05 Group I, $p<0.001$. The patients with high disease activity-Group III had significantly worse values of fatigue estimated VAS scale 66.18± 15.62 compared to patients with moderate disease activity 41.56±19.32 Group II, $p<0.001$ and compared to patients with low disease activity 12.68±6.52 Group I, $p<0.001$. The patients with high disease activity-Group III had significantly worse values of general health estimated by VAS scale 32.24 ±13.22 compared to patients with moderate disease activity 51.86±14.82 Group II, $p<0.001$ and in compared to patients with low disease activity 82.10±7.32 Group I, $p<0.001$.

Conclusion: The high disease activity causes higher pain intensity, pronounced fatigue and poor general health in patients with RA.

P303
SEQUENTIAL THERAPY IN SEVERE OSTEOPOROSIS

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Objective: Some evidence in literature suggests the utility of the addition of antiresorptive drugs, such as bisphosphonates, following teriparatide treatment, in severe osteoporosis. The aim of the present study was to evaluate the impact of the addition of 5 different treatments, following a 24-month therapy with teriparatide, on osteoporosis progression.

Material and Methods: 81 women with severe postmenopausal osteoporosis, were treated for 24 months (first step) with teriparatide and serum osteocalcin and ß-CTX and lumbar and femoral BMD changes, evaluated by DXA-BMD, were monitored at 6, 12, 18 and 24 months. After 24 months, 60 of 81 patients were randomly allocated to receive one of the following treatments, on top of calcium (1 g/day) and vitamin D (5,600 IU/week): Alendronate or risedronate weekly, ibandronate monthly or strontium ranelate daily or placebo, for 24 months (second step). At the end of the second step of the study, lumbar and femoral BMD were evaluated again.

Results: After 24 months, T-score slightly increased from baseline at femoral level ($p=0.07$, Wilcoxon test) and significantly increased at the lumbar spine level ($p<0.001$, Wilcoxon test). Osteocalcin values displayed a 4.3-fold increase (ANOVA, $p<0.001$), from baseline at month 6, and a 5.4, 4.1 and 3.7, at 12, 18 and 24 months, respectively (Bonferroni, $p<0.001$). β-CTX levels showed a 2.5-fold increase from baseline at month 6 and a 2.6, 2, 1 and 1.8 at 12, 18 and 24 months, respectively ($p<0.001$). At the end of the second step of the study, T-scores showed a further significant increase, only in the group of patients treated with ibandronate ($p<0.05$), ranelate ($p<0.05$), and risedronate ($p<0.05$). Analysis of variance showed a significant difference ($p=0.008$) between risedronate and placebo.

Conclusion: Our data confirm the efficacy of teriparatide and suggest that in severe osteoporosis the treatment of choice should include a first 24 month-step with teriparatide, followed by the addition of antiresorptive drugs or strontium ranelate therapy.

P304
NATIONWIDE COMMUNITY OSTEOPOROSIS EDUCATION AND SCREENING PROGRAM IN TAIWAN

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Objective: To report the efforts of a large scale nationwide community osteoporosis education and screening program in Taiwan.
Material and Methods: In 2013, the Wang Jhan-Yang Public Trust Fund (WJYPTF) sponsored a program with 4 sub-studies from the Taiwanese Osteoporosis Association (TOA) to conduct series of osteoporosis education and screening courses for the entire country. Structured educations on osteoporosis and/or fall preventions with brief nutrition assessments were provided to all participants. Osteoporosis awareness was assessed in most studies. Participants were screened with different instruments including FRAX®, Osteoporosis Self-Assessment Tool for Asians, One-Minute Osteoporosis Risk Test, Osteoporosis Self-Assessment Tool, and calcaneus quantitative Ultrasounds. High risk individuals (definitions varied by studies) were referred to hospitals for further osteoporosis and fall assessments and managements.
Results: Overall, 74 courses were provided and 4,808 effective questionnaires were collected. Mean age varied from 50 to 70 years of age at different study sites but most participants were women. Roughly 60–70 % were considered as high-risks in different studies. Successful referral rate was around 15–30 % in studies reported this indicator. Osteoporosis knowledge and awareness were consistently low but significantly improved after education course when post test data were available. Nutritional assessments showed that most participants did not have adequate intake of calcium and dairy products. Participant satisfactions were high across studies.
Conclusion: Community education and screening campaigns were highly appreciated and were able to improved osteoporosis awareness. However, wide variations existed among study protocols. Efforts should be made to collect common variables for comparisons across study sites.
Acknowledgements: The authors thank the WJYPTF for sponsoring the study. The sponsor reviewed and approved the study protocol but did not interfere with study conduction, data analysis or interpretation. The authors also thank the TOA for coordinating the study.

P305
A RANDOMIZED CONTROLLED TRIAL COMPARING HYDROTHERAPY AND CONVENTIONAL PHYSIOTHERAPY TO PATIENTS WITH HIP OSTEOARTHRITIS (HOA)

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Objective: It has been demonstrated that hydrotherapy can activate the cutaneous circulation by reflexive vasodilatation and has positive effects on immunoregulation. Even if there are only a few RCTs or meta-analyses which investigate the use of hydrotherapy for osteoarthritis of the hip we designed this clinical study to find if the effects of alternate cold and warm thigh affusions on pain, range of motion and quality of life are comparable with those of conventional physiotherapy.
Material and Methods: In this two-armed study we randomized 30 inpatients with osteoarthritis of the hip. In the first group (HTT) 15 patients received hydrotherapy daily with water applied in the form of alternate cold and warm thigh affusions while patients in the second group (PT) received physiotherapy. The primary outcome measure was intensity of pain in the affected hip on a ten-point VAS. The secondary outcomes included health related quality of life on Arthritis Impact Measurement Scale (AIMS2) and patient mobility and risk of falling through the timed "up and go" (TUG) test.
Results: There was no significant difference between the two groups at baseline for any of the clinical outcome measures. Pain intensity improved significantly from baseline to the end of the treatment after only 2 weeks in both the hydrotherapy and physiotherapy groups (29 % vs. 25 %). At the final assessment, the AIMS2 scores significantly declined from baseline in the hydrotherapy group, but the change was not significantly different between groups (0.56 vs. 0.38). This study has shown that both the HTT and PT programmes successfully improved physical function but the alternate affusions were found to be more effective in improving TUG test (−0.9 vs. −0.7 s).
Conclusion: Both the hydrotherapy and conventional physiotherapy interventions produce positive functional outcomes for patients with HOA, are cost effective and without side effects.

P306
COMPARATIVE ANALYSIS OF ADHERENCE TO DIAGNOSING AND TREATMENT OF OSTEOPOROSIS IN PATIENTS WITH LOW-ENERGY FRACTURES IN SAINT PETERSBURG, RUSSIA

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Objective: The objective of the research was both to study the adherence to diagnosing of osteoporosis in patients with low-energy fractures of extremities and vertebrae being able to move without assistance and to raise attention of orthopedic surgeons to prevention of secondary fractures in such patients.
Material and Methods: The women and the men being able to move without assistance who had turned to the outpatient trauma departments of the city for low- energy radius, ulna,

humerus or malleoli fractures as well as compression vertebral fractures were included into the study. 513 patients were sent to the Institute by the doctors of 4 trauma outpatient departments from March of 2012 to May 2013. 184 of them (35.9 %) came to the Institute for the consultation. On the basis of personal history of fractures and results of DXA the osteoporosis was diagnosed in all 175 patients. More often we used either a combination of alendronic acid and vitamin D3.
Results: Obtained results showed the high prevalence of osteoporosis in patients with low-energy fractures of mentioned above localizations in comparison with the study we carried out formerly (2009–2010) in Petersburg using the same design. We obtained practically the same results of densitometric examination (in the former study the mean value of T-score was −2.4 SD (σ=1.0) in L1-L4 vertebrae and -1.6 SD (σ=0.95) in right femoral neck), slightly higher incidence of visits to specialists of patients sent by the doctors of outpatient departments (from 31.0 to 35.95 %) and more than three times higher attendance at densitometric examination (from 44.0 to 95.1 %).
Conclusion: On the whole we can state that adherence of patients with low-energy fractures to diagnosing of osteoporosis continues to be low in Saint Petersburg.

P307
DESCRIPTIVE STUDY OF RENAL IMPAIRMENT IN PATIENTS WITH OSTEOPOROSIS IN DENMARK

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Objective: To estimate the prevalence of renal impairment for osteoporotic patients, and compare demographic characteristics for osteoporotic patients across level of renal impairment.
Material and Methods: This cohort study is based on data from the Danish national health registries and blood measurements of estimated Glomerular Filtration Rate (eGFR) from three of five Danish regions. Last blood measurement of eGFR is used as index-date. The inclusion criteria were:

- age ≥50 years
- AND either diagnosed with osteoporosis
- OR had a history of fracture
- OR a BMD t-score of lumbar spine or femoral neck <−2.5.

Stages of renal impairment ranged from normal to failure (KDOQI 1–5) measured by eGFR and a separate category of 'not recommended for BIS treatment' (eGFR<35).

Results: In total 7,336 patients were identified, of which 6,614 were women. The prevalence of renal failure (stage 5) amongst osteoporotic patients was 0.1 %, and the prevalence of an eGFR<35 ('not recommended for BIS') was 3.6 %. The median time from diagnosis of osteoporosis to measurement of eGFR was 7.2±5.1 years. The mean age was 72.5± 10.3 years. The age increased significantly with decreasing eGFR from 69.0±10.1 for stage 1 (normal) to 81.5±7.6 for stage 5 (failure) patients (p<0.001). Weight was significantly higher for KDOQI 3 (moderate renal impairment, eGFR 30–59) patients (p=0.021), while BMI similarly increased with decreasing eGFR (p<0.001). For comorbidities diabetes was significantly associated with decreased eGFR (p<0.001).
Conclusion: Based on eGFR<35, bisphosphonate treatment would not be recommended in 3.6 % of osteoporotic patients due to renal impairment.
Disclosures: This study was supported by an unrestricted grant from Merck & Co. AD Jorgensen is an employee of MSD Denmark. A Krishna is an employee of Merck & Co. P Vestergaard: Travel grants from Novartis, Amgen, Servier, and Eli Lilly.

P308
IN VIVO QUANTIFICATION OF TRABECULAR MICROARCHITECTURE IN THE LUMBAR VERTEBRAE OF HEALTHY VOLUNTEERS BY FINESA: A MAGNETIC RESONANCE TECHNIQUE

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Objective: Osteoporotic fractures resulted in a higher number of DALYs lost in Europe than all types (except lung) of cancer in 2000. BMD by DXA is widely used to predict fracture risk but cannot predict occurrence of fracture. Trabecular microstructure can provide further information on fracture risk. TBS uses DXA images to indirectly measure microstructure based on grey level variations which can have many causes. HR-pQCT and μMRI are restricted to peripheral sites by radiation dose and SNR, respectively, but fragility fractures often occur at the hip and spine. We thus evaluated fineSA™, an MR technique, to characterise microstructure in 1.5 min in the lumbar spine of healthy volunteers in vivo.
Material and Methods: *fine*SA was run on 13 females aged 30–40 and 25 males aged 30–50 following ethics approval from the South West Wales REC. Subjects were assumed to have reached peak bone mass and not had significant bone loss based on health questionnaires. Data was acquired in the medial/lateral direction in 2 regions of 5 lumbar vertebrae using a Siemens 3T MRI scanner. Ten sets of *fine*SA data per subject underwent linear discriminant analysis (LDA) using training data from a prior study of postmenopausal

women. Specificity was calculated for the performance of LDA in classifying subjects as having normal microstructure.
Results: Specificity values of 78–94 % for all vertebrae were obtained when classifying *fine*SA data from the central region of the vertebra using LDA. *fine*SA data from the anterior region of the vertebra showed slightly poorer specificity (60–91 %) after LDA.
Conclusion: LDA of *fine*SA data correctly identified subjects as having normal microstructure (specificity 60–94 %). Higher specificity was observed for L1 and generally for the central region of the vertebra. This may be because LDA training data was from the central region of the L1 vertebra and the vertebral body is heterogeneous.
Disclosures: A. Cox, J. Rafferty are employed by, and R.P. Hugtenburg has consulted for, Acuitas Medical who developed *fine*SA.

P309

STATIN USE AND ONSET OF SYMPTOMATIC KNEE OSTEOARTHRITIS: A POPULATION-BASED COHORT STUDY

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Objective: To examine whether statin use is associated with a decreased incidence of OA in the community.
Material and Methods: Data were obtained from the Sistema d'Informació pel Desenvolupament de la Recerca en Atenció Primària (SIDIAP) database, which contains anonymized longitudinal patient electronic medical records for a representative 5 million people in Catalonia, Spain. Men and women aged 40 years or older registered in SIDIAP from April/2006 to December/2011 were eligible. Statin incident users (exposure) were defined as participants with at least 6 previous months without any statin dispensation, and with a medication possession ratio of >70 % over the first 6 months after statin therapy initiation. Incident knee OA cases (study outcome) were identified using ICD-10 codes recorded in the study period. Propensity scores for statin use (as defined above) were derived using multivariable logistic regression models including age, gender, co-morbidities, use of concomitant drugs, and socio-economic status. Statin non-users with comparable characteristics were then matched to the identified statin users by propensity scores. Time varying conditional Cox models were used to calculate hazard ratios (HR) for risk of incident knee OA according to statin use in the propensity-matched population.
Results: There were 26,139 individuals in each cohort: 51 % were women, mean age 65 years, mean BMI: 29 kg/m^2. Median follow-up was 4.8 years. OA occurred in 1,862 participants in the statin new-users group and in 2,119 in the nonusers. Incident OA rates were 16.3 (95%CI, 15.6–17.1) per 1,000 person-years, in the statin users, and 18.1 (95%CI, 17.3–18.8) per 1,000 person-years, in the statin nonusers. HR for symptomatic knee OA was 0.95 (95%CI:0.89–1.00) for statin users. No significant interactions between age and sex were identified.
Conclusion: Statins were not associated with a reduction in incidence of clinical knee OA in members of the community aged 40 years or older.

P310

MODERN ASPECTS OF TREATMENT OF OSTEOPOROSIS IN POSTMENOPAUSAL AGE IN DEVELOPING COUNTRIES

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Objective: Based on the study of the dynamics of indicators of quality of life, BMD, vertebrogenic pain and patients' adherence to treatment develop and implement criteria for evaluating clinically significant effect of drug therapy for postmenopausal osteoporosis. The problem of osteoporosis currently retains its relevance not only in relation to the seriousness of the complications of this disease, fractures of the spine and extremities but also because of the steady increase in the number of older people in modern society, and age based diseases.
Material and Methods: Subject: history data, quality of life, the data of X-ray densitometry, the level of vertebral pain, test patients' adherence to treatment, laboratory parameters of bone metabolism. Object of study: 125 women aged 45–75 years, of which 103 women diagnosed with osteoporosis, including 69 women with osteoporosis postmenopausal aged 50–65 years and 22 women aged 50–65 years without osteoporosis, comparable social status and comorbidity with a group of postmenopausal osteoporosis.
Results: Evaluation of therapy with these instruments is justified in 3 months, 6 months and 12 months of treatment, but a decision on the correct treatment on the basis of assessment must be carried out after 6 months of treatment with alendronate ($p<0.01$) and 12 months of treatment with strontium ranelate ($p<0.01$). For clinically significant changes in QoL at CSI as duration of therapy with alendronate and strontium ranelate exceed 12 months ($p<0.01$).
Conclusion: The results obtained allowed us to develop long-term monitoring scheme antiosteoporotic therapy and criteria for evaluating its effectiveness; follow- up examinations with the use of the proposed methods provide the opportunity to participate in the evaluation of patients and the treatment of its objective status that will help them improve their adherence to treatment.

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ASSOCIATION OF HUMAN MORPHOGENIC PROTEIN-4 (BMP 4) GENE POLYMORPHISM WITH CLINICAL INDICATORS OF OSTEOPOROSIS IN POSTMENOPAUSAL SLOVAK WOMEN

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Objective: Bone morphogenic protein-4 (BMP4) is a multifunctional growth factor belonging to the TGF-β super family which is known to play an important role in the determination of osteoblast phenotype and bone turnover. The aim of the present study was to examine possible associations of T538C (V147A) polymorphism in the BMP4 gene with a variability of femoral, spinal BMD, along with circulating alkaline phosphatase, osteocalcin (formation markers), β- crosslaps (CTx; resorption marker) and fracture incidence in 161 Slovak postmenopausal women.
Material and Methods: Postmenopausal women (63.70± 0.53 years) were selected according to strict inclusion criteria. Genetic polymorphism was detected by PCR-RFLP method. Genotype frequencies and frequencies of fractures were tested using the chi-square test. The differences of quantitative variables between the genotypes were analyzed by covariance analysis (GLM procedure) after correction of the measurements for age and BMI.
Results: The prevalence of each genotype was 24.22 %, 52.18 % and 23.6 % for CC, TC, and TT genotypes, respectively. We reported a statistically significant effect of BMP4 genotypes on ALP concentrations ($P<0.05$). Homozygous genotype CC was significantly associated with decreased ALP values compared to other genotypes. Similarly, femoral ($P=0.081$) and spinal BMD ($P=0.057$) values were decreased in subjects with CC genotype, which could indicate increased bone resorption rate in this group. Biochemical markers as osteocalcin and β-crosslaps were not significantly associated with BMP4 genotypes as well as fracture incidence.
Conclusion: Our results suggest that BMP4/T538C polymorphism could contribute to the genetic regulation of BMD or bone turnover markers in population of Slovak postmenopausal women. All procedures were approved by the Ethical Committee of the Specialized Hospital of St. Svorad in Nitra (Slovakia).
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CORRELATION BETWEEN FUNCTIONAL EVALUATION, SEVERITY AND ULTRASONOGRAPHY FINDINGS IN KNEE OSTEOARTHRITIS

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Objective: To assess correlation between functional evaluation, severity and ultrasonography findings in knee osteoarthritis.
Material and Methods: Thirty patients diagnosed with knee osteoarthritis according to the ACR criteria. Control: 20 healthy age and sex matched individuals. Each patient was subjected to: demographic data collection, clinical examination, laboratory investigations, ultrasonographic assessment (concerning: sonographic effusion, cartilage erosion, joint space narrowing, synovitis and osteophytes).
Results: Subclinical sonographic effusion and synovial thickening were detected in most of the studied patients. Articular cartilage erosions and joint space narrowing were also detected by ultrasound. Statistically significant correlation was detected between clinical and ultrasound indices regarding; joint effusion, synovial thickening, articular cartilage erosion and joint space narrowing. This has been proven in other studies as well. On correlating OARSI-OMERACT Initiative New OA Pain Measure with clinical and ultrasonographic findings, there was a statistically significant correlation between constant pain score and US narrowing, synovitis, clinical effusion and ROM limitation. Statistically there was significant difference between constant pain score and clinical tenderness and clinical effusion.
Conclusion: 1. Musculoskeletal ultrasonography is superior over conventional radiograph in assessing soft tissue and cartilaginous changes accompanying knee osteoarthritis.
2. Musculoskeletal ultrasonography is sensitive in detection of subtle joint effusion and synovial thickening,
3. Sonographic imaging assessment of patients with OA could be of relevant, practical value, because clinical and conventional radiologic findings might be elusive when the disease is in the early phase.
4. US is a bedside procedure that should be ideally carried out by the rheumatologist in the context of traditional clinical evaluation.
5. The combined assessment of clinical and US data can radically modify the decision making process

P313

THE RELATIONSHIP BETWEEN DXA MEASURES OF MATERNAL, PATERNAL AND OFFSPRING BONE MASS: FINDINGS FROM THE SOUTHAMPTON WOMEN'S SURVEY

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Objective: There is evidence that bone mass may be partly inherited, but scant data from which to elucidate the independent influences of mother and father. We examined the relationships between childhood and parental bone mass, using the Southampton Women's Survey (SWS).
Material and Methods: The SWS is a prospective cohort from which 3,156 pregnancies were followed. DXA assessment of bone mass was obtained in the child (8–9 year) and both parents. Measurements included bone area (BA), bone mineral content (BMC), areal BMD (aBMD) and size-corrected BMC at whole body minus head (WB), lumbar spine (LS) and total hip sites. Correlation and linear regression were used to assess relationships.
Results: Data were available for 126 parent-offspring trios. Strong positive associations were observed between parental WB, hip and LS measures (BA, BMC, BMD) and the corresponding offspring indices (maternal β=0.17–0.39; all p<0.001; paternal β=0.09–0.21; all p<0.01). Associations for scBMC at each site were weaker, but remained significant (p<0.01). In multivariate modelling, independent relationships were observed between either parent and the offspring (mother-child β=0.10–0.33, p<0.05; father-child β=0.09–0.18, p<0.05). Larger effect sizes were observed for maternal than paternal-offspring relationships for WB BMD (β=0.21, p<0.01 vs. β=0.12, p<0.05), LS BA (β=0.30, p<0.001 vs. β=0.15, p<0.05), and hip BA (β=0.33, p<0.001 vs. β=0.11, p<0.05).
Conclusion: We observed independent associations between offspring bone mass, and corresponding measures in both parents, with evidence of a greater maternal than paternal effect for whole body BMD and BA at the LS and hip. Although direct genetic inheritance offers a mechanistic explanation, the low proportion of variance in bone mass explained by known genetic polymorphisms, increasing understanding of epigenetics, and disparity between maternal and paternal associations suggest that such relationships could be partly underpinned by gene-environment interactions in early life.

P314
BONE REMODELLING MARKERS IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Objective: Chronic obstructive pulmonary disease (COPD), a leading cause of morbidity and mortality worldwide, is not just a lung-specific disease as other comorbidities are common in patients with COPD. Osteoporosis is highly prevalent among older COPD patients, however, little is known of the usefulness of bone remodeling markers in the diagnosis of osteoporosis in these patients. To evaluate the prevalence of osteoporosis in smokers with COPD and its association with of bone remodeling markers.
Material and Methods: A pilot study was performed in 16 patients attending the Neumology Department of the Clinic University of Navarra, 8 smokers with COPD (FEV1/FVC postbronchodilatator <0.7) in spirometry and 8 smokers without COPD (FEV1/FVC postbronchodilatator >0.7), matched by age, BMI and amount of cigarettes. A bone densitometry by DXA was performed and patients were diagnosed of osteoporosis according to the criteria of the WHO. Levels of calcium, β- CTX, osteocalcin and propeptide of procollagen type I were measured by immunoassay.
Results: The prevalence of osteoporosis in the smokers population was 37.5 %. Higher prevalence of osteoporosis was found in smokers with COPD than in those without (12.5 % vs. 62.5 % Pearson X^2 P=0.039). Patients with COPD present lower BMD compared with patients without COPD (0.946±0.14 vs. 0.926±0.14 g/cm^2) and T-score (-1.000±0.47 vs. −1.243±0.57) in lumbar spine. And also in the forearm: BMD (0.989±0.02 vs. 0.856±0.06 g/cm^2) and T-score (0.338±0.19 vs. −0.650±0.400, P=0.045). Moreover, patients with COPD tend to have higher levels of bone remodeling markers: β-CTX (0.25±0.04 vs. 0.31±0.06 ng/mL) and P1NP (25.8±7.0 vs. 35.7±8.7 ng/mL), which became significant for osteocalcin (14.24±2.2 vs. 21.08±3.0 ng/mL, P=0.029). ROC curves indicate that β-CTX and osteocalcin show adequate analytical performance for the diagnosis of osteoporosis in smokers (AUC=0.81, p=0.047 and AUC=0.94, p=0.024, respectively).
Conclusion: Prevalence of osteoporosis in smokers with COPD is higher than in smokers without COPD, and associates with increased levels of bone remodeling markers. Future studies will be needed to elucidate the role of bone remodeling markers in the diagnosis of osteoporosis in COPD.

P315
CLINICAL EFFECTS OF DIFFERENT MODALITIES OF LOW-LEVEL LASEROTHERAPY ON FUNCTIONAL STATUS IN CHRONIC INFLAMMATION OF THE SUPRASPINATUS TENDON

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Objective: 1. To establish therapeutic effects of laserotherapy and laseropunctura on functional status in chronic painful

shoulder syndrome caused by tendinitis supraspinatus. 2. To compare effects of the two methods.

Material and Methods: Randomised prospective clinical study included 24 patients with acute shoulder pain, comparable with regard to sex, age and concomitant diseases. Diagnosis was made with regard to clinical, radiological and ultrasonographic examination. Patients were divided in the two therapeutic groups. I group: patients, aged 55.57±6.24 treated with laserotherapy, Midlaser Irradia, λ904 ηm, f5000 Hz. Ten points of the body located on anatomical projection inflamed region, treated by accumulative daily D 10 J/cm^2. X therapies. II group, patients aged 53.70±5.83 treated with laseropunctura (LP). Acupuncture points (AP): LI 4, G 38, UB 57, LI 11, LI 15 i LI 16 and four painful points (PP) located on anatomical projection inflamed region were treated. AP were treated by f 70 Hz, λ 780 nm, dose of 0.6 J /cm^2 per point, PP were treated by f 2,500 Hz, λ 780, D 2.1 J /cm^2, X therapies. All of the patients were given exercises for chronic phase of the tendinitis supraspinatus. Measured parameters were: local functional status, measured with Constant- Murley functional scale. Wilcoxon, Kruscal-Wallis and Mann Whitney tests (T) were used for the statistical analysis.

Results: 1. Highly significant statistical difference was fortified before and after the treatment in the I and II therapeutic groups, concerning functional status (Wilcoxon, $p<0.001$).

2. Significant difference was fortified comparing functional status improvement among therapeutic groups (Kruscal Wallis, $p<0.05$). The best functional status improving were found in group II (Mann-Whitney, $p<0.05$).

Conclusion: In patients with chronic inflammation of the supraspinatus tendon laserotherapy and laseropuncture are highly effective for functional status improving, but among the two investigated modalities of therapy laseropunctura had the better effect.

P316
NONVERTEBRAL FRACTURE PATIENTS FEATURES IN A FLS IN BRAZIL

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Objective: To describe the features of women, above 60 years of age, who have had as main fracture a nonvertebral fracture (NVF) in Prevrefrat–a FLS in Rio de Janeiro, Brazil.

Material and Methods: 86 women above 60 years old with minimal trauma NVF have been followed from February 2011 to November 20013. The patients features, fractures, risk factors, BMD values, seric vitamin D levels are reported.

Results: 40 women had only a minimal trauma NVF as the main fracture. Forty-six women had vertebral fracture associate to main NVF. The main fracture was distal radius (51 %), proximal humerus (23 %) and others (26 %). No face, hand and foot fractures were included. After DXA scan 60 % were classified as osteoporosis and 40 % as osteopenia. 78 % of patients had vitamin D insufficiency or deficiency. Beside the prior fragility fracture, 25 % had early menopause and 19 % had a parent with fractured hip were the more frequent fracture risk factors. 82 % of the patients had complete treatment adherence. In the group had only a minimal trauma NVF as the main fracture, 45 % were classified as osteoporosis and 55 % as osteopenia. 73 % had vitamin D insufficiency or deficiency. Parent with fractured hip was the most frequent clinical risk factor. In the group had a vertebral fracture associated to a minimal trauma NVF as the main fracture, 69.5 % were classified as osteoporosis and 30.5 % as osteopenia. 83 % had vitamin D insufficiency or deficiency. Early menopause was the most frequent clinical risk factor.

Conclusion: Distal radius was the most frequent NVF followed by proximal humerus fracture. Women who had a vertebral fracture associate to main NVF showed high percentage of densitometric osteoporosis, vitamin D insufficiency or deficiency and parents with fractured hip than women with NVF only. No differences in adherence to treatment.

Disclosures: Bernardo Stolnicki - Speaker: GSK, Sanofi Aventis, Servier, Novartis; Advisory board: Servier, Novartis

P317
HYPOPHOSPHATEMIC RICKETS: CASE REPORT

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Objective: Hypophosphatemic rickets is a genetic form of rickets (X-linked mutation of PHEX gene) characterized by low serum phosphate and resistance to vitamin D treatment. Diagnosis is based on clinical presentation usually in childhood and confirmed by hypophosphatemia, hyperphosphaturia, normal serum calcium, 25-OH vitamin D and typical radiographs. Treatment options in children include calcitriol, growth hormone, phosphate supplementation, and thiazide diuretics acting as anticalciurics. However, the treatment in adult patients is controversial.

Material and Methods: A case of a man (born 1971) first examined in 2011 is presented. He was of a disproportionate short stature (160 cm, 89 kg) and complained of dental problems and long bone pain. Lab tests showed findings typical for hypophosphatemic rickets (S-phosphate 0.63 mmol/l, phosphaturia 68 mmol/day), lower 25-OH vitamin D and mild secondary hyperparathyroidism. Densitometry revealed osteopenia in forearm (T/Z- score −2.2/−2.2) and proximal femur (−1.6/−1.5). Therapy with rocaltrol in daily dose of 1.5 mg and supplementation of phosphate (Natrii

hydrogenphosphate 390.9 g, phosphoric acid 378 ml and Aauae ad 1,000 ml in dose 3 spoons daily) was introduced.
Results: After the treatment, significant improvement in dental problems (implants finally healed, no abscesses) and significantly decreased pain symptoms were reported by the patient. Lab tests did not show any increase in phosphatemia (0.6 mmol/l) either decrease in phosphaturia (71 mmol/day) or any changes in increased bone turnover (β-crosslaps 673 pg/ml and PINP 60.55 ng/l), however vitamin D and PTH levels normalized. In 20 months, significant improvement was observed in densitometry (proximal femur 0.6/0.6 a forearm −0.5/−0.5).
Conclusion: Phosphate supplementation in an adult patient with hypophosphatemic rickets led to significant clinical and densitometry improvement, despite no laboratory changes. Thus, phosphate might be considered in treatment of adult patients with hypophosphatemic rickets.

P318
CIRCULATING MICRORNAS IN BONE DISEASE

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Objective: Osteoporosis is a bone disorder characterized by the systemic loss of bone mass due to alterations of the homeostasis of bone metabolism, which increases the risk of severe bone fractures. Recently, it was discovered that microRNAs (miRNAs), which are small non-coding RNAs that regulate gene expression, play an important role in bone metabolism by controlling osteogenesis (bone formation) as well as osteoclastogenesis (bone resorption). It is also known that miRNAs are selectively secreted into the bloodstream from malignant as well as normal cell types. This insight has opened up a novel area of research, where circulating miRNAs are investigated as predictive and prognostic biomarkers of disease. The objective of this work was the systematic analysis of the clinical utility of circulating microRNAs for the diagnosis of fracture risk and acceleration of bone healing in the context of osteoporosis.
Material and Methods: We established a qPCR-based workflow for analysis of circulating miRNA levels in serum. A pilot study was conducted to pre-select circulating miRNAs based on assay sensitivity and biological relevance for bone metabolism. This resulted in a panel of 384 miRNAs, which was subsequently analyzed in a case/control cohort representing 40 subjects with low-trauma osteoporotic fractures and 40 control subjects. Individual miRNAs that exhibited differential expression as well as combinations of these were analyzed for their sensitivity and specificity in predicting fracture risk. In addition in vitro experiments were performed to study the effect of miRNA overexpression and knockdown on osteoblast differentiation and osteoclast activation.
Results: Our data suggest that specific miRNAs correlate with fracture risk during the progression of osteoporosis. These miRNAs regulate the molecular signalling events that underlie osteogenesis as well as osteoclastogenesis.
Conclusion: We provide proof-of-principle that miRNAs might serve as a diagnostic and therapeutic targets in osteoporosis.

P319
EFFECTS OF LASER THERAPY IN GONARTHROSIS TREATMENT

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Objective: To compare the therapy with laser application on painful areas of the affected ankles with laser application on acupunctural points on pain relief and ankle flexion amplitude in patients with gonarthrosis.
Material and Methods: 46 patients (30 women and 16 men) aged 60–76 were included and prospectively followed during gonarthrosis treatment. Diagnosis was made on ACR criteria lasted from 4 to 20 years. Pain was measured by VAS scale before and after therapy. Ankle movement was measured with arthrometer in degrees before and after completion of therapy. Patients were randomly assigned in two groups: First group with 18 women and 6 man and second group with 12 woman and 10 men aged. Both groups were comparable in age, gender distribution and gonarthrosis duration. Laser used in this study was Mediclaser 637 Electronic design. First group of patients was treated with Laser beam applied on painful areas with 70 mW, freq. of 2,500 Hz and energy absorption 3 times a week, in 10 consecutive doses. Patients in second group were treated with laser applied on acup. points VF41, VU40, VF34, H8, G34, G35, PE31, PE32, with freq. of 70 Hz, power of 40 mW, 0,6 J/cm^2 energy absorption in 30 s, 3 times a week with 10 consecutive doses.
Results: 1. It estimated high statistical significance in both groups, Kruscal Wallis, $p<0.001$.
2. High statistical significance is achieved also in improvement of ankle flexion amplitude in both groups Kruscal Wallis test, $p<0.001$.

3. Significantly better pain relief and increased knee flexion was detected in group II- Laser acupuncture application Mann-Whitney, $p<0.05$.

Conclusion: Analysis clearly shows positive impact of Laser therapy in pain relief, and ankle movement amplitude, with better results of laser applications on acupunctural points during treatment.

P320
THE INVESTIGATION OF INFLUENCE OF THE TREATMENT WITH ANTI-CD20 ANTIBODIES (RITUXIMAB) ON BONE MINERAL DENSITY IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: To access the dynamics of BMD after 12-months rituximab treatment in patients with rheumatoid arthritis (RA). The disease activity in RA is the one of significant reasons of increasing bone resorption and decreasing BMD. The control of inflammation activity by biologics, including anti-CD20 antibodies (rituximab), can be considered as possibility to decrease bone resorption and stabilize BMD.

Material and Methods: A retrospective study of 54 women with Rahman (SD) age at start of rituximab treatment was 48.6±13.4 years, mean duration of disease 9.2±7.6 years. The high activity of RA (DAS-28) was in 50(93 %) patients, moderate - in 4(7 %). The BMD was assessed by DXA at baseline and 12 months after at least in one of following sites: L1-L4 ($n=45$), hip neck ($n=39$) and hand ($n=20$). The DXA was performed at Hologic Discovery A.

Results: Depending on the received dose of rituximab within 12 months of treatment patients were distributed in three groups: the 1 group ($n=20$) received totally 500–1,900 mg of rituximab; the 2 group ($n=26$) received 2,000 mg; the 3 group ($n=8$) received 2,500–4,000 mg. In the 1 group the mean BMD L1-L4 ($n=14$) before/after the treatment was respectively: 0.889±0.119 g/cm^2 and 0.883±0.152 g/cm^2; at hip neck ($n=12$) 0.680±0.091 g/cm^2 and 0.651±0.075 g/cm^2; at hand ($n=7$) 0.466±0.065 g/cm^2 and 0.423±0.062 g/cm^2. 2 group: mean BMD L1-L4 ($n=23$) was respectively: 0.951± 0.148 g/cm^2 and 0.960±0.124 g/cm^2; at hip neck ($n=20$) 0.729±0.121 g/cm^2 and 0.688±0.131 g/cm^2; at hand ($n=9$) 0.505±0.128 g/cm^2 and 0.473±0.074 g/cm^2. 3 group: mean BMD L1-L4 ($n=8$) was respectively: 1.017±0.164 g/cm^2 and 1.011±0.148 g/cm^2; at hip neck ($n=7$) 0.746±0.157 g/cm^2 and 0.745±0.144 g/cm^2; at hand ($n=5$) 0.523±0.065 g/cm^2 and 0.519±0.074 g/cm^2.

Conclusion: The BMD in patients with high activity of RA, taking rituximab within 12 months, remained stable regardless of the received total dose of a drug. Studying of a contribution of other factors, which influence on BMD change, requires carrying out more careful analysis.

P321
THE RISK OF OSTEOPOROTIC FRACTURES BY PROGRAM FRAX IN MEN WITH LONG EXPERIENCE OF SMOKING

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Objective: To study the risk of osteoporotic fractures and exercise tolerance in patients with chronic obstructive pulmonary disease (COPD).

Material and Methods: 125 patients with COPD were observed. The investigated group was made by the men having the long experience of smoking. Smoker index was 240. The experience of smoking (packs/year) was 40(30–47). The average age was 61.4±6.4 years. The patients received basic therapy system glucocorticoids have been excluded from the research. Research of function of external breath was studied with multimodular installation of type «Master-Lab/Jaeger». Research of mineral density of a bone fabric was studied with the method x-ray absorptiometry with the densitometer Lunar DPX-NT. The assessment of risk of osteoporotic fractures were calculated by means of the computer program FRAX. For calculation of risk by the procedure FRAX was used T-criteria of femoral neck. Tolerance Exercise test was determined the 6-min walk distance (6MWD).

Results: The highest absolute risk of hip fracture 4.3 (1.45–8.25) and the highest absolute risk of major fractures 7.4 (5–11) were detected in patients with COPD of 4 stage. The absolute risk of hip fracture in patients with COPD 3 stage was 2.35(0.95–5.3). Patients with COPD 3–4 stages have a reliably higher risk of fractures compared with patients with COPD stage 2. The absolute risk of hip fracture was minimal in patients with COPD 2 stage 0.7(0.4–1.9). Decrease in exercise tolerance was associated with worsening stage of COPD. The lowest level of 6MWD was noted in patients with 4 stage COPD. 6MWD in patients with COPD 4 stage was 233.75±117.34. The best result 6MWD was in patients with COPD 2 stage 386.57± 100.53. The correlation coefficient between 6MWD and risk of major osteoporotic fracture was −0.46 ($p<0.005$), the correlation coefficient between 6MWD and the risk of hip fracture was −0.46 ($p<0.005$).

Conclusion: The highest risk of fractures and the lowest level of exercise tolerance was detected in patients with COPD 4 stage.

P322
IN VIVO CARTILAGE-SPECIFIC DELETION OF EPHRIN-B2 IN MICE RESULTS IN BONE DEVELOPMENT LEADING TO OSTEOARTHRITIS FEATURES

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Objective: Ephrins and their receptors have been implicated in mediating developmental events. We demonstrated that a member of the ephrin family, ephrin-B2, plays a role in osteoarthritis (OA) knee joint pathology[1–3]. This study aimed to comprehensively delineate the in vivo role of ephrin-B2 in musculoskeletal growth and development using cartilage-specific ephrin-B2 knockout (ephrin-B2KO ^{col}) mice.
Material and Methods: The skeletal development of the ephrin-B2KO^{col} mice was evaluated on postnatal days (P)0, P15, P21, and at 8 weeks and 1 year old. The ephrin-B2$^{f/f}$ littermates were used as controls.
Results: Ephrin-B2KO^{col} mice exhibited reduced size postnatally, and at P15 and P21 reduced weight ($p<0.01$) and length ($p<0.01$). At 8 weeks, ephrin-B2KO^{col} mice had significantly shorter femur ($p<0.03$) and tibia length ($p<0.01$) and reduced BMD in the total skeleton ($p<0.04$), femur ($p<0.03$) and spine ($p<0.009$). μCT analyses revealed that the distal femur and proximal tibia in KO mice had decreased bone volume ($p<0.03$) and trabecular thickness ($p<0.02$), increased trabecular separation ($p<0.05$), and reduction in mineralized cartilage matrix at the chondro- osseous junction of the growth plate. At 1 year, ephrin-B2KO^{col} mice demonstrated OA features in both knee and hip. The ephrin-B2KO^{col} mice exhibited a hip- associated locomotory defect as soon as they walked. At 8 weeks the hip of the KO mice displayed abnormalities related to a smaller pelvic bone ($p<0.01$) and canal width ($p<0.03$); this was not found at 1 year. The proximal femoral head with respect to the acetabular parameters did not show major differences, suggesting that the locomotory defect is not due to a developmental hip abnormality.
Conclusion: This study was the first to show that in vivo ephrin-B2 is essential for normal bone growth and development and that cartilage-specific ephrin-B2 deficiency leads to significant long bone alterations, dysregulation of mineralization, and OA features.
References: [1]Kwan Tat et al. Arthritis Rheum 2008:58:3820; [2]Kwan Tat et al. Arthritis Res Ther 2009:11:R119; [3]Valverde-Franco et al. Arthritis Rheum 2012:64:3614.

P323
OSTEOPOROTIC FRACTURES AND THE SEVERITY OF BRONCHIAL OBSTRUCTION IN PATIENTS WITH COPD

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Objective: To study the risk of osteoporotic fractures and severity of bronchial obstruction in patients with COPD.
Material and Methods: 125 patients with chronic obstructive pulmonary disease (COPD) were observed. The investigated group was made by the men having the long experience of smoking. Smoker index was 240. The experience of smoking (packs/year) was 40(30−47). The average age was 61.4± 6.4 years. The patients received basic therapy system glucocorticoids have been excluded from the research. Research of function of external breath was studied with multimodular installation of type "Master-Lab/Jaeger". Research of mineral density of a bone fabric was studied with the densitometer Lunar DPX-NT. The assessment of risk of osteoporotic fractures were calculated by means of the computer program FRAX.
Results: Bronchial obstruction progressed with worsening of stage of COPD. FEV1 in COPD patients 2 stage was 61.3± 6.06 %, FEV1 in COPD patients 3 stage was 38.59±8.45 %, FEV1 in COPD patients 4 stage was 24.89±2.89 % ($p<0.05$). The number of patients with a high risk hip fracture increased with the progression of bronchial obstruction. Among patients with FEV1<50 % the high absolute risk of hip fracture was detected in 48.05 % of patients in this group. Among patients with FEV1>50 % the high absolute risk of hip fracture was detected in 12.77 % of patients in this group ($p<0.05$). The correlation coefficient between SaO2 and risk of osteoporotic fractures was −0.34.
Conclusion: Among COPD patients with severe bronchial obstruction was detected the increase in risk of osteoporotic fractures.

P324
HISTORY OF FRACTURE AND CHRONIC WHOLE BODY PAIN: FINDINGS FROM UK BIOBANK

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Objective: We explored the association between chronic "pain all over the body", as a marker of chronic widespread pain, and fractures in the UK Biobank cohort.

Material and Methods: UK Biobank is a large prospective cohort comprising 500,000 men and women aged 40–69 years, with detailed assessment at baseline. Specifically data relating to past fracture [upper limb (UL), hip, spine] over the last 5 years, and the presence of "pain all over the body" >3 months duration (PATB) as a marker of chronic widespread pain, were obtained. Poisson regression models with robust confidence intervals were used to explore associations between presence of PATB and fracture in the past 5 years, with adjustment for confounding factors. Results are presented as risk ratios (RR).
Results: The mean (SD) age of participants was 57 (8.1) years and just over half were female (54 %). The overall prevalence of PATB was 1.4 %, but was higher amongst those with a previous fracture (2.2 % for UL, 4.1 % for hip and 4.4 % for spine). After adjustment for demographic characteristics, PATB was most strongly associated with spine fracture (RR:3.2), then hip (RR:3.0) and UL (RR:1.5) (all $p<0.001$). Associations were somewhat attenuated by adjustment for lifestyle, socio- economic factors and psychological indices (spine: RR=2.37, hip: RR=2.16, UL: RR=1.27, all $p<0.01$).
Conclusion: In this large cohort, history of fracture was associated with increased risk of PATB, particularly for spine and hip more than upper limb fractures, even after adjustment for confounders. These results require replication in other settings, but raise the possibility that fracture may predispose to chronic widespread pain, perhaps differentially by fracture type, possibly through perturbation of the HPA axis, or psychological stressors.

P325
STRENGTH FEATURES OF THE HUMERUS AND MANDIBLE AFTER LONG TERM INHALATION OF EPICHLOROHYDRIN

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Objective: To examine strength features of humerus and mandible in rats after 60 day inhalation of epichlorihydrin and correction of its negative effects with thiotriazoline and *Echinaceae Tinctura (ET)*.
Material and Methods: The experiment involved 420 male rats (young, mature and old): intact animals, animals that received daily epchlorohydrin inhalations as a single 5-h exposure to 10 MPC for 60 day and the groups 3 and 4 received 2.5 % solution of thiotriazoline in dosage 117.r mg/kg of body weight or 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-60th days after discontinue of 60 d cycle of epichlorohydrin inhalations. Strength measures were performed with bending load at loading rate of 0.25 mm/min up to destruction.
Results: After discontinue of epichlorohydrin inhalation breaking point and fracture energy of humerus in young animals were lower than those of controls by 14.16 % and 16.57 %, in adult—by 12.70 % and 15.67 % and in old—by 10.17 % and 8.31 %, respectively. Same characteristics of the mandible were lower by 14.60 % and 14.04 %, 12.73 % and 15.72 % and 10.01 and 11.05 %, respectively. In readaptation period young animals exhibited fast bone strength recovery while in adults strength decrease kept at the same level up to the 15th day of observation yet significant changes were observed up to the 60th day of observation. In old animals bone strength recovery of both mandible and humerus was not observed. Administration of thiotriazoline or *ET* reduced negative effects of epichlorohydrin during inhalation and after it. Thiotriazoline appeared to be more effective than *ET*.
Conclusion: 60-day inhalation of epichlorohydrin results in decrease of strength and increase of fragility of both humerus and mandible in rats of different ages. Deviations degree and recovery rate depend on age of animals. Application of thiotriazoline or *ET* reduces negative effects of epichlorohydrin.

P326
THREE YEARS FOLLOW UP FOR FRACTURES IN ELDERLY WOMEN WITH OSTEOPOROTIC VERTEBRAL FRACTURES

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Objective: Prospective follow up with 3 years of examination of patients with vertebral fractures treated with bisphosphonates on the incidence of new fractures.
Material and Methods: 77 postmenopausal women older than 65, having osteoporosis, have been analysed. Upon the made densitometric examination of lumbosacral part of the spine L1-L4 and the hip, which helped to identify osteoporosis, X-ray test of the Th4 - L5 portion of the spine was made in all the patients, aimed at detecting vertebral fractures, AP and profile, which have been analysed by semi-quantitative method (Genant) the analysis was made by a radiologist. Patient were treated with weekly 87 % and monthly 13 % bisphosphonates, 5,600 weekly vitamin D3 supplementation and calcium carbonate 500 IU daily. During 3 years of treatment follow up was done for vertebral fractures any new fractures, BMD changes.
Results: Vertebral fractures were found out in 21 patients. Symptomatic fractures were reported by 4 patients whereas 17 patients had the asymptomatic ones. One fracture was registered with 11 patients 2 fractures with 6 and 3 and more fractures with 4 patients. 1st degree fractures were found out

in 12, 2nd degree fractures were registered with 8 patients and 3rd degree fractures with 1 patient. Study was finished after 3 years, and same diagnostic procedures was done. On follow up there were 71 patients, one developed colon carcinoma, 2 died from cardiovascular death, and 3 left study due to gastrointestinal reasons 3.8 %. As it concerns fractures one had fracture of femur (1.3 %), two (2.7 %) fractures of radius loco typico, and there were no new vertebral fractures.

Conclusion: The results obtained from research indicate a high percentage of asymptomatic vertebral fractures in the examined group of elderly postmenopausal women having osteoporosis. After 3 years of treatment that had low percent of new fractures, there were increase of BMD registered, no new vertebral fractures, and three new nonvertebral fractures.

P327

INCIDENCE AND LOCALIZATION OF FRACTURES IN GLUCOCORTICOID INDUCED OSTEOPOROSIS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: To determine the frequency and localization of fractures in glucocorticoid-induced osteoporosis in patients with RA.

Material and Methods: The 1-year study included 210 patients with RA, 175 women (83.3 %) and 35 men (16.7 %) of median age 58.3 with average disease duration of 8.7 years. All patients were on methotrexate in the average weekly dose of 15 mg, and prednisone in doses greater than 7.5 mg for longer than 3 months. The patients were undertaken to osteodensitometric examination. The incidence of fractures was based on anamnesis and radiological findings. Statistical analyses were done in the Statistical Package for The Sciences 20.0 program.

Results: Of 210 patients, 87 patients had osteoporosis (41.4 %), 100 osteopenia (47.6 %) and normal findings were noted in 23 patients (11 %). Fractures had 79 patients (37.6 %). In the group of patients with osteoporosis, participation of fractures was 54 % (47/87) and with osteopenia 32 % (32/100). The most common were vertebral fractures 53.1 % (42/79) mostly localized in the area of TH10 and Th12 vertebra. Two patients had a hip fracture (2.6 %), while the nonvertebral fractures were 44.3 % (35/79) mostly localized in the region of the forearm. One fracture was detected in 22.8 % (18/79), two in 40.5 % (32/79) and multiple fractures in 36.7 % (29/79) of patients.

Conclusion: The use of glucocorticoids leads to changes in the properties of the bones and increases the risk of fractures in patients with RA. Therefore, it is of great importance its prevention, early diagnosis and treatment through regular determination of BMD and redesigning GK therapy.

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2. Zvekic-Svorcan J et al. MD-Medical Data 2013;5:235

P328

EFFECT OF RISK FACTORS ON PROBABILITY OF OSTEOPOROSIS DEVELOPMENT IN WOMEN

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Objective: To assess effect of several risk factors on probability that female patients develop osteopenia/osteoporosis.

Material and Methods: The study encompassed 1,268 women with average 64.2±7.03 years of age, examined at the DXA of the Special Hospital for Rheumatic Diseases, Novi Sad, Serbia. They were also asked identical questions regarding risk factors that may be responsible for development of osteoporosis: early menopause, BMI, previous fractures, history of fractures in a family, treatment by glucocorticoids, smoking and alcohol consumption. For statistical analysis we used binear logistic regression.

Results: The only factor for development of osteopenia at the hip is the low BMI, increasing risk for osteopenia development for 52 % (OR 1.126; 95%CI 1.410–2.273). The most important predictor of osteoporosis at the hip is the early menopause, which increases osteoporosis development risk for 39 % (OR 0.663; 95%CI 1.051–2.175), then follow glucocorticoids with 29 % (OR 0.421; 95%CI 1.262–4.513) and previous fractures with 28.5 % (OR 0.415; 95%CI 1.716–3.949). The complete model with all predictors was significant (χ^2=47.77; p<0.01), i.e., it distinguishes patients having osteopenia and osteoporosis at the lumbar level. The only significant factor is the low BMI, increasing chances for development of osteopenia for 52 % (OR 1.127; 95%CI 1.091–1.165). In women, predictor for incidence of osteopenia at the spine is the early menopause, which increases chances for development of this disease for 33 % (OR 0.519, 95%CI 0.393–0.687). After that, autoimmune diseases follow with 32 % (OR 0.517; 95%CI 0.320–0.837) and previous fractures with 26 % (OR 0.359; 95%CI 0.270–0.476) increase of chances for development of spine osteoporosis.

Conclusion: Besides the osteodensitometric tests in diagnosing osteoporosis, risk factors are also of importance and should be sought actively.

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P329
BONE QUALITY IN MIDDLE AGED CUBAN MEN WITH DIABETES MELLITUS 2

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Objective: Identify bone quality in middle aged Cuban men with diabetes mellitus 2 (DM2).
Material and Methods: Subjects: We evaluates 105 middle aged (40–59 years old) men, 50 with DM2 without invalid complications nor kidney damage that were recruited on Arnaldo Milian Hospital, and 55 healthy men living in Revoluciton Square Municipality. Methods: Each subject was clinically evaluated and performed DXA (Lexxos, France, on lumbar column (L1-L4) and left hip (WHO criteria for evaluated results). In diabetic patients we determined glycatd HB (HbA1c <6 % as good control criteria) and microalbuminuria (24 h). In all subjects plasma levels of testosterone (RIA 10–14 nmol normal range). Statistical analysis: We used frequency, media and standard deviation, chi^2 test (quality variables) and T Students Test (quantitative variables), simple correlations, and ANOVA ($p<0.05$).
Results: Both groups were formed principally of Caucasians, aged 48.26 years old (diabetics) and 50.10 years old (control group), consume alcohol 7.7 % of diabetics vs. 20 % of healthy subjects ($p<0.05$). Diabetic patients were obese (872.5 %), with <10 years of DM (64 %) and with worse metabolic control (52 %). Poor bone quality/low bone mass + osteoporosis in total hip occurred on 53 % of healthy subjects vs. 33 % of DM2 patients ($p<0.05$) while in lumbar column was 20 and 25 %, respectively. Low levels of testosterone were found on 15 % os diabetes patients vs. 36 % of healthy group ($p<0.05$).
Conclusion: In spite of a few number of subjects (limitants) in this report we did not find that DM affect bone quality in middle aged men with DM2.

P330
BONE MINERAL DENSITY IN PATIENTS WITH STROKE

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Objective: Osteoporosis (OP), in terms of reduced BMD, and fractures are a well- known complication of stroke. Purpose: to determine the level of BMD in patients with stroke and to assessment the association of motor and functional recovery and BMD.
Material and Methods: We studied 74 patients with first stroke (<1 year post stroke), and mean age of 66.59± 9.607 year who had been examined in Clinic for Medical Rehabilitation, Clinical Center of Vojvodina. BMD was measured at lumbar spine (L1-4) and at proximal femur by DXA. Osteoporosis was defined as BMD >−2.5 T-score. The clinical severity of the hemiplegia was evaluated with Signe Brunnstrom staging classification, and the functional status was evaluated with Barthel index (BI) and Rivermead Mobility Index (RMI).
Results: There were 27 (36.5 %) right-sided and 47 (63.5 %) left-sided patients with stroke. The frequency of osteoporosis in the whole sample was 10 (13.51 %). The paretic side had significantly lower BMD than the nonparetic side (0.809± 0.107 g/cm^2 vs. 0.917±0.135 g/cm^2; $P<0.001$). There was a positive correlation between S. Brunnstrom stage, BI, RMI and total BMD at proximal femur in the affected side ($p<0.05$).
Conclusion: Stroke is a risk factor for the development of osteoporosis and increased bone loss at the paretic side. This risk for osteoporosis in patients with stroke increases more with worse motor recovery and functional status.

P331
PREVALENCE OF OSTEOPOROSIS IN ALBANIAN POSTMENOPAUSAL WOMEN: BMD AND T-SCORE MEAN VARIATION AGE RELATED

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Objective: To measure BMD at the calcaneus bone and to find out the prevalence of osteoporosis and osteopenia, and t-score mean results variation according to the age and disease status in Albanian postmenopausal women.
Material and Methods: It is a cohort prospective study. Bone mass measurement was performed by QUS at the calcaneus bone. 637 postmenopausal women subjects were seen to be study eligible and all of them were enrolled on it.
Results: Osteoporosis was prevalent 5.024 %, and osteopenia was prevalent 54.79 %. Older people were at higher risk of osteoporosis than younger. Important statistical difference on the mean age was found between osteoporosis and nonosteoporosis group ($p<0.001$). Mean age of osteoporosis

group was found 70 years old, and 60.79 it was on the normal BMD group. Important statistical difference was found on t-score mean results between osteoporosis and nonosteoporosis group ($p<0.001$). All cases with osteoporosis had a mean t-score result lower than normal group.

Conclusion: The older postmenopausal women were seen to be in higher risk of osteoporosis than younger and lower t-score mean result was found on them vs. normal BMD group.

P332

EVOLUTION OF BONE MINERAL DENSITY (BMD) BEYOND HORMONE REPLACEMENT THERAPY: THE OSTEOCLAST DOES NOT MAKE HOLIDAYS

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Objective: To assess the evolution of BMD after stopping hormone replacement therapy (HRT). The influence of subsequent osteoprotective treatments in maintaining BMD will be also studied.

Material and Methods: A retrospective study was performed in 168 postmenopausal patients undergoing HRT. BMD (g/cm^2) was determined at lumbar spine (L1-L4) and femoral neck by DXA technique, before and after completion of the HRT. The impact on the maintenance of bone mass with osteoprotective treatments leaving HRT was also assessed. Data were analysed by Student's t-test and ANOVA; p-value <0.05 was considered statistically significant.

Results: After stopping HRT, a decrease in bone mass in both lumbar spine (0.884 g/cm^2 to 0.852 g/cm^2, 3.2 %), and femoral neck (0.772 g/cm^2 to 0.757 g/cm^2, 1.5 %) was observed ($p<0.001$). This decrease was observed even if a subsequent alternative treatment was instituted. In 47.6 % of patients hygiene and dietetic measures were introduced with a decrease bone mass of 3.8 % at lumbar spine ($p<0.001$) and 1.8 % at femoral neck ($p<0.05$). The other 52.4 % of patients required another posterior treatment: 20.2 % of them raloxifene and 17.3 % bisphosphonates. In this case, the results showed that the vertebral bone mass decreased a 4.1 % with raloxifene and a 4.5 % with bisphosphonates ($p<0.001$). At the femoral neck the decrease was 3.4 % and 1.5 % ($p<0.05$) with the above mentioned treatments, respectively. Nevertheless, no statistically significant differences were observed in the evolution of bone mass as was the treatment given.

Conclusion: After the HRT, the rate of bone loss return to normal postmenopausal levels. Alternative treatments do not reach the same degree of bone protection that is achieved with HRT.

P333

KALSIS AS PROTECTION OF BONE MASS DURING MENOPAUSAL TRANSITION

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Objective: To propose a protocol for prevention of postmenopausal osteoporosis based on basic and clinical results.

Material and Methods: Analysis of results of effect of selenium principal element of Kalsis on bone metabolism. Kalsis is a nutriceutical that contains selenium, vitamin E and magnesium. Selenium has a mitochondrial effect that facilitates calcium absorption and incorporation into bone tissue. Vitamin E retarad oxidation of unsaturated fatty acids and to create peroxide. Magnesium is necessary in the stabilization of cell membranes. In rats with osteopenia induced by oophorectomy (Montero M, Diez Perez A, et al) demonstrated reduces partially loss of bone mineral content (BMC). In women aged 20–40 years, with osteopenia associated with the use of suppressive doses of levothyroxine (Turcios S, Rodriguez A) and in postmenopausal women (Navarro D, Triana M) aged 40–59 years old, Kalsis partially reduces the loss of BMC.

Results: Kalsis is useful for reduce the loss of BMC, so that for preserve bone mass.

Conclusion: As an expression of hypoestrogenism during menopause transition an increase in the annual rate of BMC loss occurs, which could favor fragility fractures in later stage of women life. Our proposition is use this nutriceutical in the stages of life when peak bone mass is formed (adolescent) and/or in the years around menopause may be an option with less undesirables long terms effects, and better adhesion than therapeutical drugs using for osteoporosis treatment.

P334

DISPLACEMENT OF THE TRANSITIONAL ZONES (TZ) AT THE SUBCHONDRAL BONE (SB) LAYERS IN AN EXPERIMENTAL MODEL OF OSTEOPOROSIS (OP) AND OSTEOARTHRITIS (OA) IN RABBITS

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Objective: To analyze, through μCT, the microstructural characteristics of the SB layers in an experimental model of

OP and OA to determine the effect of the SB microarchitecture in the OA severity.

Material and Methods: Experimental OA was induced in 12 female NZ white rabbits (8 month old) by ACLT and partial medial meniscectomy (OA) in the left knees. In 6 of them, OP was previously induced by bilateral oophorectomy and subsequent prednisolone administration (OPOA knees). Right knees of OPOA were used as OP knee controls, while right knees of OA group were used as healthy knees. After sacrifice, knees of both groups were carefully dissected and cylindrical samples of SB (4 mm in diameter by 9 mm in length) were extracted from femoral condyles. The microarchitectural characteristics of the samples were studied using μCT with a SkyScan 1172 (Bruker μCT NV). Statistical comparison was performed using the Kruskal-Wallis H test, and post-hoc analysis using Dunn's test (SSPS vs. 19).

Results: According to the bone area fraction (B.Ar/T.Ar) profile at least three bone layers can be clearly characterized at SB: the SB plate (SBP), a dense trabecular bone (trabecular SB) and the subarticular trabecular bone. Furthermore, two different TZ between these layers could be distinguished. SBP thickness was diminished in OP, OA and OPOA groups with respect to healthy ($p<0.05$). Some of the other variables analyzed (Tb.Th, Tb.Sp, Tb.N, polar moment of inertia and Tb.Pf) show the same behavior. As well, the dispersion curves of the parameters analyzed showed a consistent displacement of the TZ toward the joint surface in all the groups.

Conclusion: In this work, it seems to predict the existence at least of three different microstructural layers at SB level and two different TZ between them. As well, there was a clear and concordant displacement toward the superficial areas of the joint in all experimental groups, transforming the biomechanics of SB that might partially explain the OA aggravation in rabbits with previous OP.

P335

FEMALE PATIENTS WITH LOW SYSTEMIC BMD EXHIBIT AN INCREASED CUP MIGRATION AFTER TOTAL HIP REPLACEMENT

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Objective: Osteoporosis may jeopardize initial stability of cementless components in total hip replacement of postmenopausal women. Indeed, low systemic BMD and age-related geometric changes of the proximal femur have been found to increase initial migration of cementless femoral stems in female patients (1). It is possible that low BMD compromises the early stability of cementless acetabular cups as well.

Material and Methods: This prospective study included 36 female total hip replacement patients with the mean age of 64 years (41–78). Radiostereometric analysis (RSA) was used to measure the 3D migration of cementless hydroxyapatite coated cups with ceramic-ceramic bearings. The inclusion criteria included a generally healthy woman with age of <80 years with advanced hip osteoarthritis and signed informed consent. Exclusion criteria comprised of inflammatory arthritis, untreated parathyroid disease, severe undiagnosed osteoporosis (T-score<−3.5) and ongoing osteoporosis or corticosteroid therapy. Ten patients (28 %) had normal and 26 patients (72 %) had low systemic BMD (osteopenia or osteoporosis) based on preoperative DXA. The patients were followed with repeated RSA for 2 years.

Results: The patients with low BMD showed significantly greater proximal migration of the acetabular cups than patients with normal BMD ($p<0.007$). Based on the perceived risk of cup revision (2), there were no cases of unacceptable migration (proximal migration more than 1 mm). However, there were 15 (68 %) cases of patients at risk (proximal translation of 0.2–1.0 mm) in the low BMD group, while there were only two such cases among patients with normal BMD ($p=0.021$). There has not been any radiographic loosening or revisions of the cups to date.

Conclusion: This study represents the first evidence of delayed stabilization of uncemented cups in female patients with low systemic BMD.

References: (1) Aro et al. Acta Orthop 2012; 83:107, (2) Pijls et al. Acta Orthop 2012; 83:583.

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P336

EFFECT OF ADJUVANT THERAPY ON BONE MINERAL DENSITY IN PATIENTS WITH BREAST CANCER

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Objective: To assess the effect of aromatase inhibitors (AIs) and selective estrogen receptor modulators (SERMs) on BMD in patients with breast cancer.

Material and Methods: 38 Caucasian women (41–78 years) were enrolled in the study. Twenty-one patients were receiving AIs, 17 patients - SERMs (tamoxifen). We have measured BMI, calcium ionized (Ca++); lumbar spine (LS) and proximal femur (PF) BMD values were obtained using DXA. Twenty-one women on AIs therapy were grouped in two

major subgroups - 11 women, who were diagnosed to have Osteopenia and started with OB (oral bisphosphonate) and 10 women - normal BMD, no particular therapy aimed to BMD values. Seventeen women receiving tamoxifen with normal BMD on DXA were not given any antiresorptive medication. DXA BMD values were assessed in two points of research before and after therapy with the interval of 12 months.

Results: After 2 years interval in AIs group BMD loss was calculated in 11 women (with osteopenia and treated with OB) - DXA bone loss estimated to 1.7 %, 10 women not treated with antiresorptive agents showed bone loss up to 5 % (lumbar spine - median loss 4.2 %, total hip median loss 3.8 %). In 17 women treated with SERMs - tamoxifen positively affected BMD - in lumbar spine 2.1 %, and total hip 1.3 %, respectively.

Conclusion: An AI treatment is associated with significant BMD loss (5 %). Nonsignificant BMD increase was observed in patients who had been receiving SERMs (tamoxifen).

P337
HIP FRACTURES IN SWEDEN AND DENMARK 1987–2010: PERIOD AND COHORT EFFECTS

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Objective: The reasons for the recent decrease in hip fracture rates remain unclear. While current antiosteoporosis efforts are important also factors earlier in life seem essential and we examined age-period-cohort (APC) effects in hip fracture incidence in the Sweden (SE) and Denmark (DK).

Material and Methods: We studied the entire populations aged ≥50 years from 1987 to 2010 in SE and DK and ascertained acute hip fractures in nationwide discharge registers using diagnosis and surgical procedure codes for proximal femoral fracture. APC effects were evaluated country specific by log likelihood estimates in Poisson regression models (with adjustment for sex and a scale parameter included to account for overdispersion). Results are presented as Incidence Rate Ratios (IRR) compared to the most recent 3-year period (2008–2010) or 6 year birth cohort (1953–60).

Results: During the examined years there were 399,596 hip fractures in SE and 207,304 in DK. The combined period and cohort effects were generally stronger in SE than DK and in women than men. IRR ranged from 1.05–1.30 in SE women, 1.04–1.18 in SE men, 1.21–1.11 in DK women and 0.95–1.11 in DK men per period. The corresponding IRR per birth cohort ranged from 1.15–3.13 in SE women, 1.07–1.78 in SE men, 1.07–1.67 in DK women and 0.85–1.14 in DK men. Relative period effects increased with successive period for men and women in SE and described a convex curve for both men and women in Denmark with higher than expected risk in the periods in the middle of the examination years. Relative cohort effects were increasing with successive birth cohort for both genders in both countries but with markedly lower risks for DK women born 1925–44 and DK men born 1929–52 and a lower risk for SE women born 1933–44.

Conclusion: Cohort and period effects were different in SE and DK. This may in part be referred to differences in general health as evident in differences in life expectancy and to differences in exposure to war and famine as well as differences in use of osteoporosis drugs.

P338
SCLEROSTIN SERUM LEVELS ACCORDING TO GENDER IN TYPE 1 DIABETES MELLITUS: ASSOCIATIONS WITH BONE MASS, TURNOVER MARKERS AND CLINICAL FEATURES

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Objective: SOST gene product, sclerostin, is an osteocyte-derived glycoprotein which works as inhibitor of the Wnt/β Catenin signaling, a critical pathway for osteoblast proliferation and activity. Published data on sclerostin levels in type 1 diabetes mellitus (T1DM) are few. Aims of our research were to investigate gender differences in sclerostin serum levels, and the associations between sclerostin, bone mass, bone metabolism and the main clinical characteristics of subjects with T1DM.

Material and Methods: Sixty-nine T1DM Caucasian subjects (mean age 33.7±8.1; 51 % females) were consecutively enrolled in this study and evaluated for the presence of diabetic related complications. BMD was measured by quantitative ultrasound (QUS) at phalangeal site. Markers of bone resorption (PYR, D-PYR, OH-PRO) and bone formation (B-ALP and BGP) were assessed in addition to sclerostin.

Results: D-PYR and sclerostin were significantly higher in women in comparison to men (P=0.04). In the whole study population, a disease duration greater than 15 years was associated to higher sclerostin levels (P=0.03). Bone turnover markers and QUS parameters were not correlated to sclerostin. A significant negative correlation was observed between QUS parameters, BMI and OH-PRO. Sclerostin serum levels correlated with homocysteine (r=−0.34; P=0.005) and vitamin B12 (r=−0.31; P=0.02). Generalized linear model showed that

macroangiopathy was the only predictor of sclerostin serum levels (beta=−11.8, 95%CI from −21.9 to −1.7; P=0.02).
Conclusion: Our data demonstrate that T1DM women exhibit higher sclerostin levels than men, and that circulating sclerostin is not associated with bone turnover markers and phalangeal QUS measurements. Macroangiopathy predicted sclerostin levels, suggesting a role for sclerostin in vascular pathophysiology.

P339
OSTEOARTHRITIS SYMPTOMS ARE NEGATIVELY CORRELATED WITH BMD IN POSTMENOPAUSAL WOMEN

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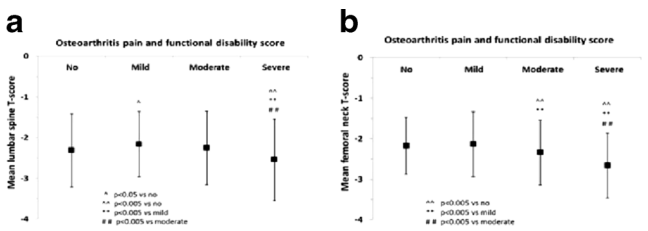
Objective: The relationship between severity of symptoms of osteoarthritis with T- score at the spine and femoral neck is examined in postmenopausal osteoporotic or osteopenic women.
Material and Methods: The severity of osteoarthritic pain and functional disability of a randomly selected population of postmenopausal women with osteopenia or osteoporosis was prospectively investigated. Participants with recent injury, inflammatory arthritis or malignancies of the musculoskeletal system were excluded. The number of symptomatic joints and the degree of osteoarthritic impairment (none, mild, moderate, severe) at the knee, hip, neck or hand were recorded. Site-specific internationally validated osteoarthritis questionnaires are used (for the knee and hip used Lequesne, for the cervical spine Vernon Mior and for the hands Michigan). IBM SPSS 17 software was used for statistical analysis.
Results: Of the 3,900 women screened, 3,000 met the inclusion criteria. An inverse relationship between severity of osteoarthritic impairment and mean femoral neck and spine T-score was observed (Figure 1). There was a significant difference in mean femoral neck T-score between patients with severe osteoarthritic impairment and those with no, mild, or moderate impairment (all p<0.005).
Figure 1: Relationship between mean lumbar spine T-score (A) and mean femoral neck (B) T-score and osteoarthritis pain and functional disability score.



Conclusion: Osteoporosis and osteoarthritis can coexist. An inverse association between severity of osteoarthritic impairment and mean femoral neck T-score. After pooling, mean lumbar spine or femoral neck T-scores of patients with severe osteoarthritic impairment were significantly lower than those of patients with less impairment.

P340
PREVALENCE OF VITAMIN D INADEQUACY IN EUROPEAN WOMEN AGED OVER 80 YEARS

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Objective: Inadequate vitamin D level is associated with secondary hyperparathyroidism and increased bone turnover and bone loss, which in turn increases fracture risk. The objective of this study is to assess the prevalence of inadequate serum vitamin D levels in European women aged over 80 years.
Material and Methods: Assessments of 25-hydroxyvitamin D levels [25(OH)D] were performed on 8,532 European women with osteoporosis or osteopenia of which 1984 were aged over 80 years. European countries included in the study were: France, Belgium, Denmark, Italy, Poland, Hungary, United Kingdom, Spain and Germany. Two cut-offs of 25(OH)D inadequacy were fixed: <75 nmol/L (30 ng/ml) and <50 nmol/L (20 ng/ml).
Results: Mean (SD) age of the patients was 83.4 (2.9) years, BMI was 25.0 (4.0)kg/m^2 and level of 25(OH)D was 53.3 (26.7)nmol/L (21.4 [10.7] ng/ml). There was a highly significant difference of 25(OH)D level across European countries (p<0.0001). In these women aged over 80 years, the prevalence of 25(OH)D inadequacy was 80.9 % and 44.5 % when considering cutoffs of 75 and 50 nmol/L, respectively. In the 397 (20.0 %) patients taking supplemental vitamin D with or without supplemental calcium, the mean serum 25(OH)D level was significantly higher than in the other patients (65.2 (29.2) nmol/L vs. 50.3 (25.2) nmol/L; P<0.001).
Conclusion: This study indicates a high prevalence of vitamin D [25(OH)D] inadequacy in old European women. The prevalence could be even higher in some particular countries.

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TRABECULAR BONE LOSS IS UNDERESTIMATED IN POSTMENOPAUSAL WOMEN: HOW TO IMPROVE THE ASSESSMENT–THE OFELY STUDY

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Objective: Definition of cortical (Ct) and trabecular (Tb) compartments is crucial for bone loss assessment. Age-related Ct thinning produces remnants that are artefactually considered as Tb bone. In longitudinal studies, accurate assessment of Ct and Tb bone loss in their original compartments would permit to determine true bone loss. Our goal was to compare Ct and Tb bone loss assessed by HR-pQCT at the distal radius over 6 years, using standard procedures and baseline-defined compartments after 3D registration.
Material and Methods: Forty-six postmenopausal women (60±7 year) were measured by HR-pQCT at the distal radius at baseline and after 6 year. The longitudinal analysis was performed using three methods:
- Method 1: Standard software: volume of interest (VOI) identified by cross-sectional area (CSA) matching, Ct and Tb bone separated by filtering and thresholding. - Method 2: VOI based on CSA matching and double contouring of the Ct bone
- Method 3: VOI based on 3D registration and double contouring of the baseline compartment used for all scans.
Results: Tb bone volume (Tb.TV) increased with methods 1 and 2 (2.6 and 2.1 %, $p<0.001$) confirming that Ct remnants are considered as Tb bone during follow-up. Tb BMD decreased by −4 % and −3 % ($p<0.005$) with those methods but was not significantly different between the two methods. Albeit both significant, decrease in Ct thickness was lower using method 2 than method 1 (−6 % vs. −15 %; $p<0.001$). When Tb.TV was kept constant with method 3, the decrease in Tb BMD was markedly higher than those obtained with methods 1 and 2 (−10 % vs. −4 % and −3 %, respectively, $p<0.01$). Moreover, the increase in Ct porosity (Ct.Po) was greater (92 vs. 65 %, $p<0.01$) and consistent with a greater decrease in Ct BMD (−6 % vs. −5 %; $p<0.01$) than that obtained with method 2.
Conclusion: With an accurate registration technique, Tb and Ct bone loss can be assessed in their original compartments, therefore precluding the artefactual underestimation of Tb bone loss and Ct.Po increase observed with standard procedures.

P342
THE PREVALENCE OF OSTEOPOROTIC FRACTURES IN THE ELDERLY POPULATION

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Objective: Osteoporosis is a metabolic bone disease that results in fractures and occurs in women of postmenopausal age and men over 60. Osteoporosis follows encumbered mobility, pain in the lower back and joint pain, spasms and weakness and muscle, decrease body height, increase the risk of bone fractures and spontaneous fracture. BMD, bones become porous and brittle and break easily.
Material and Methods: The period from 1.3.2011 to 1.3.2012 in the department of physical medicine and rehabilitation in Nis R Serbia, trial included 298 elderly patients over 75 diagnosed with osteoporosis 10 years ago, based on osteodensitometry (T-score −2.5), clinical features, the presence of more than two risk factors. The analyze of the found out that in 88 (29.53 %) patients reported a fracture in less trauma or spontaneously without trauma compression fracture of the vertebrae also occur repeated breaks of a few months or years.
Results: Results of the work of the total number of respondents 298, no fracture was 210 (70.47 %) patients, while osteoporotic fracture occurred in 88 (29.53 %) and in 83 (94.21 %) representative from the female population and in 5 (5.69 %) men.
Conclusion: Osteoporotic fractures were low-energy fractures that occur spontaneously (vertebra) or in the fall (hip). Osteoporosis is a significant risk factor for Op Fx (osteoporotic fractures). Op Fx may be symptomatic or even asymptomatic. Op Fx may be symptomatic or even asymptomatic. Op Fx have their medical socio-economic implications. Op Fx are accompanied by difficulties in activities of modern life, and only a third of patients reach prefracture quality of life. The main risk factors for Fx are female sex, age, estrogen deficit, low weight and BMI, osteoporosis in the family, smoking, and previous Fx. Low BMD, decrease in physical strength and bone geometry, gracility. The biggest socio-economic problems are hip fractures with significant mortality of 12–20 % in the first year and major disability over 50 %.

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SERUM PERIOSTIN IS INDEPENDENTLY ASSOCIATED WITH OSTEOPOROSIS- RELATED FRACTURE RISK AMONG POSTMENOPAUSAL WOMEN: THE CEOR STUDY

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Objective: Periostin (POSTN) is a secreted extracellular matrix protein preferentially expressed in bone by osteocytes and periosteal osteoblasts. Decreased POSTN expression may affect osteoblast differentiation and collagen type 1 synthesis predisposing to low BMD, osteoporosis and increased risk of fracture. We therefore hypothesized that postmenopausal

women with increased circulating POSTN levels have a greater risk for osteoporosis-related fractures (ORFs).

Material and Methods: We examined the association between circulating POSTN [measured by ELISA method, (USCNK-Life Science Inc., China)] levels and the risk of ORFs in 707 postmenopausal women, 50 years of age or older 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 for analysis of the risk of fracture with adjustment for age, body-mass index and other potential risk factors that may be associated with the risk of fracture or with higher circulating levels of serum POSTN.

Results: High serum POSTN levels were associated with an increased risk of ORFs. Following adjustment for age and other confounders, the relative risk of ORFs for each increment of 1 SD in POSTN level was about 2.3-fold among postmenopausal women [RR=2.36 (95%CI: 1.13–3.66)]. Further, women in the highest quartile of POSTN levels had an increase in the risk of ORFs so that the risk was 3.6-fold for POSTN. The risk of ORFs that was attributable to POSTN levels (in the highest quartile) was estimated at 35.8 %. The association between POSTN levels and the risk of fracture seems to be independent of BMD and other confounding risk factors for fracture.

Conclusion: Higher serum POSTN levels are associated with a greater risk of ORFs independent of several other risk factors among postmenopausal women. Serum POSTN measurement could be useful to improve fracture risk assessment.

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HIP FRACTURE RISK IN INCIDENT TYPE 2 DIABETIC PATIENTS: A POPULATION-BASED PARALLEL COHORT STUDY

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Objective: Type 2 diabetes (T2DM) and osteoporosis are two prevalent chronic diseases. Data on the association between T2DM and osteoporotic fractures is controversial. We estimated hip fracture rates in newly diagnosed T2DM patients, and compared these to matched nondiabetic peers.

Material and Methods: We conducted a population-based parallel cohort study using data from the SIDIAP Database (www.sidiap.org). SIDIAP contains clinical information from primary care records, hospital admissions, and pharmacy invoice data for >5 million patients (80 % of the population) in Catalonia, Spain. We selected all newly diagnosed T2DM patients registered in SIDIAP in 2006–2010. Up to 2 diabetes-free controls were matched to each T2DM participant on age, gender, and primary care center. Main outcome was incident hip fracture in 2006–2011, using ICD10 codes. We used Fine and Gray survival modelling to estimate risk of hip fracture according to T2DM status accounting for competing risk with death. Multivariate models were adjusted for BMI, previous fracture and use of oral corticosteroids.

Results: We identified 58,483 T2DM patients and 113,448 controls, who were observed for a median (interquartile range) of 2.63 (2.93) years. 444 (0.8 %) T2DM patients sustained a hip fracture in the study period (incidence rate 2.7/1,000 person-years) compared to 776 (0.7 %) matched controls (2.4/1,000). This is equivalent to an unadjusted (age and gender-matched) SHR 1.11 [0.99–1.24], and adjusted SHR 1.20 [1.06–1.35]. In stratified analyses, the excess risk associated with T2DM was highest amongst T2DM patients with prevalent IHD (adjusted SHR 1.39 [0.98 to 1.98]), CKD (adjusted SHR=1.26 [1.03 to 1.55]) or grade 2 obesity (adjusted SHR 1.37 [0.92 to 2.06]).

Conclusion: Newly diagnosed T2DM patients are at a 20 % increased risk of hip fracture even in early stages of disease. More data is needed on the causes for an increased fracture risk in T2DM patients as well as on the predictors of osteoporotic fractures among these patients.

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STUDY OF THE CORRELATION BETWEEN ANTH ROPOMETRIC INDICATORS AND TRIGLYCERIDE LEVELS IN POSTMENOPAUSAL WOMEN PARTICIPANTS OF THE PHYSICAL EXERCISE PROGRAM FOR OSTEOPOROSIS

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Objective: To evaluate the correlation between anthropometric indicators of total and central obesity and triglyceride levels in physically active postmenopausal women.

Material and Methods: We evaluated 47 postmenopausal women, aged 60±6.1 years, participants of the Physical Exercise Program for Osteoporosis. Triglyceride levels were measured by colorimetric assays (Mindray) after 12 h fasting. Total obesity was assessed using BMI and the percentage of total body fat was measured with DXA (Hologic Discovery A). Central obesity was assessed from the waist hip ratio (WHR), abdominal circumference (AC) and abdominal fat percentage measured with DXA. Person's test was used.

Results: The mean value of BMI (27.2±5.1 kg/m^2) classified the group as pre- obese, while the percentage of total fat indicated high values 38.2±4.4 %. All central obesity indicators showed high values: WHR 0.84±0.07; AC 95.7± 12.4 cm; abdominal fat percentage 37.4±6.7 %. The percentage of total body fat was strongly correlated with BMI (0.751); abdominal fat percentage was positively correlated with WHR (0.588) and a strong correlation with AC (0.712). Only 14.9 % of the sample had elevated triglyceride levels (≥150 mg/dL), and the mean values (96.4±37.2 mg/dL) were reflected below the expected values for this age group. Triglyceride levels showed positive but weak correlation only with WHR (0.390 p=0.007).

Conclusion: The triglyceride levels had a weak but statistically significant correlation only with WHR, showing that this can be a good indicator of fat in the abdominal region. Low levels of triglycerides can be explained by the use of lipid-lowering drugs and physical exercise. Both obesity indicators denoted that the group had high fat levels, more than the ideal for the age, increasing the development of heart diseases. However, this overweight provides a protective effect in the bones of this population, since a higher overload on them prevents the decrease of the BMD.

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EFFECTS OF ETHANOL EXTRACT OF AMOMUM TSAO-KO ON ANTI- INFLAMMATORY AND ANTI-OSTEOARTHRITIC ACTIVITIES IN VITRO AND IN VIVO

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Objective: *Amomum tsao-ko* is well known to use in traditional medicine for the treatment of stomach inflammation and lipid problems.

Material and Methods: This study was investigated to determine whether the ethanol extract of *Amomum tsao-ko* (EEA) influenced on inflammation reaction in lipopolysaccharide (LPS)-stimulated RAW264.7 murine macrophages and the temporal changes in the tibial subchondral bone architecture in monosodium- iodoactate(MIA)-induced osteoarthritis rat model.

Results: The results showed that EEA inhibits lipopolysaccharide (LPS)-induced nitric oxide (NO) and prostaglandin E_2 release through down-regulation of NO synthase and cyclooxygenase-2, respectively. In addition, treatment with EEA suppressed the expression of LPS-induced inflammatory cytokines such as IL-6, IL-10, and TNF-α in LPS-stimulated RAW264.7 cells. In animal study, μCT analysis showed protective effects of EEA on trabecular bone. EEA tended to increase in trabecular thickness (Tb.Th) and trabecular bone volume fraction (BV/TV). Treatment with EEA significantly decreased the level of trabecular spacing (Tb.Sp).

Conclusion: These findings indicate that EEA could be developed as a potential therapeutic agent for inflammation and osteoarthritis.

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CONTRIBUTION OF BONE ARCHITECTURE TO FRACTURE RISK EVALUATION

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Objective: The WHO FRAX is the most used of fracture risk models though it does not include some significant risk factors and its predictive value remains suboptimal. One of the variables which could influence significantly fracture prediction is bone geometry and architecture. The aim of this project is to examine if bone architecture and resistance parameters measured by HR-pQCT in a subgroup of women who have undergone a fragility fracture to a control group without fracture but with the same level of absolute fracture risk by the FRAX model.

Material and Methods: This ongoing project is a nested case control study carried out within the Fracture RISk Brussels Epidemiological Enquiry (FRISBEE study) on postmenopausal and senile osteoporosis. FRISBEE is a prospective observational study including 3,578 women of the Brussels area, aged from 60 to 85 years, recruited since 5 years (2007–2013) who will be followed up for 10 years. BMD and clinical risk factors (CRFs) (included or not in the FRAX) were recorded at inclusion, with the aim of building a risk model allowing absolute fracture risk prediction and comparing the weight of the different CRFs. A fragility fracture was already reported in 144 women included during the first 3 years. Three controls are selected for each fracture case to match the FRAX estimation of fracture risk. All subjects have a HR-pQCT (Scanco Medical AG, Bassedorf, Switzerland) at the radius and tibia, as well as a second DXA and a complete re-evaluation of their CRFs.

Results: Several studies have demonstrated that some structural parameters, from morphometry and from the Finite Element Analysis, can discriminate patients with fragility fracture. Conditional logistic regression models will be used to estimate whether the HR-pQCT parameters as well as other CRFs (not included in the FRAX) contribute significantly to the risk of fracture.
Conclusion: This study should demonstrate if HR-pQCT derived morphometric parameters and bone strength predict fracture risk independently of DXA and FRAX score.

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EXPRESSION OF GAP JUNCTION PROTEINS CONNEXINS 26, 30, AND 43

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Objective: Dupuytren's disease (DD) is a benign fibroproliferative process of the palmar aponeurosis showing similarities to wound healing. Communication of cells involved in wound healing is mediated by the composition of gap junction (GJ) proteins. We investigated the expression of 3 GJ proteins, connexins 26, 30, and 43 (Cx26, Cx30, and Cx43) in DD.
Material and Methods: Fragments of Dupuytren's tissue from 31 patients (mean age 56 (30–76) years, 24 male) were analyzed immunohistochemically and compared to control tissue for expression of the GJ proteins Cx26, Cx30, and Cx43 and also alfa-smooth muscle actin (α-SMA).
Results: 14 of 31 samples could be attributed to the involutional phase (α-SMA positive) whereas 17 samples had to be considered cords in the residual phase (α- SMA negative). Expression of Cx26 and Cx43 was seen in 12 of the 14 samples from the involutional phase, and Cx30 was seen in 7 of these. Only 4 of the 17 samples from the residual phase showed any Cx, and there was none in the controls.
Conclusion: The high expression of GJ proteins Cx26, Cx30, and Cx43 in α-SMA positive myofibroblast-rich nodules, which are characteristic of the active involutional phase of DD, suggests that connexins could be a novel treatment target for the treatment of DD.

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NUTRITIONAL STRATEGY TO PROTECT MATERNAL BONE LOSS DURING GESTATION AND LACTATION AS AN APPROACH TO PREVENT OSTEOPOROSIS LATER IN LIFE

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Objective: Pregnancy and lactation have been related with temporary decreases in maternal BMD. Nutrition during these periods could be key on maternal bone preservation. Long-chain polyunsaturated fatty acids (LCPUFAs) and prebiotic have been shown to have healthy effects on age-associated bone loss. Currently, maternity is becoming closer to the perimenopause period with the subsequent negative effect of increasing the risk of bone loss associated to the onset of menopause. Therefore, strategies addressed to reduce maternal bone loss are crucial to delay bone deterioration later in life. The aim of this study was to compare the effectiveness of calcium fortification vs. prebiotic supplementation or LCPUFAs fortification in pregnant rats as a nutritional approach to reduce bone loss produced during gestation and lactation.
Material and Methods: Pregnant Sprague Dawley rats were divided into four groups: Control group (CC group) was fed with a standard semipurified diet until the end of the lactation period. Ca group, Pre group and LCPUFAs were fed with the same diet fortified with 0.5 % calcium carbonate (total calcium content 1 %), supplemented with an inulin-type fructans (7.5 % of the total carbohydrate) or fortified with LCPUFAs (3.5 % Eupoly-DHA®), respectively. At the end of the lactation, BMD and bone mineral content (BMC) were determined by DXA; bone volume fraction as well as 3D parameters of trabecular architecture (trabecular number, thickness, separation and connectivity density) were analyzed by μCT.
Results: In appendicular bones, higher BMD and BMC were found for Pre and LCPUFAs groups as compared with calcium fortified group. Furthermore μCT data showed that Pre and LCPUFAs groups had an increase in bone volume/tissue volume, trabecular thickness, trabecular number and connectivity density value, with a concomitant reduction in the trabecular separation as compared not only with control but also and with calcium fortification group.
Conclusion: Based on our data, both prebiotic supplementation as well as LCPUFAs fortification exert a protection on maternal skeleton during pregnancy and lactation. The beneficial effect may delay the onset of osteoporosis and its deleterious derived- consequences later in life.

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CHEMICAL COMPOSITION OF BONES AND LOWER INCISOR DENTIN IN MATURE RATS AFTER 60-DAY ADMINISTRATION OF SODIUM BENZOATE

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Objective: To investigate of chemical composition of hip bone, mandible and lower incisor dentin in mature white rats after 60-day administration of sodium benzoate.
Material and Methods: For the purposes of study we selected 105 rats with initial body weight of 200–210 g. The control group received per os sodium chloride daily in dosage of 1 ml of 0.9 % solution throughout 60-day observation period. The rest of the animals received per os sodium benzoate (SB) daily in dosage of 500 or 1,000 mg per 1 kg of body weight as 1 ml of solution (groups B1 and B2, respectively). At the end of the cycle of administration investigated the chemical composition of the hip bone, mandible, and lower incisor dentin by gravimetric method.
Results: By the 3rd day after the end of SB administration mineral content of hip bone and body of mandible in B1 group was lower than that of the control group by 7.45 % and 8.27 % and organic substances content—by 8.56 % and 6.54 %, respectively. The lower incisor dentin these deviations amounted to 5.88 % and 8.36 %. In readaptation period of group B1 changes remained significant up to 15th day, when the share of mineral component was reduced by 5.29 % and 4.83 %, while the proportion of organic substances—by 4.38 % and 5.29 %. Higher dose of SB (1,000 mg/kg) resulted in more expressed changes—by the 3rd day after the end of medication in the group B2 mineral content in the hip bone and organic substances content decreased by 8.69 % and 9.24 %. In the readaptation period of group B2 revealed changes recovered more slowly than in group B1: in the hip bone and the mandible deviation persisted up to 24th days, and in the incisor dentin mineral content remained by 3.85 % lower than the control.
Conclusion: Daily per os SB in dosage of 500 mg/kg of body weight accompanied by a decrease of organic and mineral substances in the hip bone, the body of the mandible, as well as in lower incisor dentin. When increasing the dosage of SB to 1,000 mg/kg, the severity of the changes increases.

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A LOW DOSE 3D QCT PROTOCOL FOR THE SPINE

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Objective: To develop a low dose in vivo 3D QCT protocol for the spine.
Material and Methods: In 27 cadavers T6-L4 were scanned twice on a Philips MX8000: with 120 kV and 100 mAs and a lower dose protocol with 90 kV and 150 mAs. Reconstruction diameter was 15 cm, slice thickness 1.3 mm, and convolution kernel was 'B' for both scans. A BDC calibration phantom (QRM Möhrendorf, Germany) was used for conversion of HU to BMD values. MIAF-Spine was used to analyze total vertebral body volume and BMD. Additionally, mean and standard deviation of the HU values obtained in the three cylindrical phantom inserts (0, 100, and 200 mg/cm^3) were measured in each of the 27 dataset pairs. All parameters were compared between the two scans using matched pair t-tests (Wilcoxon signed rank test for the volume) and Pearson correlations coefficients (r). Dose reduction was estimated using ImpactDose software (CT Imaging, Erlangen).
Results: Effective dose values for 90 kV are approximately 60 % lower compared to 120 kV. BMD values were highly correlated but a significant offset ($p<0.001$) indicates differences in field inhomogeneity; segmented volume was not affected by the lower kV ($p>0.5$). All correlation coefficients were significant ($p<0.001$). Noise in the images assessed by the standard deviation of the HU values of the phantom inserts of the vertebrae were significantly higher in the 90 kV scans: 20.8±4.7 HU vs. 16.2±3.0 HU, 22.0±4.9 HU vs. 17.1±2.9 HU, and 23.3±5.0 HU vs. 18.0±3.1 HU in the phantom insert with 0, 100, and 200 mg/cm^3, respectively.
Conclusion: As expected, noise values were higher in the 90 kV protocol. However, increased noise had no effect on segmentation. The difference in calibrated BMD values indicates differences in the scan field inhomogeneity at 90 and 120 kV requiring different corrections. As the correlation between BMD values at 90 and 120 kV was very high, a linear correction approach, e.g., based on the scans of the ESP will suffice to obtain the same BMD results at 90 and 120 kV.
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THE GROWTH HORMONE RECEPTOR GENE EXON 3 DELETION POLYMORPHISM HAVE INFLUENCE ON IGF-1 LEVELS IN CHILDREN TREATED WITH RHGH

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Objective: Patients treated with recombinant human growth hormone present interindividual variability regarding

responses to this therapy. The aim of the study was to verify a relationship between GHR *exon 3 deletion* polymorphism or other genetic factors in GHR gene promoter and effectiveness of rhGH therapy.

Material and Methods: Children (n=30) aged 3–16 years old with somatotrophin pituitary insufficiency (n=20) and Turner Syndrome (n=10), which began rhGH therapy and received the same rhGH doses for 3 months. After 3rd month some doses was modified to ensure therapy safety for all children. *Exon 3 deletion* GHR gene polymorphism was detected by multiplex-PCR reaction and correlated with clinical factors, which were measured after 3rd, 6th and 12th month. Statistical analyses for genetic associations (ANOVA) were conducted with SPSS Statistics for Windows.

Results: Patients homozygous *d3/d3* (n=3) presented significantly lower increases of IGF-1 (p=0.028; 30.58± 34.06 ng/ml), than *fl/d3* (n=10; 191.13±66.33 ng/ml) and *fl/fl* (n=17; 122.31±105.92 ng/ml) genotypes after 3-month therapy. Exclusion of puberty patients and all children above 13 years old made this relationship even more significant (p= 0.005; p=0.0180, respectively). We did not observe any associations between GHR genotypes and growth increases or growth velocity as well as biochemical markers of bone metabolism levels (CTx, PINP, PIIINP, NT- proCNP). Patients with at least one *d3* allele (n=13) presented lower spin BMC and total body BMC after 12-month therapy (p=0.054; 19.02 ±6.06 %; p=0.059; 16.82±5.24 %, respectively). Sequence analysis of GHR gene promoter region did not show any polymorphisms or mutations which could influence on response variability.

Conclusion: The genetic factors have significant influence on effectiveness of rhGH therapy. *Exon 3 deletion* GHR gene polymorphism might determine IGF-1 level increase after 3-month therapy, though it did not correlate with growth velocity and growth increase. The further studies are required.

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SECONDARY OSTEOPOROSIS IN HOSPITAL SAMPLE

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Objective: Secondary osteoporosis still remains subdiagnosed entity. The aim of this study was to analyze the pattern of hospital patients who have had the diseases where development of secondary osteoporosis is expected.

Material and Methods: Out of all medical records of the patients who were treated at the inpatient Clinic of Physical and Rehabilitation Medicine (n=531) in 1 year period, the patients who have had the diseases where development of secondary osteoporosis is expected were selected. Patients were divided in two groups. The first group consisted of patients whom secondary osteoporosis was diagnosed and treated, and the second group consisted of patients whom diagnostic procedures for secondary osteoporosis presence were not performed.

Results: Out of total number of hospitalized patients (n=531), 13.2 % (n=70) have had the diseases where development of secondary osteoporosis is expected. Secondary osteoporosis was diagnosed and treated in 20 % of these patients (n=14), and they presented the first group. In this group the most frequent disease was spinal lesion, presented by 57.1 % (n= 8), followed by multiple sclerosis and rheumatoid arthritis with 14.3 % (n=2) each, than renal failure and malignoma with 7.1 % (n=1) each. Male patients formed 42.8 % (n=6) of this group. The second group was presented by 80 % of selected patients (n=56). In this group the most frequent disease was multiple sclerosis, presented by 39.3 % (n=22), followed by malignoma with 26.76 % (n=15), than spinal lesion and diabetes mellitus with 10.7 % (n=6) each, and rheumatoid arthritis with 3.6 % (n=2). Ratio between males and females was 1:1.

Conclusion: Patients with certain diseases, like multiple sclerosis, spinal cord lesion, diabetes mellitus, rheumatoid arthritis and malignoma, regardless on stage and time of disease occurrence, demand higher attention for secondary osteoporosis diagnostic processing.

P354
BONE MINERAL DENSITY OF PATIENTS WITH LOW-ENERGY FRACTURES

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Objective: Osteoporotic fractures are a serious complication of osteoporosis, however, a fracture that occurs at different stages of life, can also affect on bone health and it can be a risk factor for osteopenia and osteoporosis. Objective was to estimate BMD of patients with a history of low-energy fractures before peak bone formation, physiological stability (up to 40 years) and after 40 years.

Material and Methods: BMD was assessed by DXA (Explorer QDR, Hologic) of lumbar spine in three groups of women with any location fractures: 1) n=42, median age 51.19±1.83, fracture was in age 14.74±0.88; 2) n=32, median age 49.31±1.51, fracture was in age 33.72±0.73 and 3) n=202, median age 62.23±0.58, fracture was in age 55.72±0.6. BMI was similar in all groups (27.71±0.86; 29.05±1.30; 29.6 ±0.37).

Results: BMD on the osteoporosis level was present in the first group in 11.9 % of patients, on the osteopenia level in 35.7 % and regular T-score was present in 52.4 % of patients; in the second group was present osteoporosis level - 12.5 %, osteopenia - 43.75 %, normal value - 43.75 %; in the third group: osteoporosis - 39.1 %, osteopenia - 38.6 %, normal value - 22.27 %. The comparison of the T-score (one way ANOVA) of three groups patients, it was found that the lowest rates T-score (−1.89±0.09; p<0.05) was found for the third group, the differences between the first and the second groups were not detected. In the third group of women risk factor is menopause.

Conclusion: Patients with history of prior fracture have high risk of developing osteopenia and osteoporosis. The results of our study have important significance for clinical practice, because patients with prior fracture need for osteoporosis prevention.

P355
SETTING THE SECONDARY FRACTURE LIAISON PROGRAMME AT THE UNIVERSITY HOSPITAL CENTRE AS AN EXAMPLE FOR THE NATIONWIDE SERVICE IN CROATIA

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Objective: To plan, elaborate and apply a multidisciplinary secondary fracture liaison programme at the University Hospital Centre in Croatia, as an example for the nationwide service in Croatia.

Material and Methods: At the initiation meeting medical doctors of different specialties were informed on the concept of secondary osteoporotic fracture prevention. After the relevant literature search an assessment of the current healthcare system in Croatia and specifically of the University Hospital Centre Sestre milosrdnice in Zagreb was performed and multidisciplinary team was built. The programme was put forward to the broader audience at the symposium which was held for the World Osteoporosis Day. The conclusions of the meetings were transformed into the action plan and implemented in everyday practice.

Results: A need for a systematic approach, where capture of patients is automatic, a major involvement of the orthopaedic surgeon and a coordinator-based service were appreciated during the development of this secondary prevention programme. We set our goals, identified the patients with fragility hip fractures to be more appropriate for intervention, we agreed on the roles assigned for each member of the team (including three dedicated nurses at the orthopedic surgeons' wards as coordinators), developed a questionnaire in order to assess the risks for fragility fractures as a basis for cycle goals and measurement what was done, looked for improvement and determined the evolving actions until goals are met. The implementation of the programme started with no major difficulties and the level of compliance is high.

Conclusion: We developed and implemented the coordinator-based programme of secondary fractures. In this still ongoing fracture liaison service we have seen that the system with dedicated coordinators is effective in our University Hospital Centre and is a potential model to become a standard of care for patients with fragility fractures in Croatia.

P356
EFFECTIVENESS OF REHABILITATION PROGRAM ON LOWER LIMB FUNCTIONAL STATUS AFTER KNEE ARTHROPLASTY

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Objective: To evaluate if the rehabilitation treatment can improve pain control, improve muscle strength and ambulation in patients with knee arthroplasty (KA).

Material and Methods: 27 subjects with recent total knee arthroplasty were randomly assigned to either a group with rehabilitation program started immediately after surgical intervention (n=14), who received 12 supervised rehabilitation sessions combined with exercises at home after KA, or to a control group (n=13), who received standard care. All participants were evaluated at baseline (2 weeks after KA), 1 and 6 months later. The patients' functional status was evaluated by VAS for pain, the lower limb main muscle strength; also the 6-min walk test (6MWT) and quality of life (SF-36) assessed were performed at 6 month after KA.

Results: Subjects in the rehabilitation program group walked longer distances using 1 cane (range, 20–24 m) in 6 min at the 2nd evaluation than subjects in the control group. At the second and third evaluation we found significantly lower average pain scores and higher overall satisfaction than the control group; the same patients also had less difficulty in performing daily activities.
Conclusion: Complex rehabilitation programme appears to be beneficial to patients with arthroplasty of the knee. The programme was effective in improving the short-term lower leg functional ability. More intensive rehabilitation should be promoted in all KA patients, to optimize functional outcomes after surgery.

P357
BONE QUALITY AND BIOMECHANICAL FUNCTION: A LESSON FROM HUMAN OSSICLES

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Objective: Human middle ear contains 3 ossicles (malleus, incus and stapes) with a mechanical property highly specific (transmission of vibrations)[1]. In normal ossicles and in cases with inflammatory disease leading to a decline in hearing (cholesteatoma), the bone quality of ossicles was rarely studied. Our purpose was to assess the intrinsic bone quality and the mechanical properties of incuses.
Material and Methods: Thirteen inflammatory incuses from 13 patients [12 cholesteatoma (54±20 year), 1 chronic otitis (30 year)], 15 non-inflammatory ones from 15 patients without bone pathology (35±32 year), and human control cortical femoral samples, were used. Bones were analyzed by μCT, histology, microhardness[2] and Fourier Transform InfraRed Microspectroscopy (FTIRM)[3–4].
Results: Incuses were compact without bone marrow and with sparse vessels. As the final size of incuses was obtained early during modeling, remodeling activity was rarely observed (few osteoclasts, osteoblasts and osteoid tissue). In ossicles with either woven or lamellar textures, many periosteocytic lacunae, sometimes empty, were present. Architecture of inflammatory incuses was degraded. BMD of non-inflammatory incuses was higher than that of control bone ($p=0.003$) and inflammatory incuses ($p=0.0001$). Non-inflammatory incuses were less hard than both control cortical bone ($p=0.003$) and inflammatory incuses ($p=0.0001$). Incuses were more mineralized and less mature than control bone ($p<0.001$). Moreover, mineral of inflammatory incuses was more carbonated ($p=0.011$) and collagen matrix less mature ($p<0.013$) than in non-inflammatory incuses.
Conclusion: Bone quality of stiffen incuses is well adapted to their specific function. Inflammation degrades architecture, increases microhardness and changes material characteristics; this partly explains the decline of hearing.
References: [1]Kanzaki et al. 2006, Bone 39:414; [2]Boivin et al. 2008, Bone 43:532; [3] Farlay et al. 2011, PLoS ONE 6(12):e287; [4]Farlay et al. 2010, J Bone Miner Metab 28:433.

P358
EFFECTIVENESS OF KINETOTHERAPY IN PATIENTS WITH OSTEOARTHRITIS OF HIP

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Objective: To determine the effects of therapeutic exercises on the functional status of the hip, whether the effects of an exercise programme are sustained at 6 months' follow up and also the place of kinetotherapy in the complex rehabilitation program in patients with hip osteoarthritis (OA).
Material and Methods: Twenty-five patients with primitive bilateral hip OA (1–3 Plain film grading) were divided into 2 random groups. The patients in group I received medication (supplements, such as glucosamine and chondroitin, NSAIDs or acetaminophen) and nonpharmacologic therapies (lose weight through diet, rest of hip from overuse, electrotherapy); group II received the same treatment and kinetotherapy: low-impact aerobics and strength training for the muscles around the hip joint. Exercise programs were individualised to the patient's specific needs, abilities and preferences (resistance training, aerobic exercise and flexibility exercises) and were continued by patients at home, daily. The patients' functional status was evaluated by VAS for pain, muscle strength across the hip and knee, ambulation speed before and at 6 months later.
Results: The results showed that the patients in each treated group had significant improvement in pain reduction compared with their initial status. In the second group, the muscle strength was significantly improved ($p<0.01$), as were walking time and speed (21 %, 32 %, respectively) and pain (10 %) after treatment and at 6 months later.
Conclusion: We found a stronger favorable effect on the level of pain when kinetotherapy was associated with pharmacological treatment but therapeutical exercise associated to the other nonpharmacological treatment had the greatest effect on walking speed and also in decreasing of disability also at 6 months later.

P359
THE PLACE OF KINETOTHERAPY IN REHABILITATION PROGRAM OF KNEE OSTEOARTHRITIS PATIENTS

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Objective: To investigate the effects of therapeutic exercises on the functional status of knee and also the place of kinetotherapy in the complex rehabilitation program in patients with knee osteoarthritis (OA).
Material and Methods: Sixty-two patients with primitive bilateral knee OA (I-III stage) were divided into two random groups. The patients in group I received medication (supplements, such as glucosamine and chondroitin, NSAIDs or acetaminophen) and nonpharmacologic therapies (lose weight through diet, electrotherapy); group II received the same treatment and kinetotherapy: low- impact aerobics and strength training for the muscles around the joint (increases stability and decreases the likelihood of additional joint damage). The therapeutic exercise were continued daily by patients, at home. The patients' functional status was evaluated by VAS for pain, muscle strength across the knee (extension and flexion), ambulation speed, and Lequesne index before and 6 months later.
Results: The results showed that the patients with OA in each treated group had significant improvement in pain reduction and in walking speed after treatment compared with their initial status. In the second group, the muscle strength was significantly improved ($p<0.05$), as were walking time (18 %) and pain (21 %) after treatment and at 6 months later.
Conclusion: Therapeutical exercise associated to the other nonpharmacological treatment had the greatest effect on pain reduction after treatment and caused the greatest increase of walking speed and decrease of disability at 6 months later after treatment.

P360
COST AND HEALTH CARE RESOURCE USE ASSOCIATED WITH NONCOMPLIANCE WITH ORAL BISPHOSPHONATE THERAPY: AN ANALYSIS USING DANISH HEALTH REGISTRIES

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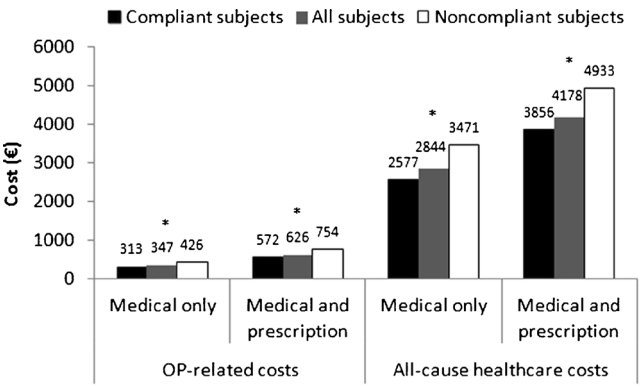
Objective: To estimate the rate of oral bisphosphonate compliance among Danish women and to examine the association of noncompliance with health care resource use and cost.
Material and Methods: Women aged 55 and over with a prescription claim for the oral bisphosphonates alendronate, risedronate, or ibandronate were identified from the Danish national health registries between 2003 and 2008. First prescription claim was defined as index. Compliance was measured as the medication possession ratio (MPR) during the first 12 months post-index. Cost and health care resource use was collected for the following 12 months.
Results: Among the 38,234 women meeting the study inclusion criteria, 29.9 % were noncompliant (MPR <70 %). Compliance rates were 69.8 %, 66.5 %, and 77.3 %, respectively, in patients taking alendronate, risedronate, and ibandronate. Younger age was associated with higher odds of compliance (OR [95%CI] 1.22 [1.15–1.29] for ages 55–64 and 1.18 [1.12–1.24] for ages 65–74; reference age group ≥75 years). Rates of all-cause health care resource use were significantly higher in noncompliant subjects: 28.9 % vs. 23.0 % had inpatient admissions, 16.5 % vs. 13.0 % had emergency room visits, and 48.7 % vs. 43.3 % used outpatient services; $P<0.001$ for all comparisons. The total mean (SD) osteoporosis-related and all-cause cost per patient (excluding office visits) was €626 (2344) and €4178 (7854), respectively. Compliant subjects accrued significantly lower all-cause and OP- related cost than noncompliant subjects (Figure).



*The difference between compliant and noncompliant subjects was significant at P<0.001.

Conclusion: Approximately 30 % of the Danish female population over age 55 is noncompliant with bisphosphonate therapy. Noncompliance was significantly associated with increased health care resource use and cost.
Disclosures: This study was supported by an unrestricted grant from Merck & Co. AD Jorgensen is an employee of MSD Denmark. A Krishna is an employee of Merck & Co. P Vestergaard: Travel grants from Novartis, Amgen, Servier, and Eli Lilly.

P361
EFFECT OF SELECTED ANTIDEPRESSANT DRUGS ON RAT BONE LEVELS OF SCLEROSTIN AFTER ORCHIDECTOMY

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Objective: Antidepressant drugs have a negative effect on bone metabolism. Sclerostin is a protein, which is produced by osteocytes. Sclerostin works by inhibiting the Wnt and bone morphogenetic protein signaling pathways that are critical for osteoblast proliferation and activity. We determined the effect of mirtazapin, trazadone and venlafaxin on bone levels of sclerostin in the orchidectomized rats.
Material and Methods: Rats were divided into five groups, eight rats in each group. The sham-operated control group (SHAM) and the control group after orchidectomy (ORX). The three experimental groups after orchidectomy (ORX) received standard laboratory diet (SLD) enriched with mirtazapine - ORX+MIRTA (1.98 mg/25 g of the diet), trazadone - ORX+TRA (12 mg/25 g of the diet) and venlafaxin - ORX+VENLA (12 mg/25 g of the diet) for 12 weeks. The levels of sclerostin were measured in a bone homogenates using the ELISA method.
Results: Levels of sclerostin in ORX (0.249 ng/ml, $n=8$) was lower vs. SHAM (0.415 ng/ml, $n=8$). In ORX+MIRTA (0.389 ng/ml, $n=8$) and ORX+VENLA (0.339 ng/ml, $n=8$) was higher vs. control group ORX with borderline statistical significance ($p<0.05$). In ORX+TRA (0.245 ng/ml, $n=8$) levels of sclerostin were unchanged vs. control ORX group.
Conclusion: The results suggest that mirtazapin a velnafaxin have a negative effect on bone metabolism by inhibiting the Wnt signaling pathway. Further studies will be needed to confirm these findings.
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P362
INCIDENCE OF VERTEBRAL AND NONVERTEBRAL FRACTURES IN RELATION TO AGE

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Objective: Osteoporosis is defined as a reduction in bone mineral mass and bone quality, resulting in increased bone fragility and increased fracture risk. Aim: To estimate the frequency of vertebral and nonvertebral fractures considering the age.
Material and Methods: 763 examinees participated in the study which was conducted from January to June 2013. 748 or 98 % were women and 15 or 2 % were men. Bone density of the all participants was measured by DXA, by Hologic Discovery C (S/N 83200) apparatus. Measures were done at the femoral neck and lumbar spine (L1-L4). The existence of vertebral and nonvertebral fractures was confirmed by the radiography.
Results: The average age of the examinees was 65.02±9.31. Based on the value of T-score (spine/hip) 244 or 32 % of the examinees had the osteoporosis, 481 or 63 % had osteopenia and 38 or 5 % had a normal value of BMD. 176 or 46.24 % of the examinees had vertebral fractures and the total number of the fractures was 189. 205 or 53.8 % of the examinees had nonvertebral fractures and the total number of these fractures was 257. There were two examinees in the group under 40 years whom the fractures weren't found. In the group 40–50 years old, there were 33 examinees who did not have vertebral fractures and 4 nonvertebral fractures or 10.28 % were confirmed. There were 225 examinees from the age of 50–60 in the study who had 34 vertebral or 17.9 % and 47 nonvertebral fractures or 18.3 %. From the age of 60–70 group, 60 (31.7 %) of 273 examinees had vertebral and 96 (37.35 %) nonvertebral fractures. 209 examinees belonged to the 70–80 group and 80 of them or 42.3 % had vertebral and 95 or 36.9 % nonvertebral fractures. The last age group was beyond 80 and there were 21 examinees, 15 of them or 7.9 % had vertebral and 15 or 15.8 % nonvertebral fractures.
Conclusion: The highest incidence of the vertebral fractures 42.3 % was in the age group 70–80. In the age group 60–70 there was the highest incidence of the nonvertebral fractures 37.35 %.

P363
EFFECTS OF TRAINING WITH JUMPS IN THE MECHANICAL PROPERTIES AND MINERAL BONE DENSITY OF OSTEOPENIC RATS

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Objective: To evaluate the effect of physical training jump exercise on the mechanical properties and BMD of bone of rats submitted to tail suspension.
Material and Methods: 30 female Wistar rats were divided into three groups: Control Group (G_c), Suspension Group

(G_S), Suspension and Training Group (G_{ST}). The animals remained suspended all day for 3 weeks, being removed from the suspension apparatus only once a day, for training, 20 jumps/day, 5 day/week. The animals were euthanized by overdose of anesthesia and femur and tibia were dissected. Mechanical tests were performed on the femur (flexion-compression, 0.5 mm/min) and tibia (3-point bend test, 1.0 mm/min), to evaluate the maximum load and stiffness. To evaluate the BMD we used DXA.

Results: The maximum load of the femur and tibia of the G_c (105.61±8.43 N and 62.15±8.67 N) were similar ($p>0.05$) to the G_{ST} (91.74±14.18 N and 63.69±10.88 N) and these groups were higher ($p<0.01$) compared to the G_S (80.03±11.86 N and 46.50±10.09 N). The stiffness of the femur was not different between groups ($p>0.05$). The stiffness of the tibia of the G_c (107.31±30.05 N/mm) was similar ($p>0.05$) to the G_{ST} (97.55±13.46 N/mm) and these groups were higher than the G_S (72.90±8.56 N/mm). The BMD of the femur and tibia of the G_c (0.22±0.01 and 0.18±0.02 g/cm^2) was similar ($p>0.05$) to the G_{ST} (0.21±0.01 and 0.17±0.01 g/cm^2) and these groups were higher ($p<0.01$) than the G_S (0.18±0.01 and 0.14±0.01 g/cm^2).

Conclusion: The high-impact training with jumps generated positive effects on the mechanical properties and densitometry of the femur and tibia of rats subjected to tail suspension. Rats suspended by the tail without performing training showed lower mechanical properties and BMD, but this deleterious effect can be prevented with high-impact exercises (jump).

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P364

EFFECT OF AROMATASE INHIBITION ON BONE DENSITY AND BONE TURNOVER IN HEALTHY POSTMENOPAUSAL WOMEN: RESULTS OF THE INTERNATIONAL BREAST CANCER INTERVENTION STUDY II (IBIS-II)

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Objective: The inhibition of aromatase in postmenopausal women with breast cancer has been associated with an increase in fracture risk, and this effect may be mediated by an increase in bone turnover and in the rate of bone loss.

Material and Methods: Measurements of bone turnover markers for the bone substudy have been completed for a sub-set of postmenopausal women from the bone study, which included 1,410 postmenopausal women aged 40–70 years at increased risk of breast cancer. Women were stratified by T-score at baseline; if the spine and hip T-score were both equal or above −1.0, women were not offered any bisphosphonate (Stratum I), but advised to take calcium and vitamin D supplementation. Bone resorption by N-telopeptide of type I collagen (NTX) expressed as a ratio to creatinine (from a second morning void urine sample) were measured at baseline, 6 months and year 1, and for 289 women bone turnover marker results were available for all three time points. Lumbar spine and total hip BMD were measured by DXA (Hologic or GE Lunar) at baseline, 1 and 3 years.

Results: 289 postmenopausal women with normal BMD at baseline (T-score≥−1.0) were included in this analysis (anastrozole=142, placebo=147). The median annual rate of bone loss was much greater at the total hip (−1.3 % vs. −0.4 %) and lumbar spine (−1.3 % vs. −0.2 %) for women receiving anastrozole compared to placebo ($P<0.0001$) (Table 1).

	Anastrozole (N=142)	Placebo (N=147)	Difference between baseline and year 1 (95% CI)
Annual change in NTX/Cr, nmol BCE/mmol Cr	8.9 (-3.1 to 21.8)	-1.9 (-11.7 to 10.2)	10.8 (5.4 to 16.2)
Annual change in spine BMD, %/year	-1.3 (-2.17 to -0.44)	-0.2 (-1.0 to 0.9)	-1.1 (-1.5 to -0.7)
Annual change in hip BMD, %/year	-1.3 (-1.8 to -0.6)	-0.4 (-1.3 to 0.3)	-0.8 (-1.2 to -0.5)

*NTX=N-Telopeptide x, Cr=Creatinine, BCE=Bone Collagen Equivalent, BMD=Bone Mineral Density

Conclusion: This is the first report of a large placebo-controlled trial investigating an aromatase inhibitor to show a significant bone loss in women taking anastrozole, which is likely due to an increase in bone resorption.

Disclosures: RE served as a consultant for AstraZeneca and received grant funding.

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LONGITUDINAL CHANGES IN BMD-LEVELS OVER 2 YEARS IN NORWEGIAN ADOLESCENTS: THE TROMSØ STUDY, FIT FUTURES

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Objective: BMD is a strong indicator of fracture risk. Maximization of the genetic potential for BMD during growth may prevent primary osteoporosis later in life. Studies exploring the timing of peak bone mass in adolescents are scarce. The aim of this population-based longitudinal study was to describe changes in BMD-levels over 2 years in Norwegian adolescents aged 15–17 years at baseline and to examine the achievement of peak bone mass during this period.
Material and Methods: In 2010–2011 we invited all first comprehensive school students in Tromsø to the Fit Futures study and 1,038 adolescents (93 %) attended. We measured total body (TB), total hip (TH), and femoral neck (FN) BMD as g/cm^2 by DXA (GE Lunar prodigy). Two years later, in 2012–2013, we invited all participants to a follow-up survey and 820 adolescents attended, providing 688 repeated measures of BMD. Data was analysed using paired sample t-test and one- way ANOVA. We calculated annual BMD changes at each sites and included 372 girls and 316 boys in the analysis.
Results: Mean follow-up time was 2 years (SD 0.2). In the overall study-population BMD increased significantly ($p<0.05$) at all sites in both sexes. Mean annual percentage increase for FN, TH and TB was 0.3, 0.5, 0.8 in girls and 1.5, 1.0 and 2.0 in boys, respectively ($p<0.05$). In one-way ANOVA analyses, the differences in changes between age groups were significant ($p<0.008$) at all sites except at the TH in boys. The annual BMD accrual decreased successively at all sites from 15 to 17 years. In girls, aged 17 years at baseline FN BMD even decreased significantly (−0.7 %, $p<0.009$) and so did TH BMD (−0.2 %), but nonsignificantly.
Conclusion: Overall, BMD levels are still increasing in adolescents aged 15–17 years, but our analysis suggest that BMD accrual is slowing down during this period. Further analyses should explore the effect of initial BMD and lifestyle factors on these changes.
Acknowledgements: The authors are grateful to the staff at the Centre and Clinical Research and Education, University hospital of North Norway and the Fit Futures research staff.

P366
ROLE OF CALCIUM SUPPLEMENTATION AND HEALTH EDUCATION IN BONE HEALTH IN RURAL INDIA

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Objective: To assess the role of calcium supplementation in the bone health of rural India and also provide health education to improve the bone health in rural India.
Material and Methods: 2 villages about 30 km apart were selected for the study, Village1 and village2. On the first visit in both the villages initial BMD was assessed, with the help of QUS technique, of random people above 30 year. and their name and other details were registered and regular follow up was advised. Along with this health education was provided in the form of information about food stuff rich in calcium and also ways and means to increase the nutritional content of food items. In village1 free calcium supplements were also provided to all the registered patients. All the patients were regularly followed up with the help of weekly camps along with visits to the homes of the registered patients if they did not reach the camp to avoid dropouts and ensure full follow ups. Health camps were organised every week for the entire village. The BMD was assessed after 4 months and compared to the initial value.
Results: 150 patients each from village1 and village2 were taken up for study out of which during the initial screening 107 were found to be in the category of osteoporosis and osteopenia in village1 as compared to 103 in village2. Eleven patients from village1 and 7 patients from village2 were lost to follow up. The BMD taken after 4 months was slightly increased as compared to the initial value. The percent of increase in the BMD of village1 was found to be greater than that of village2.
Conclusion: The bone health of the two villages increased during the 4 months when the study was conducted. The village in which calcium supplementation was given, village1, had a greater increase in the BMD as compared to the village in which only health education was provided. This proves that calcium supplementation is helpful in improving the bone health of the people. Also the generalised bone health was increased.

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INSIGHT INTO THE ROLE OF MENISCAL EXTRUSION AND BONE MARROW LESIONS IN KNEE OA PROGRESSION AND THEIR IMPACT ON RESPONSE TO STRONTIUM RANELATE TREATMENT IN A SUBSET OF PATIENTS FROM THE SEKOIA STUDY

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Objective: To evaluate the role of meniscal extrusion (mExt) on knee osteoarthritis (OA) progression and its impact on response to strontium ranelate (SrRan) treatment assessed by X-ray (change in JSW) and qMRI (cartilage volume loss [CVL]) in the medial compartment at 36 months (M36) in subjects with (mExt+) or without (mExt-) mExt, in association (+) or not (−) with bone marrow lesions (BML).

Material and Methods: Patients from the qMRI substudy of the SEKOIA trial (modified ITT, n=330) were stratified based on whether mExt (mExt+, n=60; mExt−, n=270) and BML were present or not (BML+, n=84; BML−, n=246) and on their association in the medial compartment at baseline.
Results: In the placebo group, mExt+ patients had significantly more JSW loss (p=0.002) and CVL in the medial compartment than mExt- patients. mExt−/BML+ patients (n=18) had significantly more JSW loss (p=0.003) and a trend (p=0.09) toward more CVL compared to mExt-/BML- patients (n=68). mExt+/BML+ patients (n=12) had a trend toward more CVL in the medial compartment (p=0.10) than mExt+/BML- (n=14), while JSW change showed no difference. Importantly, in the medial compartment, the JSW loss and CVL were greater when mExt and BML were simultaneously present. In mExt+ patients, while no difference was found in the JSW loss between groups, SrRan at 2 g/day reduced CVL in the plateaus (p=0.007) with a trend toward decrease in the medial plateaus (p=0.081) compared to placebo. In mExt+/BML+ patients, SrRan 2 g/day significantly reduced CVL in the medial plateaus (p=0.046), whereas there was no difference in JSW loss.
Conclusion: Progression of knee OA assessed both by X-ray and qMRI was greater in mExt+ patients and further increased when co-localized with BML. Based on qMRI, SrRan 2 g/day showed beneficial DMOAD structural effects in mExt+ and mExt+/BML+ patients, targeting a subpopulation at higher risk of knee OA progression, while JSW loss was not sensitive enough to provide evidence of such effects.
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BONE ACCRETION IN HIGH RISK NEWBORNS ASSESSED BY QUALITATIVE ULTRASOUND

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Objective: To detect bone accretion deficit through quantitative ultrasound (QUS) by measuring the speed of sound (SoS) in tibia of newborn patients at high risk of osteopenia with different pathologies during the neonatal period. To compared the bone accretion deficit between healthy vs. different pathologies of newborns.
Material and Methods: A cross-sectional study was made based on the neonatology tracking outpatient program (nicu graduates) at Hospital Infantil de Mexico Federico Gómez (Mexico City). Complete somatometry was performed and SoS measurement by ultrasound (Sunlight Omnisense® 8,000 s), with 2 transducers: CM 6823 (in over 10 kg), CS 6616 (under 10 kg) at midshaft of the tibia, from January to June 2013. Patients were classified into the following groups: 1: pulmonary pathology (RDS, BPD, pneumonia), Group 2: congenital heart disease (CHD), 3: abdominal pathology (AP) (NEC III and surgical patients), 4: Neonatal sepsis, 5 hyperbilirubin group AND 6 Healthy newborns. Then, association of SOS in between the different groups was made with analysis of co-variance (ANCOVA) adjusted by age, gestational age and height.
Results: We evaluated 198 patients, 98 were female (49.5 %), classified according to gestational age: 159 term newborn and 26 preterm infants. With median of age of 36 (interquartile range 30–270) days. The SoS Adjusted by were group 1 Pulmonary pathology: 3124±39 m/s, G2 CHD: 3075±38 m/s, G3 Abdominal Pathology: 3072±37 m/s, G4 Neonatal sepsis: 3045±37 m/s, G5 hyperbilirrubin: 2981±41 m/s and G6 Healthy: 3141±17 m/s. There were differences between healthy and all pathologic groups (p=0.006)
Conclusion: Bone accretion measured with QUS is dismissed in high-risk patients with different pathologies during the neonatal period compared with healthy term infant newborns. NICU patients are a high risk population for osteopenia. This NICU graduates persist with bone alterations during the first days of life.

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PRODUCTIVITY LOSS AMONG WORKING PATIENTS WITH KNEE OSTEOARTHRITIS IN REPUBLIC OF MOLDOVA

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Objective: To assess the health-related quality of life (QoL) and work productivity in correlation with clinical pattern in patients with knee osteoarthritis (OA).
Material and Methods: Retrospective, cross-sectional study was performed. There were 93 patients that fulfilled the ACR criteria for knee OA (1991). Productivity loss was measured by Work Productivity and Impairment questionnaires (WPAI-OA) that recorded days off work (absenteeism) and reduced productivity at work (presenteeism) for previous 7 days. The

QoL was assessed by KOOS- Knee injury and Osteoarthritis Outcome Score.
Results: In the study were included 93 employed patients; 72 (77.4 %) females, the mean age±SD 56.7±6.9 (range 37–65) years. Disease duration±SD 5.6±4.0 (range 1–21) years. The KOOS results showed that the QoL was 43, 3 %, qualified as low. The level of activity in daily living was 52.9 %, lower than the level of pain (61.4 %) or other symptoms (69.1 %). The level of pain by VAS±SD was high 62.2±1.8 mm. Over the 12-month follow up period, 63 (67.7 %) participants reported one or more days off work due to knee problems, the mean value being 13.8±3.2 days. The level of absenteeism was 10, 0 %; meanwhile 84 patients (90.3 %) reported reduced productivity at work (63.4 %). The presenteeism showed a close correlation with VAS pain (r 009, $p<0.0001$) and determine a poor QoL (r-0.4, $p<0.0001$). The painful knee induce a diminution of productivity in daily activities for 93 (98.9 %) patients, mean value 65.9±18.1 %. We established moderate correlations between the WPAI- OA absenteeism and function, pain, and disease severity (r 0.3–0.4). Therefore presenteeism was strongly correlated with health outcomes (r 0.7–0.9).
Conclusion: Patients with knee OA have been impaired QoL. For the employees with knee osteoarthritis, the work productivity reduced is mostly due to presenteeism rather absenteeism. The level of pain was the most important factor for loss productivity in patients with knee OA.

P370
RELATIONSHIP BETWEEN ACTIVITY OF RHEUMATOID ARTHRITIS, PARAMETERS OF BONE METABOLISM AND VITAMIN D

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Objective: Rheumatoid arthritis (RA) is a chronic inflammatory disorder. It is well known that RA is also associated with decreased BMD and development of osteoporosis. High inflammatory disease activity and serum concentration of vitamin D3 are believed to be involved in the pathophysiology of RA-associated osteoporosis. Our objective was to determine the relationship between activity of RA with selected laboratory parameters of bone metabolism and vitamin D3 serum concentration.
Material and Methods: We examined 43 patients with different levels of RA activity. The mean age of patients was 52.4 years, female to male ratio was 3.3:1. Patients was not taking any antiporotic drugs or vitamin D. Disease activity was evaluated by DAS28 score (disease activity score), bone metabolism by bone turnover markers—osteocalcin (OC), CTx (C-terminal telopeptide of collagen type I). We also measured serum levels of 25-hydroxycholecalciferol. For statistical evaluation, we used the Pearson correlation coefficient.
Results: We have shown a statistically significant negative correlation between disease activity and levels of vitamin D ($p<0.001$). Relationship between osteomarkers and DAS28 score not reached statistical significance, however, we observed a trend in bone turnover increase with increased activity of RA.
Conclusion: Vitamin D plays an important role in immune regulation. Some studies suggest that individuals with low serum levels of vitamin D have a higher incidence of RA. In our study, the severity of vitamin D deficiency correlated with activity of RA. This relationship may indicate the need of adequate supplementation of vitamin D in patients with RA. Sufficient concentrations of vitamin D may have a positive effect on the activity of RA and also contribute to slower development in secondary osteoporosis.

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OSTEOPRTEGERIN, SOLUBLE RANK LIGAND AND THEIR CORRELATION WITH BONE MINERAL DENSITY IN PATIENTS WITH TYPE 1 DIABETES MELLITUS

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Objective: To evaluate a possible relationship between the serum OPG and sRANKL and BMD in patients with type 1 diabetes mellitus (DM).
Material and Methods: 162 patients with type 1 DM (97 females and 65 males) age 29.17 year (20–40) and 200 (100 women and 100 men) age- and sex-matched healthy controls were analyzed for BMD of lumbar spine and femoral neck by DXA using Lunar DPX-A. Serum levels of OPG and sRANKL were determined using ELISA. We performed statistical analysis (t-test, ANCOVA), Spearman's rank correlation, data are expressed as mean±SD and as percentages.
Results: BMD in type 1 DM showed statistically significant lower levels both for lumbar spine L1-L4- men (1.21±0.15 g/cm^2 DM vs. 1.33±0.16 g/cm^2 controls, $P<0.05$) and L1-L4 women (1.10±0.12 g/cm^2 DM vs. 1.19±0.12 g/cm^2 controls, $P<0.05$) and femoral neck - men (0.91±0.21 g/cm^2 DM vs. 0.98±0.15 g/cm^2 controls, $P<0.05$) and women (0.86±0.12 g/cm^2 DM vs. 0.92±0.14 g/cm^2 controls, $P<0.05$). Serum OPG levels were significantly lower in diabetic patients (37.57±21.76 pg/ml) than in control group (43.58±23.71 pg/ml $p=0.029$). Serum sRANKL did not differ significantly between both groups (0.39±0.21 pmol/L vs. 0.491±0.23 pmol/l, $p=0.16$). However sRANKL/OPG ratio (0.011

±0.08 vs. 0.065±0.013, p=0.034) was significantly lower in DM group than in the controls. We observed positive correlation between serum OPG and sRANKL/OPG levels and BMD (r=0.54; P=0.03 and r=0.34; P=0.13 resp.) and weak negative correlation between BMD and sRANKL.

Conclusion: BMD measured at lumbar spine and femoral neck was significantly lower in patients with type 1 DM than in age-and sex matched controls. Decreased levels of OPG and sRANKL/OPG ratio may be the cause for increased bone resorption and decreased BMD in patients with type 1 DM. OPG and/ sRANKL system may play role in the bone remodeling in concert with other factors influencing bone changes in diabetes mellitus type 1.

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HIP FRACTURE TYPES IN CANADIAN MEN AND WOMEN CHANGE DIFFERENTLY WITH AGE

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Objective: There is evidence that the type of hip fracture, intertrochanteric (IT) versus subcapital (SC), changes differently with age in men and women. We have explored this in a Canadian population and looked at community dwelling and institutionalized seniors to see if frailty plays a role.

Material and Methods: Three years of hip fracture data (2007–2009) were obtained from the Canadian Institute for Health Information for all Canada excluding Quebec, and stratified by age and gender. Statistical Analysis Logistic regression was used to test for a significant interaction between age and gender on the likelihood of sustaining one fracture type compared to the other.

Results: The database contained a total of 18,316 (28 %) hip fractures in men (mean age 78.48±10.90) and 47,343 (72 %) in women (82.08±9.63). Overall the prevalence of the IT fracture rises with age, but when analyzed by gender, intertrochanteric fractures rose in women (p<0.05), from 35.9 % in the youngest category to 50.7 % in the oldest, but not in men. For each year of age the odds of sustaining an IT fracture vs. a SC fracture rises by 2.7 % in women. Analysis of community and institutionalized subjects showed no difference between them.

Conclusion: Results confirm the proportion of the two main hip fracture types changes differently in men and women with age. Previously identified risk factors for subcapital fractures include unchanging structural factors (neck length, neck/shaft angle) so the risk of a subcapital hip fracture in a fall will remain constant and be determined by the frequency of falling. Intertrochanteric fractures are better predicted by trabecular bone mass, loss of which is greater in women. Thus the risk of an intertrochanteric fracture per fall will rise with age in women. Frailty, a condition seen mostly in institutionalized people, does not appear to influence the type of hip fracture.

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RADIOGRAPHIC CHARACTERIZATION OF THE BONE HEALING PROCESS AFTER PROTEIN APPLICATION EXTRACTED FROM HEVEA BRASILIENSIS

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Objective: Current literature has shown that the protein extracted from the rubber tree, *Hevea brasiliensis*, has interesting properties regarding to tissue repair, especially for soft tissues, biocompatible and with angiogenic properties. The aim of this study was to study radiographically the bone healing process in rat skulls, using different types of bone grafts and protein extracted from *Hevea brasiliensis*.

Material and Methods: For this work, 112 albino Wistar rats (~250 g) were divided into eight groups, waiting in each one for sacrifice, 4 and 6 weeks. The groups are the following: AT: Particulate autologous bone graft; HOM: Particulate homologous bone graft; HET: Particulate heterologous bone graft (lyophilized bovine bone); ATP1: Particulate autologous bone graft + 5 μg protein; HOMP1: Particulate homologous bone graft + 5 μg protein; HETP1: Particulate heterologous bone graft (lyophilized bovine bone) + 5 μg protein; P1: 5 μg of protein; DO: bone defect only. Images of the samples were obtained using the X-ray machine GE-100 (General Electric, Milwaukee, USA), operating at 50 Kvp, 10 mA, 8 pulses, handled by the digital system (Soredex, Orion Corporation, Helsinki, Finland), Digora software for Windows 1.51. Data were subjected to statistical analysis, ANOVA and Tukey test (p<0.05).

Results: Results showed that at 4 weeks, the DO data were statistically different than AT and HET (p<0.05), and the last one was different than HOMP1, AUTP1 (p<0.05). For 6 weeks, the P1, AT, ATP1, HOMP1 data were statistically different than DO (p<0.05).

Conclusion: According to obtained data, we can suppose that this protein, at 6 weeks, was able to improve the bone healing process in this experimental model using this methodology.

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COST-EFFECTIVENESS OF TOTAL HIP REPLACEMENTS: A COMPREHENSIVE MODEL

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Objective: Total hip replacements (THRs) have been widely reported to be highly cost-effective interventions. However, most economic models of THRs have assumed that, unless a revision surgery is performed, the outcome of the primary would be the same and excellent for all patients. We aimed to build a comprehensive economic model to assess the cost-effectiveness of THRs in the UK.
Material and Methods: A life-time cohort Markov model was developed including two outcome categories after primary and revision surgeries. Preoperative transition probabilities were obtained from an expert elicitation exercise and postoperative probabilities from HES-PROMs. Data from HES-PROMs were also used to estimate quality-adjusted life years (QALYs). Surgery costs were estimated from HES data combined with NHS healthcare resource groups. Primary care costs were estimated based upon resource use data obtained from GPRD extracts, which were combined with preliminary results from the COASt cohort to estimate postoperative values by outcome category.
Results: Current practice is associated with both higher costs and higher QALYs compared to not performing THRs. For women 45 years of age, current practice of conducting THRs would represent discounted costs of £11,500 and 14.5 QALYs over lifetime. If THRs were not performed, costs would drop to £4,300 and so would QALYs to 6.7, producing an incremental cost-effectiveness ratio (ICER) of £928 per QALY gained. Results varied only slightly between genders but quite significantly with patients' age entering the model.
Conclusion: THRs are highly cost-effective even when distinguishing between very good and fair outcomes after surgery and accounting for corresponding primary care costs. The significant improvement in the quality of life of patients undergoing the procedure is at the heart of these results. The intervention is more cost- effective for younger patients and not much difference is reported between genders other than higher QALY gains for women given their lower mortality rate.

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HYDROXYAPATITE AND FIBRIN SEALANT FOR BONE REPAIR IN RATS

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Objective: To evaluate the bone healing process in rat skull defects grafted with porous hydroxyapatite and fibrin sealant derived from snake venom.
Material and Methods: A skull defect was performed surgically in 40 rats and these animals were divided into four groups: G1 (control, no graft); G2 (defect grafted with hydroxyapatite); G3 (defect grafted with fibrin sealant), and G4 (defect grafted with hydroxyapatite and sealant). The animals were euthanized after 2 and 6 weeks of the surgery and the samples submitted to macroscopic, radiologic and histological analyses. The newly formed bone was quantified based on the principle of Delesse and the results were compared by ANOVA and the Tukey test ($p<0.05$).
Results: Macroscopic analysis showed absence of inflammatory signs, characteristic of rejection of the employed biomaterial. Radiographical analysis showed a radiolucency inside of the bone defects. In animals sacrificed after 2 weeks, immature trabecular bone was formed from the borders of the defect. In G2 and G4, qualitative histological aspects showed few hydroxyapatite particles surrounded by new bone. After 6 weeks, the new bone tissue showed mature aspects, and surrounded several hydroxyapatite particles in G4, without connective tissue interposition. The relative volume (%) and standard deviation for new bone tissue in the surgical area after 2 weeks was 5.66±0.57, 6.66±0.57, 20±1.0 and 21±1.0 in G1, G2, G3 and G4, respectively. There was no significant difference between G1 and G2 or between G3 and G4. After 6 weeks, the new bone tissue volume and the standard deviation were respectively, 10.66±0.57, 20.66 ±1.15, 29.66±1.52 and 53.66±0.57.
Conclusion: The fibrin sealant derived from snake venom, according to the limitations of this study showed positive properties for biocompatibility and was able to improve the bone healing process when combined to hydroxyapatite.

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LEAD CHARACTERIZATION IN BLOOD AND TIBIA SAMPLES IN RATS EXPOSED TO 30 MG/L OF LEAD IN DRINKING WATER

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Objective: Bone is considered the best marker for lead exposure, and bone lead determinations can be easily made. Even so, most animals studies carried out nowadays only determine whole blood lead concentrations. The aim of this study was to observe whether there would be differences in whole blood versus tibia lead concentrations over time in growing rats when these were exposed to relatively low lead prenatally until days 28 and 60.
Material and Methods: Lead was given in the drinking water at 30 mg/L from the time the dams were pregnant until offspring was 28 or 60 days old. Male Wistar rats were used in this study. Concentrations of lead were measured in whole blood and in bone (tibia) after 28 (28D) and 60 days (60D) in control (C) and in lead exposed animals (Pb). Calcium and Lead were measured by Flame and Graphite Furnace Atomic Absorption Spectrometry.
Results: Whole blood lead in the Pb-28D animals was 8.0 μg/dl (±1.1), and in the Pb-60D, 7.2 μg/dl (±0.89) ($p>0.05$ for difference between these groups), while control animals lead levels were 0.2 μg / dl (±0.4) ($p<0.001$ for comparison with respective age groups). There was a significant difference between the tibia masses of the C-60D group (0.86±0.13 g) and the ones of the Pb-60D (0.61±0.11 g) ($p=0.0004$), a 25 % decrease in tibia bone mass. Bone lead concentrations were 8.02 μg/g (±1.12) in the Pb-28D, and 43.3 μg/g (±13.26) in the Pb-60D ($p<0.01$ for difference between these groups), while the C-28D and C-60D showed tibia lead concentrations <1 μg/g ($p<0.001$ for comparison with respective age groups).
Conclusion: The five times higher amount of lead found in the bone of older animals (Pb-60D vs. Pb-28D)(when no differences in lead in whole blood were observed) reinforces the importance of using bone lead as an exposure biomarker, instead of blood, particularly when studying the effects of lower lead levels. Furthermore, in this study lead exposure decreased the mass of tibial bone in the Pb-60D, but not in the Pb-28D group.
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DISTRIBUTION OF VERTEBRAL FRACTURES VARIES AMONG PATIENTS ACCORDING TO HIP FRACTURE TYPE

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Objective: Of the two main types of hip fractures: intertrochanteric (IT) and subcapital (SC) either can have associated vertebral fractures (VF) but they are fewer in the SC patients who also tend to have better bone density. This raises the question of whether VF in the SC patients indicate osteoporosis or if a different etiology, such as trauma, could be the cause. In this study, we explored the nature of VF in the two hip fracture populations.
Material and Methods: This was an analysis of 120 patients: 40 with SC fractures and VF, 40 with IT fractures and VF, and for comparison, 40 osteoporotic patients with VF alone. Based on Genant's semiquantitative assessment method, the distribution, type and severity of each patient's vertebral fractures were described[1].
Results: Patients with SC fractures had significantly fewer total VF ($p=0.005$ and $p=0.019$), fewer fractures from T4-T10 ($p=0.005$ and $p=0.042$), than patients with IT fractures and those with VF alone. The number of VF from T11-L4 and at the T12-L1 peak did not differ among the groups. Patients with SC fractures were more likely to have only one VF ($p<0.001$). The distribution of VF in those with IT fractures and VF and in those with VF alone was similar and significantly correlated ($r=0.6496$, $p=0.009$).
Conclusion: Patients with IT fractures and VF closely resemble the spinal osteoporotic patients in number and distribution of the VF. The distribution of VF in patients with SC fractures and VF differs from the other fracture groups in being usually single and concentrated in the lower spine, suggesting a different etiology. The SC and VF of some of these patients may be a consequence of trauma and not osteoporosis.
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NORMAL AND ANIONIC COLLAGEN MEMBRANES IN AN EXPERIMENTAL MODEL FOR BONE HEALING PROCESS

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Objective: Biomaterials constituted by extracellular matrix components have osteogenic properties that are important for the bone repair. Materials composed by collagen derived from pericardium or bovine intestinal serosa are been used in many regenerative therapies. Therefore, the aim of this study was to evaluate the osteogenic capacity of natural collagen membranes (native) and anionic collagen obtained by alkaline hydrolysis, both derived from bovine serosa.
Material and Methods: Fifty Wistar rats were submitted to surgical skulls defects. The animals were then divided into five groups: group 1, empty defect; group 2, defect filled with nonmineralized native membrane; group 3, defect filled with mineralized native membrane; group 4, defect filled with non-

mineralized anionic membrane; and group 5, defect filled with mineralized anionic membrane. The animals were sacrificed after 2 and 6 weeks, and the samples were submitted to macroscopic, radiologic and histological analyses.
Results: Macroscopic and radiologic analyses revealed the integrity of bone tissue in the surgical area and in adjacent areas, without signs of pathological alterations. Histologically, the new bone tissue projected from the margins of the defect in all groups, and the newly formed bone matrix exhibited good birefringence of type I collagen fibers and immunoexpression of osteocalcin. Morphometric analysis showed a greater concentration of bone matrix in the groups that received the anionic membranes.
Conclusion: In conclusion, the anionic collagen membrane presented better osteogenic properties for this experimental design model, however, was not sufficient for complete bone healing, considered the short period of time used in this study.
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ACTION OF PHYSICAL EXERCISE COMBINED WITH RISEDRONATE IN OSTEOPENIC BONE USING EXPERIMENTAL ANIMAL MODEL

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Objective: This study evaluated the effects of physical training associated with the risedronate, as prophylactic and therapeutic environment in osteopenic bones.
Material and Methods: 48 rats were divided into 8 groups: sedentary for 12 weeks and ovariectomized (OVX); ovariectomized and the 12 weeks following administered risedronate (OVXM); ovariectomized and physical training on the treadmill during 12 weeks (OVXC); ovariectomized and 12 weeks following administered risedronate associated with physical training on the treadmill (OVXCM); simulated surgery and sedentary for 12 weeks (SHAM); simulated surgery, and the 12 weeks following administered risedronate (SHAMM); simulated surgery followed by physical training on the treadmill during 12 weeks (SHAMC); simulated surgery, and the 12 weeks following administered Risedronate associated with physical training on the treadmill (SHAMCM). After 12 weeks of the experiments, tibias were surgically dissected and analyzed by different methodologies.
Results: We obtained as a result of mechanical tests regarding the stiffness, the SHAMM group with values below the OVXM (p=0.001); at maximum strength full, the SHAMM group also with values below the OVXM and OVXCM (p=0.002), the global densitometry showed no statistical difference between the groups, since the proximal densitometry, the OVX group with values less than SHAMM and SHAMCM (p<0.000). For histological analysis, according to quantification of trabecular bone microarchitecture, the OVX group had lower values than SHAMC, OVXM, SHAMCM and OVXCM, and OVXCM and SHAMCM groups having superior results than SHAM, SHAMM and OVXC (p<0.001).
Conclusion: It is concluded that the physical exercise and the employed medicine, changes to better the biomechanical properties of bone of ovariectomized rats. The risedronate has no benefits on primary prevention and the quantification of bone trabecular, the medicine was more effective in relation to race in ovariectomized groups, and when associated, the treatments were more effective.

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EVALUATION OF THE TIBIAL BONE STRUCTURE IN RATS SUBMITTED TO THE TAIL SUSPENSION AND TREATED WITH SWIMMING EXERCISES

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Objective: This study investigated the effectiveness of swimming in the recovery of bone quality assessed in the tibia of rats with induced osteopenia by tail suspension.
Material and Methods: 50 Wistar rats were divided into 5 experimental groups (n=10 each). Group suspended by the tail for 21 consecutive days (S) and its control remained in cages for the same period (CI). Group suspended and trained, remained in suspension during 21 day and then underwent 30 sessions of swimming (ST). Suspended for 21 day and released after 30 day in cages (SNT). In the control group II rats were observed during 51 day without intervention (CII). Bone quality assessment was made by DXA and mechanical tests on the right tibia, and in the proximal metaphyseal region of the left tibia was performed the histomorphometric study.
Results: Mechanical tests showed that for the group S values of maximum force (-14.03 %, p=0.0003), stiffness (−21.68 %, p=0.0055), BMD (−17.62 %, p=0.019) and percentage of trabecular bone (−57.2 %, p=0.0001) decreased significantly as compared with the IC group. The simultaneous comparison of mechanical properties between groups evaluated after 51 day (STxCIIxSNT) showed significant differences between groups for peak force (p=0.0014), stiffness (p=0.0010), BMD (p=0.0095) and the percentage of trabecular bone (p<0.0001). The ST group showed an increase in maximum force (+10.23 %, p<0.05), stiffness (+21.91 %, p<0.001), BMD (+9.46 %, p<0.05) and the percentage of trabecular bone (+48.82 %, p<0.001) compared to the SNT group. The groups SNT and CII also decreased significantly (−14.4 %, p<0.05) for maximum strength, stiffness (−25.21 %, p<0.005), BMD (−13.34 %, p<0.05)

and the percentage of trabecular bone (−52.06 %, $p<0.001$). Finally, the comparison between the SNT and CII groups showed no significant difference ($p>0.05$) for the values of maximum strength, stiffness, and BMD percentage of trabecular bone.

Conclusion: The swimming reversed the osteopenic deterioration caused by hypoactivity, with complete and quickly recovery of bone quality.

P381

WHETHER WE COULD PREDICT HIP FRACTURE

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Objective: Hip fracture is a serious medical and socioeconomic issue. Hip fractures occur in the low trauma in patients with osteoporosis. The FRAX questionnaire is designed to identify patients with an increased risk of fractures in general and risk of hip fracture. Objective: To determine whether patients who have sustained a hip fracture had an increased risk of hip fracture based on FRAX calculator.

Material and Methods: The study included 50 patients aged over 60 who have suffered a hip fracture to a small trauma and are operated at the Orthopedic Clinic in Nis. None of the patients were analyzed regarding the risk of fractures by FRAX Calculator prior to the fracture incident. Only three of all the patients had undergone bone densitometry which showed presence of osteopenia in one of the patients and osteoporosis in two of them. Subsequently after the surgery all patients were analyzed by FRAX questionnaire calculator to determine whether they had had an increased risk of hip fracture.

Results: The patients were divided according to age in 3 groups: 60–69 years old (12 patients), 70–79 (29 patients) 80 and over (9 patients). As regarding the presence of other risk factors in addition to age and female gender, 39 patients had no other risk factors, 10 patients had one, and only one patient had 2 additional risk factors. In the age group of 60–69 only 1 patient had a risk of a hip fracture greater than 3 which requires introduction of therapy for osteoporosis. In the 70–79 age group, 27 out of 29 patients had a risk factor of 3 or more as well as all of patients in the 80 and older age group.

Conclusion: Our results showed that almost all women aged over 70 had a risk factor of over 3 and that they needed treatment for osteoporosis, which could reduce the risk of hip fracture. Also, in patients under 70 years of age, the current issues FRAX questionnaire were not sufficient for determining increased risk for hip fracture.

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ADMINISTRATION OF PROTON PUMP INHIBITORS IN LONG-TERM DECREASES BONE MINERAL DENSITY OF THE FEMUR OF ADULT RATS

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Objective: To assess BMD of rats that were subjected to the use of omeprazole in the long term.

Material and Methods: Fifty Wistar rats, adult male of average weight between 200 and 240 g were equally distributed ($n=10$): 1) OMP300 Group - intake of omeprazole at 300 μmol/kg; 2) OMP200 Group - intake of omeprazole dose of 200 μmol/kg; 3) OMP40 group - intake of omeprazole at 40 μmol/kg;4) OMP10 group - intake of omeprazole at 10 μmol/kg; and 5) CONT group - control group, only intake of vehicle dilution. For 90 day the animals of the experimental groups received orally, their respective doses of omeprazole and control animals receiving vehicle dilution, compound doses natrosol solubilized in sodium bicarbonate. After euthanasia, the right femurs were dissected and subjected to analysis of BMD in a densitometer dual X-ray emission, DPX-alpha, Lunar®.

Results: The bone density of OMP300 (0.20 ± 0.008 g/cm^2) group was lower than the CONT group (0.22 ± 0.107 g/cm^2, $p=0.006$). There was no difference in the comparison between the control group (0.22 ± 0.107 g/cm^2) and the other groups: OMP200 (0.21 ± 0.019 g/cm^2, $p=0.644$), OMP40 (0.21 ± 0.015 g/cm^2, $p=0.305$) and OMP10 (0.21 ± 0.016 g/cm^2, $p=0.410$).

Conclusion: With these results, we observed that the relationship between the use of PPIs with bone tissue is true, as the BMD has changed over use of the highest dose.

P383

USING TRABECULAR BONE SCORE IN MONITORING OF THE OSTEOPOROSIS TREATMENT EFFECT

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Objective: BMD as a widely used quantitative bone parameter does not bring whole information about real bone status. Therefore, bone quality shows as main determinant of bone strength, fracture prediction and treatment effect monitoring. A method to assess bone quality through the grey-level texture analysis from lumbar spine DXA scan is trabecular bone score (TBS). The aim of our study was to evaluate the effect of strontium ranelate (SRn), denosumab(DMAb) and teriparatide (TPT) using TBS in comparison to the effect on BMD.

Material and Methods: Noncontrolled comparative analysis of 3 osteoporosis treatment modalities in our osteocentrum. All patients included were naive. TBS from lumbar spine DXA scans using TBS INsight® (Med-Imaps) software was evaluated during the 4-years of treatment, annually. Bone turnover was assessed using CTx - bone resorption marker and osteocalcin (OC) - bone formation marker. A standard dose (800 IU/day) of 25-OH-D3 and oral calcium (1,000 mg/day) has been administered to the patients.

Results: A total of 245 patients (SRn: N=113; mean age 72 year; DMAb: N=74; 71.7 year; TPT: N=58; 76.2 year) were included. After 1 year in SRn subgroup BMD increased 4.8 % (p<0.007) vs. 0.5 % (NS) increase in TBS; DMAb subgroup: BMD + 3.8 % (p=0.003) vs. TBS +2.43 % (p=0.001); TPT subgroup: +2.05 % (NS) vs. +3.1 % (p=0.03). After 2 year: SRn subgroup: BMD +6.5 % (p<0.001) vs. TBS +2.5 % (NS); DMAb subgroup was not analysed; TPT subgroup: BMD + 5.9 % (NS) vs. TBS +6.1 % (NS). After year 3 and 4 was analysed only SRn subgroup with maximum increase after 4 year (BMD +13.4 % (p<0.001) vs. TBS +7.2 % (p=0.01)).

Conclusion: Despite lack of long-term results for DMAb and TPT we have observed positive effect of all three treatment modalities on trabecular bone architecture. According to previous data seems SRn, DMAb and TPT as 3 most effective treatment options positively influencing bone microarchitecture which results in improvement of bone quality.

P384
OSTEOANABOLIC TREATMENT OF GLUCOCORTICOID INDUCED OSTEOPOROSIS: RESULTS FROM SLOVAK NATIONAL REGISTRY

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Objective: GIOP is the most frequent and severe form of secondary osteoporosis. The rate of bone loss is greatest in the first year and the first osteoporotic fracture occur as early as in first 3–6 months of hypercorticism. One of the treatment modalities is osteoanabolic treatment. The primary outcomes were defined as changes of BMD and BTM after 12 M and 18 M. Secondary outcomes included prevalence of clinical fractures, tolerability and safety of the treatment.

Material and Methods: Prospective, open label, non-randomized, 18 M study. The inclusion criteria: (1) T-score< −2.9 or ≥1 fracture, (2) use of 5 mg corticoids for >3 M. Patients were treated 20 μg of rhPTH(1–34) s.c. All patients received 500–1,000 mg of calcium and 400–800 IU of Vitamin D. The register has 186 pts (150 women and 36 men, mean age 58.3 year). The measurement was at baseline, 6, 12 and 18 M. Statistical analyses were performed according to the intention-to-treat principle. T- test was used to determine the changes in BMD and BTM in 6, 12 and 18 M compared to baseline.

Results: TPTD treatment resulted in increase of BMD total hip after 12 M (+3.8 %, p=0.035) and 18 M (+3.4 %, p=0.135). The most significant increase was found in LS, +4.8 % (p<0.001) during 12 M of treatment and an increase of 9.8 % after 18 M of treatment with TPT (p<0.001). 18 M of TPTD therapy led to significant increase of CTx and OC. The increase of CTx was 169 % after 6 M and 183 % after 12 M (p<0.001). As for OCn, the increase represented 242 % after 6 and 257 % after 12 M (p<0.001). Treatment was well tolerated and no serious side effects were observed. Borderline asymptomatic hypercalcemia was present in 5.3 % of patients. Interesting finding was low levels of 25-OH-D (<30 ng/ml) in 82.9 % of patients after 18 M of treatment.

Conclusion: Osteoanabolic treatment using teriparatide was effective, well tolerated and safe. Main problem is prevalent hypovitaminosis D during treatment period because of lower supplementation dosage to avoid severe hypercalcemia.

P385
EQ-5D AND QUALITY OF LIFE OF OSTEOPOROSIS AT-RISK PATIENTS IN A SWEDISH OSTEOPOROSIS PATIENT REGISTRY

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Objective: To assess health-related quality of life (HRQoL) using EQ-5D questionnaires and identify factors associated with HRQoL in a Swedish osteoporosis (OP) patient registry.

Material and Methods: The OP registry collected patient information in an outpatient clinic in Göteborg region from 1991 to 2009. New patients were referred to the clinic for OP assessment and BMD measurement (new patients). Patients with prior osteoporotic BMD (T-score≤−2.5) or OP diagnosis may return for follow-ups (returning patients). Each patient filled the EQ-5D questionnaire once, which covered mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Responses were aggregated into a HRQoL index, between −0.074 (worst) and 1 (best), using the European formula. Descriptive and multivariable analyses were used to identify factors associated with patients' HRQoL.
Results: 3,240 patients completed the EQ-5D questionnaire. 89 % were female, average age was 66 [SD=11.9]. 48.4 % were new patients, 51.6 % were returning. 34.1 % reported problems in mobility, 8.0 % in self-care, 27.8 % in usual activities, 74.7 % in pain/discomfort, and 43.3 % in anxiety/depression. Average HRQoL was 0.7 [SD=0.2]. Patients with a history of fractures had lower HRQoL than those without fractures (0.69 vs. 0.71; $p<0.01$). Among those with fractures, lower HRQoL was indicated in patients with hip (0.62), vertebral (0.63) and arm (0.66) fractures. Compared with patients receiving OP medication (bisphosphonates, raloxifene, teriparatide, estrogen), those without reported more pain or discomfort (77 % vs. 73 %; $p=0.01$). New patients had lower HRQoL than returning patients (0.68 vs. 0.72; $p<0.01$). Other factors affecting HRQoL included elder age, history of falls and comorbidities (hypertension, arthritis, and asthma).
Conclusion: In a Swedish OP registry, average HRQoL based on EQ-5D was 0.7. 75 % patients reported pain/discomfort and 43 % reported anxiety/depression. Factors affecting HRQoL included age, history of fractures and/or falls, comorbidities.
Disclosures: This study was funded by Merck & Co., Inc

P386
STUDY REGARDING THE INFLUENCE OF FRANK AND SUBCLINICAL HYPERTHYROIDISM ON BONE MINERAL DENSITY

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Objective: To evaluate the incidence and risk of osteopenia/osteoporosis in women with frank and subclinical hyperthyroidism.
Material and Methods: The study was performed at the County Hospital of Oradea, in premenopausal and postmenopausal women (between 42 and 76 years of age), divided in 2 groups: patients with frank hyperthyroidism ($n=39$) and patients with subclinical hyperthyroidism ($n=32$). In this cross-sectional study there were taken measurements of lumbar spine and femoral neck bone mineral densities using DXA, values of TSH and thyroid hormones levels. The obtained results were compared with those provided by a control reference population of similar age and sex with the first two groups ($n=61$).
Results: In the group of patients with frank hyperthyroidism results showed a decrease of bone mineral densities in 89.74 % of cases, indicating a significant difference from the sex and age-matched reference population ($p<0.001$). In patients with subclinical hyperthyroidism, bone mineral densities for all the scanned sites were decreased in 71.87 % of cases. The decrease of BMD was more marked in the postmenopausal women ($p<0.001$) than in the premenopausal women ($p<0.05$). Even so, statistical calculus shows that in premenopausal women with subclinical hyperthyroidism there is a 3.2 higher risk of osteopenia and a 1.9 higher risk for osteoporosis then in the control reference population ($p<0.001$).
Conclusion: This study indicates that frank or subclinical hyperthyroidism significantly influences the BMD. This phenomenon is more obvious in postmenopausal women. Subclinical hyperthyroidism may be considered a risk factor to develop osteoporosis even in premenopausal women. To avoid premature BMD decrease or its complications, prophylactic measures should be taken that involve evaluation of TSH and thyroid hormonal levels to identify thyroid dysfunction.

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INDEX OF OSTEOPOROTIC RISK IN THE EVALUATION OF THE DENOSUMAB TREATMENT

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Objective: Predomination of bone resorption compared to bone formation in postmenopausal osteoporotic women and inversion of this relation during denosumab treatment (DT), indicated the need to discover their relationship as an index of the osteoporotic risk (IOR). Osteocalcin and CTX reduction and IOR increase were determined after 3 and 6 months of DT.
Material and Methods: Bone turnover markers N-MID osteocalcin (O) and β- crosslaps (CTX) were determined, as well as their ratio IOR=O/CTX, and their post- treatment values. O and CTX levels were expressed in ng/ml. The mean percentage (%) of O and CTX reduction and IOR increase from the basal levels was also determined during DT.
Results: Pretreatment mean O levels were 20±4.23 ng/ml, and lowered to 14±4.09 ng/ml ($p<0.007$) and 12.58±3.53 ng/ml ($p<0.0001$), after 3 and 6 months of DT as well

as the correspondent CTX levels 0.37±0.06 ng/ml, 0.1±0.06 ng/ml and 0.04±0.009 ng/ml ($p<0.0001$). Pretreatment IOR mean levels were 63.45±19.56, and increased to 163.25±82.22 and 249.25±93.85 ($p<0.0001$) after 3 and 6 months of DT. The mean% of CTX reduction for the first 3 months was 74.17±12.96 %, and for 6 months 88.16±2.74 %. The mean% of O reduction for the first 3 months was 29.06±35.48 % and for 6 months 35.48±16.87 %. The mean% of IOR increase for the first 3 months was 154.71±135.56, and for 6 months 330.63±303.07.

Conclusion: Significant O decrease, highly more significant CTX and CTX% decrease, IOR significant increase confirmed bone formation predomination compared to bone resorption, decreased bone turnover, which indicates lower bone loss, reduced osteoporotic risk in postmenopausal women and reduced fracture risk as a result of DT. Determination of the relation of the two processes, bone resorption and bone formation through IOR will greatly assist in the conduction and evaluation of clinical trials, and follow up of the level of the osteoporotic risk and the efficacy of the treatment. IOR confirmed very high efficacy of DT in postmenopausal osteoporosis.

P388
DENOSUMAB THERAPY IN CONTINUATION TO IBANDRONATE THERAPY

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Objective: Patients treated with bisphosphonates for osteoporosis may require a switch to other therapies. The outcomes after changing therapies are important to investigate. The present study was conducted in postmenopausal women (PM) previously treated with ibandronate to evaluate the effects of transitioning to denosumab therapy (DT) on biochemical bone turnover markers (BTM), in comparison with branded ibandronate therapy (IT).

Material and Methods: Biochemical BTM of bone formation osteocalcin (O) and β- Crosslaps (CTX) as a marker of bone resorption were determined in PM receiving i.v. ibandronate 150 mg every 3 months for 1 year (O-IT and CTX-IT). Subjects continued without pause with subcutaneous denosumab 60 mg and were followed for 6 months. O values were determined after 3 (O-DT3) and 6 months DT (O-DT6), as well as the correspondent CTX values (CTX-DT3 and CTX-DT6). O and CTX levels were expressed in ng/ml. Higher reduction of CTX values in comparison to O levels indicates better treatment effect.

Results: O-IT levels were 15.7±3.78 ng/ml, O-DT3 were 11.9±3.78 ng/ml and O- DT6 (11.8±3.49 ng/ml) and were not significantly different ($p=0.07$) as well as the correspondent CTX levels, CTX-IT (0.094±0.07 ng/ml), CTX-DT3 (0.054±0.014 ng/ml) and CTX-DT6 (0.052±0.03 ng/ml) ($p=0.27$). The reduction of O and CTX remained nonsignificant and stable at months 3 and 6. Calcium levels remained stable after 3 and 6 months of DT (2.45±0.05 mmol/l; 2.35±0.08 mmol/l) compared to Ca levels before the DT (2.4±0.08 mmol/l).

Conclusion: Transitioning of intravenous ibandronate therapy to denosumab therapy was associated with no significant difference in O-I, O-DT3 and O-DT6 values as well as the correspondent values of CTX, CTX-DT3, CTX-DT6. This indicated not significant change of bone turnover markers as a result of the treatment with the two different medicines, and it confirmed the efficacy of consecutive continuous osteoporotic denosumab therapy, which is very important especially in bisphosphonates resistant states.

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MALE OSTEOPOROSIS AND TYPE 2 DIABETES MELLITUS

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Objective: To determine the prevalence of osteoporosis (OSP) and osteopenia (OST) in a sample of male patients with T2DM, evaluated in the Teaching Hospital National Police (HDPN-G No. 2).

Material and Methods: We selected 110 males, aged 50 years, who came to control the T2DM to the Endocrinology Outpatient Clinic HDPN-G No. 2, during the period January-September 2013. We measured BMD at lumbar spine (LS) and femoral neck (FN) with DXA (Hologic Discovery W®). We use the densitometric criteria developed by WHO to classify osteoporosis. Data treatment and analysis were performed by computer support, using the Epidat program v.3.1 for Windows.

Results: Mean age 64.8±9.22 ($n=110$). We found that in LS 9 (8.3 %) had OSP, 31 (28.4 %) OST and 68 (62.4 %) were in ranges of normal (N). In FN: 41 (37.6 %) had OST, 5 (4.6 %) had OSP, and 63 (57.8 %) were in the normal range. The prevalence of bone disease in the age groups 65–74 and over 75 years was 27.3 % and 14.5 % in the group aged 50–64 years.

Conclusion: In this sample of diabetic men skeletal involvement is high. (LS=36.7 % and 42.2 % FN). The highest

prevalence was found in the older age groups (65–74) and the group aged 75 years, and the lowest in the younger age group. Osteoporosis remains underdiagnosed in men, so we recommend screening programs for osteoporosis in our entire male population.

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DEVELOPMENT OF THE ASSAY METHOD DETECTING THE SUPPRESSION OF GASTROINTESTINAL MOVEMENT BY TERIPARATIDE USING POSITRON EMISSION TOMOGRAPHY IMAGING ANALYSIS

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Objective: During an osteoporosis treatment, patients occasionally feel discomfort such as nausea and vomiting after receiving the medication such as teriparatide. Although side effects have been reported due to the suppression of gastrointestinal motility, the care for the abdominal discomfort has not been clarified yet. The aim of this study is to develop the method detecting the suppression of gastrointestinal movement by teriparatide for exploring the antiemetic reagent giving a relief to patients.
Material and Methods: Rats subcutaneously received low or high dose of teriparatide (5 or 50 μg/kg, respectively) or only vehicle as a control group 30 min before oral administration of 2-deoxy-2-[^{18}F]-D-glucose ([^{18}F]FDG). Under the awaking condition of rat, positron emission tomography (PET) was performed on the abdominal region for 90 min by a μPET Focus220 scanner (Siemens, Knoxville, TN) designed for laboratory animals immediately after oral administration of [^{18}F]FDG. Blood samples were also taken at appropriate time points. The quantitative PET imaging data analysis was carried out for the evaluation of pharmacokinetic parameters.
Results: The absorption rate constant of [^{18}F]FDG obtained from the time- radioactivity in blood curve significantly decreased after both teriparatide groups. PET imaging data analysis revealed that the residual radioactivity in the forestomach increased in both teriparatide groups. Moreover, area under the time- radioactivity curve on the duodenum was significantly elevated on the high dose teriparatide group compared with the control group.
Conclusion: The suppression of gastrointestinal movement was detected by pharmacokinetic PET imaging data analysis on the abdominal region in rat, indicating that PET may be able to solve the vomiting process induced by teriparatide. The molecular imaging technique using PET is applicable to explore the antiemetic reagents to ease drug induced nausea and vomiting.

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ONCE-WEEKLY TERIPARATIDE REDUCES VERTEBRAL FRACTURE RISK: SUBGROUP ANALYSIS FROM THE TERIPARATIDE ONCE WEEKLY EFFICACY RESEARCH (TOWER) TRIAL

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Objective: We analyzed the effects of once-weekly teriparatide (human PTH1-34) injection on incident vertebral fracture in various subgroups using data from the TOWER trial (2012 JCEM).
Material and Methods: Antifracture efficacy with weekly 56.5 mg teriparatide injection was examined in a randomized, double-blind, placebo-controlled trial of 542 Japanese patients with osteoporosis (65–95 years). Patients were divided by baseline age, number or deformity grade of prevalent vertebral fractures, BMD level, bone turnover marker levels, and level of renal function using estimated glomerular filtration rate (eGFR). Relative risk (RR) was calculated using Cox regression analysis.
Results: Significant fracture risk reductions were observed in the subgroup of subjects <75 years (RR, 0.06; p=0.007) and ≥75 years (RR, 0.32; p=0.015). For prevalence of vertebral fractures, a significant risk reduction was observed in the subgroup with 1 vertebral fracture (RR, 0.08; p=0.015) and in those with ≥2 vertebral fractures (RR, 0.29; p=0.009). In the subgroup based on deformity of vertebral fracture, a significant risk reduction was observed in subjects with grade 3 deformity (RR, 0.26; p=0.003). Significant risk reduction was observed in the subgroup with lumbar BMD <−2.5 SD (RR, 0.25; p=0.035). No incident vertebral fracture was observed in the subgroups with no prevalent vertebral fractures, with vertebral deformity grade 0–2, and with lumbar BMD ≥−2.5 SD in the teriparatide group. Significant risk reductions were observed in the subgroups over/under the median value for each bone turnover marker. The subgroups over/under the eGFR levels: 70 ml/min/1.73 m^2 showed a significant reduction in fracture risk (RR, 0.13, p=0.001; RR, 0.31; p=0.004, respectively).
Conclusion: Once-weekly 56.5 mg teriparatide injection reduced the vertebral fracture risk in patients with varying degrees of fracture risk, age, vertebral fracture number and grade, bone turnover level, and renal function.

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PROSPECTIVE COMPARISON OF QCT BMD MEASUREMENT USING EITHER ASYNCHRONOUS OR SIMULTANEOUS CALIBRATION AT THE FEMORAL NECK AND LUMBAR SPINE

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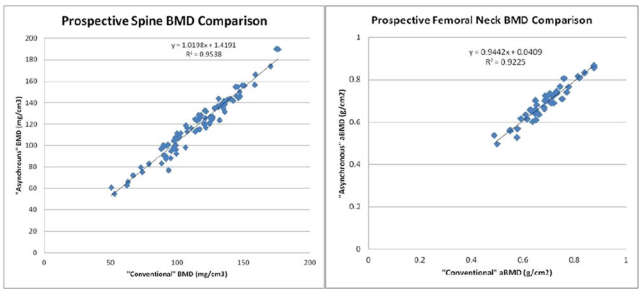
Objective: Conventional QCT calibration requires simultaneous scanning of patient and phantom. We compared BMD estimates using conventional versus asynchronous QCT calibration, in which the calibration phantom is scanned separately from the patient. Advantages of this method include simplification of workflow, dual-use of CT studies, and retrospective analysis of images.

Material and Methods: IRB approval was obtained for a prospective study of measurement bias between asynchronous and simultaneous QCT BMD estimates. The study was powered to detect a 1 % bias relative to mean young normal BMD. Three clinical sites recruited 43 subjects (ages 44–80). Each subject received two QCT scans: with and without a calibration phantom present.

Results: Regression analysis shows that the lumbar spine measurements are strongly correlated (R>0.97) with small standard error (SEE)=5.98 mg/cm^3. A paired t-test indicates the means are significantly different ($P<10^{-6}$), with a difference of means of 3.7 mg/cm^3 or 0.14 T-Scores. Linear regression at the femoral neck shows strong correlation (R=0.96) with small standard error (SEE)=0.025 g/cm^2. A paired t- test did not indicate a significant difference in mean BMD (P= 0.47).



Conclusion: No bias was found in proximal femur aBMD estimates. A small bias was found in lumbar spine vBMD estimates in the presence versus absence of a CT calibration phantom. This bias is considerably less than the error usually associated with BMD measurement, typically±0.4 T-scores for DXA, and is therefore very unlikely to be clinically significant. This workflow change could greatly enhance osteoporosis screening since BMD can be easily measured regardless of the clinical indication for CT scanning.

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CORRELATION OF BMD AND FRACTURES WITH DIETARY INTAKE OF CALCIUM : A BRIEF ANALYSIS OF COLLECTIVE DATAWITHIN A METROPOLITAN HOSPITAL IN SOUTH BANGALORE

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Objective: To correlate BMD levels using DXA and history of dietary intake of calcium intake.

Material and Methods: Osteopenia and osteoporosis was evaluated among adult patient (>18 years) population of a midsized hospital in a metropolitan city Bangalore, South India. A case matched control (age and sex) were enrolled. BMD results, using DXA, estimated and T-score & Z-score derived.

Results: Of 75 case-patients who underwent routine or referral testing, the median age was 61 years (range: 27–87 year), 82 % were females 18 % male. The 50 control patients (with no fractures) who also underwent BMD testing were in the median age of 58 (range: 28–80), 86 % female and 14 % male. Of them risk factors were present in 48 % of the fracture group (40 % of females and 8 % of males), and 96 % of patients in the case matched control group with no fractures (84 % females and 12 % males). The most common risk factor was menopause in females and smoking in males and site of fracture was the hip in both. In the fracture group, the lowest T- score was estimated at the hip at −7.3 with a corresponding BMD value of 0.105. And the Lowest BMD was documented at the spine 0.04. with a T score of - 5.2. 9 patients (12 %) gave history of gave intake of calcium rich history and 24 (32 %) of them were on calcium supplementation. In the group with no fractures, both the lowest BMD and T-score were in the same patient at −0.358 and −5.7, respectively, at forearm. 17 of them (34 %) gave history of good calcium intake in their diet and 5 (1 %) were on calcium supplementation.

Conclusion: Detailed analysis of data show that group of patients with fractures higher number of patients (88 %) had lower dietary calcium intake and amongst the group of patients with no fractures lesser number of patients (1 %) required calcium supplementation. This also suggests that presence of fracture was a prelude for the further management of osteoporosis and therefore calcium supplementation.

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REFERENCE INTERVALS FOR BONE TURNOVER MARKERS IN SPANISH PREMENOPAUSAL WOMEN

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Objective: Bone turnover markers (BTMs) are used in clinical practice for assessing patients with osteoporosis and their treatment. In Spain it is necessary to fine tune the reference intervals, since they were established years ago in a low number of individuals. The aims of this study were to establish robust reference intervals for BTMs in healthy young premenopausal Spanish women and to investigate the factors influencing BTMs.

Material and Methods: We included 185 women; aged 35–45 year, from 13 centres in Catalonia. Period: February–June 2013. Blood and second-void urine samples were collected between 8 and 10 a.m. after an overnight fast. Serum PINP and βCTX were measured by two automated methods (Elecsys, Roche[a] and IDS-ISYS, Immunodiagnostic Systems[b]), bone ALP by ELISA (IDS, Vitro), osteocalcin by IRMA (Cis Bio) and urinary NTX by ELISA (Osteomark, Vitro). PTH and 25OHD levels were measured in all participants, who completed a questionnaire on lifestyle factors. A quantile regression was fit to estimate the 5 %, 50 % and 95 % percentiles for the BMTs, and the Fisher's exact test and non-parametric tests were used to assess the influence of factors on BTMs.

Results: The median (P5-P95) for BTMs were: bone ALP 9.3 (6.0–13.8) ng/ml, PINP[a] 35.9 (20.8–60.6) ng/ml, PINP[b] 35.8 (20.8–64.9) ng/ml, NTX 32.7 (19.3–68.9) nM/mM, CTX[a] 0.250 (0.137–0.480) ng/ml, CTX[b] 0.246 (0.107–0.541), osteocalcin 14.0 (8.0–23.0) ng/ml. Oral contraceptive pills (OCPs) were reported in 10.9 % of participants, mean BMI was 23 and 60 % had 25OHD levels lower than 20 ng/ml. Women on OCPs had lower PINP levels ($p=0.007$). 25OHD levels didn't influence BTMs, but low BMI was associated with higher levels of almost all BTMs.

Conclusion: Robust reference intervals for BTMs in a southern European country are provided.

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EFFECTS OF ANTIHYPERTENSIVE AND LIPID-LOWERING THERAPY ON BONE MASS DEPENDING ON THE RISK FACTORS OF OSTEOPOROSIS

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Objective: To investigate the effect of treatment with β-blockers (β-AB), inhibitors of angiotensin converting enzyme (ACEI) and statins on BMD depending on the risk factors (RF) of osteoporosis.

Material and Methods: In a retrospective study included 1,163 outpatients (1,121 women) aged over 40 years, who had the first DXA examination prior to start of the treatment for osteoporosis. Baseline characteristics of pts. including data on osteoporosis risk factors (RF) and medication were obtained at the initial visit which had taken place between 2001 and 2011. BMD at the lumbar spine (LS), femoral neck (FN) and total hip (TH) were measured by DXA (Hologic Delphi W). 418 pts. have been taking β-AB, ACEI, statins and their combination not less than 6 months before the DXA examination ("users group"), 745 pts. have not been receiving any therapy ("nonusers group").

Results: In the "users group" risk of reduction of BMD was lower than in the nonusers [RR=1.6 (95%CI 1.25–2.022) $p<0.001$], osteoporosis was diagnosed 1.3 times less frequently, and the BMD in LS, FN and TH were significantly higher than these parameters in "nonusers group". The highest BMD were noted in pts. on combined therapy with statins. The risk of BMD reduction not depends in both groups on RF such as age, postmenopause duration, presence of early or surgical menopause, low body weight, physical inactivity, previous fractures, fractures in relatives, rheumatoid arthritis, glucocorticoid use or alcohol abuse. In multivariate regression analysis after adjustment with these RF, BMD at all measured locations in users group maintained significantly higher than in nonusers. There was no correlation between BMD and duration of β-AB, ACEI and statins therapy.

Conclusion: Prolonged use of β-AB, ACEI and statins in combination as well as monotherapy could has a protective effect on bone mass regardless of osteoporosis risk factors.

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COMPLIANCE, PERSISTENCE AND PREFERENCES TOWARDS OSTEOPOROSIS TREATMENT AMONG POST-MENOPAUSAL ISRAELI WOMEN DURING ACTIVE THERAPY OR DRUG HOLIDAY

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Objective: Adherence to osteoporosis treatments after 1 year is only about 50 % and is related to increased risk of fractures. Our study objectives were to determine compliance and persistence with osteoporosis therapy and attitudes regarding resuming treatment among patients of a metabolic bone clinic on active therapy or drug holiday. Understanding possible reasons for low compliance can provide a basis for a strategic plan to improve compliance.

Material and Methods: Compliance was assessed by medication possession ratio (MPR), representing the number of doses dispensed in relation to those prescribed. Persistence was defined as continuation of treatment without a >30-day gap in refills. Data were collected by personal interviews.

Results: Of 100 patients interviewed (70.2±7.7 years old), 55 % were taking medication; 60 % oral medication, mostly a bisphosphonate. MPR≥80 % was found in 82 % of patients and <50 % in 13 %. MPR was 100 % for zoledronate, denosumab and raloxifene, and 92 %, 89 % and 71 % for teriparatide, oral bisphosphonates and strontium ranelate, respectively. Of 27 patients who took oral bisphosphonates, 63 % Persisted with treatment. Of patients on oral bisphosphonates, 87 % took them as directed, compared to 25 % of 8 patients taking strontium ranelate. Of 40 patients on a scheduled medication break, 20 % expressed concern about resuming treatment, while 65 % expressed confidence in their physician's treatment choice.

Conclusion: Compliance among our patients was higher than reported in the literature. MPR for bisphosphonate treatment was high; lower for strontium ranelate. We found a high rate of taking oral bisphosphonates as directed, compared with lower rates for strontium ranelate. Compliance with percutaneous treatments (zoledronate and denosumab) was 100 %. High persistence and compliance may be specific to patients from a dedicated bone diseases clinic. This study provides new information about the attitudes of osteoporosis patients on a scheduled drug holiday. Most were not concerned about resuming treatment and did not have a preferred medication. These results indicate that a trusting relationship between doctor and patient seems to be an important factor in medication compliance.

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LOW BONE MINERAL DENSITY IN SWEDISH MEN WITH DISTAL RADIUS FRACTURE

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Objective: Distal radius (DR) fracture is a predictor of future osteoporosis risk in women. However, this has not been extensively studied in men. Only a small portion of men with DR fracture are evaluated for osteoporosis and even fewer receive treatment. The purpose of this study is to evaluate BMD of adult Swedish men of all ages with DR fracture compared to the background population.

Material and Methods: This cross sectional study recruited 233 adult men from Malmö, Sweden, with a DR fracture in two ways:
1. All men who fractured in 1999–2000 (n=288) were invited to participate in 2003
2. Men who fractured in 2003–2007 (n=460) were invited to the prospective study-arm and followed during the first year postfracture

Male controls from the same geographical area were randomly selected from the population registry. BMD was measured by DXA (femoral neck (FN), total hip (TH) and lumbar spine (LS)). Medical history and risk factors were obtained by questionnaire. To evaluate mean BMD levels participants were grouped by age at fracture: 20–39, 40–64 and ≥65 year and in 10-year age-bands.

Results: Mean age at fracture was 52.2 y. Distribution by age group was 27 %, 44 % and 29 %. Men with DR-fracture had lower BMD (p<0.001) than controls (FN: 40–64 y: 0.936 vs. 1.004; ≥65 y: 0.839 vs. 0.941); (TH: 40–64 y: 0.993 vs. 1.059; ≥65 y: 0.898 vs. 1.019); (LS: 40–64 y: 1.161 vs. 1.228, ≥65 y: 1.109 vs. 1.286). The proportion with osteoporosis at any site was higher at all ages: 20–39 y: 8.5 % vs. 1.5 %; 40–64 y: 16.8 % vs. 5.1 %; ≥65 y: 23.3 % vs. 8.3 % (p=0.023; <0.001; 0.005). The corresponding T-score difference was 0.4–0.8 (FN) and 0.5–0.9 (TH). Compared to controls, this equates to 6.3–6.7 % lower BMD in patients 40–64 y and 10.7–11.9 % in ≥65 y, while not significant <40 y.

Conclusion: In this study, to our knowledge the largest on men with DR fracture, those with fracture have significantly lower BMD at all sites. Interestingly, compared to controls the difference in BMD becomes more pronounced with higher age, but is already evident from middle age.

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SCREENING FOR OSTEOPOROSIS WITH HEEL ULTRASOUND IN A SAMPLE OF ELDERLY WOMEN WITH A HIGH PREVALENCE OF FALLS

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Objective: Falls are common in older people and cause much morbidity including fragility fractures. Assessment for osteoporosis is important in fallers. Currently DXA is the preferred method. Heel ultrasound (QUS) is an alternative technique for assessing bone fragility. However, few studies have focused on older fallers. The objective of this study was to investigate the ability of QUS to identify women with osteoporosis in a sample of elderly women with a high prevalence of falls.
Material and Methods: A total of 221 women were assessed with DXA of hip and spine (Hologic Discovery) and QUS of the heel (Achilles Lunar). Using QUS we measured broadband ultrasound attenuation (BUA). We defined osteoporosis as DXA T-score ≤−2.5 at the hip or spine. Sensitivity, specificity, positive and negative predictive values (PPV, NPV) and receiver operator characteristics (ROC) curve for QUS were calculated. The optimal cutoff for QUS was identified using Youden index. Applying a triage approach, as recommended by UK National Osteoporosis Society, we identified the cut-offs for 90 % sensitivity and 90 % specificity and calculated the proportion of women who would not need further examination with DXA.
Results: Median age was 80 years [IQR 75–86, range 65–98]. 135 (61.1 %) reported at least one fall within the last 12 months. Prevalence of osteoporosis was 45.2 % (100/221). Area under the ROC-curve (AUC) was 0.811 (95%CI 0.755–0.868). The optimal cutoff (BUA=93.88) yielded a sensitivity of 74.0 % and specificity of 78.5 %, PPV 74.0 % and NPV 78.5 %. At the cut-offs of 90 % sensitivity (BUA=105.98) and 90 % specificity (BUA=86.63) 69 women would be diagnosed as non-osteoporotic, 62 women osteoporotic. 131 women (59.3 %) would not need further examination with DXA at the expenses of 10 (4.5 %) women being false negative and 12 (5.4 %) false positive.
Conclusion: In a two-step triage approach heel ultrasound performs well in diagnosing osteoporosis among older women with falls.

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ASSOCIATION OF SPINAL OSTEOARTHRITIS WITH OBESITY

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Objective: Osteoarthritis (OA) is a common disease that affects articular tissues. The obesity showed strong link with OA in multiple studies (Coggon et al, 2001). Relationship between obesity, gender, and degenerative changes in the spine varies in different studies and countries (Zukowski et al, 2012). Objective: To determine the association of spinal OA with obesity, gender and age within adult population of Banjaluka region.
Material and Methods: The study included a retrospective analysis of 7,089 medical records of patients with established diagnosis of OA. We used the electronic data base of primary care and CBR units. Analyzed parameters were: age, gender and BMI in patients with OA. The obesity was classed as BMI>30.0 kg/m^2 (NIH, 2009). The baseline characteristics of the participants are presented as means (SD) and percentages in relation to BMI and age. Association between OA and BMI, and OA and age were assessed by a chi-square test with significance threshold of 0.05. All statistical analyses were performed using SPSS software version 15.0 (SPSS Inc.2006).
Results: Out of 7,089 patients with OA (mean age 50.6±14.2; age range 19–91), the number of spinal OA was 5,918, with significant increase with age ($p<0.01$). The number of cervical OA was 1,211 (65.2 % in women and 34.8 % in men; $\chi^2=0.48$; $p>0.05$). Lumbar OA was presented in 4,707 participants (52.6 % women and 47.4 % men; $\chi^2=39.66$; $p<0.01$). Obesity was most evident at age >50 years. From a total of 1,787 OA in obese subjects, percentage of spinal OA was 77.9 %. The correlation of obesity and lumbar OA was statistically significant ($\chi^2=18.9$; $p<0.01$). No statistical significance was fond with obesity and cervical OA ($\chi^2=3.6$; $p>0.05$).
Conclusion: Aging and female gender have a high statistical significance in the development of OA at all sites ($p<0.01$). There was a high statistical significance between obesity and OA of lumbar spine ($p<0.01$), but not with obesity and cervical OA ($p>0.05$).

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EVALUATION OF TOPICAL ALENDRONATE ON SUCCESS OF MAXILLARY SINUS ELEVATION IN CASES OF ALENDRONATE TREATED AND NONTREATED OSTEOPOROSIS

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Objective: Previous experimental and clinical studies results showed that osteoporosis negatively affects bone grafts healing, the aim of this study is to evaluate the effect of osteoporosis on the healing of maxillary sinus grafts, and to evaluate the effect of topical application 10^{-8} M/L of alendronate on the healing of maxillary sinus grafts.
Material and Methods: Study was performed on 34 adult New Zeeland females rabbits, Rabbits were divided into 3 groups: rabbits of normal bone "10 rabbits", osteoporotic rabbits treated with subcutaneous alendronate 50 mg/week "12 rabbits", nontreated osteoporotic rabbits "12 rabbits". Osteoporosis was induced via bilateral ovariectomy in addition to intramuscular injection of prednisolone 1 mg/kg/day for 1 month, and it was confirmed through the evaluation of femur and vertebral bone density on CT scan, and the evaluation of serum CTX. A bilateral sinus lifting procedures were performed for all experimental animals with the application of topical alendronate with the bone graft in the left side, while saline was used with the bone graft in left side "control group", sacrificing the animals and obtaining histologic biopsies of the whole maxillary sinus with surrounding bone was performed 2 months after surgery. Sagittal and cross sectional sections were prepared for each biopsy, and all sections were stained with H&E, Masson's trichrome, and TRAP stains. Bleeding, inflammation, bone formation, and osteoclasts presence were evaluated on H&E sections, Osteoblast activity was evaluated on sections stained with Masson's trichrome, and osteoclast activity was evaluated on sections stained with TRAP immune technique. Histomorphometric study was performed for both sagittal and cross sectional sections stained with H&E to evaluate and compare the healing process between different groups and between the experimental and control samples within each group.
Results: Histologic study for H&E sagittal and cross sectional sections showed no differences between topical alendronate and control samples within each group concerning the bleeding and inflammation, while bone formation was higher in topical Alendronate samples in both H&E and Masson's trichrome sections, no differences in osteoclast presence were found on H&E sections, while osteoclasts counts and activity were lesser in topical Alendronate group in comparing to control group on TRAP. Histomorphometric study results showed that the ratio of newly formed bone in control group of rabbits of normal bone was greater than the ratio of newly formed bone in control group of treated and non-treated osteoporotic bone, and the ratio of newly formed bone in sinuses in which topical alendronate was applied with bone graft was greater than the ratio of newly formed bone in sinuses in which saline was applied with bone graft in the whole study group.
Conclusion: Both treated and non-treated osteoporosis affects the healing of bone grafts in maxillary sinus negatively and this effect present as a reduction in newly formed ratio, topical application of alendronate 10^{-8} M/L helps in increasing bone grafts healing in maxillary sinus in cases of alendronate treated and non-treated osteoporosis and also in normal bone.

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CHANGES IN BONE MINERAL DENSITY IN PATIENTS WITH SERUM POSITIVE OR NEGATIVE RHEUMATOID ARTHRITIS

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Objective: To examine variables associated with BMD in patients with positive or negative rheumatoid factor rheumatoid arthritis (RA).
Material and Methods: We investigated 72 patients with low to moderately active positive or negative rheumatoid factor RA. Demographic and clinical data were collected. BMD was measured by means of DXA. Associations between demographic and clinical measurements on the one hand and BMD on the other were investigated in regression analyses.
Results: The patient group consisted of middle aged, mainly female, patients. The median (interquartile range) disease duration was 5.4 (3.2–9.8) years, the mean disease activity score (SD) was 4.7 (1.1). Of the group, 57 % was rheumatoid factor positive, and 86 % ($n=62$) had never used corticosteroids. The median Larsen score of hands and feet was 32 (9–59). Greater age and low BMI were related to low BMD at the hip and spine. High Larsen score for hands and feet was significantly associated with low BMD at the hip. Joint damage at baseline and joint damage progression according to the Sharp-van der Heijde score were independently associated with more BMD loss after 1 year. The use of corticosteroids was not independently associated with BMD. Median BMD loss after 1 year was 0.8 % and 1.0 % of baseline in the spine and the hip, respectively. No significant differences between positive or negative rheumatoid factor groups were observed with regard to BMD loss after 1 year of treatment.
Conclusion: BMD data of patients with low to moderately active positive or negative rheumatoid factor RA demonstrated an association between high radiological RA damage and low BMD at the hip, which suggests an association between the severity of RA and the risk of generalized bone loss, which also occurred in corticosteroid naive patients. There were no significant differences between positive or negative rheumatoid factor groups in BMD loss after 1 year of treatment.

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THE RELATIONSHIPS BETWEEN PHYSICAL PERFORMANCE VARIABLES AND BONE MINERAL DENSITY IN A GROUP OF YOUNG LEBANESE ADULTS

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Objective: To explore the relationships between performances in different physical tests and bone parameters (bone mineral content (BMC) and BMD) in a group of young Lebanese adults.
Material and Methods: 100 young Lebanese adults (42 women and 58 men) whose ages range from 17 to 34 years participated in this study. Weight and height were measured, and BMI was calculated. Daily calcium intake (DCI), daily protein intake (DPI) and physical activity level (h/week) were evaluated using validated questionnaires. Physical performance variables were measured using several physical tests: vertical jump test, standing long jump test, 3-jump-test, 5-jump-test and 1-RM half-squat. Body composition, BMC and BMD at whole body (WB), lumbar spine (L2-L4), total hip (TH) and femoral neck (FN) were measured by DXA.
Results: In women, weight, height, lean mass, and performances in vertical jump test, standing long jump test, 3- jump-test, 5-jump-test and 1-RM half-squat were positively correlated to BMC and BMD values. In men, weight, height, BMI, DCI, DPI, lean mass and performances in standing long jump test and 1-RM half-squat were positively correlated to BMC and BMD values.
Conclusion: This study suggests that lean mass and maximum strength obtained in the half-squat test are positive determinants of BMC and BMD in young Lebanese adult. Our findings may have practical implications in the field of prevention of osteoporosis.

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IS TBS ABLE TO IDENTIFY THORACIC VERTEBRAL FRACTURE AS WELL AS LUMBAR ONES?

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Objective: Establish the useful of TBS to identified subject with altered bone structure, which could explain the vertebral fractures in subject categorized as normal by BMD. Evaluate a new method combining information on BMD and TBS to improve the identify subject with high risk.

Material and Methods: We analyzed 333 patients (263 women; 70 men) with a mean age of 67.9±5 years. Among them, 139 subjects sustained no fracture (WFx). Subjects with fracture were stratified by fracture type: lumbar (L, n=62)-; thoracic (T, n=97) or with fracture in both sectors (TL, n=35); by TBS: normal (N, TBS>1.,350), partial (P, 1.200<TBS≤1.,350) or severe (S,TBS≤1.200) and by BMD (WHO recommendation).
Results: WFx: 36 % and 34 % of subjects without fractures had normal BMD or normal TBS; Dorsal Fractures: 85/97 (87.62 %) of patient had osteopenia or osteoporosis; 94/97 (96.9 %) had TBS altered (P-S); Lumbar fractures: 16/62 (25.8 %) patients had osteopenia or osteoporosis while 61/62 (98.4 %) had TBS altered (P-S). Only one of them showed a normal TBS. Considering Thoracic-lumbar fractures, 28/35 (80 %) had osteopenia or osteoporosis, whereas all these patient had TBS in pathological range (P-S). Results are presented in the table below:

	TBS (N)	BMD NORMAL	TBS (P)	BMD OSTEOPENIA	TBS (S)	BMD OSTEOPOROSIS
WFX (n=139)	31 (22,3%)	43 (30,9%)	54 (38,8%)	50 (35,9%)	54 (38,84%)	46 (33,09%)
T (n=97)	3 (3,1%)	15 (15,46%)	27 (27,8%)	32 (32,98%)	67 (69%)	50 (51,5%)
L (n=62)	1 (1,6%)	13 20,9%)	18 (29%)	29 (46,7%)	43 (69,35%)	17 (27,41%)
TL (n=35)	0 (0%)	7 (20%)	4 (11,4%)	14 (40%)	31 (88,5%)	14 (40%)

Conclusion: This results showed, for the first time, that TBS evaluated in lumbar region permit to detect patients with thoracic fractures. In addition, TBS thoracic and lumbar fracture sensitivities are similar (96.9 vs. 98.4 % considering the P and S zones). For the TL fracture group, TBS exhibits the best sensitivity. The evaluation of TBS in lumbar spine can be used to screen patient and choose to perform a VFA.
Disclosures: R. Winzenrieth is Senior Scientist at Med-Imaps.

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KNEE JOINT BIOMECHANICS DURING STAIR DESCENT IN PATIENTS WITH KNEE OSTEOARTHRITIS VS. CONTROLS

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Objective: To investigate biomechanical differences at the knee between knee osteoarthritis (OA) and healthy control participants during stair descent.
Material and Methods: Thirty male and female participants (58.9±7.7 years) with patellofemoral and medial tibiofemoral OA and thirty age- and BMI-matched control participants were recruited. Participants descended a 7-step staircase at a standardised speed. Kinematic data were obtained by tracking the movement of rigid clusters and markers using a 10-camera motion analysis system (Vicon) and a modified 6° of freedom full body model. Ground reaction forces (GRF) were measured from force platforms embedded into 4 steps. Joint moments were calculated through inverse dynamics techniques by combining kinematic and GRF data. Pain was assessed using a VAS. An independent t-test was used to test for differences between groups. Values are mean±SD.
Results: The OA group had a significantly reduced minimal knee flexion angle [OA: 13.0±3.3°; control: 16.4±3.5°] and internal peak knee extension moment [OA: 0.96±0.23 Nm/kg; control: 1.16±0.19 Nm/kg] during the stance phase compared to controls. Additionally, compared to controls during the stance phase, the OA group had a significantly increased maximal knee adduction angle [OA: 5.9±5.8°; control: 2.8±5.2°]. The OA group descended stairs in significantly more pain [OA: 32±29 mm on a 0–100 VAS; control: 0±0 mm], at a slower gait speed [OA: 0.49±0.06 m/s; control: 0.52±0.03 m/s] and with a wider stride width [OA: 0.15±0.02 m; control: 0.14±0.03 m] compared to controls.
Conclusion: Stair descent is a challenging activity for people with knee OA affecting knee biomechanics as proven by our findings of a reduced knee flexion, increased knee adduction, lower knee extension moment, slower pace and wider stride width, which may all together be results of the pathology while experiencing more pain during the task.
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P405
BONE MATERIAL STRENGTH IN LONG-TERM BISPHOSPHONATE USERS IS DECREASED IN PATIENTS THAT SUFFER FRACTURES WHILE ON TREATMENT

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Objective: Bisphosphonates (BP) reduce fracture risk in patients with osteoporosis but some still suffer fractures while on treatment even with good adherence. Moreover, there is debate on the effects of long-term BP on bone quality. Bone microindentation estimates bone material strength (BMS) in vivo. We aim to compare BMS values in patients on long-term BP with and without incident fractures while on treatment with good adherence
Material and Methods: Case-control study of postmenopausal women with osteoporosis, on treatment with oral BP for >4 y, with good adherence. DXA (Hologic) and microindentation with an Osteoprobe™ (Active Life Sci, S Barbara, CA) at the anterior midtibia after local anesthesia, at a force of 20 N making 8 measurements were performed. BMS units express 100× the ratio indentation distance into a calibration PMMA/ indentation distance into the bone. Incident fractures on treatment were validated
Results: 40 female patients were included (age 70.0±6.8 y, time on BP 4–14 y). BMS values were lower in the 22 cases of incident fracture while on BP (81.65±6.26) than in the 18 without (72.17±9.78) (mean±SD). These differences were significant after adjusting by age, BMI, lumbar BMD and years on BP treatment (p=0.01). The risk of suffering a fracture while on BP decreased with increased BMS (OR 0.79, 95%CI 0.68,0.93 per each BMS unit increase). Discrimination between incident fracture and no-fracture yielded an AUC of 0.82 (95%CI 0.69, 0.95) for microindentation' BMS values while for BMD ranged between 0.63 and 0.69 for the different measured regions.
Conclusion: BMS at a tissue level is a strong conditioning factor of suffering incident fractures in treated patients with oral BP. Microindentation can detect cases in which tissue level properties are not fully restored by the treatment. Future agents might target some BMD-independent aspects of bone strength to further increase the efficacy of the treatments.
Disclosures: A Diez-Perez owns stocks of Active Life Sci.
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P406
3D-DXA: A 3D MODELLING METHOD OF THE PROXIMAL FEMUR INTEGRATED IN DMS DXA DEVICE

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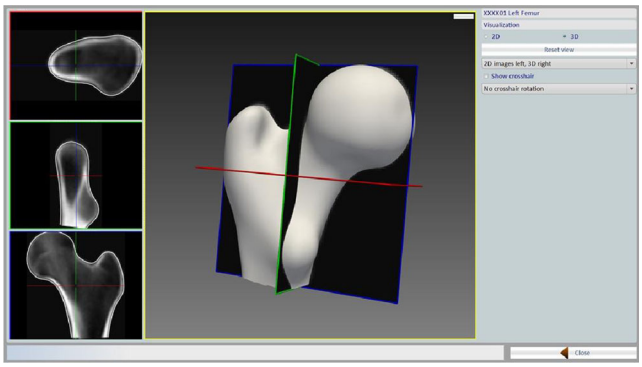
Objective: To present the 3D-DXA technology: a 3D modelling method of the proximal femur embedded in Stratos dR DXA device (DMS, Montpellier, France); and evaluates its accuracy in comparison with QCT.
Material and Methods: The 3D-DXA technology relies on a 3D statistical model constructed from a dataset 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 (Stratos dR, DMS) with QCT acquisitions. The study involved 40 patients, including patient with osteoporosis, osteopenia and normal bone density (mean age: 53±12 years, range: 23–84 years).



Results: Mean computing time was 2 min. on an Intel Xeon, 3.40GHz, 8GB of RAM, 64bit platforms. Mean shape accuracy evaluated on the 40 patients was 0.9 mm. Volumetric BMD and BMC reconstructed by 3D-DXA were highly correlated with Volumetric BMD and BMC computed from QCT (r=0.94 and r=0.98, respectively, p<0.001).

Conclusion: This method presents a high potential for clinical routine use, by providing 3D models of shape and vBMD of the femur while maintaining DXA as the current standard modality. This should potentially improve the diagnosis of osteoporosis and fracture prevention.

P407
COMPLICATIONS AFTER LOW MINIMALLY-INVASIVE FIXATION OF CALCANEUM FRACTURE

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Objective: Fractures of the calcaneus is still a delicate point regarding the indication for osteosynthesis. Knowing the poor vascularization of the back leg skin we face trying to choose between an open outbreak invasive osteosynthesis and correct reduction or minimally invasive osteosynthesis, preserving the quality of the soft parts.

Material and Methods: In the traumatology and orthopedic clinic of the Emergency University Hospital of Bucharest in 2009–2012 were performed 66 surgeries that targeted reduction and internal fixation of calcaneal fractures. Patients were aged between 25 and 65 years. Sex ratio M/F=40/26. In 29 cases underwent open reduction and internal fixation with osteosynthesis outbreak being made with plates and screws or Kirschner wires and in 37 cases underwent minimally invasive reduction and osteosynthesis technique Essex Lopresti. Fracture diagnosis and postoperative follow up assumed clinical examination and radiological incidents both axial and profile.

Results: Postoperatively no patient walked on the operated limb for 6 weeks then those who underwent open reduction and fixation with plate and screws were loaded gradually reaching full load after 10 weeks postoperatively. Postoperative recovery was excellent in 30 cases operated minimally invasive and 20 cases who underwent open reduction. No patient who underwent minimally invasive reduction had skin lesions, but showed pain following injury occurrence subtalar joint arthrosis. 4 patients who underwent open reduction and internal fixation had postoperative wound infections, skin necrosis and 2 of them had skin necrosis which delayed healing.

Conclusion: Given that you can get an accurate reduction of the articular surface of the calcaneus avoiding invasion of soft tissues and joints, consider that minimally invasive osteosynthesis is the method of choice in fractures of the calcaneus, postoperative recovery is encumbered with fewer complications resulting absolutely favorable long term.

P408
PREFERENCES OF PATIENTS FOR OSTEOPOROSIS DRUG TREATMENT: A CROSS-EUROPEAN DISCRETE CHOICE EXPERIMENT

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Objective: To evaluate the preferences of European patients with, or at risk of, osteoporosis for medication attributes, and to establish how they trade between these attributes.

Material and Methods: A discrete choice experiment was conducted using a questionnaire in Belgium, France, Ireland,

Spain, Switzerland and United Kingdom. Patients were asked to choose between two hypothetical unlabelled drug treatments (and an opt-out option) that vary in several attributes: efficacy in reducing the risk of fracture, type of potential common side effects, mode and frequency of administration and out-of-pocket costs (only in countries with patients' contribution on the cost of treatment). An efficient design was used to construct the treatment option choice sets and a mixed logic model was used to estimate patients' preferences.
Results: A total of 1,124 patients completed the experiment, with at least 100 patients per country. As expected, patients preferred treatment with higher effectiveness and lower cost. In all countries, patients preferred 6-month subcutaneous injection above weekly oral tablets. In most countries, patients also preferred oral monthly tablet and yearly intravenous injections above weekly oral tablets. Patients disliked being at risk of gastro-intestinal disorders more than being at risk of skin reactions and flu-like symptoms. There was significant variation in preferences across the sample for most attributes.
Conclusion: This study revealed that European osteoporotic patients prefer 6-month subcutaneous injection above weekly oral tablets. In most countries, they also prefer oral monthly tablets and yearly intravenous above weekly oral tablets, and they dislike gastro-intestinal disorders. Patients are willing to trade efficacy (or cost) for their preferred outcomes. We found differences in preferences across patients which highlight the potential importance of clinical decision-making taking individual preferences into account to improve osteoporosis care.
Disclosures: Unrestricted educational grant from Amgen

P409
RECOVERY ASPECTS IN ACL RECONSTRUCTION WITH SEMITENDINOUS AND GRACILIS TENDONS

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Objective: ACL reconstruction is the surgical intervention used to replace the damaged ACL with a bone-patella tendon-bone (BTB) graft or with soft parts (semitendinosus - gracilis muscles (ST-G) - a method more frequently used nowadays). Our purpose was to highlight how to optimize postoperative recovery after ACL reconstruction using a minimally invasive approach compared with BTB technique.
Material and Methods: During the period 2010–2012, a number of 64 arthroscopic ACL reconstructions with ST-G muscles were studied and a number of 22 B-T-B ACL reconstruction, all performed to treat ACL isolated injuries or injuries associated with complex trauma of the knee. Most of the patients were male (72) and aged between 17 and 39 years (arthroscopic ACL reconstruction) and 19 male patients for the B-T-B reconstruction. Arthroscopy was the main method of diagnosis in 64 cases, and in the other 22 cases an MRI examination was used. The surgical intervention was performed for all 86 patients at more than 3 weeks from the occurrence of the trauma which caused the ACL injury.
Results: Postoperative pain is greatly reduced due to the minim-invasive character of the surgical intervention:

- The neoligament is more resistant due to its thickness and means of attachment.
- Recovery is early, after 24 h or immediately after the removal of the drainage tube.
- Good mobility of the knee is obtained very fast, approximately 60° of flexion after the first 72 h.
- The active mobilization of the patient is early.
- Through the faster postoperative recovery and the significant decrease of the postinterventional pain, the hospitalization costs are substantially decreased by reducing the period of hospitalisation.

Conclusion: Arthroscopic ACL reconstruction with autograft from the semitendinosus and gracilis muscles provides early recovery with minimum postinterventional pain, increased mobility of the knee as early as the first 2 weeks postoperatively and significant decrease of the hospitalization duration and costs.

P410
ATYPICAL FRACTURES OF FEMUR IN PATIENTS TREATED BY BISPHOSPHONATES

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Objective: Prevention of atypical fracture requires careful attention to the symptoms that precede a fracture. Additional medication is considered as a risk factor, usually glucocorticoids, proton pump inhibitors and bisphosphonates (BF).
Material and Methods: 4,213 patients treated with BFs; 2,147 patients were treated with original alendronate and 2,066 with original ibandronate. Totally 15 fractures were found in the alendronate group (2 in adult patients with osteogenesis imperfecta) and 14 in the ibandronate group (1 in adult patients with osteogenesis imperfecta). All radiographic examinations of any fracture in the study group were subjected to the retrospective analysis of fracture type identification including fractures of femur and humerus.
Results: In the alendronate group 4 pertrochanteric, 6 diaphysis of femur, 2 subtrochanteric and 2 periprothetic fractures were identified. No fracture of femur was found in this group. Based on radiography analysis 3 fractures met the criteria for AF in the alendronate group. In the ibandronate group 4 pertrochanteric, 2 subtrochanteric, 5 fractures of femur diaphysis and 2 peripathetic fractures in patients with endoprothesis (which were implanted

before BF treatment) were identified. Again, there was no fracture of femur found. Only 1 fracture met the criteria for AF in the ibandronate group. Markers of bone remodeling were examined in the study group - serum osteocalcin, PINP, PTH, ALP and CTX.
Conclusion: From the whole study group of 4,213 patients only 4 AFs were identified. Patients with AF were treated with BF for 7–10 years on average. Two patients were treated with glucocorticoids and 3 with proton pump inhibitors through the whole course of BF treatment. The authors discuss the early identification of risk factors, especially the difference between mechanic and anatomic axis of femur. Emergence of AF is primarily related to inadequate therapy decision or to misleading interpretation of risk factors after 5 years of BF treatment.

P411
TRABECULAR BONE SCORE IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: To evaluate influence of age, duration of postmenopausal period (PMP) and duration of disease on trabecular bone score (TBS) and BMD of women with rheumatoid arthritis (RA).
Material and Methods: 129 women with RA aged 21–83 years were examined (age 52.4±12.7 year; height 162.6±6.4 cm; weight 68.5±13.8 kg; duration of disease 9.1±7.6 years). BMD of lumbar spine, proximal femur and total radius were measured using the DXA method (Prodigy, GEHC Lunar, Madison, WI, USA) and PA spine TBS was assessed by means of TBS iNsight® software installed on our DXA machine (Med-Imaps, Pessac, France).
Results: We have observed a significant decrease of TBS in 50 year-old women with RA as compared to women aged 30–39 years (p=0.001)/ The same was true of BMD of lumbar spine (p=0.04), femur neck (p=0.02), total radius (p=0.04). TBS is significantly lower in patients with a PMP duration of more than 3 years, as compared to women who were still menstruating (p=0.007). Femoral neck (FN) BMD significantly decreased when PMP duration was 5–10 years, as compared to women without menopause (p=0.0004). A similar trend was observed in case of spine BMD (p=0.001) and total radius, (p=0.001) when the duration of PMP was more than 10 years. Duration of disease did not influence TBS (p=0.336). However, Total Radius BMD (p=0.03) significantly decreased when RA lasted more than 3 years, spine (p=0.008) and FN (p=0.04) BMD when RA lasted more than 10 years, as compared to patients whose duration of RA did not exceed 3 years.
Conclusion: Age influences both TBS and BMD to the same extent, these parameters significantly decrease from 50 years onwards. TBS rapidly reacts to the changing hormonal status which is observed during menopause, and significantly declines after 3 years. Duration of RA influences only BMD, and its significant decrease is observed when the disease lasts for more than 5 years.

P412
INFLUENCE OF GLUCOCORTICOIDS ON TRABECULAR BONE SCORE IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: To evaluate the influence of GC on the trabecular bone score (TBS), BMD and TBS dynamics during 1 year in patients with RA.
Material and Methods: 134 examined women with RA (age 52.5±12.8 years; height 162.6±6.4 cm, weight 68.2±13.7 kg) were divided into three groups: first group, G1, includes 37 patients who did not use GC, second group, G2 - 50 patients who used GC in a dose of more than 5 mg of prednisolone for more than 3 years, third one, G3 - 47 patients who took GC only at the exacerbated stage for less than 6 month. All the patients had been taking methotrexate as a basic treatment. BMD of total body, PA lumbar spine, proximal femur and forearm were measured using the DXA method (Prodigy, GEHC Lunar, Madison, WI, USA) and PA spine TBS was assessed by means of TBS iNsight® software package installed on our DXA machine (Med-Imaps, Pessac, France). Evaluation of TBS dynamics in the patients of G1 & G2 groups during the year was conducted on the background of ongoing therapy which included doses of GC and/or without any osteotropic treatment.
Results: The 3 groups did not differ as to age, basic anthropometric parameters, duration of disease and duration of postmenopausal period in these groups. TBS in G2 was significantly lower compared to G1 (TBSL1-L4: 1.147±0.168 vs. 1.250±0.135; t=-3.07; p=0.003), and G3 compared to G1 (TBS L1-L4: 1.274±0.138; t=3.95; p=0.0002). However, there were no differences of BMD of PA spine and hip among groups. Only forearm BMD in the second group was significantly lower compared to the first one (0.583±0.176 g/cm^2 vs. 0.675±0.229 g/cm^2; t=−2.18; p=0.032). Spine TBS decreased by 1.4 % after 1 year for G1 and by 5.8 % for G2.
Conclusion: For patients who are GC-users, TBS, but not BMD, reflects bone microarchitecture deterioration which is an indicator for those patients to of a higher vertebrae and nonvertebral risk of fracture. TBS is a determinant of bone state and must be monitored during the long-term treatment with GC.

P413
IMPACT OF COMPONENTS OF THE METABOLIC SYNDROME ON PROGRESSION OF KNEE OSTEOARTHRITIS IN THE SEKOIA STUDY

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Objective: Recent studies have suggested that components of the metabolic syndrome might be involved in the pathophysiology of osteoarthritis (OA). However, their impact on joint space narrowing in patients with established OA is unknown. We investigated the impact of each component of the metabolic syndrome on knee joint space narrowing.
Material and Methods: 559 men and women aged over 50 years with clinical knee OA (K&L 2-3) were recruited to the placebo arm of the SEKOIA study (98 centres; 18 countries). The presence or absence of type 2 diabetes, hypertension, and hyperlipidaemia was determined at baseline interview. Height and weight were measured and BMI calculated. Minimal tibiofemoral joint space on plain radiographs of the knee was assessed by two independent readers at baseline and then yearly for up to 3 years.
Results: The mean(SD) age of participants was 62.8(7.5) years. A total of 43.8 % had a BMI>30, 6.6 % had type 2 diabetes, 45.1 % hypertension and 27.6 % hyperlipidaemia. Those with type 2 diabetes had significantly faster rates of joint space loss over the duration of the study than those without (0.26 and 0.14 mm/year, respectively; $p=0.01$). This relationship also held true for an annualised assessment of joint space narrowing. No evidence of an association was found between the remaining components of the metabolic syndrome (obesity, hypertension and hyperlipidaemia) and the rate joint space narrowing. The relationship between type 2 diabetes and joint space loss remained statistically significant after adjustment for BMI. When sexes were examined separately, type 2 diabetes was a significant predictor of joint space loss in men but not women.
Conclusion: Type 2 diabetes was a predictor of the rate of joint space narrowing in individuals with established knee OA. No such relationships were found for obesity, hypertension, and hyperlipidaemia. Further studies are required to replicate these findings and to explore a biological explanation.
Disclosures: C Cooper has received honoraria and consulting fees from Amgen, Eli Lilly, Medtronic, Merck, Novartis and Servier. F Petit-Dop is an employee of Servier.

P414
BONE MINERAL DENSITY IN PEDIATRIC PATIENTS WITH CHRONIC KIDNEY DISEASE

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Objective: Chronic kidney disease (CKD) is associated with increased fracture risk and skeletal deformities one hand and vitamin D (VD) by known hormonal effects may well take place in renoprotective events on the other hand. Aim: Bone mineral status in children with chronic kidney disease (CKD) stages I-III.
Material and Methods: The main group were examined 32 children aged 10–17 years. The control group ($n=45$) consisted of patients without CKD of the same age. Methods conducted chemiluminescent content of 25 OH vitamin D and PTH, ultrasound densitometry. The results are statistically processing using the program Statistica 6.0.
Results: In the main group of patients the mean serum levels of 25 OH VD was 27.5±16.5 nmol/L, which was not statistically different with the control group (24.4± 19.9 nmol/L, $p>0.05$) and match a condition VD deficiency level below 37.5 nmol/L. Number of children with CKD with deficiency VD was 91.2 % vs. 82.9 % ($p<0.05$). In VD state failure (range 38–74 nmol/L) was 9.8 % of children with CKD vs. 15.9 % ($p<0.05$). Children with CKD and normal VD were not found (vs. 1.2 %). The content of PTH in the mean group was 30.8±10.6 pg/ml vs. 24.4±19.9 pg/ml ($p>0.05$). The index of the strength of bone densitometry to match a state of osteopenia in 10.2 % of children with CKD vs. 8.7 % ($p>0.05$), of osteoporosis - in 3.1 % of children with CKD (control group these children were not).
Conclusion: Children with CKD stages I-III had low BMD and VD status. How much VD replacement therapy will improve the prognosis of CKD remains to be explored.

P415
DISCRIMINATION OF HIP FRACTURE IN POSTMENOPAUSAL WOMEN USING A 3D RECONSTRUCTION METHOD FROM 2D DXA

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Objective: Evaluate the hip fracture discriminative power of 3D volumetric BMD (vBMD) computed over 3D shape and density models reconstructed from 2D DXA.

Material and Methods: A retrospective study was carried out to collect 86 DXA scans of postmenopausal Caucasian women (CETIR Grup Mèdic, Barcelona). Selection criteria included: (1) No osteoporotic fracture at baseline, (2) femoral fracture between 1 and 7 years from basal scan for half of the patients (fracture group) and (3) no osteoporotic fracture during at least a 7 years of follow-up from basal scan (control group). 3D patient-specific femurs were obtained from baseline DXA scans by registering a 3D active appearance model of the femoral shape and density onto each patient DXA image. vBMD in the neck, shaft, trochanter and total femur regions were computed over those 3D patient-specific models. Discrimination ability between fracture and control group was computed for each parameter.

Results: Area under the receiver operative curve (AUC) of vBMD, before and after age-adjustment, measured over 3D femur reconstructed, and areal BMD measured over 2D DXA at the neck, trochanter, shaft and total hip regions are shown below in Table 1.

2D aBMD		AUC	AUC adj.
Neck	BMD	0.79	0.81
Trochanter	BMD	0.77	0.82
Shaft	BMD	0.76	0.81
Total Hip	BMD	0.80	0.83

3D vBMD		AUC	AUC adj.
Neck	BMD	0.86	0.86
Trochanter	BMD	0.83	0.85
Shaft	BMD	0.84	0.84
Total Hip	BMD	0.84	0.84

Conclusion: Higher AUC values are consistently obtained by vBMD in neck, trochanter, shaft and total hip regions, which suggests that vBMD computed over 3D reconstructed femur from 2D DXA potentially provides a better discrimination between hip fracture cases and controls than densitometry measures computed from 2D DXA image. This will potentially improve fracture risk estimation while maintaining DXA as the current standard modality.

P416

SECONDARY FRACTURE PREVENTION AFTER HIP FRACTURE: A QUALITATIVE STUDY OF THE EXPERIENCES OF CLINICIANS AND SERVICE MANAGERS OF MAKING BUSINESS CASES FOR A FRACTURE PREVENTION SERVICE

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Objective: To better understand the challenges healthcare professionals face when making business cases to develop a fracture prevention service (FPS) and the strategies they use to construct them effectively.

Material and Methods: Patients with hip fracture are at a high risk of subsequent osteoporotic fractures. However, only a third of hospitals in England have a FPS. To develop services healthcare professionals may submit business cases to managerial bodies within the Trust. Final funding approval may be required by their local Clinical Commissioning Group(s). We have conducted 42 interviews with healthcare professionals involved in delivering FPS within nine NHS Acute Trusts. These have explored their experiences of making business cases, views on what informs decisions to introduce new services and ways of making business cases effectively. Interviews have been audio-recorded, transcribed, anonymised and coded using NVivo software. A framework approach is being used.

Results: Participants reported several challenges in making business cases. Clinicians felt that they lacked the skills and did not receive enough managerial support. Cost savings were seen as the most important factor in making decisions to introduce new services whilst National Guidelines and improvements in patient care were seen as less so. The challenges of budget compartmentalisation, the need to demonstrate immediate cost savings, the vested interests of commissioners and the low profile of osteoporosis were highlighted. A number of strategies were identified for making effective business cases, including citation of successful models, published research and audit data. Building support networks and involving stakeholders in service design were advocated.

Conclusion: Participants identified a number of challenges when making business cases and strategies they used to construct them effectively. Stakeholders may find knowledge of these of benefit when considering how best to develop business cases in the future.

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EARLY AND PROFOUND DETERIORATION OF BONE QUALITY IN PATIENTS INITIATING GLUCOCORTICOIDS IS PREVENTED BY TREATMENTS

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Objective: Fracture risk increases early after starting glucocorticoids (GC). Microindentation detects changes in bone material strength (BMS) related with fracture (JBMR 2010). We assess early BMS changes in patients initiating GC and response to treatment.

Material and Methods: 35 patients within 4 weeks of starting GC. General laboratory and BMD were performed. BMS measurement at the anterior midtibia were made with an Osteoprobe® (Active Life Sci S Barbara CA). Measurements were done at baseline, after 7±1.5 weeks (V1) and at week 18 (V2). Treatment with Ca+vitD3 (Ca+D) alone, or with bisphosphonates (BP) or teriparatide (TPTD) was started according to risk categories following Spanish guidelines. Linear regression was used adjusting by age, gender, and cumulative dose of GC.

Results: BMS declined by 10.5 % after 7 weeks in 17 cases on Ca+D, did not change in the 13 on BP and increased significantly by 12.6 % in the 5 participants on TPTD. These differences stood for multivariate adjustment for potential confounders (Table). At visit 2 all these changes remained although cases on Ca+D that declined (10/17) were switched to active treatment group and excluded, as pre specified by ethics requirements. No changes in BMD were observed

Baseline(V0)	7 weeks(V1)	18 weeks(V2)
Mean(SD)	Mean(SD) Ad Mean(95%CI)*	Mean(SD)BMS
Ca+D	81.6 (6.3)	72.8 (10.6) Ref group 76.3 (9.0)
BP	82.9 (12.1)	83.9 (12.7) 10.5 (1.6–19.3)¥ 85.3 (10.2)
TPTD	68.7 (5.3)	83.9 (12.7) 23.7 (11.3–36.1)§ 87.7 (5.9)

*BMS loss differences; ¥p=0.022;;§p=0.001

Conclusion: BMS declines very early, after only 7 weeks on GC. BP prevent this decline whereas teriparatide significantly increases this bone tissue quality parameter. These changes persist after 4.5 months. BMD measurements are insensitive to these changes. Microindentation might monitor changes induced by GC and their treatments well beyond what BMD currently allows.

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GOUT IS ASSOCIATED WITH AN EXCESS RISK OF OSTEOPOROTIC FRACTURE: FINDINGS FROM A DANISH REGISTRY

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Objective: Although metabolic syndrome is common in gout patients, recent reports that BMD may actually be reduced (and falls common) in this group have led researchers to hypothesise that osteoporotic fracture may be more common in subjects with gout than in healthy controls. We tested this hypothesis in a national Danish registry.

Material and Methods: We identified subjects as new users of allopurinol, a proxy for gout, for the years 1996–2010. Each incident user was assigned up to 10 age- and gender matched controls. We used propensity score matching to identify a highly matched control population. Patients with a diagnosis of malignancy in the year prior to the first allopurinol prescription were excluded. A final propensity score model included hospital diagnoses since 1994; Charlson index components; and prior osteoporotic fractures; use of drugs (including osteoporosis medication, prednisolone and HRT) in the last year. Conditional Cox regression modelling was undertaken.

Results: We studied 86,129 patients and the same number of controls (58,129 men and 28,000 women). Thirteen thousand and ninety one cases and 12,188 controls sustained any osteoporotic fracture; the number of major osteoporotic fractures was 5,574 in the cases and 4,893 in the control group. We found a modest adjusted effect of allopurinol prescription on major osteoporotic fractures; an association with hip fractures just failed to attain statistical significance (see table). Among patients who were incident allopurinol users and who also had at least one hospital contact with a gout diagnosis (about 20 % of allopurinol users, median number of allopurinol prescriptions 12 vs. 6 in nonhospital group), we found stronger associations.

	Major osteoporotic fracture	Hip fracture
Allopurinol	1.075 (1.031-1.121) p<0.001	1.060 (0.990-1.134) p=0.093
Allopurinol + gout diagnosis	1.211 (1.093-1.343) p<0.001	1.188 (1.007-1.403) p=0.04

Conclusion: These data suggest that gout requiring allopurinol prescription is a risk factor for osteoporotic fracture.

Disclosures: Lilly, Amgen, Novartis, Merck, Alliance for Better, Glaxo Smith Kline, Roche, Merck, Wyeth, Servier, Nycomed, Takeda

P419

LOW BONE MINERAL DENSITY IS PRESENT IN YOUNG CHILDREN (<18Y) OF MEN WITH IDIOPATHIC OSTEOPOROSIS

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Objective: Previous research in adult men with idiopathic osteoporosis (IO) and their adult sons has provided indirect evidence that the condition is caused by a deficient bone mass acquisition. To investigate if a low bone mass is already present in childhood, we studied the young children (<18 y) of men with IO.
Material and Methods: 38 male children of IO men (defined as Z-score<−2 on the lumbar spine or hip) aged 6–19 years old and 38 healthy age-matched controls were included in this cross-sectional study. Whole body and lumbar areal (aBMD) were determined by DXA. Trabecular (distal site) and cortical (proximal site) volumetric BMD (vBMD) were assessed at the nondominant forearm and leg using peripheral QCT.
Results: Compared to age-matched controls, children of men with IO have a significant lower median z-score (P25/P75) at the lumbar spine (−0.9 (−1.2/−0.27) vs. −0.4 (−0.8/0.19); $p<0.01$) and whole body (−1.0 (−2.0/−0.1) vs. −0.1(−0.7/0.4); $p<0.05$). In absolute values, children of IO men have a lower median aBMD (P25-P50) at the whole body (0.86 (0.80–0.95) vs. 0.95 (0.85–1.1) g/cm^2; $p<0.05$), a lower median trabecular vBMD at the radius (170 (154–200) vs. 192 (169–212) mg/cm^3; $p<0.05$) and a lower median trabecular vBMD at the tibia (189 (168–199) vs. 226 (194–242) mg/cm^3; $p<0.001$). aBMD at the lumbar spine was also lower in the children of men with IO (0.67 (0.56–0.86) vs. 0.85 (0.60–0.89) g/cm^2) however, significance was not reached. Cortical density at the radius and tibia was similar in both groups. Studying line plots, the differences in whole body and lumbar spine aBMD become more apparent from the age of 11–12 years onwards.
Conclusion: Low BMD is present in children of men with idiopathic osteoporosis at different skeletal sites. There are indications that the deficit develops during puberty. In order to confirm our findings and unravel the underlying mechanisms, prospective longitudinal study is required.

P420

PLASMA SPHINGOSINE 1-PHOSPHATE LEVELS AND THE RISK OF OSTEOPOROTIC FRACTURES: THE CEOR STUDY

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Objective: 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 compartments. Also, S1P is known to stimulate osteoblasts proliferation, migration and survival. We hypothesized that postmenopausal women with increased plasma S1P levels have a greater risk for osteoporosis-related fractures (ORFs).
Material and Methods: We examined, the association between circulating S1P [measured by ELISA kit (Echelon Biosciences Inc., USA)] 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: Plasma S1P levels (μmol/L) were significantly higher in women with ORFs (7.23±1.79) than in those without ORFs (5.02±1.51) ($P<0.0001$). High S1P levels were strongly associated with increased fracture risk. After adjustment for age and other confounders, the relative risk was >6.2-fold among postmenopausal women for each 1-SD increment increase in plasma S1P level. Women in the highest quartile of S1P levels had a 10-fold increase in fracture risk. Results were similar when we compared S1P at the 1-year visit to an average of 2–3 measurements. Fracture risk attributable to S1P levels was 41.5 % in the highest quartile. Associations between S1P levels and fracture risk were independent of BMD and other confounding risk factors.
Conclusion: High plasma S1P levels are a strong and independent risk factor for ORFs among postmenopausal women and could be a useful biomarker to improve fracture risk assessment.

P421

BONE MICROARCHITECTURE ASSESSED BY HIGH RESOLUTION PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY IS ASSOCIATED WITH FRACTURE STATUS IN OLDER MEN AND WOMEN

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Objective: Assessment of BMD by DXA is the accepted method for osteoporosis diagnosis and is used in fracture risk prediction. However, half of fragility fractures occur in nonosteoporotic women. Bone microarchitecture from HR-pQCT also contributes to bone strength. We compared microarchitecture in older men and women with and without prevalent fractures.
Material and Methods: 180 men and 165 women, aged 72.1–80.9 years, from the Hertfordshire Cohort Study were studied. HR-pQCT (XtremeCT) images (voxel 82 μm) were acquired from the distal radius and tibia. Standard analyses were performed for assessment of macrostructure, densitometry, cortical porosity and trabecular microarchitecture. Femoral neck (FN) BMD and vertebral fracture assessments were completed using DXA (Lunar Prodigy Advanced). Nonvertebral fracture status was obtained from participant interviews.
Results: Forty five men (25 %) and 51 women (31 %) had prevalent fractures. In both sexes, cortical thickness and density were lower in fracture cases (tibial cortical thickness, mean±SD: fracture 0.86±0.20, no fracture 0.95±0.18 mm, p=0.004 in women; fracture 1.13±0.27 mm, no fracture 1.24±0.26 mm, p=0.014 in men). Trabecular density, number, and thickness also tended to be lower in those with prevalent fractures but these differences only reached statistical significance in women. In men, total and trabecular area were greater in those that had fractured (tibial total area: fracture 961±157 mm^2, no fracture 893±138 mm^2, p= 0.006). After adjustment for FN BMD, relationships with cortical and trabecular microarchitecture were partially attenuated but associations in men between fracture status and both total and trabecular area were maintained.
Conclusion: This study is the first to show that patterns of radial and tibial bone microarchitecture by fracture status differ in men and women. Most associations are maintained after adjustment for BMD and are therefore likely to add to fracture prediction by DXA.
Disclosures: C Cooper has received honoraria and consulting fees from Amgen, Eli Lilly, Medtronic, Merck, Novartis and Servier.

P422
SECONDARY PREVENTION OF FRACTURES AFTER HIP FRACTURE: A QUALITATIVE STUDY OF EFFECTIVE SERVICE DELIVE

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Objective: This study aims to identify and describe healthcare professionals' views on effective care for hip fracture, focusing on prevention of secondary fractures.
Material and Methods: Patients with hip fracture are at a high risk of subsequent osteoporotic fractures. While the NHS recommends effective fracture prevention services, there is wide variation in service organisation. 42 semistructured interviews have been conducted with healthcare professionals involved in delivering fracture preventions services (FPS) in nine NHS Acute Trusts. These explored their views on the best models of care for the four components of a FPS: (1) case finding, (2) osteoporosis assessment, (3) treatment initiation, and (4) monitoring (treatment adherence) and care coordination. Interviews were audio-recorded, transcribed, anonymised and coded using NVivo software. A framework approach is being used.
Results: Case finding: A number of approaches were discussed. Using multiple methods ensured that there was a 'backstop' if patients were overlooked. Osteoporosis assessment: There was no consensus on who should conduct this. The location of the DXA scanner was seen to influence the likelihood of patients receiving a scan. Treatment initiation: It was felt this was best done in an inpatient setting rather than in outpatients or primary care. In primary care this was reliant on comprehensive discharge summaries. Monitoring (adherence): Adherence was a major concern and participants felt more monitoring could be conducted in secondary care. Coordination of care: Participants advocated using dedicated coordinators and formal and informal methods of communication. A gap between primary and secondary care was identified, and strategies suggested for addressing this.
Conclusion: A number of ways of organising effective fracture prevention services after hip fracture were identified. It is hoped that this will help healthcare professionals to identify gaps in care and provide them with the information to develop their services in the future.

P423
INFLUENCE OF BALNEOPHYSICAL THERAPY ON FUNCTIONAL STATUS OF HAND IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: Rheumatoid arthritis is an inflammatory systemic (organ nonspecific), autoimmune disease of unknown cause with chronic course that leads to progressive destruction of articular and periarticular structures. The aim of this study was to evaluate the influence of balneophysical therapy on functional status of wrists in patients with moderate active rheumatoid arthritis.
Material and Methods: The research included 33 patients: 29 (87.7 %) women and 4 (12.3 %) men, average age 64.78 (ranges 40–81),mean duration of illness was 22.06 years (ranges 8–30). Between October 2010 and February 2013, all the patients were referred for 28 days to the Specialized Hospital for Rehabilitation Bukovicka banja of Arandjelovac. They underwent treatment with mineral peloid therapy (36 °C to 1 h), local baths (35 °C to 20 min), electrotherapy (dyadinamic currents CP3′±LP3′±), magnetotherapy (10 mT, 50 Hz, 30 min), individual kinesiotherapy. The assessment of disease activity was performed at the beginning and after the rehabilitation through the calculating DAS28. Majority of patients (84.92 %) had moderate active disease activity DAS28 (3.2–5.1). Physical therapy was performed 24 days. Statistical analysis was performed by descriptive methods (mean, SD, SE) while significance was tested using Student's t-test.
Results: Results of rehabilitation are objectified following measurements: pain intensity was measured by VAS length in cm. Joint mobility was determined by the patient's ability to form a fist and by the patient's ability to bring the thumb away from the palm as much as possible with following scale: 0-no restriction, 1-low to moderate restriction, 2-severe restriction. Ritchie index was used to assessment of joint tenderness. Grip strength was measured by using a dynamometer.
Conclusion: Balneophysical therapy leads to reduction of pain, improves the joints mobility and the grip strength in patients with moderate active rheumatoid arthritis.

P424
CYP2R1 GENETIC POLYMORPHISMS ARE ASSOCIATED WITH VARIABILITY IN 25-HYDROXYVITAMIN D LEVELS IN THE ELDERLY LEBANESE

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Objective: To study the association between variability in 25(OH) vitamin D levels (25-OHD) and polymorphisms in four single nucleotides (SNP) of CYP2R1 gene, in 250 Lebanese elderly (109 men and 141 women) aged ≥65 years (71.0±4.7), participating in an ongoing randomized controlled trial evaluating the impact of two doses of vitamin D on musculoskeletal outcomes and nonclassical parameters.
Material and Methods: Genotyping was performed for rs12794714, rs10741657, rs1562902, rs10766197 SNPs using Real-Time PCR. Blinded duplicate sample analyses were performed for all assays. 25-OHD levels were measured by chemiluminescent platform Liaison assay DiaSorin.
Results: The mean age was 71.0±4.7 year, mean BMI 30.0±4.5 kg/m^2, mean 25-OHD level 18.4±7.6 ng/ml. Genotype frequencies were in Hardy-Weinberg equilibrium. There was a significant difference in 25-OHD levels between genotypes. For rs10741657 and rs1562902 SNPs, the mutant genotype had the highest levels compared to wild and heterozygous genotypes. Conversely, for rs10766197 SNP, the wild genotype had the highest levels. After adjustment for age, season, gender and BMI, mutant genotype had 25-OHD levels higher by 4.8 and 4.3 ng/ml than wild genotype for rs10741657 SNP and for rs1562902 SNP respectively ($p<0.01$). Conversely, for rs10766197 SNP, mutant and heterozygous genotypes had 25-OHD levels lower by 3.6 and 2.7 ng/ml, respectively, compared to wild genotype ($p<0.01$). Mutant genotype for rs12794714 SNP had levels lower by 3 ng/ml compared to wild genotype ($p=0.02$). Subgroup analyses by gender revealed comparable results for rs10741657 SNP in men and for rs1562902 and rs10766197 SNPs in women.
Conclusion: This study showed a difference in 25-OHD levels between CYP2R1 genotypes that equates a daily supplementation of 200–400 IU vitamin D. This underscores possible genetic causes for the high prevalence of hypovitaminosis D in the Middle East.
Acknowledgements: The study was funded by: Lebanese National Council for Scientific Research, American University of Beirut, and Saint Joseph University.

P425
INCREASED LOW-DENSITY LIPOPROTEIN CHOLESTEROL LEVEL IS ASSOCIATED WITH NONVERTEBRAL FRACTURES IN POSTMENOPAUSAL WOMEN

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Objective: Although a high serum low-density lipoprotein cholesterol (LDL-C) level is an established risk factor for atherosclerosis, it is unclear whether it is associated with osteoporosis. In this study, the associations between the serum LDL-C level and BMD, bone metabolic markers, and the presence of prevalent vertebral or nonvertebral fractures were examined.

Material and Methods: We enrolled 211 postmenopausal women, who were undergoing examination for osteoporosis. Serum levels of total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), LDL-C, triglyceride, Ca, P, Cr, PTH, 25-hydroxyvitamin D {25(OH)D}, N-terminal propeptide of type I collagen (PINP) and C-terminal crosslinked telopeptide of type I collagen (CTX) were measured. The BMD of the lumbar spine and femoral neck was measured using DXA, the presence or absence of morphological vertebral fracture was determined.

Results: Prevalent vertebral and non-vertebral fractures were found in 49 (23.2 %) and 36 (17.1 %) subjects, respectively. Simple regression analyses showed that the serum LDL-C level was not significantly correlated with lumbar or femoral BMD or serum levels of PINP or CTX. Logistic regression analyses adjusted for age and BMI showed that the serum LDL-C level was significantly and positively associated with prevalent nonvertebral fractures [odds ratio 1.50 (1.03–2.18), p=0.034], but not with vertebral fractures. This result was still significant after additional adjustments for bone markers, BMD, serum 25(OH)D, grip strength, tandem gait test, and use of drugs for hyperlipidemia [odds ratio 1.69 (1.11–2.58), p=0.015].

Conclusion: These findings suggest that a high serum LDL-C level may be a risk factor for prevalent non-vertebral fractures independent of bone turnover, bone mass, vitamin D insufficiency, or frail status in postmenopausal women, and that it may be detrimental to bone, as well as blood vessels.

P426
IS BONE STRUCTURE AND BONE TURNOVER OF OESTROGEN DEFICIENT RATS AFFECTED BY DIABETES?

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Objective: Osteoporosis is a common bone disease. Deficiency of 17-β estradiol, caused either by menopause or ovariectomy, results in accelerated bone loss and bone mass decline. Osteopenia is recognized in diabetic patients but there is controversy about its effects on bone remodelling. The degree of bone loss differs between type 1 and type 2 diabetes (1). In some studies, type 2 diabetes has been associated with an increase in BMD in postmenopause women (2). Our aim was to compare the effects of ovariectomy, in bone structure and bone turnover, both in healthy and diabetic type 2 Wistar rats.

Material and Methods: 3 month old rats (n28) were divided into 4 equal groups: control (C); ovariectomized (OV); diabetes mellitus induced by streptozotocin (DM); diabetes mellitus+ovariectomized (DM+OV). Serum glucose, triglycerides (TG), cholesterol, Ca, E2, CTX, and PINP were estimated on day 56 postovariectomy. Body weight and bone vertebral histomorphometry were evaluated. Data were analyzed using Mann-Whitney nonparametric test (statistical significance considered at 0.05 level).

Results: Glucose and TG levels were higher in DM rats (p<0.05). A significant increase in bone turnover was observed in ovariectomized groups (OV & OV+DM) (p<0.05) when compared to C group, but not between DM and C. However the ratio PINP/CTX was higher in DM compared to OV and C group (p<0.05) pointing to an unbalance formation/resorption, favouring formation. A similar trend was observed in OV+DM group. Histomorphometric data were consistent with these results.

Conclusion: Diabetic rats were less prone to bone fragility when exposed to ovariectomy compared to nondiabetic OV rats, which is consistent with studies referring an increase in BMD in type 2 diabetic women with osteoporosis.

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P427
INTERLEUKIN-17, INTERLEUKIN-1BETA, OSTEOPROTEGERIN, SRANKL IN PATHOLOGY OF BONE METABOLISM IN PATIENTS WITH LEŚNIOWSKI-CROHN DISEASE AND ULCERATIVE COLITIS

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Objective: Inflammatory bowel disease (IBD) are pathology related to bone resorption cased osteoporosis. IL-17 induces bone destruction and is strongly mediated by loss of the local RANKL/OPG balance. IL-17 induces proinflammatory cytokines IL-1β and TNF-α and RANKL. IL-17 can synergize with these cytokines (IL-1, TNF-α, and RANKL). IL-1β is stimulator of bone resorption and has been implicated in the pathogenesis of high bone turnover and osteoporosis.
Material and Methods: Evaluation of BMD by DXA, serum concentrations [c] of IL-17, IL-1β, sRANKL and OPG by ELISA in patients with IBD and in control group and evaluation correlation between IL-17, IL-1β and OPG, s-RANKL and BMD.
Results: Group: Leśniowski-Crohn (I:L-C) n=37 mean age 31.7 years SD 8.0, 15 female and 22 male, in ulcerative colitis (II:CU) n=37 mean age 40.6 years SD 15.1 21 female and 16 male and control (III:C) n=37 mean age 29.6 years SD 8.0, 18 female, 19 male. Mean BMD (g/cm2) in group I - L-C in L2-L4: 1.109±0.193 in neck: 0.922±0.202, II-CU in L2-L4: 1.168±0.155 in neck: 0.965±0.160, III-C in L2-L4: 1.224± 0.084 in neck: 1.0859±0.159. Prevalence of osteoporosis and osteopenia in I - L-C - 18.92 % and 32.43 % in L2-L4; 13.51 % and 35.13 % in neck, II - CU - 2.7 % and 37.84 % in L2-L4; 2.7 % and 29.73 % in neck. Mean serum [c] of: IL-17 (pg/ml), IL-1β (pg/ml), OPG (pmol/l), s-RANKL (pmol/l): I - L-C: 7.71±6.77; 0.73±1.18; 8.76±3.22; 284.87±213.05, II -CU: 8.86±7.85; 0.56 v 0.48; 6.02±2.51; 223.81±118.14 III-C: 5.32±2.01; 0.51±1.51; 9.42±2.10; 236.84±111.63. Serum [c] of IL-1β and OPG differ significantly in group I, II, III. Serum [c] of IL-17 correlated negative with OPG in CU group and correlated negative with Z-score L2-L4 in all persons.
Conclusion: Prevalence of osteopenia and osteoporosis in patients with IBD is frequent and IL-17 and IL-1β may decrease BMD by modulation OPG.
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P428
SHOULD PTH SERUM LEVEL IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN BE ROUTINELY EXAMINED?

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Objective: Primary hyperparathyroidism (PHP) is a rare disease. However, its frequency might be underestimated in specific populations, e.g., patients with osteoporosis, nephrolithiasis, some gastrointestinal abnormalities. The aim of this paper was to assess the validity of PTH serum assessment in differential diagnosis in osteoporosis in postmenopausal women, particularly in order to recognize PHP.
Material and Methods: The study group comprised 326 postmenopausal women aged 46–92 (mean 70.5 years) with confirmed osteoporosis (WHO criteria/previous low-energy fracture), treated in osteoporotic outpatient clinic, (Poznan, Poland). Following medical history and physical examination, differential diagnosis in terms of secondary osteoporosis was performed (i.e., serum level of calcium, iPTH, 25-OH- D).
Results: 76 subjects (23.3 % of the whole group) were shown to have serum level of PTH beyond upper range norm (≥65 pg/ml). PHP was further confirmed in seven patients (2 % of the whole group). Secondary hyperparathyroidism (due to malabsorption syndrome and/or kidney disease) was recognized in 63 (19.3 %) patients, osteomalacia in 5 (1.5 %), and Paget's disease in one patient.
Conclusion: Diagnosis of osteoporosis gives a rationale to routinely evaluate serum PTH, as the PHP might be treated causally and therefore complications might be prevented.

P429
CORRELATIONS BETWEEN CLINICAL AND FUNCTIONAL STATUS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: To determine the importance of correlations between clinical parameters and functional disability in patients with rheumatoid arthritis (RA).

Material and Methods: We observed 48 patients with RA during 2 years (RA was diagnosed based on 1987 ACR revised criteria): mean age 46.23; mean disease duration 48.36 months; 79 % from patients are rheumatoid factor positive; functional disabilities were classified based on 1991 ACR Functional Classification. The patients were laboratory evaluated by complete blood count, ESR, CRP and RF. The results were analyzed with the medical statistics programme SPSS.

Results: The most common clinical manifestations were morning stiffness (100 %), hands arthritis (88.6 %) and rheumatoid nodules were on found in 7.5 % of patients; systemic and extra articular manifestations were: underweight (BMI≤20 kg/m^2) (32.5 %), anemia (34.6 %), and thrombocytosis (29.2 %). The functional capacity assessed (HAQ) was significantly determined by disease duration (r 0.680), age (r 0.442), ESR and CRP (r 0.384), age of onset (r 0.324), and rheumatoid factor (r 0.313), respectively.

Conclusion: We concluded that, for our patients, duration of RA, age of patient, ESR, age of onset and rheumatoid factor can be considered as risk factors for functional status in RA.

P430

ANTIOSTEOPOROSIS MEDICATION USE REMAINS LOWAFTER FRACTURE BUT IS RELATED TO SELF PERCEIVED FRACTURE RISK: FINDINGS FROM THE GLOW STUDY

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Objective: Traditionally the use of antiosteoporosis medication (AOM) is low following fracture, with typical reported 1 year compliance rates of 10–30 % in women adhering to therapy at 1 year postfracture. We considered whether a woman's self-perception of her own fracture risk (SPR) might influence the initiation and continued use of AOM, and investigated this using the GLOW study.

Material and Methods: GLOW is an international cohort study involving 723 physician practices across 10 countries in Europe, North America and Australasia. Sixty thousand three hundred ninety-three women aged ≥55 years completed baseline questionnaires detailing medical history, including comorbidities, fractures and SPR, defined as much or a little lower than average; about the same; much or a little higher than average. Annual follow-up determined self-reported incident fractures and AOM use.

Results: Of the 16,491 women with a low baseline SPR, 5,516 (11 %) were taking AOM at baseline while of the 8,389 women with a high SPR, 3,773 (45 %) were taking AOM at baseline. There were 780 incident fractures by 1 year. Women not using AOM at baseline who incurred a fracture were more than twice as likely to start AOM, than women without a fracture. Women already on AOM at baseline exhibited no further increased use after fracture, but usage was already high (83 %, 85 %, and 90 % use at baseline in the 3 risk groups). At 1 year, the proportion of women who had sustained a fracture that started AOM was higher among women with a high SPR compared with those with a low SPR. More women with a high SPR remained on

treatment at 1 year as compared with women with a low SPR, as displayed below.

SPR at baseline	AOM at baseline %	Started AOM in the following year	
		Incident fracture (Persistence after 1 year)	No fracture
Low	11%	13% (83%)	3.2%
High	45%	24% (90%)	11%

Conclusion: While SPR does appear to be associated with AOM uptake, these figures suggest that a low proportion of women who sustain a fracture are commenced on AOM. Our results highlight the need for secondary fracture prevention initiatives.

Disclosures: The authors have the following disclosures: Servier, Shire, Nycomed, Novartis, Amgen, Procter & Gamble, Wyeth, Pfizer, The Alliance for Better Bone Health, Roche, GlaxoSmithKline; Eli Lilly, Merck, Sanofi, Astra Zeneca, Bristol-Myers Squibb, Maxence Pharma, Kyphon, GE Lunar, Orion Pharma.

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P431
EFFECTIVENESS OF REHABILITATION PROGRAM OF THE HAND IN RHEUMATOID ARTHRITIS PATIENTS

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Objective: To verify how the rehabilitation programme can improve the functional status of the hand in rheumatoid arthritis (RA) patients and to assess the clinical and functional evolution of the hand complex in correlation with pain.

Material and Methods: 76 RA patients were complete evaluated (clinical and functional, lab and imagistic assessments). Average age of patients was 43.2 (SD=5.57) and duration of disorder was 7,8 years. All patients performed a complete rehabilitation program (including occupational therapy), twice daily, 5 day/week, 4 weeks and completed the VAS and HAQ scales and Lee index, at the beginning (T1 - time1) and after 4 weeks (T2 - time2).

Results: The median Lee and HAQ values in T2 (Lee index=16.5; HAQ score=18.1) were significantly correlated with the median corresponding scores in T1 ($r=0.887, p<0.001$) (Lee index=14.3; HAQ score=15.1). The presence of ultrasound pathologic aspects of the soft tissues into hypothenar and thenar eminences was significantly correlated with the median VAS and HAQ scores.

Conclusion: The rehabilitation programme in RA is complex and multidisciplinary and it must be initiated as soon as possible. If everyone respects the kinetic principles of the rehabilitation program (including occupational therapy), that are associated with the correct pharmacological treatment, all patients have optimal prehension and adequate quality of life.

P432
FRACTURE PREDICTION IN ECUADORIAN MEN WITH THE FRAX TOOL

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Objective: The FRAX® tool has been widely used in the prediction of osteoporotic fractures. In Ecuador the usefulness of this instrument is unknown. Objectives: To study the utility of FRAX in predicting osteoporotic fractures in a group of Ecuadorian men with type 2 diabetes mellitus.

Material and Methods: We included 207 Ecuadorian men with type 2 diabetes mellitus, aged 50 years, without previous treatment of osteoporosis. Bone density was measured at the femoral neck with DXA (Hologic Discovery W®), and values are expressed as units T-score (T-DOF). The risk of hip fracture (FRAX-FN) and major osteoporotic (FRAX-M) was calculated using the FRAX tool with data generated for the Ecuadorian population (<ahref="http://www.shef.ac.uk/FRAX/tool">www.shef.ac.uk/FRAX/tool.Aspx?Country=3). Treatment and analysis of data was performed using computerized format by using the EPIDAT program v.3.1 for Windows.

Results: Mean age 64.5±8.7 years (range 50–99); BMI 28±4; 51 men had osteopenia, 5 had osteoporosis, and 151 had T-DOF in normal ranges, mean T-DOF -0.61±1.14;mean FRAX-FN 0.18±0.33, mean FRAX-M 0.72±0.5; only 3 men (1.4 %) developed FRAX values >3 % for hip fractures, no male presented FRAX values >20 % for major osteoporotic fractures. The FRAX sensitivity was 25 %, CI (95 %) 0.00–79.93; specificity 99.49 %, CI (95 %) 98.24–100.00. The positive predictive value 50 %, CI (95 %) 0.0–100 and negative predictive value 98.48 %, CI (95 %) 96.53–100.00. The prevalence 2 %, CI (95 %) 0.0–4.19. Using ROC curves, the area under the curve was 0.622, CI (95 %) 0.377–0.867.

Conclusion: According to the FRAX tool, the risk of osteoporotic fractures in this group is low, no male had a positive FRAX for major osteoporotic fractures, and 3 (1.4 %) men had a positive FRAX for hip fractures. The umbral of the FRAX tool for therapeutic intervention and evaluation with DXA has not been established in our population.

P433

OSTEOPOROSIS SCREENING SELF-ASSESSMENT TOOL FOR PREDICTION OF LOW BONE MASS IN ECUADORIAN MEN

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Objective: The score OST [self-assessment Osteoporosis Screening Tool] is a tool to estimate the risk of osteoporosis by means of simple clinical variables. Objectives: To estimate the risk of low bone mass in men by the score OST, as a way of screening for osteoporosis in a group of Ecuadorian men.

Material and Methods: 208 men who attended from 1 June to 30 December 2013 to control their type 2 diabetes in the Teaching Hospital of the National Police No. 2 were included. All were measured BMD at the femoral neck and lumbar spine using DXA (Hologic Discovery W®). The OST score was calculated using the formula: 0.2 × (weight in kg - age in years). OST score of <2 indicated reduced bone mass (osteoporosis + osteopenia) and corresponded to a T-score of ≤−1 (Table 1). We use the T-score of BMD in the femoral neck (T-DOF) as the reference test. The processing and analysis of data was performed using computerized format by using the EPIDAT program v.3.1 for Windows.

Results: The sensitivity OST was 65 %, CI (95 %) 53.92–76.08; specificity 72.6 %, CI (95 %) 64.54–80.77. The positive predictive value 59.77 %, CI (95 %) 48.89–70.65 and negative predictive value 76.86 %, CI (95 %) 68.93–84.79. The prevalence 38.46 %, CI (95 %) 31.61–45.31. Using ROC curves, the area under the curve was 0.68; CI (95 %) 0.62–0.75.

Table 1

Score OST	
Number of patients (n=208)	T-DOF ≤−1 (With osteopenia + osteoporosis)
T-DOF>-1 (Without osteopenia + osteoporosis)	
<2	52
35	
≥2	28
93	

Conclusion: In men 50 years and older, the OST score is easy to identify men at risk for osteoporosis/osteopenia and refer to the DXA method for confirmation. The OST seems to be an excellent method to identify men at high and low risk of osteoporosis.

P434

A META-ANALYSIS OF REFERENCE MARKERS OF BONE TURNOVER FOR PREDICTION OF FRACTURE

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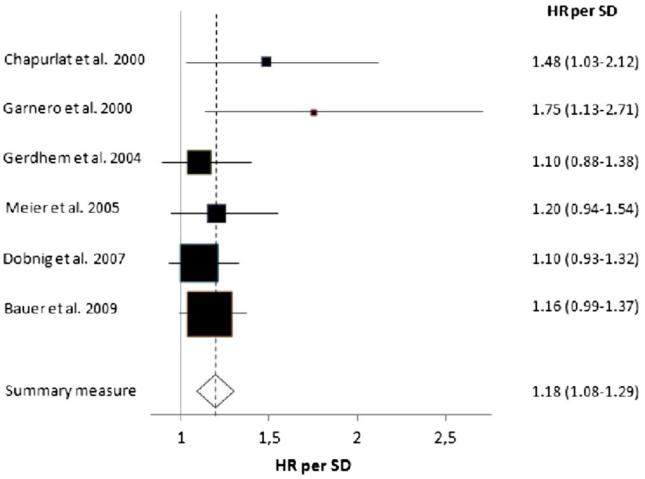
Objective: The IFCC/IOF recently recommended s-PINP and s-CTX as the primary candidates for reference markers of bone turnover. The aim of this report was to summarise the clinical performance of two reference bone turnover markers (BTMs) in the prediction of fracture risk.

Material and Methods: We used an updated systematic review to examine the performance characteristics of s-PINP and s-CTX in fracture risk prediction in untreated individuals in prospective cohort studies. Ten potentially eligible publications were identified and six included in meta-analysis.

Results: There was a significant association between s-PINP and the risk of fracture. The hazard ratio per SD increase in s-PINP (gradient of risk: GR) was 1.23 (95%CI: 1.09–1.39) for men and women combined, unadjusted for BMD. There was also a significant association between s-CTX and risk of fracture, GR 1.18 (95%CI: 1.05–1.34) unadjusted for BMD (Figure). For the outcome of hip fracture, the association between s-CTX and risk of fracture was slightly higher 1.23 (95%CI: 1.04–1.47).



<p style="margin-right:41 pt">Figure. Forest plot for the relationship between s- CTX and fracture risk.

Conclusion: There is a modest but significant association between BTMs and risk of future fractures. Whether this predictive ability remains significant following adjustment for other risk factors is unknown.

P435
EARLY EFFICACY AND SAFETY OF HYALURONIC ACID OF DIFFERENT MOLECULAR WEIGHTS IN KNEE OSTEOARTHRITIS

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Objective: Evaluation the efficacy and safety of intra-articular therapy of hyaluronic acid derivative Rusvisk, "Rusvisk", Russia, MW 3.5 million Da, in comparison with Ostenil, Chemedica, Germany, MW 1.2–1.4 million Da, in reducing symptoms of knee OA.
Material and Methods: 50 patients (25 Rusvisk group and 25 Ostenil group) were included in a randomized, double-blind, parallel-group study and received a course of 3 intra-articular injections. Inclusion criteria: knee OA stage II-III, Lequesne index score ≥ 4 and ≤ 12. Exclusion criteria: OA stage IV; BMI$\geq$35 kg/m^2; inflammatory diseases; trauma target joint history; intra-articular injection of corticosteroids and physical therapy within the last 3 months. The WOMAC index, pain on VAS, an overall assessment of the effectiveness of therapy the patient were evaluated after the end of treatment (4 weeks from first injection) and after 8 and 12 weeks and 6 months after treatment (not presented here).
Results: The intensity of weight-bearing pain VAS after 4 weeks from first injection decreased significantly in both groups: group Rusvisk from 52 mm to 16, group Ostenil from 56 mm to 25 mm. The total WOMAC index decreased in the group Rusvisk 56 %, in the group Ostenil 65 %. Differences between groups were not statistically significant (p=0.59 and 0.63 respectively). In the group Rusvisk answer "much improved" and "improved" gave 21 of the 25 patients, which was higher than in the group receiving Ostenil: 14 of 25 (p=0.003). Tolerability was satisfactory and did not differ significantly between the groups. No case of acute pseudoseptic arthritis was observed.
Conclusion: For short-term observation efficacy and safety of intra-articular therapy intermediate molecular weight hyaluronate is comparable to that of low molecular weight hyaluronate. At the same regimen both reduced the pain intensity at movement and improved functional characteristics.

P436
INCIDENCE OF OSTEOPOROSIS AMONG TWO ENDOGAMOUS POPULATIONS OF INDIA

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Objective: Osteoporosis is a multifactorial disease which is characterized by low bone mass and micro-architectural deterioration of bone tissue with increased susceptibility to fracture. BMD, the net result of bone mass achieved in early adult life and bone loss later in life, is a measurable predictor of bone mass. Both genetic and nongenetic factors are involved in maintenance of bone mass. BMD is one of the major determinant of osteoporotic fracture risk. The present study includes two endogamous populations of East Godavari District of Andhra Pradesh. All subjects were interviewed using a structured schedule and tested for BMD using speed of sound (SOS) at calcaneum by QUS (qualitative ultrasound) method and two endogamous postmenopausal women were compared for incidence of osteoporosis.
Material and Methods: Subjects: The present study was conducted in East Godavari region, Andhra Pradesh, India. For the study, two endogamous populations kapu & koppula velama were tested using SOS at calcaneum by QUS method to determine the BMD. BMD Analysis: Bone mass was assessed by SOS (m/s) at the calcaneus using QUS device. It measures bone mass in the form of T-score which is calculated by using peak speed of sound value for a defined population of young adults, and its standard deviation. Based on T-score values of QUS device subjects were classified in to normal (>−1), osteopenia (−1 to −2. 5) and osteoporosis (<−2.5).
Results: BMD Koppula Velama Kapu
Normal 22 % 5 %
Osteopenia 26 % 39 %
Osteoporosis 51 % 55 %
Conclusion: Among two endogamous populations, koppula velama whose main occupation is agricultural labourer were showing more percentage of normal BMD postmenopausal women when compared with kapu endogamous population.
Acknowledgements: This study was funded by Women Scientist Scheme-A (Wos- A), Department of Science &Technology, Government of India.

P437
SUPPRESSION OF UNDERCARBOXYLATED OSTEOCALCIN BY ALENDRONATE IS ASSOCIATED WITH A TRANSIENT DECREASE OF INSULIN SENSITIVITY AND ADIPONECTIN IN WOMEN WITH OSTEOPOROSIS

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Objective: Undercarboxylated osteocalcin (ucOC), the active form of osteocalcin (OC), promotes insulin sensitivity (IS) and secretion in rodents, whereas its impact on glucose homeostasis in humans needs further clarification. We examined the association of decrease in ucOC levels on IS and adiponectin in osteoporotic women on antiresorptive therapy with alendronate.
Material and Methods: 30 postmenopausal women (mean±SD, aged 68.1±11.4 years, with BMI 26.9±4.4 kg/m^2) with newly diagnosed primary osteoporosis and normal glucose homeostasis had anthropometric measurements and fasting venous blood sample taken for the determination of ucOC, intact OC, blood glucose, insulin, and adiponectin. IS was assessed by glucose to insulin (G/I) ratio. All the measurements were repeated at 6 and 12 months of newly introduced treatment with fixed dose combination alendronate 70 mg plus D3 5,600 IU once weekly tablet.
Results: As expected, ucOC (mean±SD; baseline: 4.0±1.5 ng/mL, 6 months: 2.8±1.4 ng/mL, 12 months: 2.4±1.1 ng/mL; $p<0.001$) and intact OC (baseline: 7.5±3.9 ng/mL, 6 months: 2.6±1.1 ng/mL, 12 months: 2.0±0.8 ng/mL; $p<0.001$) values continuously decreased during treatment intervention. Significant changes in fasting insulin (baseline: 6.9±3.3 mU/L, 6 months: 9.4±3.9 mU/L; $p=0.029$), G/I ratio (median (Q25; Q75); baseline: 0.78 (0.61; 0.95), 6 months: 0.62 (0.50; 0.80); $p=0.032$) and adiponectin (baseline: 16.6 (11.55; 20.15) mg/L, 6 months: 11.39 (6.85; 14.82) mg/L; $p=0.024$) levels were detected only at 6 months, whereas at 12 months the changes from baseline were not significant anymore.
Conclusion: Decreases of ucOC levels caused by alendronate are accompanied with a transient decrease of IS and adiponectin in osteoporotic postmenopausal women with normal glucose homeostasis. Further studies are needed to clarify the escape of glucose metabolism parameters almost back to baseline at 12 months of treatment.

P438
THE INCIDENCE OF A FIRST MAJOR OSTEOPOROTIC FRACTURE IN ICELAND AND IMPLICATIONS FOR FRAX

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Objective: The construct for FRAX models depends on algorithms to adjust for double counting of fracture outcomes in some models, and in others to estimate the incidence of a major fracture from hip fracture rates. The aim of the present study was to test the validity of these algorithms in a large prospective cohort.

Material and Methods: The incidence of hip, clinical spine, distal forearm and humerus fracture was determined in the prospective and ongoing population based Reykjavik Study with follow up of 257,001 person-years. The incidence of a first major fracture was compared with the correction factors used in FRAX to adjust the incidence of several fracture outcomes for double counting. In addition the incidence of a major osteoporotic fracture estimated from the Icelandic hip fracture rates was compared with the Malmo ratios used in FRAX.
Results: The adjustments necessary to account for multiple fracture outcomes were similar to those previously derived from Sweden (Figure). Additionally incidence of a first major osteoporotic fracture was similar to that derived for FRAX models.

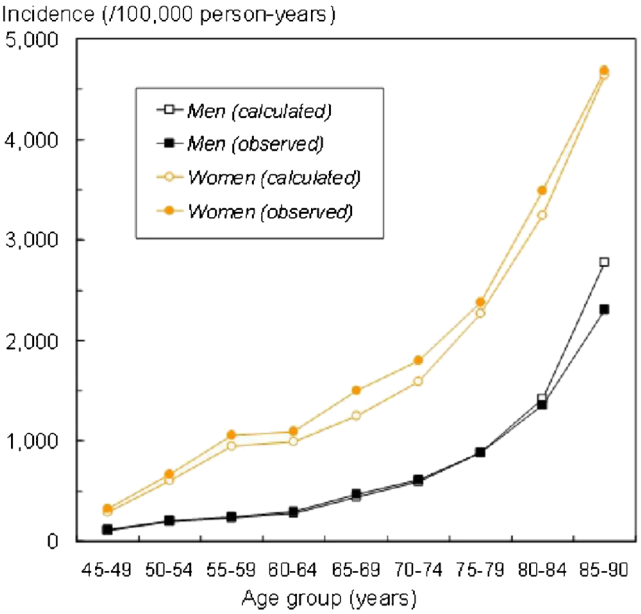

Figure The incidence of a first major osteoporotic fracture (per 100,000 person years), by age and sex observed in the present study and that computed from Malmo.
Conclusion: The findings of the present study support the algorithms used in FRAX to estimate the incidence of a first major fracture and the predictive value of hip fracture for other major fractures.

P439
PRELIMINARY RESULTS FROM A RETROSPECTIVE PILOT DATABASE STUDY IN SWEDEN (SWE) AND NETHERLANDS (NED) TO EXPLORE METHODS FOR COMPARING FRACTURE RATES ACROSS ANTIRESORPTIVE THERAPIES

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Objective: Examine differences in patient (pt) characteristics across antiresorptive therapies; explore methods to adjust for these when comparing fracture rates.
Material and Methods: For women initiating alendronate or risedronate (oral bisphosphonates [OBPs]), or zoledronate (ZOL) in SWE and NED from 2006 to 2011, medication data (SWE prescription register/NED PHARMO data) were linked to death dates, outpatient (SWE only) and inpatient care. Pts were followed for up to 6 years. Pts dispensed both OBP and ZOL were allocated to ZOL and prior OBP use accounted for. Relative fracture risk (ZOL vs. OBP) was measured in crude and adjusted survival models adjusted for pt characteristics, prior fracture, comorbidities, prior osteoporosis (OP) treatment and concomitant therapies. In a second approach, a pt was used as their own control and their fracture risk over the first 90 days of therapy compared with their risk thereafter.
Results: ZOL pts had higher prevalence of prior OP treatment (SWE: 52 % vs. 3 %; NED: 43 % vs. 2 %), and prior fracture (SWE: 24 % vs. 19 %; NED: 9 % vs. 6 %). In SWE, 199 and 2,775 fractures were observed for ZOL and OBPs; in NED, 5 and 898 were observed. Results of Cox proportional hazard models are shown below. Results of other models were similar. In SWE, hip fracture rates for ZOL (based on 24 fractures) were 1.36 pt-years over the first 90 days of therapy and 0.74 thereafter, vs. 1.07 and 1.17 for OBPs.

PROPORTIONAL HAZARD MODEL RESULTS

COUNTRY (N [OBP, ZOL])	MODEL	HR* [95% CI] (ZOL vs. OBP)	P-value
SWEDEN (N=14764, 1196)	Unadjusted	1.35 [1.17, 1.56]	< 0.01
	Adjusted for covariates†	1.13 [0.95, 1.34]	0.16
	Adjusted for propensity scores	1.12 [0.95, 1.34]	0.18
NETHERLANDS (N=25058, 149)	Unadjusted	1.47 [0.61, 3.55]	0.39
	Adjusted for covariates†	1.43 [0.59, 3.50]	0.43
	Adjusted for propensity scores	1.48 [0.60, 3.64]	0.39

CI, confidence interval; HR, hazard ratio; N=Number of incident [OBP, ZOL] users identified; *HR>1 favors OBP; †Adjusted for pt characteristics, prior fracture, co-morbidities, prior OP treatment and concomitant therapies;

Conclusion: Pt characteristics differ between women receiving ZOL and OBPs. In SWE, risk of new fracture was significantly higher for ZOL. The HR remained >1 in adjusted models, likely due to nonavailability of key baseline data, e.g., BMD. The own-control analysis is a promising approach but requires a larger sample.
Disclosures: Amgen/GSK

P440
AN EVALUATION OF THE AGE, GENDER AND ITEM SPECIFICITY OF DIFFICULTY IN PHYSICAL FUNCTIONING

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Objective: The age and gender dependency of symptom experience in the general population has been investigated at the domain level using two modified osteoarthritis (OA) specific PROMs. While domain-level analyses have been informative (Bellamy et al. Inflammopharmacology 2009), we have recently investigated the relationship between age, gender, and self-reported difficulty in performing 69 individual activities of daily living.
Material and Methods: Using the physical function item banks from the WOMAC (n=37) and AUSCAN (n=32) Indices, and removing attribution statements to arthritis, a scannable questionnaire containing health status and demographic questions was developed, pretested and distributed by Australia Post to a random sample of 24,000 members of the Australian general public, generated by the Australian Electoral Commission (AEC). WOMAC and AUSCAN item responses were scaled on 0–10 Numerical Rating Scales [0=none, 10=extreme].
Results: In this analysis, 50th and 75th percentiles for age and gender-specific profiles were estimated, for 32 upper and 37 lower extremity physical function items, based on data from approximately 5,500 respondents. The data indicate that the degree of difficulty in performing physical function activities is gender-specific, varies with age group and differs between items. Lower extremity items such as "squatting", "kneeling", "jumping" and "running" and upper extremity items such as "picking up large heavy objects" are associated with higher degrees of difficulty in the general population.
Conclusion: The observed age-associated differences in physical function profiles for different items, indicate that composite physical function scores and global function scores reflect a complex phenomenon in which different activities of daily living are associated with differing degrees of difficulty for men and women at various stages of life. These observations have important implications for benchmarking health status in OA, particularly in older respondents.

P441
RISEDRONATE FOR PREVENTION OF STEROID INDUCED OSTEOPOROSIS IN RHEUMATOID ARTHRITIS PATIENTS

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Objective: Corticosteroids are widely used to suppress hyperactive inflammation in rheumatoid arthritis (RA). Bone loss is a serious side effect of this therapy. Risedronate is frequently used for prevention and treatment for corticosteroid induced osteoporosis. The objective of this study is to assess the effects of risedronate for the prevention and treatment of corticosteroid induced osteoporosis.

Material and Methods: The study includes 42 RA postmenopausal women aged between 54 and 62 years which require long-term corticosteroid therapy at >5 mg/day prednisolone daily. All RA patients fulfilled the 1987 American College of Rheumatology (ACR) revised criteria for RA. All patients were interviewed and examined for the gathering of information on disease and treatment history. All patients received risedronate (35 mg/week),elemental calcium (1,000 mg/day) and vitamin D (800 U/day) for 12 months. BMD (lumbar spine, hip and whole body) and bone turnover markers (urine deoxypyridinoline, serum osteocalcin) were assessed at baseline, month 6 and month 12. Plain radiographs of the thoracic and lumbar spine for fractures were taken at baseline and month 12. Patients with gastrointestinal disease and neoplasms were excluded.

Results: The duration and dose of prednisolone received by the participants was 18.4±20 months. Osteopenia or osteoporosis (T-scores<−1.0) of the lumbar spine and the hip occurred in 74 % at baseline. The BMI of the participants was 21.9± 2.3 kg/m^2. At month 12, a significant gain in BMD at the lumbar spine (+1.3±2.4 %; p=0.005) and the hip (+1.1± 2.6 %; p=0.01) was observed. No new fracture was reported. 4 patients were withdrawn from the study because non- compliance to treatment (N=3) and adverse events - dyspepsia (N=1).

Conclusion: Risedronate is effective for preventing and treating bone loss at the lumbar spine and femoral neck after 12 months treatment in RA postmenopausal women receiving long-term glucocorticoids.

P442

VALIDATION OF STATISTICAL SHAPE MODELING TO PREDICT HIP OSTEOARTHRITIS IN FEMALES: DATA FROM TWO PROSPECTIVE COHORT STUDIES (CHECK AND CHINGFORD)

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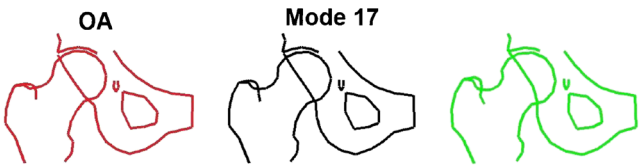
Objective: Statistical shape modeling (SSM), a technique to quantify hip shape, can predict the need for total hip replacement (THR) within a cohort, but the validity of the predictive shape variants between different cohorts is unknown. The aims of this study were to investigate which shape variants can predict the need for THR in women, and to validate the resulting shape variants in the prediction of THR.

Material and Methods: Hip shape on baseline anteroposterior pelvic radiographs was assessed using SSM. Female participants from the CHECK cohort without radiographic OA (K&L<2) at baseline were included (1,100 hips); 22 hips had a THR within 5 years follow-up. For the Chingford cohort, with only female participants, hips without radiographic OA at baseline were selected and a nested case-control design was used, with 19 THR cases within 19 years follow-up and 95 controls matched for age and BMI. The association between each shape variant and THR was calculated by logistic regression.

Results: In the CHECK and Chingford cohorts, the respective mean(SD) age was 55.8(±5.1) and 53.6(±5.4), and BMI 26.14(±4.3) and 25.7(±3.3). Multiple modes of shape variation could predict (p<0.05) the need for THR both in the CHECK cohort (mode 4,11,15,17, and 22) and in the Chingford cohort (mode 2 and 17). However, only mode 17, representing a flattened head-neck junction and flat major trochanter(fig1), could be validated in the Chingford cohort.

Modes associated with THR

CHECK			CHINGFORD		
Mode	OR (95% CI)	p-value	Mode	OR (95% CI)	p-value
4	0.38 (0.20-0.69)	0.002	2	1.61 (1.02-2.54)	0.042
11	2.18 (1.23-3.86)	0.008	17	0.41 (0.23-0.82)	0.010
15	1.66 (1.02-2.68)	0.040			
17	0.51 (0.33-0.80)	0.003			
22	1.90 (1.29-2.78)	0.001			



Conclusion: Several shape variants can predict THR within a cohort. One predictive shape variant in the CHECK cohort could be validated in the Chingford cohort. SSM is not easily transferable between cohorts; reasons may include differences in participant characteristics, radiographic protocol, and follow-up time.

P443

DECLINING HIP FRACTURE RISK IN SWEDEN

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Objective: Secular changes in hip fracture incidence are described in many regions of the world. The objective of this study was to determine long term trends in hip fracture incidence in Sweden.

Material and Methods: The fracture hazard function was estimated between 1987 and 2009 by Poisson regression including the variables sex, age, latitude, population density, and day of the year.

Results: Women contributed 38.4 million person years and 264,362 hip fractures and men 33.3 million person years and 104,888 fractures. In women, there was a minor reduction of the risk with time (Table). For the period 1994–2001, for example, the change in risk corresponded to a reduction of 1.27 years of age. Thus, at the end of the period the hip fracture risk of a lady of the age 81.50 years was the same as the risk of a lady of the age 81.50–1.27=80.23 years 8 years earlier. For men there was an increase of the risk during the period 1987–1993.

Period	Women		Men	
	Annual change (%)	Corresponding age difference (years)	Annual change (%)	Corresponding age difference (years)
1987-1993	-0.6	-0.05	+1.4	+0.81
1994-2001	-1.5	-1.27	-1.1	-0.75
2002-2009	-1.1	-0.83	-0.3	-0.16

Conclusion: There has been a small decrease in the age and sex specific incidence of hip fracture for women since 1987 and in men since 1994.

P444
HYPOVITAMINOSIS D AND TYPE 2 DIABETES MELLITUS IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Objective: To investigate an association between the serum level of 25-hydroxivitamin D (25-OHD) and incidence of type 2 diabetes mellitus (T2DM) in postmenopausal women with osteoporosis (OS).

Material and Methods: Prospective observational study involved 97 postmenopausal Caucasian women with OS: T-score of spine (L1-L4) and hip of 2.5 SD or more below the mean peak bone mass measured by DXA, Hologic Discovery A device and hypovitaminosis D (serum 25-OHD level below 75 nmol/L) who were monitored for 2 years for incidence of T2DM. During that time, once monthly oral dose of ibandronate 150 mg followed by calcium (1,000 mg) and 25-OHD (800 IU) supplementation was administered to all patients with strict instructions for use. Statistical analysis was performed using SPSS ver.12 for Win software package. Logistic regression analysis was used to establish an association and prognostic value of vitamin D to the onset of T2DM. Serum level of 25-OHD was measured using immunochemiluminescence in March and April 2011.

Results: Out of the 97 patients (mean age 51.64±5.86 years, range 36.0–73.0), 21 (21.65 %) were diagnosed with T2DM during the observational period. Increased amounts of 25-OHD significantly reduced the probability of T2DM occurrence ($p<0.05$). Study showed that patients with low levels of vitamin D were more susceptible to being diagnosed with T2DM (OR=0.958). The cut-off value of the vitamin D below which postmenopausal women with OS have a greater chances to develop T2DM using ROC curve was 62.36 nmol/L with sensitivity of 39.5 % and specificity of 90.5 %.

Conclusion: Our study showed that in patients with postmenopausal OS, serum level of 25-OHD has an predictive potential in the onset of T2DM with an increased risk for those with hypovitaminosis D.

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P445
PREOPERATIVE DETECTION OF PARATHYROID ADENOMAS WITH 3T MRI IN PATIENTS WITH HYPERPARATHYROIDISM

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Objective: To assay the role of a fast protocol with a 3T MR unit in the localization of hyperfunctioning parathyroid in order to propose, in the near future, the potential use of MRI as second level imaging technique as alternative or substitute to CT in case of discordant US and 99-Tc sestamibi scans.

Material and Methods: 24 patients (7 M and 17 F) affected by primary hyperparathyroidism with both positive US and Tc-99 sestamibi scan underwent to MR examination with a 3T

unit (Discovery MR750, GE) using a dedicated protocol: T2 IDEAL on three-plane, axial T2 FS BH and axial T1 IDEAL before and after administration of 10 ml of gadolinium. Two radiologists in consensus identified five features suggestive for parathyroid adenomas in controls: homogenous or marbled hyperintense signal on T2 IDEAL or on T2 Breath-Hold; Indian ink artefact on T2 outphase IDEAL; rapid enhancement in post-contrast T1-weighted images. MRI localization of parathyroid adenomas was graded in high (presence of 4–5 features), medium (2–3 features) or low (1 feature) positivity and negativity (no features). All patients with negative MRI exam underwent to a further CT scan.

Results: All parathyroid adenomas were correctly identified in the proper location showed by US and Tc-99 sestamibi scan (100 %). Average lesion size was 14.8×8.7 mm (range 5–33 mm). All the lesions were located in the classical anatomic site. The two radiologist detected hyperintensity of the lesions on T2-weighted sequences in 29/29 cases (100 %); marbled aspect in 23/29 cases (79.3 %); oblong morphology in 26/29 cases (89.7 %), clevage plane between adenomas and thyroid in 23/29 (79.3 %) and rapid enhancement in 9/29 cases (31 %).

Conclusion: This study demonstrates clear localization by MRI of parathyroid adenomas, in most of cases, also in the pre-contrast sequences. It could be of benefit to patients with chronic kidney failure. Therefore we suggest MRI as second level imaging technique as substitute to CT in case of discordant US and 99-Tc sestamibi scans.

P446
VITAMIN D DEFICIENCY: CAUSES AND CONSEQUENCES

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Objective: Vitamin D has an important role in the organism. Adequate levels of vitamin D are essential for the maintenance and preservation of good health. A vitamin D deficiency (vitamin D deficiency syndrome, VDDs) is defined when a patient has a plasma concentration of 25(OH)D of <50 nmol/L. Vitamin D deficiency is considered to be a major cause of occurrence of the pathology in different types of cancer, heart disease, hypertension, autoimmune disease, diabetes, depression, chronic pain, osteoarthritis, osteoporosis, muscle weakness, muscle loss. Vitamin D deficiency is very common among older adults but it is not rare nowadays even among younger people because of the way of life, reduced tannin and bad eating habits.

Material and Methods: 37-year-old female patient was admitted in hospital because of pain in bones, weakness, headache and cough.

Results: In the laboratory examination find anemia (Hgb 10.8 g/L), elevated serum proteins 84 g/L without hypoalbuminemia, with elevated IgA 28.02 g/L and the restriction of IgM and IgG. There's not found kidney and liver disease, the entire electrolyte status is regular, only higher serum values for C-reactive protein 2.40 mg/L and sedimentation SE 80 mm/h. On CT scans of the thorax were found enlarged lymphatic glands. In myelogram was found 30 % plasma cells. Electrophoresis of serum proteins found in the β2 zone paraprotein 30.5 g/l and immunofixation of serum proteins IgA monoclonal lambda type chains was found. Bence-Jones protein are negative, β-2 microglobulin 1.47 mg/l. On X-rays were not found changes in the bone structure of the skull, pelvis and spine that indicate underlying disease. Bone marrow biopsies performed with the IHC, which indicates the monoclonal plasma cell infiltration from about 40 %, thus confirming the diagnosis of multiple myeloma. Bone mineral loss evaluated by DXA on lumbar (BMD 0.894 g/cm^2; Z-score -1.2SD) with greater loss on femoral neck (BMD 0.718 g/cm^2; Z-score -1.0SD). Low bone mass is the result of vitamin D deficiency (25OHD3 7.50 nmol/L) with relative hyperparathyroidism 69.56 pg/ml, but with normal range of β-crosslaps 0.450 ng/ml.

Conclusion: This report highlights a causes and consequences of vitamin D deficiency in multiple myeloma. Since vitamin D deficiency is a widespread public health issue linked to cancer and other health risks, healthcare providers should not ignore this condition. Therefore, evaluation of vitamin D levels and vitamin D supplementation especially in younger population should be taken into consideration, promoting bone health and potentially reducing cancer risks.

P447
HOW WELL DOES SELF-PERCEPTION OF FRACTURE RISK RELATE TO FRACTURE PROBABILITY USING FRAX? FINDINGS FROM THE GLOW STUDY

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Objective: Among women participating in Global Longitudinal study of Osteoporosis in Women (GLOW), increased self-perceived fracture risk is associated with incident fracture rates. Here we investigate how self-perception of risk (SPR) in this group aligns with risk as assessed in fracture prediction tools such as FRAX.

Material and Methods: GLOW is an international cohort study involving 723 physician practices across 10 countries in Europe, North America and Australasia. Sixty thousand three hundred ninety-three women aged ≥55 years completed baseline questionnaires detailing medical history, including co-morbidities, fractures and self-perceived fracture risk, defined as much or a little lower than average; about the same; much or a little higher than average. Annual follow-up determined self-reported incident fractures. We calculated FRAX risk without BMD measurement.

Results: Of the 27,623 women with complete follow-up data, 1,625 (5.9 %) sustained an incident major fracture over 5 years of follow-up. Table 1 below shows how SPR and FRAX risk aligned. In a model containing both FRAX risk and SPR both were significant ($p<0.0001$).

	Low FRAX risk N (%) annual fx incidence HR (95% CI)	Medium FRAX risk N (%) Annual fx incidence HR (95% CI)	High FRAX risk N (%) Annual fx incidence HR (95% CI)
Self perceived fracture risk – much or a little lower	4942 (18) 1.3% 1.00	3792 (14) 1.7% 1.30 (1.05 – 1.60)	1585 (5.7) 2.8% 2.31 (1.84 – 2.90)
About the same	6289 (23) 1.4% 1.00	4355 (16) 2.1% 1.56 (1.31 – 1.86)	2205 (8.0) 3.4% 2.56 (2.13 – 3.08)
Much or a little higher	1521 (5.5) 2.1% 1.00	1648 (6.0) 3.4% 1.64 (1.26 – 2.14)	1286 (4.7) 5.7% 2.89 (2.24 – 3.72)

Conclusion: These observational data suggest that SPR offers a further contribution to fracture prediction, independent of fracture prediction algorithms such as FRAX.

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P448
IS THERE ANY NEUROPATHIC COMPONENT OF PAIN IN KNEE OSTEOARTHRITIS?

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Objective: Osteoarthritis(OA)-related pain has long been considered as nociceptive pain caused by local tissue injury. In recent data suggest that people with OA can experience pain due to not only nociceptive also neuropathic mechanisms. Our objective was to investigate the existence of a neuropathic component to the pain of OA knee using the neuropathic pain (NP) questionnaires.

Material and Methods: 71 patients with knee OA were evaluated in this study. Data on sociodemographic factors, pain scores using VAS, WOMAC, Lequesne Index, Neuropathic Pain Diagnostic Questionnaire (DN4), severity of OA using the Kellgren- Lawrence (KL) system scored by radiologist were obtained and evaluated DN4 scores and correlations with other parameters.

Results: Our study identified 26.8 % of our knee OA patients as likely to have NP. DN4 score was significantly correlated with Lequesne ($p=0.01$) and WOMAC ($p=0.001$) pain severity. Compared with DN4, there was positive correlation with

KL grade and VAS score but the correlations were not significant.

Conclusion: DN4 scores identified one quarter of patients with knee OA pain as NP. This is important rate to consider existence of NP and identification of neuropathic component in coming days may lead to new treatment strategies of knee OA.

P449

A PARATHYROID CELL LINE WITH STABLE EXPRESSION OF CASR AND PTH GENES

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Objective: To stably overexpress calcium-sensing receptor (CaSR) and PTH genes in a rat parathyroid cell line named PTH-C1 and to study the role of CaSR in parathyroid tumourigenesis.

Material and Methods: CaSR and PTH genes were inserted in two separate pcDNA3.1/Zeo(+) plasmid expression vectors and cells were subsequently transfected. Stably transfected cells were selected with zeocin and were cloned by serial dilutions afterwards. Stable integration of CaSR and PTH genes at mRNA and protein level was verified by PCR and immunocytochemistry, respectively. Study of cell proliferation was performed at 1,2 mM calcium (Ca^{2+}), with growth curves, by direct cell counting of growth plates in a LSM510META Microscope every day, during 4–5 days.

Results: Transfection allowed obtaining: 2 clones stably overexpressing CaSR gene, 4 clones stably overexpressing both CaSR and PTH genes and 9 clones stably overexpressing PTH gene. PCR results showed stable integration of CaSR and PTH genes at mRNA level. Immunocytochemistry allowed to confirm CaSR and PTH expression at protein level. Study of cell proliferation showed a statistical significant higher population doubling time for one of the clones stably transfected with CaSR gene, named clone B6, when compared with the non-transfected PTH-C1 cells, which have low endogenous expression of CaSR and PTH genes.

Conclusion: CaSR and PTH genes were successfully stably transfected in PTH-C1 cell line. Both genes are expressed at mRNA and protein level and population doubling times of the clones were determined with growth curves at 1.2 mM Ca^{2+}. The higher population doubling time showed by clone B6, with stable overexpression of CaSR gene, could support a role for CaSR in inhibiting PTH-C1 cell proliferation, as seen in normal parathyroid glands. Obtained results indicate that PTH-C1 stably transfected clones can be a good model to study parathyroid gland physiology and pathology.

P450

HEALTH CARE RELATED NEEDS 36 MONTHS AFTER VERTEBRAL AND DISTAL FOREARM FRACTURE: RESULTS FROM ICUROS IN LITHUANIA

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Objective: To evaluate the changes of health care related needs in 36 months after clinical vertebral and distal forearm fracture.

Material and Methods: Patients aged 50 years and older, with vertebral fracture (VFx) or distal forearm fracture (FFx) enrolled and observed for 18 months in the International Costs and Utilities Related to Osteoporotic fractures Study (ICUROS) in Lithuania, were further interviewed in 24 and 36 months after the fracture. In this study, visits to health care specialists due to the fracture were analyzed. Exclusion criteria were: other fractures or conditions, which could significantly change the health status. The McNemar test was used to compare dichotomous variables between time periods. The chi-square test was used to determine p-value between groups.

Results: In total, 256 persons were included in this study: 65 subjects with VFx (51 women and 14 men) and 191 subjects with FFx (179 women and 12 men). The age did not differ significantly between the groups ($p=0.346$). Our results showed that 29.9 % of patients with FFx and 60.3 % of patients with VFx were hospitalized in connection to the fracture. In all patients an x-ray was used. Just after the fracture, surgery was performed in 17.1 % of patient with forearm fracture and in 2.2 % of patients with VFx; 2.9 % of patients with FFx underwent the repeated surgery during the following 5–12 months. During the first year after fracture, the health care specialists were visited more frequently, than during the second and third years ($p<0.001$), in both groups. During 25–36 months, GPs were visited more frequently by patients with FFx than patients with VFx (35.9 % and 14.4 %, respectively). In average, more physiotherapy procedures per patient were performed in the cases of VFx comparing to FFx ($p<0.001$). 36 months after the FFx, the procedures of occupational therapy were still needed in 1.6 % of patients.

Conclusion: There is still a need of fracture related health care during the third year after a vertebral or a distal forearm fracture.

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DEFINING A MUSCULOSKELETAL FOOT AND ANKLE ASSESSMENT PROTOCOL TO BE USED WITHIN THE INVESTIGATION OF LOWER LIMB OSTEOARTHRITIS: RESULTS OF AN INTERNATIONAL CONSENSUS STATEMENT

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Objective: The focus of evidence of knee and hip osteoarthritis is such that we now have a good understanding of pathology, mechanisms and cost effectiveness of interventions. However such evidence for foot and ankle osteoarthritis is lacking. An absence of agreement for the ideal methods of assessing the physical musculoskeletal status of the foot and ankle is a fundamental limitation for clinical investigations. The objective of this study was to define a core set of standard clinical foot and ankle measures to be used within clinical investigations.

Material and Methods: An expert derived core set of musculoskeletal foot and ankle measures was developed using an evidence driven approach via: 1) A systematic literature review to identify and evaluate current foot and ankle musculoskeletal assessments 2) A Delphi exercise, including international foot and ankle experts from a variety of professions, to gain consensus on foot and ankle assessment measures to include in a protocol 3) An expert meeting to ascertain future research agendas 4) Strength of recommendation values for each agreed measure.

Results: Systematic review: There was an absence of agreement for current foot and ankle assessment measures, with considerable variation in reliability and a lack of robust validity testing. Delphi: Via four rounds of a Delphi exercise, 20 foot and ankle assessment measures were identified. Expert meeting: Agreement was made that the set of measures should be used for clinical and research screening purposes. Strength of recommendation: Clinical and research strength of recommendation values were established for each measure. Scores were consistently wide and predominantly higher for clinical than research use.

Conclusion: The results of the study form the first stage in a process towards developing a novel musculoskeletal foot and ankle assessment tool applicable for both clinical and research purposes. Future work is required to validate these measures against outcomes of disease severity, pain and function.

P452
GENOME-WIDE ASSOCIATION STUDY OF OSTEOARTHRITIS IN A GREEK (THESSALY) POPULATION OF 399 INDIVIDUALS

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Objective: Osteoarthritis (OA) is known to be caused by both environmental and genetic factors, and there have been several large-scale genome-wide association studies (GWAS) [1,2,3,4] aiming to detect gene targets to be used for either susceptibility identification or treatment. The current study focuses on identifying OA-associated single nucleotide polymorphisms and their respective genes, in the Greek (mostly Thessaly) population, by studying a cohort of 399 individuals, whose family history and medical records are available.

Material and Methods: The genotyping platforms used were the Affymetrix Human Mapping 250K Nsp Array, and the Affymetrix Genome-Wide Human SNP Array 6.0. The odds ratio (OR) statistical test was used to detect and evaluate statistically significant polymorphisms between the OA and control samples.

Results: The SNPs with the strongest observed OA association were rs8713 (CAV1, OR=0.38, $p=3.4\times10^{-6}$), rs3213031 (CDK1, OR=0.33, $p=2.5\times10^{-6}$), rs5968981 (DACH2, OR=5.35, $p=4.2\times10^{-6}$) and rs10501580 (DLG2, OR=2.84, $p=7.8\times10^{-6}$).

Conclusion: Based on other detected significant polymorphisms, as well as support from literature[5,6], we are currently focusing our research in genes CAV1, TGF-a, DOCK, and RHOCK1 which are currently being validated via biochemical and immunohistochemical methods and proteomics analysis.

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P453
THE BENEFITS OF STRETCHING IN THE TREATMENT OF OSTEOPOROSIS

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Objective: Osteoporosis is one of the most common metabolic bone disease, is responsible for a high percentage of all fractures occur. Physical therapy is important in both the prevention and treatment of osteoporosis. Bone forming activity is stimulated by muscle tension through a mechanism still unknown. Prolonged inactivity is a leading cause muscle atrophy and bone loss. Statistics show that women who did aerobic exercise is quite had higher bone mass than those who practiced only walking as physical activity.
Material and Methods: We included a total of 26 women aged between 58 and 72 years, diagnosed with osteoporosis, T-score between −2.5 and −2.8 being. Patients were divided into two groups. We conducted four assessments of pain using VAS score initially 2 weeks of initiating treatment, at 6 months and 1 year, when he again led the T-score. Treatment was followed by anti-resorptive patients with physiotherapy. Group I followed a special training with stretching torso and legs twice a week throughout the study, and the second group continued normal living arrangements.
Results: T score: media group I was −2.68 initially, after 1 year the average reaches −2.33 , group II: mean of −2.89 −2.91 reach.
Conclusion: The results are as expected, in the case of patients undergoing complex treatment, both medical and physical training T-score values corresponding condition improves.
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P454
EFFICACY OF TERIPARATIDE ON THE RISK OF VERTEBRAL FRACTURE AND THE INTERACTION WITH FRAX

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Objective: Teriparatide has been shown to significantly decrease the risk of vertebral fractures in Japanese patients with osteoporosis. The aim of this study was to evaluate the efficacy of teriparatide on fracture outcomes as a function of fracture risk.
Material and Methods: The phase III study was a double-blind, placebo-controlled randomized, 72 week study that enrolled 542 Japanese men and women aged 65–95 years with a prevalent vertebral fracture and low BMD. The active arm of the study received weekly sc injections of teriparatide 56.5 μg and the effect on morphometric vertebral fracture was compared with placebo. The relationship between 10-year fracture probabilities (FRAX) and efficacy was examined by an extension of Poisson regression.
Results: 44 incident vertebral fractures occurred during a follow up of up to 72 weeks. Overall, teriparatide was associated with a significant decrease in incident morphometric vertebral fractures compared to placebo (hazard ratio HR= 0.21; 95%CI=0.09–0.48). Baseline 10 year probability of a major osteoporosis fracture (FRAX) calculated without BMD was available in all individuals, mean age 75 years. For FRAX without BMD there was no significant interaction with the effect of the treatment (p= 0.28). 346 (64 %) participants had FRAX calculated with BMD and there was a small but significant interaction (p=0.028) between efficacy and baseline fracture probability. For example, at the 25th percentile of FRAX probability calculated without BMD, teriparatide was associated with a HR of 0.13 (95%CI=0.03–0.49) for vertebral fractures and for the 75th percentile it was 0.29 (95%CI=0.11–0.73). The corresponding HR for FRAX with BMD was 0.05 (95%CI=0.01–0.37) and 0.21 (95%CI=0.06–0.72).
Conclusion: Weekly teriparatide significantly decreased the risk of morphometric vertebral fractures. Overall, the efficacy of weekly teriparatide was not significantly dependent on the level of fracture risk assessed by FRAX calculated without BMD.

P455
OSTEOPOROSIS IN PATIENTS WITH RHEUMATOID ARTHRITIS: METHOTREXATE COMPARED WITH LEFLUNOMIDE TREATMENT ALONE

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Objective: To examine the effect of methotrexate (MTX) compared with leflunomide (LF) on bone loss in patients with rheumatoid arthritis (RA) in a randomised study design.
Material and Methods: All 40 patients with RA (20 patients in each treatment group) had active RA. BMD was assessed at the hand, lumbar spine (L2-4) and hip by DXA at baseline and 12 months' follow-up. Clinical data were collected at regular visits.
Results: Demographics showed: mean (SD) age 48.4 (16.3) years, BMI 24.9 (5.1) kg/m^2, and median (range) disease duration 3.2 (0.1–5.0) years. BMD loss was significantly reduced in the MTX group compared with the LF group at the femoral neck (−0.42 % vs. −3.12 %, $p=0.01$), total hip (−0.31 % vs. −3.02 %, $p=0.02$) and spine (−0.63 % vs. −2.56 %, $p=0.01$), but not at the hand (−2.1 % vs. −2.3 %, $p=0.76$). Measures of disease process and joint damage were found to be independently associated with bone loss. At the end of the study mean BMD was reduced by −2.2 % at the femoral neck, −1.1 % at the total hip, and −1.0 % at the spine L2-4 in both groups. In subgroups BMD increased in patients treated with bisphosphonates (femoral neck +1.6 %, total hip +3.2 %, spine L2-4 +4.5 %), whereas BMD decreased at all sites in patients not treated with antirersorptive treatment, both for users MTX (femoral neck −4.4 %, total hip −2.4 %, spine L2-4 −2.1 %) or LF (femoral neck −4.2 %, total hip −2.6 %, spine L2-4 −2.4 %).
Conclusion: This study provides strong evidence of a causal link between DMARD therapy and bone loss in RA. LF induce more expressive osteoporosis from the very beginning of the treatment in comparison with MTX, but in time, after 9 months the osteoporosis was expressed the same in both groups.

P456
CORRELATIONS OF FRAX SCORE WITH PAIN SCORE

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Objective: BMD measured at the spine and hip using a device DPX-α, which cause T-score on DXA osteoporosis is defined when T-score at least 2.5 SDs below the young adult and values between −1 and −2.5 is increased in osteopenia. Aim of the study was to track the correlation of pain with fracture risk in patients with osteoporosis and osteopenia.
Material and Methods: We included a total of 20 women, aged between 50 and 65 years, with a mean age of 63 years, diagnosed with osteoporosis. Average T-score (determined by DXA machine) was −2.8. Based on height, weight, age, calculated FRAX score. We conducted two evaluations at baseline and at 1 year after treatment initiation complex, antiresorptive and therapist.
Results: The first evaluation: The mean VAS score was 48, the average major FRAX fracture was 13. At the second evaluation after 1 year, the average VAS values were 39, and the average value of fracture risk for major fractures was 12.
Conclusion: The results are as expected, in the case of patients undergoing complex treatment, both medical and physical training properly illness, pain values to decrease in parallel with the decrease in fracture risk.

P457
THERAPEUTIC MEASURES TO IMPROVE QUALITY OF LIFE IN PATIENTS WITH OSTEOPOROSIS

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Objective: To evaluate the effectiveness of balneo-kineto therapy in improving the quality of life in patients with osteoporosis type I.
Material and Methods: We conducted a prospective study using a sample of 53 female patients, aged between 56 and 64 years old diagnosed with osteoporosis type I, divided into two groups. Group I consists of 23 patients with a mean age of 61.32 years old. Group II consists of 30 patients with a mean age of 58.69 years old. The monitoring was carried out over a period of 1 year. Patients received a treatment based on specific kinetic and balneo-kinetic therapy means specific from Felix Spa Resort in Romania, combined with drug therapy. We evaluated the quality of life by applying standardized questionnaire Qualeffo-41. We also apply tests the highlight the diminishing functionality of legs, an important factor in falls (Tandem Standing, Up & Go, Chair Rising Test).
Results: Outcomes assessed before and at the end of the monitoring showed improvement of the scores that reach statistical borderline significance ($p\leq0.05$) at the motivated group to perform physical therapy. Benefits of regularly practiced exercise are associated with weight loss. There is a great receptivity and efficiency in the elderly, proving the undeniable value of complex functional recovery as a possibility of maintaining, strengthening or developing the remaining functionality.
Conclusion: Physical exercises, especially those with loading and resistance, have a beneficial effect on quality of life contributing among other factors to the prevention of worsening of osteoporosis and falls, especially in elderly women. External cure with oligo-thermal spa water influences body reactivity and the positive state of mind that the patient feels due to natural factors of therapy and contributes to the reaching of the proposed therapy objectives.

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P458
NORMOCALCEMIC PRIMARY HYPERPARATHYROIDISM: BMD GAIN AT THE INDIVIDUAL PATIENT LEVEL AFTER PARAT HYROIDECTOMY

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Objective: To assess BMD gains after parathyroidectomy (PTX) in normocalcemic primary hyperparathyroidism (PHPT) at the individual level and to identify predictors of BMD gain after PTX in this context.
Material and Methods: Longitudinal cohort study of 55 PHPT patients referred for low bone mass and mild abnormalities of calcium/phosphorus metabolism, and successfully treated by PTX. BMD was assessed at the spine, hip and forearm before and 1 year after PTX using QDR 4500 (Hologic). To determine the impact of PTX on BMD at the individual level, the mean difference between pre and post-PTX BMD values was calculated (g/cm^2). BMD gain at 1 year was considered significant if ≥0.030 g/cm^2 at one site or more, without any equivalent BMD loss at another site. A logistic regression analysis was performed to identify predictive factors of individual gain.
Results: Among the 55 PHPT included, 36 patients with normocalcemic PHPT, defined by normal pre-PTX serum total (albumin-corrected) calcium (tCa), were identified. At 1 year of PTX, an individual gain was observed in 44.4 % of normocalcemic patients. In univariate analysis, PHPT patients with a significant BMD gain were more likely to have lower pre-PTX eGFR (72.8±18.6 vs. 79.9±13.4 ml/min/1.73 m^2, p=0.02), tended to have higher pre-PTX alkaline phosphatase activity (ALP) (79.1±30.7 vs. 65.1±23.1 UI/l, p=0.06), and higher pre-PTX serum tCa (2.56±0.14 vs. 2.51±0.12 mmol/l, p=0.07). Multivariate analysis revealed that ALP levels above median were predictive of BMD gain, both in the overall cohort (OR=4.9, 95%CI 1.3–18.9), and in the normocalcemic group: OR=8.4, 95%CI 1.4–56.6. No association was identified with any other pre-PTX characteristic.
Conclusion: Successful PTX is followed at 1 year by a significant individual BMD gain in nearly half of normocalcemic PHPT patients with osteoporosis. ALP levels above median may contribute to the therapeutic decision in this context.

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RISK FRACTURE TOOLS IN ELDERLY POPULATION: A MISSED OPPORTUNITY FOR TREATMENT?

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Objective: To assess the reliability of 2 common risk scales (FRAX index, QFracture) for the evaluation of patients with no previous treatment for osteoporosis admitted in an orthogeriatric unit with a major osteoporotic fracture. Would they have received treatment with an assessment made the day before the fracture? Would they have been treated using these same scales 10 years ago?
Material and Methods: Retrospective epidemiological study of patients admitted in an Orthogeriatric Unit with major osteoporotic fracture (Jul 2013-Jan 2014). Statistical analysis SPSS 15.0.
Results: 106 patients (women 79.2 %, mean age 85.21) with major osteoporotic fracture (pertrochanteric 53.8 %, subcapital hip fracture 34 %, others 11.2 %). No previous osteoporosis treatment: 100 %. Ten years ago (valid n=105): according to FRAX for major fractures, 56.6 % of women and 9.1 % of men from our sample should have received treatment; according to FRAX for hip fracture, 67.5 % of women and 45.5 % of men should have been treated. Regarding QFracture global risk for women, 59 % of them should have been treated (for men 73.3 %) Regarding QFracture hip fracture risk, 60.2 % of women and 81.8 % of men should have received treatment. Nowadays, with the same scales for the suitable population (26 patients excluded due to age over 91 years), should have been treated: 83.9 % of women, 18.8 % of men (FRAX major fracture); 87.3 % of women, 75 % of men (FRAX hip); 95.2 % of women, 100 % of men (QFracture global); 100 % of women and men (QFracture hip).
Conclusion: 1. Risk fracture assessment tools are a highly effective method for detecting people with osteoporosis at risk that should have been received treatment.
2. Ten years ago, near 2/3 of our patients would have been treated. The day before the fracture, between 70.5 and 91.1 % of our global sample would have received pharmacological therapy.

3. In global terms for elderly men of our sample, QFracture seems to be more suitable for the detection of osteoporosis that should be treated without further additional tests.

P460

OSTEOPOROSIS IN MEN: HOW TO TREAT?

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Objective: Our research studied 205 male patients (aged 40–70) with osteoporosis who have been on strontium ranelate treatment for 3 years, with the standard scheme—daily 2.0 mg Ca and D3 with combined drugs. Osteoporosis was diagnosed through X-ray densitometry method (Hologic-100).

Material and Methods: On selecting strontium ranelate as a basic medication, its pathogenesis, its anabolic effect on osteoblasts and an antiresorptive effect caused by influencing on RANKL in OPG conditions; BMD basic index was also considered in the studied category. Despite the clinical form of the disease, average index of T- criteria in spinal ribs and hip fluctuated between 2.5 SD and 2.7 SD, which is more likely to be related to the empirically higher peek bone mass index in males. In 68 cases out of 205 patients, hypogonadotropic hypogonadism was verified; 52 patients were with thyroid gland diseases; 48 patients with diabetes mellitus; 37 patients with rheumatoid arthritis.

Results: As a result of densitometric study after 3 year treatment, it was established that: 1) BMD in the treated patients increased, in 62 % of cases reaching 7.2 % in hip proximal part, while it was 4.8 % in 51 % of patients. Bone increase was identified in spinal ribs. 2) Our data proves that besides antiosteoporotic effect, strontium ranelate has analgesic effect too which was identified in 70 % of patients. 3) All patients underwent the treatment well, without possible undesirable complications.

Conclusion: The positive treatment effect of strontium ranelate among the osteoporotic men, and perfect tolerability, proves that strontium ranelate has priority effect and can be selected as a basic medication for treatment of male osteoporosis.

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SUBSTANTIAL INCREASES IN FEMORAL BMD AND STRENGTH IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS AFTER A LOCAL OSTEO-ENHANCEMENT PROCEDURE

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Objective: The economic and clinical burden of osteoporosis is large and growing. We evaluated the effects on BMD and bone strength of a novel local osteo- enhancement procedure with a synthetic bone graft substitute injected into the proximal femur of osteoporotic patients. Adverse events were tracked.

Material and Methods: In this prospective, single-cohort pilot study, 12 postmenopausal women with osteoporosis (DXA T-score≤−2.5 at femoral neck or total hip) received unilateral injections of the graft material in the left femoral neck, their noninjected right hip serving as a pairwise control. All patients were maintained on their current osteoporosis treatments. Femoral BMD was measured at baseline and at 1, 6, 12, 18, and 24 week and 12, 18, and 24 months postinjection. Femoral strength was estimated by nonlinear finite element analysis (FEA) conducted on quantitative CT scans taken preoperatively and 12 and 24 week post injection (performed by O.N. Diagnostics, Berkeley, CA). The study was IRB- approved; subjects gave written informed consent.

Results: Baseline BMD of treated and control hips did not differ. At 12 months, the graft material had been substantially resorbed as observed on both X-ray and CT. Median (range) changes from baseline in femoral neck BMD were 67.1 %(38.0, 95.3) and −2.3 %(−8.5, 8.5) in the treated and control hips, respectively, at 12 months ($P<0.01$), and were maintained at 62.4 %(18.0, 94.6) and −2.2 %(−8.4, 10.8) at 24 months ($P<0.01$). Consistent with these changes, mean (±SD) FEA-estimated femoral strength of treated hips in fall loading increased 69.0±29.0 % and 60.7±30.2 % from baseline at 12 and 24 weeks, respectively ($P<0.05$). No serious procedure-related adverse events were reported.

Conclusion: Osteoporotic patients treated with a novel local osteo-enhancement procedure demonstrated substantial increases in DXA-measured hip BMD and FEA- estimated femoral strength. Given these results and the favorable safety profile, further evaluation of the effects of this novel procedure is warranted.

Disclosures: This study was sponsored by Wright Medical Technology. B.M. Huber: Consultant with Equity Interest and/or Stock Options and/or Research Grant (AgNovos Healthcare and Conformis); Consultant (Videoscope, Covidien, and Arthrocare); Research Grant (Stryker). M.L. Bouxsein: Consultant (AgNovos Healthcare). T.M. Keaveny: Equity Interest (O.N. Diagnostics); Consultant (AgNovos Healthcare, Merck, Amgen, O.N. Diagnostics). J.G. Howe: Company Employee and Equity Interest (AgNovos Healthcare).

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FEMORAL CORTICAL INDEX AS A SPY OF BONE FRAGILITY IN PATIENTS WITH HIP FRACTURE

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Objective: The femoral cortical index (FCI) uses the ratio between the diameter of the femoral shaft and the thickness of the cortical bone calculated 10 cm distal to the small trochanter in an AP view X-Ray of the femur. Aim of our study is to evaluate a possible association among low values of FCI, risk factors, comorbidities and serum 25-hydroxyvitamin D levels and to establish the importance of FCI as a potential predictor of a new fracture.
Material and Methods: We conducted a retrospective study on 160 consecutive patients (44 men and 116 women, range 60–103 ya) surgically treated for hip fractures in 2012. FCI has been calculated by routine clinical radiographs of the pelvis both on fractured femur and on the opposite side. For each patient, we analyzed the presence of comorbidities (such as diabetes, hypertension, IRC, rheumatoid arthritis),osteoporosis risk factors and blood levels of vitamin D, usually evaluated in our patients with fragility fractures.
Results: Average values of FCI were 0.42 (range 0.18–0.58) at the fractured femur and 0.48 at the opposite side (range 0.25–0.66) with a statistically significant difference (p= 0.002). At the fractured side an average value of 0.45 was found in men, and of 0.40 in women. Patients with severe hypovitaminosis D (serum concentration <12 ng/ml) had a minor FCI compared to those with a moderate deficiency (0.41 vs. 0.46, P<0.01). The presence of comorbidities or osteoporosis risk factors had a different influence on the values of FCI.
Conclusion: In our study, we found a correlation among low values of FCI, clinical factors related to bone fragility and severe hypovitaminosis D in elderly patients with hip fractures. As described in the literature regard DXA limitations in elderly, FCI could be an useful tool in terms of bone fragility evaluation and fracture risk prediction. As osteoporosis causes a cortical bone trabecolarization that leads to fracture, FCI can therefore give a measure of specific cortical bone at low cost using a X-ray standard examination.

P463

EFFECTS OF TRAINING AND SEDENTARISM ON BONES OF OVARIECTOMIZED RATS

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Objective: To evaluate the effects of treadmill training on BMD and mechanical properties of bone from ovariectomized rats.
Material and Methods: 40 female Wistar rats were divided into 4 groups: OVXS: ovariectomized rats and sedentary; OVXE: ovariectomized rats with training; SHAMS: rats submitted sham surgery and sedentary; and SHAME: rats submitted sham surgery with training. The ovariectomy and sham surgery with expose of ovaries were performed bilaterally. After surgery the animals in the sedentary groups were placed individually in plastic boxes with limited space, with the aim of reducing their movement, making them sedentary. The animals in groups (OVXE and SHAME) underwent treadmill training. The initial phase of adaptation was 2 weeks and a phase of gradual evolution speed to be achieved the speed of 17 m/min lasting 60 min. The training was conducted 5 day/week. After 12 weeks the animals were euthanized. The femurs were dissected, cleaned of soft tissues, weighed and subjected to analysis of BMD in the proximal parts. Subsequently, the mechanical test flexion-compression of the head of each femur was performed. The speed of application of force was 1 mm/min. The mechanical properties evaluated were: the maximum load (N) and stiffness (N/mm).
Results: The weight of the femurs showed a significant difference between the types of treatment (p=0.035), with greater weight to the bones of trained animals. The BMD of the OVX groups was lower (p<0.000) than the SHAM groups, and trained groups are higher (p=0.005) than the sedentary groups. The maximum load of SHAME group was higher than the SHAMS (p=0.011) and it was observed that SHAM groups showed higher stiffness compared to the OVX group and this difference was significant (p=0.015).
Conclusion: The ovariectomy caused a decrease and physical training with treadmill improved densitometry and mechanical properties of femurs.
Acknowledgements: National Council for Scientific and Technological Development

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BONE MINERAL DENSITY AFTER OSTEOTOMY AND IMMOBILIZATION: AN EXPERIMENTAL STUDY IN OSTEOPENIC RATS

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Objective: To analyze the effects of different times of immobilization on fracture healing osteopenic rats by densitometric analysis.
Material and Methods: 24 female Wistar rats were randomized into four groups: OL2: free rats and, after osteotomy,

were immobilized for 2 weeks; OS2: osteopenic rats and after osteotomy were immobilized for 2 weeks; OL6: free rats and after osteotomy were immobilized for 6 weeks; OS6: osteopenic rats and after osteotomy were immobilized for 6 weeks. The animals in groups OS2 and OS6 were subjected to tail suspension, initially for 3 weeks to installation of osteopenia and during immobilization, while those groups OL2 and OL6 were free throughout the experiment. After 3 weeks, was performed in all groups, partial osteotomy in the medial region of the right tibia. Immediately after surgery, the limb was immobilized with an orthesis designed specifically for this study, by 2 or 6 weeks, as specified in the groups. The right tibias were dissected for densitometric evaluation of calluses.

Results: The statistical results for the values of BMD showed significant differences, being lower in the group OL2 (0.164± 0.014 g/cm^2) when compared at OL6 (0.191±0.010 g/cm^2) with p=0.013. Similarly, the group OS2 (0.154±0.009 g/cm^2) was lower than the OS6 (0.218±0.009 g/cm^2) with p=0.004. However, the group OL2 (0.164±0.014 g/cm^2) was higher than the OS2 (0.154±0.009 g/cm^2), but no showed statistical difference. Already the group OL6 (0.191±0.010 g/cm^2) was lower than the OS6 (0.218±0.009 g/cm^2) with p=0.005, statistically significant result.

Conclusion: The calluses of animals 2 weeks of immobilization had lower BMD than 6 weeks, both for the free animals as for the suspended animals. The suspension and immobilization for 6 weeks of an osteopenic bone, submitted the osteotomy caused a higher BMD in their callus.

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BONE MINERAL ACCRUAL AND FRACTURE OUTCOMES IN CHILDREN WITH OSTEOGENESIS IMPERFECTA TREATED BY PAMIDRONATE: SINGLE CENTER EXPERIENCE

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Objective: To evaluate the bone mineral accrual and fracture outcomes in children with osteogenesis imperfecta treated by pamidronate (PAM).

Material and Methods: In our retrospective study 21 children with different types of OI were included: 7 boys (33.3 %) and 14 girls (66.7 %). According to clinical OI classification proposed by D. Sillence, patients were divided in 3 types: OI I type -11 (52.4 %), OI III type - 7 (33.3 %) OI IV type - 3 (14.3 %). Due to limited number of participants all patients were divided in 2 groups: mild to moderate (OI I type) and moderate-to severe (III and IV types). The standard protocol with cyclic PAM infusions (3 consequent days 3–4 times in a year) was applied in annual cumulative dose ranged from 9 to 12 mg/kg. All children received vitamin D and calcium supplementation in physiological doses. Observation period was 36 months. Bone mineralization parameters were detected by DXA of lumbar spine L_1-L_4 (densitometer Hologic QDR 4500C, with pediatric reference database). We evaluated BMD Z-score, measured in standard deviations and deficiency in percentages.

Results: The age of initiation of PAM infusions depended on type of OI: 9.6 (4.5; 12.7) years in I type and 0.56 (0.24; 7.9) years in III+IV types (p=0.01). There were no differences in bone mineral accrual between types of OI. The maximum efficacy in bone mineral accrual was observed in first year (+32.9 %) and second year (+22.1 %) and no real improvement in BMD in third year. Reduction of fractures in OI I types was from 0.87 (0.64; 1.08) to 0 (0.0; 0.5) fractures per year (p=0.09). In severe OI group fracture reduction was more impressive: from 28.5 (4.6; 56.2) to 1.1 (0.86; 2.6) fractures per year (p=0.02). No side effects besides "flu-like" syndrome were observed.

Conclusion: PAM treatment was effective in bone mineral accrual and fracture reduction. The maximum efficacy in bone mineral accrual was observed in first 2 years.

P466
ZOLEDRONIC ACID IN OSTEOPOROSIS SECONDARY TO MASTOCYTOSIS

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Objective: Osteoporosis is the prevalent manifestation of bone involvement in patients with systemic mastocytosis. Mastocytosis-related osteoporosis is characterized by both absolute and relative prevalence of osteoclastic activity, consistent with the positive results reported in small series of patients with antiresorptive drugs, such as bisphosphonates. Aim of this study is to investigate the efficacy of zoledronic acid (ZOL) in patients with mastocytosis-related osteoporosis.

Material and Methods: Twenty five patients with osteoporosis secondary to indolent systemic mastocytosis (ISM) were given a single intravenous (iv) infusion of 5 mg ZOL dissolved in 100 mL of 0.9 % saline over 60 min.

Results: After 1 year the mean increase in BMD was 6.0± 4.4 % at the spine and 2.7±3.2 % at the total hip. Serum levels of bone turnover markers (BTMs) decreased vs. baseline: bone alkaline phosphatase −34 % and −35 %, and C-terminal telopeptide −68 % and −56 % at 6 and 12 months, respectively. None of the patients reported new fractures during the year of follow-up. In all the first 20 treated patients a transitory acute phase response was observed but this was prevented in 4 out of 5 subsequent patients in whom acetaminophen was systematically given during the 3 days postinfusion.
Conclusion: A single 5 mg ZOL iv infusion in patients with osteoporosis secondary to ISM is associated with significant increases in spine and hip BMD and decreases of BTMs over a least 1 year. Yearly ZOL might represent a therapeutic option for ISM associated osteoporosis.

P467
ESTIMATION OF MICROSTRUCTURAL PARAMETERS IN THE PROXIMAL TIBIA BY MEANS OF SHAPE REGRESSION: COMBINING HIGH RESOLUTION X-RAY COMPUTED TOMOGRAPHY AND GEOMETRIC MORPHOMETRICS

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Objective: In order to contribute to the pre-surgical diagnosis of bone degradation, we investigate patterns of variation and covariation between the shape and microstructure of the proximal tibia. The general objective of this pilot study is the prediction of bone microstructure in aged and osteoarthritis (OA) individuals based on the estimation of microstructural parameters via the external shape of the tibia.
Material and Methods: Our sample comprises 32 dried human tibiae (age range: from 20 to 80 years), including nine cases of moderate osteoarthritis. The microstructural parameters were obtained from high resolution X-ray computed tomography (CT) images (isometric voxel size of 50 μm) and include relative bone volume, mean trabecular thickness, number, and spacing. The shape of the tibiae is captured by dense CT-derived meshes that were processed by geometric morphometric methods. Patterns of variation and covariation between proximal tibial shape and microstructural parameters were estimated via multiple multivariate regression (MMR) and two-block partial least squares (PLS) analyses.
Results: Using MMR, we found a high covariation between tibial shape and microstructure (R^2=0.55). The outcomes of the PLS additionally show that a decrease in bone volume fraction, as seen in old individuals, correlates with a flattening and broadening of the proximal tibia. These findings may reflect age- related structural adaptations in the knee due to cartilage damage in aged individuals showing OA.
Conclusion: Using this new approach it is possible to estimate structural parameters in the tibia according to its geometry. This method may assist in the clinical diagnosis of tibial bone degradation and delivers anatomical information that may be of great value in the design of custom knee implant components.
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P468
THE MINERAL DENSITY OF THE BONE DEPENDING ON ANKYLOSING SPONDYLITIS FORM IN MEN

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Objective: To estimate BMD in men with ankylosing spondylitis (AS) depending on a disease form.
Material and Methods: Under supervision there were 70 male patients with the diagnosis the AS (according to the modified New York criteria of 1984). The average age 43.2±9.1 years. Among 70 surveyed sick 62.8 % had only axial defeat. In 60.0 % of cases at a X-ray analysis of a backbone came to light sindesmofit, from them in lumbar department at 52.3 % of patients, in the chest - 45.2 % and in cervical - 35.7 %. Sindesmofita in two departments of a backbone came to light at 35.7 %, and in all departments - at 15 % of patients, up to symptom formation "a bamboo stick". Damage of peripheral joints had 26 (37.1 %) patients. More often joints of the bottom extremities - 35.7 % of cases, in 25.7 % - joints of the top extremities were surprised. 65 % of patients had clinical signs of damage of coxofemoral joints (pain and/or function restriction), and 45.7 % from them had bilateral localization. BMD was measured by the two-power x-ray densitometry method (densitometer Exceell XR-46, Norland, USA). BMD and Z - criteria was estimated at the femoral neck and lumbar spine.
Results: At patients with peripheral arthritis decrease in BMD came to light authentically more often than at patients with mainly axial defeat (p<0.05).
Conclusion: Damage of peripheral joints associates with decrease in BMD at patients with the AS.

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THE DYNAMICS OF CHANGES IN BONE MINERAL DENSITY IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: To get data about dynamics in BMD in patients with long-term duration of rheumatoid arthritis (RA).

Material and Methods: Retrospective study of the BMD dynamics included 129 women with RA, age 18–75 years. In all patients it was performed DXA with Hologic Discovery A with the BMD assessment at the lumbar spine (L1-L4) and femoral neck (FN); conducted clinical and laboratory examination, including data about treatment of RA and osteoporosis (OP). Patients were divided into 3 groups: group1 (n=67) - dynamics of BMD in 3 years, group2 (n=34) - 4 years, group3 (n=28) - 5 years.

Results: Average age of the patients of the group1 was 43.1(19–75) years, the group2 - 42.0(21–67) years, the group3 - 41.3(18–67) years, duration of RA: 10.8(2–40) years, 13.7(5–31) years and 14.1(5–34) years, respectively. Steroid therapy has been taken by 15(22 %), 11(32 %) and 12(43 %) patients, respectively; 20(30 %), 16(47 %) and 14(50 %) patients, respectively, took the disease-modifying antirheumatic drugs (DMARDs); biological drugs - 40(60 %), 18(53 %) and 10(36 %) patients, respectively; drugs for the prevention and treatment of OP - 25(37 %), 17(50 %) and 10(36 %) patients, respectively. BMD at L1-L4 in the group1 was 0.9571±0.237 g/cm^2, then became 0.971± 0.198 g/cm^2; in group2 - 0.882±0.185 g/cm^2 vs. 0.930± 0.202 g/cm^2; in group3 - 0.827±0.230 g/cm^2 vs. 1.114± 0.287 g/cm^2. BMD at FN in group1 was 0.747±0.145 g/cm^2, then became 0.817±0.138 g/cm^2, in group2 - 0.703±0.120 g/cm^2 vs. 0.803±0.138 g/cm^2; in group3 - 0.753±0.120 g/cm^2 vs. 0.915±0.136 g/cm^2. Differences were not significant. Number of patients with OP at L1-L4 in the group1 was 5(8 %), became 19(29 %); 2nd group - 5(16 %) vs. 4(13 %) and in 3rd - 3(18 %) vs. 3(18 %). Number of patients with OP at FN in group1 was 19(29 %), became 15(23 %); group2 - 5(16 %) vs. 9(28 %) and in 3rd- 3(20 %) vs. 5(33 %).

Conclusion: BMD in RA patients with long-term monitoring remained stable on the background of anti-inflammatory and antiosteoporotic therapy.

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MORTALITY RATE AND RISK FACTOR OF PATIENTS WITH FRAGILE HIP FRACTURE

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Objective: To evaluate the effects of history, fracture type, method of treatment and complications on the mortality risk in elderly patients with fragile hip fracture.

Material and Methods: The 418 patients (306 women and 112 men) who older than 60 years who underwent surgery for fracture around hip at the Khon Kaen Hospital between January 2010 and October 2012. The follow-up ranged from 12 to 36 months. The following was recorded: age, gender, underlying diseases, pre-injury status, fracture type (AO classification), time between injury and surgery, anesthesia technique, surgical technique and instruments, complications and death. Statistical significance at the 95%CI was using for analyzed variables by multivariate analysis.

Results: The average age was 76 years. Overall 1-year postoperative mortality was 28 % and mortality after hip fracture at the end of the follow-up was 43 %. The increase in age, the shorter of survival time as each additional year reduced survival by 7.12 %. The male gender, two and more underlying diseases in the patient's medical history, the complications, failed instrumentation; revision surgery and the time between injury and surgery was a risk factor for shorter survival. The patient who can move without walking support before injury, the survival was significantly longer than in a patient using a walking or in a bedridden patient. The fracture type, type of anesthesia, surgical technique, type of implant were not significant for the length of survival.

Conclusion: In the patients who aged over 60 years, a significantly shorter time was related with many factors, for example increase age, male gender, multiple morbidity, less mobility status before injury, development of postoperative complication (pressure sores), failed instrumentation with revision surgery and time between injury and surgery. No relation to significantly survival was found for the following factors: type of fracture, type of anesthesia and operative technique.

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DIFFERENTIAL EXPRESSION OF INFLAMMATION- AND REGENERATION-ASSOCIATED MARKERS OF MACROPHAGE-POLARIZATION (M1 VS. M2) IN BISPHOSPHONATE RELATED OSTEONECROSIS OF THE JAW (BRONJ) AND OSTEORADIONECROSIS (ORN)

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Objective: Suppression of the local osseous remodeling and inflammation of jaw bone are involved in the pathogenesis of BRONJ. ORN has been described to be related to chronic inflammation and fibrotic bone remodeling. Inflammatory processes are mediated by M1-polarized macrophages (CD68-, iNOS-expression), whereas M2 macrophages (CD163-expression) are critical for tissue regeneration. Aminobisphosphonates were shown to shift macrophage polarization towards the M1-type. It is unknown, if BRONJ and ORN differ regarding the polarization of involved osteoclasts and macrophages. The aim of this study was to compare the M1- and M2-polarization of osteoclasts and macrophages in BRONJ and ORN by immunohistochemistry analysis compared to healthy jaw bone (NB).
Material and Methods: 15 specimens of BRONJ-associated bone, 15 of ORN-bone and 15 of healthy jaw bone were processed for immunohistochemistry (Peroxidase/DAB+, DAKO Autostainer). A staining of polarization markers (M1: CD 68; iNOS; M2: CD163) was performed. The specimens were completely digitalized in 400× magnification using "Whole-Slide-Imaging" and in each case the three fields of view with the highest expression level within the bone tissue were selected for cell counting (cells/mm^2, ANOVA-Test).
Results: A significantly ($p<0.05$) increased CD68-expression was seen in ORN compared to BRONJ and NB. Additionally a significantly ($p<0.05$) increased expression of CD163-positive cells was seen in ORN compared to BRONJ. The iNOS-expression in BRONJ-specimens was significantly ($p<0.05$) higher than in ORN samples.
Conclusion: The results indicate a differential polarization of osteoclasts and macrophages in BRONJ- and ORN-affected bone. Compared to ORN, BRONJ samples show an increased M1- and a reduced M2-polarization. These findings are a possible explanation for the clinically and histopathologically observed fibrotic tissue remodelling processes in ORN compared to the dramatically impaired tissue proliferation and regeneration in BRONJ affected bone.

P472
BMD, TBS AND FRACTURE ASSESSMENT IN WOMEN UNDER CHRONIC GLUCOCORTICOID TREATMENT

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Objective: To assess BMD and bone microarchitecture changes, evaluated by trabecular bone score (TBS), such as their relations to the osteoporotic fractures in women under chronic glucocorticoid (GC) treatment.
Material and Methods: The study group consisted of 109 patients (pts) - 37 premenopausal and 72 postmenopausal women, who received ≥5 mg/day of GCs for at least 1 year. Lumbar and hip BMD was measured by DXA (Prodigy, GE) and TBS values were assessed using TBS iNsight software (Med-Imaps, France). X-ray of thoracic and lumbar spine were made to identify vertebral fractures. For the 72 subjects in the group of the postmenopausal women, TBS L1-L4 values of a corresponding reference group were obtained by **BMD L1-L4** /normal, osteopenia, osteoporosis/ and age-matching. Statistical analysis was performed by Kolmogorov- Smirnov Test, Paired samples Test or Wilcoxon Signed Ranks Test using the SPSS 13.0 for Windows.
Results: GCs-treated postmenopausal women showed significant decrease of TBS ($p<0.0001$) compared with the values of the reference group. This data were confirmed for the entire population as well for the subgroups of the osteoporotic and osteopenic women. Vertebral fractures were found in 11 pts (31 %) with osteopenia and 5 pts (31 %) with normal BMD, but low TBS. In the group of the premenopausal women bone microarchitecture deterioration (low TBS) was found in 17 pts (46 %), while only 9 pts (24 %) exhibited low BMD. Vertebral fractures were detected in 7 pts with normal BMD, but with low TBS.
Conclusion: Chronic GC treatment leads to significant degradation of bone microarchitecture and higher susceptibility to fractures, independent of the changes in BMD. TBS is a good noninvasive technique for assessment of bone quality in GC treated patients, giving additional information about vertebral fracture risk. It could be used for decision taking about starting with bone protection or treatment.

P473
IMPACTS OF OBESITY ON PAIN THRESHOLD, DEPRESSION AND QUALITY OF LIFE

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Objective: To assess the effects of obesity on pain threshold, depression and quality of life.
Material and Methods: The study was designed as a cross-sectional observational study and carried out on 80 adult obese and nonobese people aged between 18 and 40 years who were admitted to the obesity and metabolic syndrome outpatient clinics. The subcutaneous adipose tissue thickness was measured for rectus femoris, triceps muscle, and umbilicus by using ultrasonography. The pressure pain thresholds in 3 muscles including the deltoid, tibialis anterior, and first interosseus dorsalis muscle of the hand were measured by using a digital pressure algometer. The subjects were evaluated by VAS when a pressure was applied on the first distal phalanx (FDP) at a rate of 25 Newton. Depression level of the subjects were evaluated by the Beck Depression Inventory (BDI). Quality of life was evaluated by Short Form 36.
Results: The mean pain threshold values showed no statistically significant difference between groups ($p>0.05$). The mean values of adipose thickness were significantly higher in the obese group ($p<0.01$). No statistically significant difference was determined between the groups in terms of DP VAS scores ($p>0.05$). The obese group had significantly higher BDI scores than the control group ($p<0.01$). All parameters of SF-36 were significantly lower in obese individuals ($p<0.01$).
Conclusion: Our findings suggest no significant correlation between obesity and pain threshold. But we found strong relationship between obesity and both for depression and quality of life.
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P474
SLOVAK REGISTER OF PATIENTS TREATED BY ZOLEDRONIC ACID AFTER OSTEOANABOLIC TREATMENT

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Objective: Osteoanabolic treatment is highly effective for severe PMO, GIOP and OP in man, but after discontinuation is there a decline of BMD leading to an increased risk of fracture. Therefore is an urgent need to continue with other treatment. Meaningful and recommended are antiresorptive drugs. We present a register of patients treated with zoledronic acid after PTH treatment. The outcome was to define the BMD and BTM changes.
Material and Methods: In 2013 started a register of pts treated with ZOL after PTH. First infusion was applied 60 days after termination of PTH treatment. All patients were supplemented with calcium (avg. 723 mg) and vitamin D (avg. 736 IU). In all patients were recorded changes in BTM (osteocalcin, CTx, P1NP), calcium, vitamin D and creatinine after 3 M and then in yearly period. Measurement of BMD (lumbar spine, femoral neck and total hip) is planned in yearly intervals.
Results: At this time we present baseline characteristic and effect of treatment by ZOL on BTM after 3 M with focus on patients with GIOP. Totally 68 pts were enrolled (17 males) with average age 69 year. Average length of PTH treatment was 556 days. From the whole group of patients 39 were with PMO, 14 with OP in man and 15 with GIOP. Patients with GIOP were younger than whole population (average 63 year). Average Prednisolone-equivalent dose usage was 9 mg/day, what corresponds to 3.28 g/year. Length of corticoid treatment was 113 days. For all GIOP patients baseline densitometry was performed: BMD (g/cm^2) at LS 0.841; Total Hip 0.731 and Femoral neck 0.597, what was lower than for whole population. 3 M after ZOL infusion BTM were reduced (47 % for OC, 30 % for CTx and 52 % for P1NP). Only 1 new fracture was recorded during course of PTH treatment and no during 3 M of ZOL follow-up.
Conclusion: According of mode of action and dosage regiment zoledronic acid represent a suitable treatment for patients after osteoanabolic treatment. Longer follow up of patients in this registry is necessary for more conclusions.

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SERUM 25-HYDROXYVITAMIN D LEVELS OF HEALTHY ADULTS IN GREECE

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Objective: To identify the prevalence of vitamin D deficiency in healthy adults in Greece, as reflected by the levels of 25-hydroxyvitamin D (25(OH)D), since recent data indicate that vitamin D deficiency can be common in countries previously considered as low risk (e.g., Mediterranean countries).

Material and Methods: A population of 974 community dwelling adults (134 males, 840 females) was recruited at the health promotion events carried out by the Hellenic Society for the Support of Patients with Osteoporosis in rural and urban areas throughout Greece. Serum total calcium (Ca), phosphorus (P), creatinine, PTH and 25(OH)D were measured. The study was approved by the Ethics Committee of Harokopio University.

Results: The mean age of the population was 49.58 years, (range, 18–86 years) while 87.2 % were 18–65 years old. Mean serum 25(OH)D was 20.38 ng/mL, mean PTH was 41.24 pg/mL and mean Ca, P and creatinine were 9.97, 3.57 and 0.79 mg/dL, respectively. Concerning the vitamin D levels, 53.6 % of the subjects had deficient (0–19.9 ng/mL), 34.4 % had insufficient (20–29.9 ng/mL) and only 12.0 % had adequate (30–150 ng/mL) levels, while 8.0 % had vitamin D levels ≤10 ng/mL. PTH was at normal range (15–65 pg/mL) for 89.7 % of the population and 8.2 % had high PTH (>65 pg/mL). The levels of serum Ca, P, and creatinine, were within the normal range.

Conclusion: The majority of Greek adults (88 %) in this study had vitamin D levels below 30 ng/mL. Given that low levels of 25(OH)D are associated with increased risk for fractures and exacerbate bone loss, this study highlights the emerging issue of 25(OH)D insufficiency in Greek population and the need for targeted interventions even in age groups not previously considered as at risk.

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SERUM VITAMIN D, PARATHYROID HORMONE AND CALCIUM ARE ASSOCIATED WITH NONVERTEBRAL FRACTURE INDEPENDENT OF PROXIMAL FEMUR MICROARCHITECTURE

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Objective: Vitamin D deficiency and hyperparathyroidism is associated with bone loss. However, it is less clear whether the serum levels of vitamin D and PTH are associated with risk of fracture. We therefore hypothesized that lower vitamin D levels and higher PTH and calcium levels are associated with nonvertebral fracture.

Material and Methods: We measured serum 25(OH) vitamin D, PTH and total calcium, femoral neck (FN) areal BMD (aBMD), and femoral subtrochanteric microarchitecture as cortical porosity and thickness, and trabecular volumetric BMD (vBMD) in 211 postmenopausal women aged 54–94 years with nonvertebral fractures and 232 controls in Tromsø, Norway. Odds ratio (OR) for fracture was calculated using logistic regression analysis.

Results: Women with fracture had lower serum levels of Vitamin D (76.4 vs. 82.9 nmol/L), and higher PTH (4.58 vs. 4.13 pmol/L), and total calcium (2.43 vs. 2.35 mmol/L) than controls, all $p<0.05$. In addition, cases had higher porosity within each of the cortical compartments; compact appearing cortex (32.7 vs. 31.5 %), outer transitional zone (45.5 vs. 44.5 %), and inner transitional zone (79.4 vs. 78.6 %), reduced cortical thickness (4.06 vs. 4.36 mm) and lower trabecular vBMD (117.9 vs. 126.6 mg HA/cm^3), all $p<0.01$. Each standard deviation decrease in vitamin D and increase in PTH and calcium were associated with increased risk of fracture (OR 1.38 95%CI (1.10–1.72), 1.31 (1.03–1.65) and 1.77 (1.38–2.27), respectively, all $p<0.05$) after adjustment for age, height, weight, FN aBMD, femoral subtrochanteric cortical porosity, cortical thickness and trabecular vBMD.

Conclusion: Calciotropic hormones are associated with increased risk of fracture, independent of the cortical microarchitecture and trabecular density.

Disclosures: R Zebaze is inventor of the StrAx1.0 software.

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FRACTURES IN PATIENTS WITH ENDOGENOUS CUSHING'S SYNDROME AND THEIR INFLUENCE ON QUALITY OF LIFE AND FUNCTIONAL PERFORMANCE

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Objective: Endogenous Cushing's syndrome (CS) characterizes by numerous severe complications one of which is low traumatic fractures. This study evaluates the difference in quality of life and functional performance of patients with active Cushing's syndrome who sustained low traumatic fractures as compared to those who did not.

Material and Methods: 139 consecutive patients with active CS fulfilled EQ-5D and ECOS-16 questionnaires. They performed "up-and-go", "tandem" and "chair- rising" tests. All patients underwent lateral thoracic and lumbar X-Ray to reveal vertebral fractures and were interviewed on the recent low-traumatic fractures. The level of free urinary cortisol (24 h UFC) was measured on a Vitros ECi, reference range 59.2–413 nmol/24 h.

Results: Among 139 patients (35 (26–47) y.o.; 115 females; 24 males; 24hUFC-1470 (856–2937) nmol/24 h) fractures were diagnosed in 61 cases (43.9 %): in 55 cases vertebral (43 - multiple) and in 17 cases cured nonvertebal fractures.

Patients with CS who sustained fractures reported more limitation in their usual activity (1.48 (0.57) vs. 1.25 (0.48) p= 0.02) and suffered from more severe pain and discomfort (1.42(0.53) vs. 1.23 (0.42) p=0.03) than patients with active CS without fractures. All others dimensions of EQ-5D were not different. The results of VAS showed that patients with fractures estimated their health status of being worse as compared with patients without fractures: 46.7 (17.8) vs. 55.4 (19.9) p=0.01. The total score of ECOS-16 was higher in patients with CS suffering from low-traumatic fractures 2.83 (0.79) vs. 2.30 (0.70) p<0.001. Patients with fractures performed worse in a "tandem" test 24 (7–30) vs. without fractures 30 (15–30) s, but did not differ in up-and-go 11 (8–13) vs. 9(7–11) p=0.41 or chair-rising 14 (8–18) vs.12(9–14) s p= 0.28 tests.

Conclusion: Patients with CS complicated with a history of fractures have more limited usual activities and balance performance, suffer from more pain than patients with CS and other complications.

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IF TREATMENT OF DEPRESSION WITH SELECTIVE SEROTONIN REUPTAKE INHIBITORS INCREASED RISK FOR OSTEOPOROSIS

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Objective: Selective serotonin reuptake inhibitors (SSRIs) are most prescribed of all antidepressants in Europe, but this fact in future can be relativised as results of some studies suggesting that SSRIs may lower BMD.

Material and Methods: BMD by DXA and biochemical markers of bone metabolism were measured in 44 women with recurrent depressive disorder, age 44,5 years, the SSRI group treated with SSRI (n=23) and the SNRB group treated with selective reuptake noradrenalin blockers (n=21). Average daily doses of antidepressants were compared to maprotiline 88.5 mg/die and sertraline 75 mg/die.

Results: Of the total sample of 25 % of the patients with central DXA method lower BMD. In the SSRI group of patients treated with sertraline, in 6 patients with diagnosed osteopenia, the level of 25-hydroxycholecalciferol (25OHD3) was on average 23±3.4 nmol, osteocalcin 18.2±0.4, β-crosslaps 371±16.2, ionized calcium 0.96±0.2. In the SNRB group of patients treated with maprotiline, in 5 patients were diagnosed osteoporosis, the average levels of 25OHD3 were both 25±2.2 nmol/l; osteocalcin 19.8±0.9, β-crosslaps 310± 20.6; ionized calcium 1.01±0.4.

Conclusion: Patients with recurrent depressive disorder have reduced bone cell metabolism in which the most pronounced decrease 25OHD3. BMD was less reduced in patients who were treated with the SSRI with respect to the treated SNRB.

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P479

PREDICTIVE MATHEMATICAL MODEL FOR THE ASSESSMENT OF COMORBIDITIES IN PATIENTS WITH DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS: MULTIFACTOR REGRESSION ANALYSIS

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Objective: The importance of cardiovascular changes, osteoporosis and metabolic diseases in the etiopathogenesis of diffuse idiopathic skeletal hyperostosis (DISH) is undeniable. The aim of the report is to analyze the importance of the most common diseases of the cardiovascular system and metabolic diseases system as a risk factor as an element for multifactor analyze for the development of DISH.

Material and Methods: 124 patients were analyzed with DISH, hospitalized in the Clinic of Rheumatology UMHAT Sv. Georgi, Plovdiv or visited rheumatologic practice of Medical centre Sv.Vrach, Plovdiv because of complications of the diseases of the cardiovascular system and metabolic disease and the receiving treatment for them. Control group analyzed 270 individuals with proven spondylosis. Methods used are interviews, instrumental and paraclinical results for the collection of information. Risk assessment is made by a multifactor regression analysis computer program SPSS 19.

Results: Regression analysis demonstrated the importance of the most important diseases that participate in this model - the most important in hypertension (RR 62.62, 95%CI 10.542; 372.02), ischemic heart disease (RR 62.62, 95%CI 10.542; 372.02), TIA (RR 45.606, 95%CI 58.44; 355.81), proven osteoporosis (RR 14.618, 95%CI3.312; 64.561).

Conclusion: Multifactor regression analysis demonstrated the importance of the most important diseases for the development of DISH.

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P480

CORRELATION OF RADIAL BONE FRACTURE AND OSTEOPOROSIS IN POSTMENOPAUSAL PATIENTS

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Objective: The goal of investigation is, in a routine practice of physiatric clinics, establish the link between radial bone fracture in typical site and osteoporosis in postmenopausal patients, and to stress the need for diagnostics of osteopenia/osteoporosis as early as possible.
Material and Methods: In time interval from beginning of January to the end of June 2013, we observed the targeted group of 115 examinees aged 55–80 years with radial bone fracture in typical site. 42 of these examinees had proven osteopenia, at 73 examinees analysis of bone density was not performed earlier.
Results: In 73 patients radiologic densitometry was performed, with that osteoporosis was verified in 41 examinees (56.2 %), osteopenia in 20 patients (27.2 %), while in only 12 examinees (16.4 %) decrease of bone density was not established. In patients with verified osteoporosis and osteopenia, with fracture in predilected site, adequate medicamentous therapy was introduced on an individual basis. Targeted medical rehabilitation was performed, with stress on medical gymnastics, and education for prevention of falling.
Conclusion: Achieved results point to the necessity for performing mineral density of bones analysis at all postmenopausal women, and if need be, as soon as possible, start the adequate treatment in goal of prevention and diminishing the number of further fractures, that is, improvement of life quality.

P481

MANAGEMENT OF PERIPROSTHETIC KNEE INFECTIONS WITH HANDMADE ANTIBIOTIC-IMPREGNATED ARTICULATING CEMENT SPACER

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Objective: To follow the efficacy of custom-made cement antibiotic-loaded mobile cement spacers in the treatment of periprosthetic knee infections.
Material and Methods: A retrospective study included patients who were hospitalized and diagnosed with periprosthetic knee infection in Emergency University Hospital of Bucharest over a period of 7 years (2006–2012). 21 patients were diagnosed with septic knee arthroplasty (a frequency of 2.1 %), and of these 13 were treated with handmade antibiotic-impregnated articulating cement spacers, 2 patients with arthrodesis and 6 cases of debridement and implant preservation. The surgical procedure consisted of debridement, removal of all components of prosthesis and cement, followed by custom-made mobile cement spacers loaded with antibiotic according to the antibiogram.
Results: All patients were followed from the time of intervention with removal of prosthesis until the time of revision prosthesis implant. Rate of success was 84.6 % (11 cases), 2 patients still with increased inflammatory tests. The average post- revision follow-up was 2.3 years (between 1 and 3 years). Of the 13 patients, 8 were women and 5 men, aged 62–76 years old, mean 68.6. the Interval elapsed since primary arthroplasty to the manifestation of a septic phenomenon was on average 1.2 years (between 14 days and 3 years). The diagnosis of infection was made on the following criteria: inflammatory markers, culture from the puncture fluid. The quantity of cement required for the intraoperative hand-made of spacers was 3 envelopes in 11 cases, and only 2 in 2 other cases. The antibiotic used for loading cement was gentamicin 2.5 % (9 cases) and vancomycin (3 cases), which are used according to the antibiogram. The amount of vancomycin was within 2–4 g per 40 g of cement powder.
Conclusion: Intraoperative handmade spacers with antibiotic load represent a reliable approach in the management of septic knee arthroplasty treatment and their cost is low compared with prefabricated spacers. The custom-made of spacers doesn't require a laborious technique and can be made on a properly adapted size opposed to prefabricated spacers. The antibiotic used to load the spacer observes the result of the antibiogram.

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BONE MINERAL DENSITY IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM AFTER PARATHYROIDECTOMY

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Objective: To study BMD in patients with PHPT after 1 year of surgery.
Material and Methods: We studied 63 patients with PGPT (100 % of men were in the age group up to 50 years, 14 women were of childbearing age and 47 postmenopausal women) general medical examination has been made, indicators of calcium-phosphorus metabolism (PTH, Ca, Ca^{2+}, P) bone markers (alkaline phosphatase, osteocalcin, β-CTX),

sonography of the thyroid and PTG, scintigraphy PTG, BMD was also examined. BMD was measured by DXA. Patients with comorbidities and conditions associated with low BMD were excluded from the study.

Results: In the group of postmenopausal women low BMD was detected in of 83 %. In the lumbar spine low bone mass was 74.4 % (1 year after parathyroidectomy positive trend was observed in 44.8 %, 2 % - no changes, 2 % noted progression of osteoporosis). In 59.5 % of patient low bone mass localized at the femoral neck with the positive dynamics after parathyroidectomy in 100 %. In fertile women low bone mass was registered in 14 % of cases, increase of bone density was noted in 100 % after surgery. In men younger than 50 years low bone mass was registered in 100 %, increasing bone density was noted in 100 % after the operation.

Conclusion: The findings suggest that 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.

P483
SERUM PTH CONCENTRATION IS RELATED TO TOTAL, BUT NOT BIOAVAILABLE, 25-HYDROXYVITAMIN D

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Objective: Recent work suggests that measurement of albumin-bound plus free 25-hydroxyvitamin D [25(OH)D], i.e., "bioavailable" 25(OH)D [Bio-25D], may improve assessment of vitamin D (D) status. Substantial variability exists in the total 25(OH)D increase following D supplementation. The cause(s) of such variability is not well understood, but may be related to age, body size/body fat and efficiency of absorption/rate of degradation. Whether similar variation occurs with Bio-25D has received limited study.

Material and Methods: This randomized trial evaluated the relationship of total and Bio-25D with PTH and also the effect of age and body composition on total and Bio-25D increase following daily intake of D_3-fortified food. Ninety-nine women in 3 age groups (20–30, 55–65 and 75+ years) received either a chocolate disk fortified with D_3 2,300 IU or a matching placebo daily for 4 month. Body composition was determined at baseline by total body DXA. Serum total 25(OH)D, Bio-25D and PTH were measured/determined at baseline and 4 month.

Results: Baseline total 25(OH)D and Bio-25D (mean [SEM]) were 31.1 [1.0] and 3.7 [0.2] ng/mL, respectively; neither differed by age. At baseline, total 25(OH)D was negatively correlated with total body, fat and lean mass ($p<0.05$). After 4 month of supplementation, total 25(OH)D and Bio-25D increased ($p<0.001$) by 14.2 [1.3] and 1.7 [0.2] ng/mL, respectively. No age-group effect on the total or Bio-25D increase was observed. Changes in total and Bio-25D at 4 month were unrelated to fat, lean or total body mass. At baseline and 4 month, total 25(OH)D but not Bio-25D was negatively correlated with PTH ($p<0.05$).

Conclusion: Age and body composition were unrelated to the total 25(OH)D or Bio-25D increase. Unexpectedly, serum PTH was negatively associated with total, but not bioavailable 25(OH)D. Further evaluation of the importance of Bio-25D on health status and the mechanism(s) underlying differences in total 25(OH)D and Bio-25D increase following oral D supplementation are needed.

P484
STUDY OF MEASURING THE SERUM LEVELS OF S-RANKL ON PATIENTS WITH DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS, ANKYLOSING SPONDYLITIS AND SPONDYLOSIS

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Objective: S-RANKL, one of the basic markers for bone metabolism, has not been thoroughly studied on patients with DISH and AS. The aim of the study is to estimate the serum levels of s-RANKL on patients with diffuse idiopathic skeletal hyperostosis (DISH), ankylosing spondylitis (AS) and spondylosis (SP).

Material and Methods: s-RANKL is estimated on 55 patients with DISH, 25 patients with AS, 50 patients with spondylosis and 15 particularly healthy people aged 55–65, 10 particularly healthy people aged 20–25. The measuring of the s- RANKL is done by ELISA sandwich method, with a kit of eBioscience, Austria. The statistic processing is done with SPSS 19 programme ($p<0.001$).

Results: Results: The average measurements of s-RANKL of patients with DISH and SP are higher in comparison with the results of patients with AS and healthy people, regardless of their age ($p<0.05$). S-RANKL in patients with DISH was 197.00±35.9, in patients with SP 200.6±66.1 pg/ml, in patients with AS 90.8±18.5 pg/ml in controls 83.00±14.98 pg/ml.

Conclusion: S-RANKL is significantly increased on patients with DISH and SP in comparison with the results of patients with AS and healthy people, but it is really hard to explain the reason why at the present moment. Measuring the levels of s-RANKL can be used for early diagnose of DISH due to

a difference between the serum levels on patients with DISH and AS, with which differential diagnose is mostly done.

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HIP FRACTURE AND SARCOPENIA: A MODEL OF OSTEOPOROSIS-RELATED MUSCLE LOSS

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Objective: $p>$To evaluate the degree of muscular atrophy by using diffusion tensor imaging (DTI) in osteoporotic patients and to determine the role of IGF-1/PI(3)/Akt signaling pathways in the genesis of muscle atrophy.
Material and Methods: We performed vastus lateralis biopsy in 25 women with osteoporosis (OP) undergoing surgery for hip fracture and in 25 age matched women undergoing arthroplasty for hip osteoarthritis (OA) with no significant functional limitations. All patients gave informed consent. We evaluated the DTI protocol with magnetic resonance system operating at 9.4 T the Fractional Anisotrophy (FA), the mean Diffusivity (MD) and the three eigen values ($\lambda_1>\lambda_2>\lambda_3$). All computation was made using an homemade script in Matlab®. Mean values and standard deviation were obtained for each variable for OP and OA subjects.
Results: Our findings revealed a high percentage of atrophic type II fibers (37 %) in OP, whereas in OA lower figures were observed (12 %). Furthermore, we show that: 1) in OP, atrophic type II fibers a) are3-fold more frequent than atrophic type I fibers ($p<0.01$), b) significantly correlate with the degree of OP($p<0.05$); 2) in OA, type II fibers atrophy a) is 1.5-fold more frequent than type I atrophy ($p<0.001$), b) significantly correlates with type I fiber atrophy, disease duration, degree of pain and functional impairment of hip joint. The average values of Akt in OP, the most affected by atrophy of type II muscle fibers, is two and a half times (60 %) lower ($p<0.01$) than all Akt OA subjects, where the muscle fibers of type II are almost normal. FA was significantly higher in OA compared to OP ($P=0.022$) while MD, λ2 and λ3 were lower in OA compare to OP ($P=0.039$, $P=0.040$, $P=0.022$, respectively).
Conclusion: The reduction of Akt in osteoporotic muscle may be one of the possible moments of compromise in intracellular IGF-1/PI(3)/Akt signaling pathway that is likely to stimulate protein synthesis and cell survival as a result of activation of the complex mTOR/p70S6K22.

P486

PREVALENCE AND RISK FACTORS OF OSTEOPOROSIS IN ALBANIAN POSTMENOPAUSAL WOMEN

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Objective: To measure BMD at the calcaneus bone in Albanian postmenopausal women, and to evaluate the influence of risk factors of osteoporosis on BMD changes.
Material and Methods: Bone mass measurement was performed by quantitative ultrasound at the calcaneus bone. A detailed questionnaire for determination of risk factors for osteoporosis (number of children born; menopause age, coffee and tea consumption, smoking, corticosteroids, rheumatic diseases, BMI, lifestyle, etc.) was administered to all subjects enrolled in this study. 507 postmenopausal ambulatory women were seen to be study eligible.
Results: Osteoporosis was prevalent 4.73 %. Osteopenia was prevalent 25.27 %. Important statistical relationships were found by Kendal's correlation coefficient between menopause and changes on BMD ($r=0.174$; $p=0.001$), and BMD changes and BMI ($r=0.111$; $p=0.003$). Through multiple regression analysis were found important relationships between BMD changes (dependent variable) and number of children born ($p=0.003$), coffee consumption ($p=0.048$), treatment with diuretics ($p=0.050$), rheumatoid arthritis ($p=0.035$).
Conclusion: Responsible factors for changes on BMD in Albanian post menopause women, except menopause, are coffee consumption, BMI, number of children born, treatment with diuretics and rheumatoid arthritis.

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ALTERNATIVES FOR CHRONIC LUMBAR PAIN

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Objective: The high of osteoporosis in the general population, limited diagnostic capacity and controversy about the most appropriate treatment have caused new therapeutic options.
Material and Methods: A 71 year old woman with history of significant osteoporosis, morbid obesity that goes to clinics because of lumbar pain of years of evolution. A L4-L5 decompression and circumferential fusion with interbody peek implants and pedicle screws was done 5 years ago. Three months after surgery the patient continues with the same symptoms. It was decided to perform another intervention by withdrawing the screws on the right side, noting significant

fibrosis and releasing L4-L5 roots. TAC is requested and shows how interbody implants protrude into the channel obliterating the foramina of conjunction.

Results: It is decided to perform another operation, left pedicle screws are removed although it is impossible to remove the interbody implant because of fibrosis and the important risk of dural and root injury. It Is performed an instrumented posterolateral fusion with grafts. Due to the persistence of pain it was decided to place a neurostimulator at the level of D9-D10-D11. Despite the initial success, the psychosocial problems of the patient difficult current valuation.

Conclusion: Osteoporosis, in recent decades, has become a major problem and due to the increase in life expectancy is likely to increase the incidence. Other pathologies such as low back pain secondary to disc degeneration is also a major challenge in our profession. Surgery has been used for decades in the treatment of degenerative disc disease. However, the disparity between clinical results presents difficult choice in cases where the source of pain is not clearly identified. Although good results have been observed, there are still no conclusive evidence of effectiveness of neurostimulators. However, they are increasingly used as an alternative in those patients in which salvage surgery is no longer an option.

P488
THE CORRELATION BETWEEN WOMAC AND LEQUESNE INDEX IN PATIENTS WITH PRIMARY KNEE OSTEOARTHRITIS

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Objective: To determine the correlation between WOMAC and Lequesne index in patients with knee osteoarthritis.

Material and Methods: The analysis included 52 patients with knee osteoarthritis. The criterion for inclusion was the duration of the disease (up to 5 years). All patients filled WOMAC and Lequesne index. WOMAC questionnaire consisted of three parts: WOMAC pain, WOMAC stiffness and WOMAC function. For each listed parts of the WOMAC was calculated the total, then the average value for each part of the questionnaire. Lequesne index was divided into three groups. First part included questions related to the sensation of pain and discomfort. In the second part relating to the maximum distance walked and last part included questions related to activities of daily living. Filling in both questionnaires was performed by patients selecting one of the answers to the above explanation of doctors.

Results: The average age was 59.04±6.71. Women were more frequent (88.50 %). The average BMI was 27.86± 2.11 kg/m^2 and a greater number of patients had second radiological degree by the Kellgren-Lawrence score (76.92 %). The patients were approximately evenly involvement of the left and right knees and at 36.5 % were affected both. In patients with primary knee OA, WOMAC pain was 10.63±4:34; WOMAC stiffness was 3.0±2:09, WOMAC function 31.42±13:43 and total WOMAC was 45.05±18:42. The average Lequesne index was 9.91±3.13. There was a statistically significant correlation between the total WOMAC score and Lequesne index (r=0.64, p<0.01).

Conclusion: WOMAC significantly correlates with the Lequesne index and the use of both is justified in the osteoarthritis of the knee.

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P489
CARDIOVASCULAR DISEASE ASSOCIATED WITH LOW BONE MINERAL DENSITY IN OLDER MEN

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Objective: To investigate lumbar spine and femoral neck BMD and T score particularities in documented coronary artery disease (CAD) men.

Material and Methods: The association between CAD, BMD, and fracture risk in older men is uncertain. We studied spine and femoral neck BMD in 47 angiographically documented coronary artery disease male patients and 31 men with normal angiography by DXA. Patients age varies from 64 to 73 years.

Results: The mean age was 69.5±4.3 years. In multiple regression analysis, after adjustment of age, sex and BMI, severity of coronary artery disease was independently correlated with BMD of lumbar spine. BMD was significantly lower in patient with coronary artery disease (P=0.04). Prevalence of spine osteopenia and osteoporosis in patients with coronary artery disease was 44.3 % whereas 20.8 % of men with normal angiography had femur osteoporosis or osteopenia (P=0.01, OR=4.37; CI95%, 1.29–14, 77).

Conclusion: A negative correlation between CVD and BMD in elder men was demonstrated in our results. A suggestion of bone status evaluation should be considered in patients with vascular disease for earlier diagnosis and prevention of osteoporosis and osteoporotic fractures.

P490

FAILURE IN CERVICAL INSTRUMENTATION

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Objective: Osteoporosis is a widespread disease of the skeletal system characterized by loss of bone mass and microarchitectural deterioration of bone tissue that compromises bone strength and conditions an increased bone fragility, susceptibility to fractures and an increased risk of mobilization of osteosynthesis material.
Material and Methods: This is an 82 years old woman who has HTA, right inguinal hernia repair, intestinal occlusion and T9 fracture who goes to clinics because of progressive gait disturbance with hypoesthesia in both upper limbs. On examination we can observe strength 4+/5 in all cervical roots without motor impairment of the lumbar roots. Hypoesthesia is observed innervated territories by C6, C7 and T8 of both upper limbs without changes in reflexes or in sphincters control. Severe cervicoarthrosis in cervical segment corresponding to C3-C6 is seen in radiographs. **MRI** confirms degenerative in stenosis at these levels especially in C3-C4 where there are myelopathy signs. There is also a decrease in disc height and posterior osteodiscal bulging and degenerative changes are also noted in uncovertebral joints.
Results: On 07/06/2010 is operated performing anterior approach, C4 and C5 corpectomy and replacement with mesh filled with graft, discectomy C6-C7 and placement of anterior plate C3-C7. During the immediate postoperative period it is observed distal screws and mesh mobilization. Five days later, reoperation is performed. Mobilized osteosynthesis material is removed and a longer mesh is placed with iliac crest graft and a new longer plate with six cancellous screws.
Conclusion: The percentage of mobilization of cervical instrumentation is very high in patients suffering from osteoporosis especially if multiple corpectomies are made, most occurring in the first 6 weeks. For this reason, it would be desirable to consider the combination with posterior instrumentation for best results and avoid further surgeries.

P491

INTERLEUKIN-13, INTERLEUKIN-4 AND OSTEOPROTEGERIN AND SRANKL IN PATHOLOGY OF BONE METABOLISM IN PATIENTS WITH LEŚNIOWSKI-CROHN DISEASE AND ULCERATIVE COLITIS

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Objective: Inflammatory bowel disease (IBD) is pathology related to bone loss and osteoporosis. IL-4 is a pleiotropic immune cytokine that is closely related to IL-13. Both cytokines bind to receptor IL-4Rα. IL-4 regulates bone metabolism by effects on osteoclast interfering with NF-κB and calcium signaling. IL-4 and IL-13 increase OPG expression and decrease RANKL expression. Evaluation of BMD by DXA, serum concentrations [c] of IL-13, IL-4, sRANKL and OPG by ELISA in patients with IBD and in control group and evaluation correlation between IL-4, IL-13 and OPG, s-RANKL and BMD.
Material and Methods: Group: Leśniowski-Crohn (I:L-C) n=37 mean age 31.7 years SD 8.0, 15 female and 22 male, in ulcerative colitis (II:CU) n=37 mean age 40.6 years SD 15.1, 21 female and 16 male and control (III:C) n=37 mean age 29.6 years SD 8.0, 18 female, 19 male. Mean BMD (g/cm^2) in group I:L-C in L2-L4: 1.109±0.193 in neck: 0.922±0.202, II:CU in L2-L4: 1.168±0.155 in neck: 0.965±0.160, III:C in L2-L4: 1.224±0.084 in neck: 1.0859±0.159. Prevalence of osteoporosis and osteopenia in I:L-C - 18.92 % and 32.43 % in L2-L4; 13.51 % and 35.13 % in neck, II:CU - 2.7 % and 37.84 % in L2-L4; 2.7 % and 29.73 % in neck. Mean serum [c] of: IL-13 (pg/ml), IL-4 (pg/ml), OPG (pmol/l), s-RANKL (pmol/l): I:L-C: 65.85±48.61; 0.06±0.12; 8.76±3.22; 284.87 ±213.05, II:CU: 109.36±42.84; 0.26±0.36; 6.02±2.51; 223.81±118.14 III:C: 5.32±2.01; 0.51±1.51; 9.42±2.10; 236.84±111.63.
Results: Serum [c] of IL-13 and OPG differ significantly in group I, II, III. Serum [c] of IL-4 correlated negative with BMD L2-L4 in L-C group and IL-13 correlated negative with neck BMD in all person. OPG correlated negative with IL-13 in all person. s-RANKL correlated negative with IL-4 in CU group.
Conclusion: Osteopenia and osteoporosis in patients with IBD are frequent. IL-13 and IL-4 may decrease BMD in IBD by modulation OPG and sRANKL.
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P492

BONE METABOLISM AND ADIPOSE TISSUE EXPRESSION OF ADIPOCYTES IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Objective: To investigate the serum adiponectin, leptin and osteoprotegerin (OPG) levels and its expressions in the adipose tissue, and their relationships with bone metabolism and in patients with severe COPD.
Material and Methods: Serum leptin, adiponectin, OPG, the receptor activator of nuclear factor-kB ligand (RANKL) and bone turnover markers (osteocalcin and type I collagen C-telopeptide (CTx)) were determined in 52 patients with severe COPD and 42 age- and sex-matched healthy controls. BMD and body composition was assessed by DXA at the lumbar spine (LS) and left femur neck (FN). Subcutaneous adipose tissue samples were analyzed by immunocytochemical analyses.
Results: Adipose tissue expression of leptin (LepR) was low and adipose tissue expression of adiponectin (AdipoR1) was higher in COPD group than in control. Compared to patients without osteoporosis, those with the disease had significantly lower serum leptin, OPG levels and LepR, in association with increased serum CTx, RANKL, adiponectin and AdipoR1 expressions ($p<0.05$). LepR was inversely related to serum CTx ($p<0.01$), and directly to serum leptin ($p<0.01$), to fat free mass (FFM) ($r=0.44$, $p<0.01$) and to BMD FN and BMD LS ($p<0.05$ for all relationships). Serum leptin was correlated positively with OPG ($p<$o.05) and negatively with RANKL ($p<0.05$); serum adiponectin was negative association with serum OPG ($p<0.05$) and positive correlation with RANKL ($p<0.05$) in severe COPD. AdipoR1 expression was negatively related to FFM ($r<-0.51$, $p=0.01$) and directly to serum adiponectin and CTx ($p<0.01$). Adipose tissue OPG expression was related to BMD FN only ($p<0.05$).
Conclusion: Our results suggest that adipose tissue leptin, adiponectin and OPG expressions are related to development of osteoporosis in severe COPD, and appear to act as mediators between fat mass and bone density.

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IMPACT OF OSTEOPOROSIS IN SPINAL FRACTURES

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Objective: Osteoporosis is an important problem of great social impact represents a high health care spending. Although the incidence of osteoporotic fractures is lower in men (39 % of the total), morbidity and mortality is higher so early diagnosis is critical.
Material and Methods: This is a 62 years old man with history of hypertension, hypertensive heart disease, osteogenesis imperfecta, rheumatoid arthritis, complete thrombosis of internal carotid and facial paralysis which goes to clinics for chronic back pain. On examination we observe general pain in lumbar region and negative Lassegue and Bragard signs. There is a dorsolumbar scoliosis with right- left curve structures. There is no involvement of strength or feeling in both lower limb and sphincters are not affected. Lumbar scoliosis is confirmed in radiographs and in MRI marked degenerative changes in vertebral bodies are seen with decreasing height and anterior wedging mainly in level D11, L1 and L5.
Results: On 27/03/12 he was operated doing a decompression and fusion with cemented screws from D11 to S1 using a posterior approach. During the postoperative period she presents febrile syndrome with MRSA bacteremia treated with Rifampin and Linezolid which is solved after several months of treatment. The patient reports pain relief allowing her to perform works of daily living.
Conclusion: Vertebral fractures are the most common type of osteoporotic fractures. Most fractures happen at the thoracolumbar junction and are associated with low bone density. However it has been found that other factors are also important as bone disease (osteogenesis imperfecta in our case), activities of daily life or trauma. It is important to make an early diagnosis since it has been observed that these fractures cause significant reductions in quality of life and increased mortality.

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INTERLEUKIN-10, TNF-α, OSTEOPROTEGERIN, SRANKL IN PATHOLOGY OF BONE METABOLISM IN PATIENTS WITH LEŚNIOWSKI-CROHN DISEASE AND ULCERATIVE COLITIS

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Objective: Evaluation of BMD by DXA, serum concentrations of IL-10, TNF-α sRANKL and OPG by ELISA in patients with IBD and in control group and evaluation correlation between IL-10, TNF-α, OPG, s-RANKL and BMD. Evaluation of influence disease duration and number of hospitalization on BMD.
Material and Methods: Group: Leśniowski-Crohn (I:L-C) $n=37$ mean age 31.7 years SD 8.0, 15 female and 22 male, in ulcerative colitis (II:CU) $n=37$ mean age 40.6 years SD 15.1, 21 female and 16 male and control (III:C) $n=37$ mean age 29.6 years SD 8.0, 18 female, 19 male.

Results: Mean BMD (g/cm^2) in group I - L-C in L2-L4: 1.109 ±0.193 in neck: 0.922±0.202, II - CU in L2-L4: 1.168±0.155 in neck: 0.965±0.160, III-C in L2-L4: 1.224±0.084 in neck: 1.0859±0.159. Prevalence of osteoporosis and osteopenia in I - L-C - 18.92 % and 32.43 % in L2-L4; 13.51 % and 35.13 % in neck, II - CU - 2.7 % and 37.84 % in L2-L4; 2.7 % and 29.73 % in neck. BMD Neck and T-score in I-L-C differ significantly with III-C ($p<0.05=0.0007$) but not differ with II-CU. Mean serum concentration of: IL-10 (pg/ml), TNF-α (pg/ml), OPG (pmol/l), s-RANKL (pmol/l): I - L- C- 1.67± 3.69; 4.62±5.16 8.76±3.22; 284.87±213.05, II - CU- 5.97± 22.80; 3.82±4.54; 6.02±2.51; 223.81±118.14, III-C - 0.84± 1.78; 2.04±0.81; 9.42±2.10; 236.84±111.63. Serum concentrations of IL-10 correlated negative with OPG in all patients. Serum concentration of cytokines differ between group but we didn't observe any correlation with BMD. In CU group we observed positive correlation between TNF-α and OPG. Duration of disease (in years) were: I - L-C -8.05±5.29, II - CU 8.03±7.92 and correlated with neck T-score and Z-score. Similar correlation was for number of hospitalizations.

Conclusion: Prevalence of osteopenia and osteoporosis in patients with IBD increase with disease duration and number of hospitalizations. Patients with Leśniowski-Crohn disease have higher probability of bone resorption. Interleukin-10 and TNF-α may modulated BMD by OPG. **Acknowledgements:** NN 402 481 737

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BONE LOSS IN WOMEN WITH CROHN'S DISEASE

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Objective: Gastrointestinal disease is often overlooked as a cause of osteoporosis (OP). Gastrointestinal diseases associated with OP include early onset of disease (and, therefore, prolonged exposure to risk factors for developing OP, particularly with inflammatory bowel disease), malabsorption, and maldigestion of nutrients necessary for bone health and maintenance (calcium, vitamin D), as well as the impact of glucocorticoids. The aim of this study was to investigate the BMD in patients with Crohn's disease to propose some strategies for management OP.

Material and Methods: Two groups of women with Crohn's disease were studied: I group 11 premenopausal women in the age 25–45 years; II group 13 postmenopausal women aged of 45–65 years. All patients were treated periodically with glucocorticoids. 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 one year of medication with supplemental calcium and vitamin D; in the II group patients were received intravenous injections of ibandronate 3 mg/3 ml every 3 months.

Results: In both groups of women with Crohn's disease before medication the mean BMD was decreased. I group T-score: distal 1/3 radius −1.6±0.06; midshaft tibia −1.7±0.06; proximal phalanx- 2.0±0.08; II group T-score: −2.7±0.07; −2.5±0.05; −2.8±0.06. After one year medication in both groups of women BMD was increased: I group T-score: −1.2±0.06; −0.5±0.06; −1.4±0.08; II group T-score: −2.0± 0.08; −1.6±0.06; −1.6±0.07, respectively.

Conclusion: Patients with Crohn's disease are at increased risk of developing disturbances in bone and mineral metabolism because of several factors. All patients with Crohn's disease should be screened for OP by means of a BMD measurement in addition to full correction of any potential calcium and vitamin D deficiency.

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NEW POINT OF CARE METHOD FOR OSTEOPOROSIS DIAGNOSTICS IN US

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Objective: Currently, majority of the osteoporotic patients are not diagnosed (1). A new ultrasound based device (Bindex®) has been recently introduced for osteoporosis (OP) screening and diagnostics at primary healthcare (2). Bindex® measures cortical thickness and determines parameter called density index (DI). Thresholds for DI in OP assessment have been determined in Finnish-Caucasian (F- C) population ($n=448$) along the International Society of Clinical Densitometry (ISCD) guidelines (3). In this study, these thresholds are tested in American- Caucasian (A-C) population.

Material and Methods: A total of 221 A-C females participated the study (age 69.7±9.4 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). DI was calculated either by using measurement at one location (DI_1, proximal tibia) or all three locations (DI_3). By using the diagnostic thresholds, subjects were classified as healthy, osteoporotic or in need of DXA examination to verify diagnosis.

Results: A total of 74.2 % and 73.8 % of the subjects could be directly diagnosed by using Bindex® measurement, with DI_1

and DI_3, respectively. Both parameters showed significant linear correlation with total proximal femur BMD (r=0.62–0.70). Sensitivity in OP diagnostics was 80.9 % and 89.7 % for DI_1 and DI_3, respectively. Specificity was 86.9 % and 84.3 % for DI_1 and DI_3, respectively. OP was diagnosed in 68 subjects in total.

Conclusion: In this study, fewer subjects would have needed additional DXA examination to verify diagnosis when compared to previous findings. The correlation between BMD and DI was similar than previously observed. These results suggest that F-C thresholds may be applicable for A-C population.

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MARKERS OF BONE METABOLISM (OSTEOCALCIN AND B-CROSSLAPS (B- CTX)) AND PARATHYROID HORMONE IN MEN WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) (AGED 40–70 YEARS)

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Objective: COPD and osteoporosis are strongly associated. Our aim was to study the imbalance of markers of bone metabolism in men with COPD.

Material and Methods: Serum PTH was determined by the enzyme-linked immunosorbent assay. Bone markers were determined by the electrochemiluminiscence immunoassays. We examined 3 groups of patients and control group (15 healthy men with mean age 56 year, mean BMI 26 kg/m^2). The COPD pts were subdivided into groups according to COPD severity: the 1st was made of 20 men; GOLD I degree; mean age 55 years; FEV_1 78 %, the 2nd included 43 patients; GOLD II degree; mean age 57; FEV_1 63 %; the 3^d -20 pts; GOLD III degree; mean age 60; FEV_1 41 %.

Results: The level of b-CTX increased during COPD progression: in the control −0.29 ng/ml; 1st group - 0.30; 2nd- 0.40 and 3rd group - 0.37; p<0.05 vs. the control and the 1st group. b-crosslaps was elevated in 5 % patients in the 1st group, in 24 % patients in the 2nd group. Increased b-crosslaps was noted in 11 % patients in the 3rd group, but without significant differences with 1st and 2nd groups. Osteocalcin level was decreased in 32 % pts in the 1st group and 45 % in the 2nd group. Osteocalcin was reduced in 47 % pts in the 3rd group, but with no significant differences with 1st and 2nd groups. The level of PTH decreased during COPD progression: in the control - 38.5 (35.6; 46.7) pg/ml; 1st group - 32.5 (24.6; 41.3); 2nd- 26.6 (22.3; 33.6) and 3rd group - 24.9 (19.0; 35.4); p<0.05 control vs. the 1st and 2nd groups.

Conclusion: Bone metabolic imbalance caused predominantly disturbance of bone formation then increasing bone resorption in men with COPD. This is supported by a significant number of patients (43 %) with a marked reduction of osteocalcin as compared with patients (9 %) with higher level of b-crosslaps (χ^2=2035, p<0.001). The observed reduction of osteocalcin against reduction of serum level of PTH indicated the predominance of the anabolic effect of PTH in men with COPD.

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EFFECTS OF ANTIRESORPTIVE OSTEOPOROSIS THERAPY ON SPINE BMD AND TRABECULAR BONE SCORE (TBS) IN POSTMENOPAUSAL WOMEN

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Objective: BMD measurements (DXA) is the reference standard for diagnosing osteoporosis. TBS, a new grey-level texture measurement that can be extracted from DXA, is an index of bone microarchitecture independent of BMD and several studies have documented its value for fracture risk assessment. To date there are no conclusive data on the role of TBS in the monitoring of antifracture treatment The aim of this study was to assess the effects of antiresorptive therapy on lumbar spine BMD and TBS in postmenopausal women.

Material and Methods: A group of untreated Caucasian women (age 49–83 years) were candidate for treatment (oral bisphosphonates 94 % and raloxifene 6 %), if osteoporotic (64 %) or osteopenic (36 %) with high fracture risk (FRAX). All patients received vitamin D and calcium supplements. We performed DXA examination (Hologic Explorer) before and after a treatment period of 24 months. TBS was calculated for each lumbar spine exam. The correlations between lumbar spine BMD and TBS and between FRAX (total) and TBS were examined.

Results: N 150 women (mean age 64, menopause mean age 50) completed the study, the adherence was >75 %. A weak correlation was seen between BMD and TBS values before (r=0.39) and after therapy (r=0.32).A significant difference (p=0.019) were observed for the mean value of FRAX (total) among patients in the lowest quartile of TBS (n.38 cases)

compared to those in the higher quartiles. After therapy, we observed a significant increase in mean spine BMD (0.072± 0.08 gr/cm^2 vs. 0.806±0.09 gr/cm^2, p<0.001) and a, not significant increase in mean TBS (1.074±0.13 vs. 1.180± 0.11).

Conclusion: Our data suggest a weak sensitivity of TBS to detect the effects of osteoporosis treatment in postmenopausal women over a period of 2 years. The results are consistent with the known effect of maintenance of bone microarchitecture of antiresorptive agents. Additional longitudinal studies are required to clarify the role of TBS changes in the monitoring of various osteoporosis therapies.

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OSTEOPOROTIC OR METASTATIC VERTEBRAL COLLAPSE IN ONCOLGY: WHAT IS THE CONTRIBUTION OF THE SPECT/CT?

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Objective: Differentiation of benign and malignant causes of vertebral collapse can be difficult because both of them occur in an elderly population with no notion of trauma. The aim of our study is to determine the contribution of SPECT/CT as a complement of planar bone scintigraphy in the identification of benign and malignant causes of vertebral collapses.

Material and Methods: Our study included 10 patients referred to the department of nuclear medicine for the staging assessment of their primitive neoplasy. Planar bone scintigraphy showed spinal hot spots. The complement SPECT/CT revealed a vertebral collapse.

Results: All patients included in our study had a known malignancy. Sex ratio H/F: 0.25, the mean age of the patients was 61.4 years. The location of spinal hot spots was classified as panvertebral in 9 cases and hemivertebral in one case. The complement SPECT/CT highlighted a vertebral collapse that interested the lumbar spine in 6 cases and the thoracic spine in 4 cases. The aetiology of vertebral collapse was osteoporotic in 8 cases and metastatic in just 2 cases.

Conclusion: Planar bone scintigraphy is very sensitive to evolutive vertebral lesions, however, it has a very weak specificity. Therefore, the SPECT/CT is useful in the distinction between the benign and malignant cause of vertebral collapses.

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VERTEBRAL FRACTURE ASSOCIATED TO OSTEOPOROSIS AND HEMANGIOMA

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Objective: The fractures of vertebral bodies in aged patients are really common after making a small effort or activity due to the poor bone quality, and a second cause a hemangioma or any other benign or malignant process. They can lead to chronic lumbar pain and other complications. Kyphoplasty is a good treatment to restore the shape and volume of the vertebra and to get good functional results in aged patients.

Material and Methods: An 81 years old female patient presented an increase of her lumbar pain not irradiated to lower extremities and with no neurological deficiencies after a small effort. The examination showed lumbar pain, Lasegue and Bragard signs were negative. A small compression fracture in L1 was demonstrated in the X-ray and confirmed with a TC. The TC also showed a hemangioma in the body of L1 and a low bone density.

Results: A kyphoplasty of L1 was made percutaneously with an expansive device and posterior cement augmentation with X-ray control. Lumbar pain was controlled with analgesics and ceased 3 days later. After one year follow-up the patient does not have back pain, she realizes the basic dairy activities by herself and do not require analgesics.

Conclusion: Lumbar fractures in patients with low bone mass are really common and can be produce by small efforts or daily activities. A hemangioma in an osteoporotic lumbar spine is a bigger risk for this kind of fractures. The back pain caused can be very invalidating and kyphoplasty is a good treatment reaching a full recovery and a total reincorporation to the daily activities.

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PROGRESSIVE NEUROLOGICAL DEFICIENCY AFTER AN OSTEOPOROTIC VERTEBRAL FRACTURE

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Objective: The neurological deficiency can be the first demonstration of nondiagnosed osteoporotic vertebral fracture and it is not very common. The neurological deficiency can be recovered depending on the time of evolution, the progression of the symptoms and an adequate surgical treatment. Kyphoplasty combined with lumbar fusion is a good treatment to relieve pain and obtain good clinical results.

Material and Methods: An 88 years old female patient presented an increase in her chronic lumbar pain with progressive neurological deficiency in her inner extremities

without previous trauma for a week. The examination showed a diminished force in her limbs, hypoesthesia in L4, L5 and S1 dermatomes, inability to stand up and could not control sphincters. X-ray demonstrated a compression fracture of T12 and L3 and an osteoporotic lumbar spine, confirmed by capting image in T2 sequence of MRI as acute T12 fracture and spinal cord compression at this level.

Results: Initial treatment with intravenous corticoids were unsuccessful. A percutaneous kyphoplasty combined with a T11-L2 decompression and fusion were made. Back pain diminished after surgery and a bilateral anti-echinus braces were used to controlled the residual echinus. After a 6-moth followed-up the patient has no back pain, does not need anti-echinus braces, walks with help and has regained control of bladder and anal sphincters.

Conclusion: Undiagnosed osteoporotic vertebral fractures in aged people can developed as a first symptom a neurological deficiency. MRI has great utility in diagnosis of acute vertebral fractures and spinal cord compression. An emergency surgical treatment is elective to achieve a recovery of the neurological symptoms. The percutaneous kyphoplasty and vertebral fusion in aged patients is a good treatment to minimize opened surgery risks, and the results are very similar to the ones obtained by open surgery.

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ANALYSIS OF PATIENTS TREATED AT THE INSTITUTE FOR ORTHOPEDIC SURGERY "BANJICA" FOR MOST SEVERE OSTEOPOROTIC COMPLICATIONS

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Objective: Hip fractures are the most severe complications related to osteoporosis. The aim of this study was to make a retrospective analysis of patients with hip fracture that were treated at our Institute.

Material and Methods: 110 patients hospitalized for hip fractures in the geriatrics department of the Institute for orthopedic surgery during 2012–2013 were studied. The following parameters are presented: age of the patient, level of the fracture, number of days spent in the hospital, previously made diagnosis of osteoporosis, presence of simultaneous multiple fractures, as well as result of the treatment at the end of hospital stay.

Results: 110 female patients whose mean age was 74.66 years were treated (the youngest patient had 55 years and the oldest had 92 years). Fracture level: 56 patients had fracture of the femoral neck, 45 patients had intertrochanteric fractures of the hip and 9 patients had subtrochanteric fractures. Mean time spent in the hospital was 28.49 days (min. 4, max. 82 days). Only four patients had osteoporosis diagnosed before fractures and were on medication therapy. 56 patients were treated operatively and 54 conservatively. There was a lethal outcome in 8 patients (2 of which were treated operatively and 6 conservatively).

Conclusion: Results of this analysis indicate that greater care in early detection of osteoporosis is a serious task for both individuals, family, health institutions and the society in general. Such behavior would also help in prevention of the most severe osteoporotic complication - hip fracture.

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APPROPRIATENESS OF OSTEOPOROSIS TREATMENT WITHIN A MEDICAL INPATIENT POPULATION IN AWELSH DISTRICT GENERAL HOSPITAL

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Objective: To assess the pharmacological management of osteoporosis in a cohort of hospitalized medical in-patient within a Welsh district general hospital.

Material and Methods: We collected data using medical records on a structured proforma as a point prevalence study targeting medical inpatients aged fifty and above in an admitted hospital cohort.

Results: All of the 117 patients studied (100 %) had at least 2 or more risk factors. 83 (71 %) of them had >3 risk factors. 28 (24 %) of the inpatients were on any form of treatment for osteoporosis and an equal number (i.e.24 %) had undergone a fracture risk assessment. Only 16 (13.6 %) of them were on both calcium-vitamin D3 and a bisphosphonate. 25 (21.4 %) of them were receiving calcium and vitamin D3. 19 (16.%) of them were on bisphosphonates [17 on alendronate, 1 on denosumab, 1 on risedronate]. 8 (6.8 %) of them had contra-indications to bisphosphonates and among them only 4 of them were on calcium and vitamin D3.

Conclusion: A significant percentage of hospitalized inpatients have risk factors for osteoporosis. Several of them have multiple risk factors but are inadequately treated for osteoporosis. Creating an awareness in this aspect among health professionals for identifying and adequately treating patients with osteoporosis would be a step towards reducing the burden of this chronic and treatable condition.

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DECREASED OPG LEVELS IN THE SERUM OF BORRELIA AFZELII SEROPOSITIVE PATIENTS

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Objective: Borrelia infection has a colorful symptomatology, which due to colonization of various tissues span from erythema migrans, arthritis, carditis to various neurological symptoms. Recently, some Borrelia surface antigens, namely OspA, DbpA, and BBA64 antigens have been identified as determinants of cellular adherence. As arthritis characterizes 60 % of cases, it might be of interest to find its predictive biomarkers. Osteoprotegerin (OPG) became our target as its administration in mice proved to be protective against cartilage destruction and prevented chondrocyte apoptosis.
Material and Methods: An overall of 76 Borrelia afzelii seropositive patients (18 with IgM/IgG, 31 IgM, 27 IgG positivity) and 44 seronegative controls have been tested for serum OPG levels. Samples were drawn from individuals who visited our ambulatory service for recent tick-bite or serological follow-up after treatment. Borrelia afzelii IgM and IgG has been measured by commercially available ELISA assays (Sekisui Virotech, Germany), OPG was determined by a sandwich ELISA applying the OPG Duoset kit (R&D Systems, DY805).
Results: All seropositive groups had significantly lower OPG levels than the control group. The highest OPG values have been detected at the control group, 3.12±0.21 ng/mL, while the double positive group showed the lowest levels of 1.57± 0.20 ng/mL. IgM and IgG seropositive cases possessed similar OPG levels of 2.18±0.17 vs. 2.20±0.18 ng/mL.
Conclusion: The significant decrease of OPG levels in Borrelia afzelii seropositive patients may suspend its protective effect on the cartilage tissue and could contribute to the formation and progression of Lyme arthritis. For this consideration, OPG should be considered as a new predictive marker of arthritis related to tick- borne disease.
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OSTEOPOROSIS SCREENING AND RISK OF FRACTURE PREDICTION TOOLS IN THE ECUADORIAN POPULATION

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Objective: To analyze the OST score (self-assessment Osteoporosis Screening Tool) as a screening method for osteoporosis and predict fracture risk osteoporotic calculated by the FRAX® tool to a group of Ecuadorian men and women.
Material and Methods: 286 patients, 206 men and 80 women were included. All patients were given a bone densitometry in lumbar spine and hip with a Hologic Discovery W® densitometer. The OST score was calculated using the formula: 0.2 × (weight in kg - age in years). A OST score <2 indicated osteoporosis and corresponded to a T-score in femoral neck of ≤−2.5. The risk of major and hip osteoporotic fracture was calculated using the FRAX tool with data generated for the Ecuadorian population.
Results: Men: mean age 64.5±8.7 years; mean FRAX hip 0.18±0.32; Sensitivity 25 % (0.00–79.93); Specificity 99.49 % (98.24–100); Positive predictive value 50 % (0.0–100); Negative predictive value 98.48 % (96.53–100); Area under the ROC curve 0.622 (0.377–0.867). Mean OST 2.3± 2.98; sensitivity 100 % (90–100); specificity 59.60 % (52.51–66.68); positive predictive value 5.88 % (0.29–11.47); negative predictive value 100 % (99.58–100); area under the ROC curve 0.79 (0.763–0.832). Women: mean age women 61.9± 11 years; mean FRAX hip 0.64±0.30; sensitivity 28.57 % (6.87–50.27); specificity 100 % (99.09–100); positive predictive value 100 % (91.67–100); negative predictive value 78.57 % (68.24–88.90); area under the ROC curve 0.64 (0.050–0.543). Mean OST 0.31±0.05; sensitivity 94 % (82–100); specificity 42.11 % (28.41–55.8); positive predictive value 35.9 % (21.20–49.39); negative predictive value 96 % (86.32–100); area under the ROC curve 0.68 (0.601–0.766).
Conclusion: Score OST has a high sensibility for screening to osteoporosis in both Ecuadorian, men and women. We consider that the version for the Ecuador of the FRAX tool, underestimate the probability of fracture osteoporotic. FRAX cutoffs for assessment with DXA and therapeutic intervention has not been established in our population.

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LITERATURE REVIEW OF THE LOCKED METACARPOPHALENGEAL JOINT

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Objective: in this presentation our aim is to focus on the differentiation between two different pathologies, stenosing flexor tenosynovitis and the locked MCP, with literature review of this entity.
Material and Methods: A case repot is presented with the initial presentation, with its management, followed by time sequence literature review of this entity from its initial emergence, with exploration of the etiological classification system for the locked MCP.
Results: Locked MCP joint of long fingers refers to loss of active and passive extension of the MCP joint without loss of flexion and with a normal mobility of the interphalengeal (IP) joints, as defined by Posner. In this presentation our aim is to focus on the differentiation between two different pathologies, stenosing flexor tenosynovitis and the locked MCP, with literature review of this entity. A case repot is presented with the initial presentation, with its management, followed by time sequence literature review of this entity from its initial emergence, with exploration of the etiological classification system for the locked MCP.
Conclusion: Locked MCP joint of long fingers refers to loss of active and passive extension of the metacarpophalengeal Joint without loss of flexion and with a normal mobility of the IP joints, as defined by Posne; in this presentation our aim is to focus on the differentiation between two different pathologies, stenosing flexor tenosynovitis and the locked MCP, with literature review of this entity. A case repot is presented with the initial presentation, with its management, followed by time sequence literature review of this entity from its initial emergence, with exploration of the etiological classification system for the locked MCP.
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CROSS-CALIBRATION OF BMD MEASUREMENT BETWEEN A DEDICATED PQCT SCANNER AND QCT OF PERIPHERAL SITES USING A CLINICAL WHOLE-BODY HELICAL CT SCANNER

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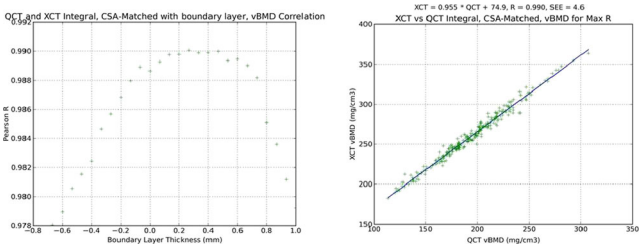
Objective: Dedicated pQCT scanners have restricted availability, require minutes of scanning time often causing motion artefact, and image isolated slices. Whole- body helical CT scanners are widely available and require only seconds per scan. A previous study has explored the use of whole-body scanners for pQCT [1] but the provision of pediatric normal data has not been addressed.
Material and Methods: Our 287 M & F subjects (14.4± 2.7 years; range 8–23) cohort had tibia CT imaging with QCT calibration (Mindways, Austin, TX) and pQCT using Stratec XCT2000 (Orthometrix, White Plains, NY) on 1 day. Whole tibia CT was 120 kVp, 1 mm slices and 0.5 mm pixels; 2.3 mm pQCT slices were at 3 % proximal to the distal physis, 0.4 mm voxels. Volumetric integral BMD (vBMD) was compared by matching bone cross-sectional area (CSA) of XCT scans with QCT slices correcting for resolution difference. Cross-calibration was by linear least- squares.
Results: The effective "boundary layer" for maximum correlation when comparing CSAs from the two methods was ~0.4 mm (see graph). Using this thickness, a linear correlation for vBMD was found with R=0.990 and a standard error (SEE) of 4.6 mg/cm^3. A linear cross-calibration equation for vBMD was determined as XCT=0.96 * QCT + 75 mg/cm^3.



Conclusion: A strong correlation in vBMD estimates was observed with a an offset of −75 mg/cm^3 consistent with Stratec machines using fat as the zero for BMD while Mindways uses water. The SEE of 4.6 mg/cm^3 is much less than expected normal- population vBMD dispersion estimates. The observed cross-calibration equation could be used to convert whole-body CT derived vBMD estimates for comparison to existing Stratec reference data.
References: [1] Engelke et al. Bone 2009;45:110

P508
RELATION AMONG ANTHROPOMETRIC VARIABLES, SARCOPENIA AND BONE MINERAL DENSITY IN POSTMENOPAUSAL ADULT WOMEN

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Objective: To evaluate the relation among anthropometric variables, sarcopenia and BMD at lumbar spine (LS) in postmenopausal adult women.
Material and Methods: There were selected by convenience 39 postmenopausal women until 60 years old, all attending the

Public Hospital of Ribeirão Preto. Data were collected at Laboratory of Balance Evaluation and Rehabilitation of the Medical School at the University of São Paulo. The subjects were classified according to World Health Organization: G1(T-score>−1 SD): normal BMD, G2(-1<T-score<−2.5 SD): osteopenia and G3 (T-score<−2.5 SD): osteoporosis. All were submitted to LS and whole-body DXA to determine BMD and relative skeletal muscle index (RSMI). The Timed up and Go Test (TUG), Handgrip Test (HG) and anthropometric variables measured and BMI calculated. The groups were compared using t-test/Mann- Whitney test with differences considered significant $p \leq 0.05$. The correlations between variables were assessed using Pearson's analysis.

Results: The LS BMD showed the prevalence of 39.5 % with normal BMD ($n=15$), 50 % with osteopenia ($n=19$) and 10.5 % osteoporosis ($n=4$). As only 4 women presented osteoporosis, the statistical comparisons were done between G1 and G2. No differences were found for variables age, age of menopause, weight, height, BMI, RSMI, TUG and HG ($P>0.05$). Only 13.3 % of G1 and 5.3 % of G2 reached the RSMI cutoff of 5.5 kg/m^2 for sarcopenia. There were moderate correlation between LS BMD and RSMI ($r=-0.34$; $p=0.05$) and between RSMI and TUG ($r=0.39$; $p=0.06$), but a strong correlation between RSMI and weight ($r=0.73$; $p<0.0001$).

Conclusion: The results shown that 60 % of women presented decrease of LS BMD, which corroborate with studies that shown changes in BMD before 65 years. Also, results suggest that lean mass could affect the spine BMD and the protective factor of weight on BMD may be associated to lean mass. The cutoff 5.5 kg/m^2 for RSMI may not be appropriate for the evaluated sample.

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OSTEOPOROSIS RISK ASSESSMENT IN AWELSH DISTRICT GENERAL HOSPITAL

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Objective: To determine the prevalence of clinical risk factors for osteoporosis in medical inpatients.

Material and Methods: Data was collected on a patient questionnaire through a point prevalence study targeting patients aged fifty and above.

Results: 117 patients (62 female; 55 male) met the age criteria. Nonmodifiable risk factors were white/Caucasian race (117), age 75 years and above (77), female sex (62), previous fragility fracture (16) family history of osteoporosis and fragility fractures (4). Potentially modifiable risk factors were restricted mobility (63), low BMI (33), frequent falls (20), smoking (17), excess alcohol use (9). Secondary causes of osteoporosis (68) were chronic kidney disease (25), insulin dependent diabetes mellitus (8), rheumatoid arthritis (7), hormone therapy for breast cancer/prostate cancer (5), inflammatory bowel disease (5), chronic liver disease (5), hyperthyroidism (2), hyperparathyroidism (1), premature menopause (1) and Paget's disease of bone (1). 14 were on long term oral steroids. 71 % were at high risk for osteoporosis with more than three risk factors.

Conclusion: Identification of clinical risk factors is a recommended case finding strategy for osteoporosis. Our study shows that clinical risk factors for osteoporosis are common. Majority of them had multiple risk factors. Screening hospitalised patients for osteoporosis can be utilised as an additional opportunity to identify and treat the disease and thereby reduce the burden of osteoporosis related falls and fractures. Ideally, all the patients at high risk clinically should be offered further assessment for osteoporosis. The literature suggests an additive effect for risk factors and guides us to prioritise patients who would need a DXA scan thus enabling an efficient use of scarce resources.[1]

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P510
OSTEOPOROTIC AXIS FRACTURE: DECISIONS AND COMPLICATIONS

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Objective: An older person usually sustains a type II odontoid fracture in a fall from standing or a seated height. Cervical spine fractures in the elderly are potentially life threatening. The best treatment remains unclear because of the morbidity associated with prolonged cervical immobilisation versus the risks of surgical intervention. Special situation would be an osteoporotic axis fracture in which first fixation could be complicated with another pathologies or the synthesis failure.

Material and Methods: Man of 80 years old who suffered an acute pain in his neck after a minimal effort and small fall down, with cervical trauma. He had a 15 points Glasgow scale, without discovering any alteration in his physical examination. After X-ray and TC study, a C2 fracture was discovered: Anderson and D'Alonzo type II odontoid fracture. The injury was reduced by open reduction and synthesis with one central screw; this technique was completed by anterior approach and the use of an intraoperative 3D image-TC (O-arm).

Results: C2/C3 joint seemed to be stable after that surgical treatment; C3/C4 became to be dislocated after a discitis. It was decided to remove the infection soft tissue inside C3 and C4 disc space and vertebral bodies, and replace it for two

titanium implants and an anterior plate with screws. After completing antibiotic treatment, actual outcomes offer the patient stable fixation, with normal analytic parameters and without any radiological sign of failure. Anti-resorptive treatment was ordered for medical support.

Conclusion: Older patients seem to sustain Type II odontoid fractures because, during a simple fall, the rotation of the head produces torque force on the osteoporotic dens-body junction. Some authors defend immediate single-stage anterior-posterior reduction, instrumentation, and arthrodesis, directly. Cement- augmented screw could prevent osteoporotic failure or collapse. O-arm offers high-resolution 2D/3D images that facilitate the accurate and safe insertion of CPS via high quality navigation.

P511
SPINE PHANTOMS ARE INADEQUATE FOR DXA WHOLE BODY COMPOSITION CROSS-CALIBRATION

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Objective: Patient assessment continuity requires measurements be consistent between densitometers; consequently, cross-calibration is necessary. To this end, when replacing a DXA unit with the same model, ISCD recommends scanning phantoms 10 times on each instrument and states spine BMD should be within 1 %, while %fat, lean and fat mass should be within 2 % of the prior instrument. We report a total body cross-calibration experience with phantoms and humans.

Material and Methods: Cross-calibration between an existing and new Lunar iDXA was performed using 3 encapsulated spine phantoms (GE-Lunar, BioClinica & Hologic), one body composition phantom (BioClinica) and 30 human volunteers. Thirty scans of each phantom and a total body scan of human volunteers were obtained on each instrument.

Results: All spine phantom BMD means were similar (within 1 %) between existing and new unit, −0.010 g/cm^2 bias. The total body phantom (TBP) BMD and BMC values were within 2 % with biases of 0.005 g/cm^2 and 3.3 g. However, lean, fat and %fat mass measurements differed by 4.6 to 7.8 % with biases of +463 g, −496 g and −2.8 %. In vivo comparison verified TBP data; BMD/BMC were within ~2 % but lean, fat and %fat differed from 1.6 to 4.9 % with biases of +833 g, −860 g and −1.2 %. As all body composition values exceeded the recommended 2 %, the new instrument was recalibrated to conform with existing scanner. Post recalibration analysis of in vivo scans revealed reduced bias for lean and fat; −22.7 g and −4.6 g, reducing difference to 0.1 %. Similarly, agreement of TPB lean and fat improved.

Conclusion: Recognizing we studied only iDXAs, these data suggest the BioClinica TBP behaves similar to human in vivo measurements for densitometer cross-calibration. Additionally, although falling within the recommended 1 % BMD and BMC, spine phantoms did not detect substantial differences in lean and fat mass observed with the TBP and in vivo assessments. Consequently, spine phantoms alone are not adequate to assure whole body composition DXA cross-calibration.

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SPONTANEOUS BONE EDEMAVS. KNEE TRANSIENT OSTEOPOROSIS

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Objective: Temporary or transient osteoporotic bone edema is a rare disease of unknown etiology self-limited course, with only three cases reported in the knee joint. It generates MRI hyperintensive images on T2, suggesting spontaneous osteonecrosis. It could be, in some cases, similar to algodystrophy or reflex sympathetic dystrophy.

Material and Methods: 52 year old woman with right knee pain nontraumatic NSAIDs partially sagging. Pressure pain in medial femoral condyle. No single radiologic bone disease. But the MRI shows extensive edema in the medial femoral condyle bone irregularities in the subchondral bone. With the diagnosis of spontaneous idiopathic osteoporosis is indicated NSAIDs and bisphosphonates; unloaded and early ambulation of magnet.

Results: After 3 months, clinically asymptomatic. A new control MRI shows decreased bone edema, with mild subchondral lesion, informed as “suggestive of osteonecrosis in evolution”. Start full charge, continuing the pattern of diphosphonates. Complete recovery from pain and radiological edema sign after 15 months of follow-up and a new MRI control.

Conclusion: The etiology of idiopathic transient osteoporosis is still unknown, although some authors relate it with microvascular injury and tissue ischemia, secondary to trauma or vitamin C deficiency. The transient demineralization is a self-limited, with osteoclastic activity inhibited by bisphosphonates. His knowledge is important to avoid misunderstood, especially complementary imaging tests.

References: 1. Ververidis AN et al. Knee Surg Sports Traumatol Arthrosc 2009;17:1061
2. Gaeta M et al. Eur Radiol 2002;12 Suppl 3:S40

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CLINICAL INTERVENTION IN PATIENTS WITH HIP FRACTURE IN THE ORTHOPEDIC UNIT OF THE UNIVERSITY HOSPITAL OF CANARY ISLANDS

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Objective: To evaluate bone metabolism markers, vitamin D status and osteoporosis treatment of elderly patients with fragility hip fractures admitted to the Traumatology Unit of our Hospital between January 1, 2011 and December 30, 2011.

Material and Methods: 103 elderly patients with hip fractures admitted during the study period in our orthopedic unit were included. Demographic data, comorbidities, nutritional status, previous diagnosis of osteopenia or osteoporosis and osteoporosis treatment were analyzed. Vitamin D levels (25-hydroxyvitamin D) and bone metabolism markers were studied.

Results: 103 patients were included with a mean age of 78± 12 year-old, 23 % male and 77 % women. Mean level of 25-hydroxyvitamin D was 33±18 ng/ml. We found vitamin D insufficiency in 77 % of patients (22.1± 3.5 ng/dl) and was more frequent among patients with dementia. Previous diagnosis of osteoporosis were established in 20 % of patients. However less than 9 % were taken calcium or vitamin D and only 5 % of patients received bisphosphonates before the fracture. No relationship among vitamin D concentrations, falls and fractures were found in this population. Proximal femur fractures were present in 82.7 % of patients (hip fractures 73.7 %). Hip fractures were more frequent in women (p=0.03). Clinical evaluation and medical care during hospitalization was performed by an internist assigned to the orthopedic service. Secondary prevention of fractures was initiated before discharge in 70.4 % of patients with calcium-vitamin D and bisphosphonates in 34 % of patients.

Conclusion: In this population mean levels of 25-hydroxyvitamina D were normal and no relationship with fractures or falls were found. Clinical intervention during hospitalization performed by an internist achieved an increased rate of prescription of anti-osteoporotic treatment after admission. Interventions to improve early diagnostic and treatment of osteopenia-osteoporosis and management post-fracture need to be developed and implemented.

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WHY NOT USE RESORBIBLE CEMENT IN OSTEOPOROTIC YOUNG PEOPLE FRACTURES?

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Objective: Consequences of a bad reduction of a vertebral osteoporotic fracture will be observed over time. The use of acrylic cements during the fixation keeps reducing, but does not eliminate the risk of late collapse at 100 % and has no biological properties.

Material and Methods: We compared two cases of men under 50 years with vertebral fractures. Man of 22, with traumatic crushing fracture A1 of L1 with the subsequent wall condition and fracture A1 of T10 and T11 bodies. Reduction of L1 fracture is carried on through kyphoplasty Spine-Jack and instrumentation USS T12-L2. Election of a resorbable ceramic cement of calcium sulphate, injected under x-ray control. Forty-seven years-old male with back pain after a minimal effort. Height loss of vertebral bodies L3, L5, and D12. After rejecting serious underlying pathology, D12 and L5, the most severe levels, were fixed by reduction and conventional cement balloon kyphoplasty, recovering 40 % and 30 % loss of height, respectively. Biopsy and X-Ray absorptiometry were decisive to confirm osteoporosis etiology.

Results: The evolution was favorable describing rapid improvement in pain. No radiological signs of vertebral bodies collapse or alignment deformity in any case. X- Ray and CT at 18 months, in the first man, denoted a positive osseo-integration of cement; the biomaterial began to deteriorate and the radiographic image showed that the radiopacity was becoming more tenuous, indicating reabsorption.

Conclusion: The vertebral fracture status is a powerful and independent risk factor for all new fractures, which is a great health care problem. Our goal is the anatomical reduction. The mechanism of pain relief of percutaneous kyphoplasty is related to the stabilization of micromovements, the prevention of progressive collapse by cement augmentation, and to thermal and chemical nerve ablation. Consolidation will determine the prognosis. We will make progress in the study of biocompatible materials with osteogenic capacity.

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REGULATION OF OSTEOCLAST DIFFERENTIATION AND FUNCTION BY MICRORNA-124

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Objective: Osteoclasts are specialized cells for bone-resorption originated from precursors of macrophage/monocyte lineage. The receptor activator of NFκB ligand (RANKL) initiates osteoclast differentiation, in which nuclear factor of activated T cell cytoplasmic 1 (NFATc1) plays a key role as a master transcription factor. MicroRNAs are small RNAs involved in numerous cellular functions. However, their role in osteoclastogenesis have been rarely studied.
Material and Methods: Osteoclasts were differentiated in vitro from mouse bone marrow macrophages in the presence of M-CSF and RANKL. The expression and the role of miR-124 were investigated by real-time RT-PCR, western blot analysis, and osteoclast migration assays.
Results: In the present report, we show that microRNA-124 (miR-124) regulates osteoclastogenesis of mouse bone marrow macrophages by suppressing NFATc1 expression. On the other hand, synthetic inhibitor that binds specifically to miR-124 enhanced osteoclast differentiation and NFATc1 expression. The overexpression of a constitutively active form of NFATc1 prevented the inhibitory effect of miR-124 on osteoclastogenesis. Finally, miR-124 also affected the proliferation and motility of osteoclast precursors, the latter coinciding with the reduced expression of RhoA and Rac1.
Conclusion: These findings not only reveal unprecedented role of miR-124 in osteoclastogenesis but also suggest a novel mode of regulation of NFATc1 in osteoclasts.
Acknowledgements: This work was supported by a grant of the Korea Healthcare Technology R&D project, Ministry of Health and Welfare, Republic of Korea (A120195, Y.L.) and by the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT & Future Planning (2012M3A9B6055415, Y.L.).

P516
PREVALENCE OF VITAMIN D DEFICIENCY IN RESIDENTS OF NORTHWEST RUSSIAN REGION

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Objective: Recent studies suggest high prevalence of vitamin D deficiency in the world. Russian Federation has geographic, demographic and economic preconditions for development of vitamin D insufficiency and deficiency. We examined residents from northwest region of Russia Federation (St. Petersburg and Petrozavodsk) and analysed serum 25(OH)D level to study a prevalence of vitamin D deficiency.
Material and Methods: Were examined 1,654 residents (including 1,349 adults and 120 children and adolescents). Level of 25(OH)D was determined in 1,226 participants (1,106 adults and 120 children/adolescents) by chemiluminiscent method on AbbottArchitect 8000 (USA) with commercial reagents (Abbot, USA). Were used different vitamin D deficiency criteria (Institute of Medicine (IOM), 2011 and Endocrine Society (ES), 2011).
Results: The serum 25(OH)D level was from 9.8 to 147.5 nMol/L: main level in adults St. Petersburg population −54.8±0.7 nMol/L, in Petrozavodsk population −49.6±1.6 nMol/L, in children/adolescents −46.8±1.6 nMol/L. The 25(OH)D in women was lower than in men (53.9±0.8 nMol/L, 67.2±2.2 nMol/L, accordingly; $p<0.01$). Overweight and obese people had lower 25(OH)D level than one with normal BMI (44.8±2.0 nMol/L and 52.5±2.8 nMol/L, $p<0.05$). We found negative correlations between serum 25(OH)D and BMI in adults and children ($r=-0.17$, $p=0.03$ and $r=-0.41$, $p=0.03$) and WC ($r=-0.15$, $p=0.02$) (only for adults). We found high prevalence of vitamin D deficiency. When applying ES criteria for vitamin D deficiency we revealed that 16.8 % of the all study population had a normal vitamin D level, up to 37.5 % had insufficiency and 45.7 % deficiency of vitamin D. On the other hand when applying the IOM criteria, 49.6 % showed to have normal level, 40.0 % were insufficient and only 10.4 % were deficient in vitamin D.
Conclusion: The results of this study showed high prevalence vitamin D insufficiency and deficiency in residents of the northwest region of Russian Federation.
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OSTEOPROTECTIVE EFFECT AND SUSTENANCE OF TRABECULAR MICRO-ARCHITECTURE BY LIPOSOME-GLYCOL-CHITOSAN BASED DELIVERY SYSTEM OF WITHAFERIN A

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Objective: To enhance the osteoprotective effect of withaferin A (WFA) by formulating WFA with liposomes-glycol chitosan delivery system. The efficacy of this formulation was assessed after treatment and withdrawal in a rodent model for postmenopausal osteoporosis.
Material and Methods: liposome based formulation was developed using DSPC, Soya PC and cholesterol (7:3:3 mols).

Formulated WFA was administrated in rodent model at 10 mg/kg dose and plasma was withdrawn for bioavailability. For postmenopausal model, Balb/c mice were bilaterally ovariectomized and kept for 8 weeks to achieve osteopenic condition. After 8 weeks the mice were administrated with different doses (WFA, WFA+formulation and PTH) for 8 weeks. For withdrawal studies treated mice were analyzed at day 15 and day 30 using μCT.

Results: Developed formulation (WFA/GC-Lip) showed enhanced WFA bioavailability in rodent against plain WFA at the same dose 10 mg/kg. WFA/GC-Lip promotes bone marrow cell differentiation by enhancing expression osteogenic molecular markers. As a result of enhanced differentiation of cells, there was increased bone marrow osteoprogenitor cell mineralization, new bone formation and improved trabecular micro-architecture in osteopenic bones. Withdrawal of formulated WFA show sustainment of bone trabecular micro-architecture up to day 15 and gradually decreases at day 30 comparable to FDA approved bone anabolic drug iPTH.

Conclusion: Overall, our results show that WFA/GC-Lip formulation modulated the pharmacokinetic parameters of existing drugs by providing mucoadhesive properties that resulted in the increased plasma concentration as well as the half-life of WFA. This novel formulation based strategy provides preclinical data for reducing risk of fracture, improving bone health in postmenopausal osteoporosis and maintains its effect after withdrawal of treatment comparable to iPTH.

P518
REAL-WORLD DATA ON PERSISTENCE WITH BISPHOSPHONATES THERAPY AND THE RISK OF HIP FRACTURES

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Objective: To provide real-world data on the long-term effectiveness of bisphosphonates therapy for reducing the risk of hip fractures in postmenopausal women.

Material and Methods: The computerized databases of Maccabi Healthcare Services in Israel were used to retrospectively follow women aged 60–75 who initiated bisphosphonates therapy in 2002–2007. Study outcomes were diagnosis and/or surgery for hip fracture. Persistence with bisphosphonates was assessed by calculating the proportion of days covered (PDC).

Results: During the study follow-up (50,630 person-years, median follow-up of 6 years), 218 incident hip fractures were documented among the study population (n=8563). 40 % were persistent with bisphosphonates (PDC≥80 %). In a multivariable analysis, no significant or monotone association was observed between persistence and hip fracture incidence, where patients with PDC of 20–79 % demonstrated reduced risk compared to nonpersistent patients (<20 %) with HR of 0.84 (95%CI: 0.56–1.26) and patients with PDC≥80 % exhibited increased risk with HR of 1.22 (95%CI: 0.84–1.80) compared to non-persistent. Hip fractures were significantly associated with age, diabetes, and use of benzodiazepines and glucocorticoids.

Conclusion: These results indicate that persistence to bisphosphonates therapy among postmenopausal women is inadequate, with no evidence of a negative association between persistence and hip fracture risk. Further study is in place to examine alternative methodology to quantify exposure instead of PDC, and gain a better understanding of the mechanisms of action of bisphosphonates.

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CHONDROCYTE HYPERTROPHY, MEASURED BY THE SECRETION OF COLLAGEN TYPE X, IS ASSOCIATED WITH CARTILAGE DEGRADATION AND SYSTEMIC INFLAMMATION IN OSTEOARTHRITIS

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Objective: Osteoarthritis (OA) is the most common degenerative joint disease, of which the pathogenesis is inadequately understood. Hypertrophic changes have been observed in the initiation and progression of OA. The aim of this study was to investigate the relationships of chondrocyte hypertrophy, cartilage degradation and systemic inflammation by measuring three biomarkers in serum of OA patients.

Material and Methods: A competitive ELISA, C-Col10, was developed as a marker of chondrocyte hypertrophy. C-Col10, C2M (MMP fragments of type II collagen) and hsCRP were quantified by ELISA in 271 patients, stratified by Kellgren-Lawrence (KL) score 0–4. Pearson correlations were done comparing the levels of the biomarkers. The data is shown as mean [95 %-CI]. Full-depth cartilage biopsies from OA patients with different disease stages were stained for ColX and C2M.

Results: There was a trend towards increasing C-Col10 levels with increasing KL score: KL0 52[24–80] pg/ml (n=10); KL1 65[54–76] pg/ml (n=59); KL2 86[73–98] pg/ml (n=144); KL3 80[60–101] pg/ml (n=36); and KL4 87[47–127] pg/ml (n=22). There was a significant correlation of levels between

C-Col10 and hsCRP (r=0.23, P<0.0001), and C2M (r=0.55, P<0.0001). OA patients with elevated levels of hsCRP (>5) showed increased C-Col10 independent of cartilage degradation. The immunolocalization showed that ColX was in the deep zone around the pre- hypertrophic chondrocytes in mild OA and around chondrocyte clusters. C2M was observed in all layers of the OA cartilage.

Conclusion: Serum C-Col10 levels were significantly higher in patients with above normal hsCRP levels, suggesting that inflammation is associated with chondrocyte hypertrophy. Correlation between C-Col10 and cartilage degradation indicated that chondrocyte hypertrophy may be involved in the cartilage degradation. The data show that chondrocyte hypertrophy is an essential step in the pathogenesis of OA.

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IS INCREASED AWARENESS OF VITAMIN D DEFICIENCY RESULTING IN AN EPIDEMIC OF VITAMIN D TOXICITY?

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Objective: Widespread prevalence of vitamin D deficiency has been reported from India across all ages and regions. Increased awareness of vitamin D deficiency related health problems among health professionals and general population has resulted in ordering of a greater number of serum 25(OH) vitamin D test. Further it has led to availability of numerous vitamin D formulations (oral and intramuscular) for treatment. There is thus increased usage of vitamin D preparations by all medical specialties in India.

Material and Methods: We analyzed our hospital database for serum 25(OH) vitamin D performed over 3 years (2011–2013).

Results: During this period 46,348 tests were performed for serum 25(OH) vitamin D. The number has increased 6-fold from 3,874 (2011) to 25,332 (2013). The proportion of patients with vitamin D deficiency (<20 ng/ml) was 52–56 %. Of the total 46,348 tests, 226 had serum 25(OH) vitamin D level above 150 ng/ml. During this period 20 cases of vitamin D toxicity related hypercalcemia were managed at our center. Azotemia was recorded in 9 cases, neurological manifestations were seen in 5 cases and 2 had pancreatitis. Of the patients who presented with vitamin D toxicity related hypercalcemia, 18 cases had received frequent intramuscular vitamin D formulations and 2 had long term high dose oral preparations. Hypercalcemia management resulted in normalization of calcium and improvement in clinical status in all except one case where death occurred because of aspiration pneumonia.

Conclusion: Our data highlights vitamin D toxicity as an emerging and potentially fatal health problem related to indiscriminate and inappropriate therapeutic use of vitamin D.

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EVALUATION OF TREATMENT EFFICACY OF ORLISTAT IN OBESE WOMEN WITH KNEE OSTEOARTHRITIS

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Objective: Osteoarthritis (OA) is an important social and medical problem. Obesity is an significant modifiable risk factor for the development and progression of knee OA.

Material and Methods: The study included 50 women, aged 45–65 years with knee OA stage II-III Kellgren-Lawrence and obesity (BMI>30 kg/cm^2). Obese patients were randomized into 2 groups. Group 1 (25 patients) took orlistat a dose of 120 mg 3 times daily for 6 months in combination with a low calorie diet and physical activity. Group 2 (25 patients) nonpharmacological therapy of obesity (hypocaloric diet and physical activity). Functional index WOMAC, quality of life according to VAS were evaluated.

Results: Weight reduction was more signified in the group of patients on orlistat therapy by 9.05 %, compared with patients who were only on a hypocaloric diet where the weight has decreased by 2.54 %. WOMAC pain for patients who are on orlistat therapy decreased by 48.7 % and was significantly lower (p=0.012) than in the second group, where the rate declined by only 32.2 %. Similar changes were observed in functional failure: the dynamics of this index in the first group was significantly lower than in the second group (p=0.004) (a decrease of 49.75 % and 32.77 %, respectively). After 6 months against the background of the weight reduction the total index WOMAC decreased in both groups (at 49.31 % and 32.9 %, respectively), but was significantly lower in the group treated with orlistat (p=0.006). Moreover, in this group revealed a significant improvement of life quality compared with those with a smaller weight loss (p<0.001).

Conclusion: Our study demonstrated that weight loss, especially while taking drugs that reduce weight by obese patients with knee OA leads to a reduction in the clinical developments of knee OA: relieve pain and improve the functional state of the knee. In this connection, drugs that affect the weight loss should be included in the treatment regimen of patients with OA and obesity.

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COMPREHENSIVE TREATMENT OF OSTEOPOROSIS WITH KNEE OSTEOARTHRITIS

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Objective: Through to the knee osteoarthritis patients with osteoporosis with comprehensive treatment, the treatment was observed.
Material and Methods: From June 2009 to March 2009 admitted to our department, 86 cases of knee osteoarthritis with osteoporosis patients, 23 cases of male, female 63 cases, 48–91 years old, mean age 58.18±17.25 years, all of the patients had the symptom such as knee joint swelling and tenderness, the X-ray, CT and/or MRI examination confirmed that osteoarthritis, BMD instrument detection in the diagnosis of osteoporosis, 86 patients were randomly divided into treatment group and control group (n=43), the control group given cervus and cucumis polypeptide Injection 160–200 mg/day; calcitriol, 0.25 QD; glucosamine hydrochloride capsule 0.24 TID; celecoxib,0.2, QD; 2 weeks treatment. The treatment group with subcutaneous injection with calcitonin 50 units, QD, for 2 weeks treatment, the Lysholm knee score before and after treatment in both groups, joint pain intensity evaluation method (VAS) to evaluate the curative effect. Using SPSS software for data analysis, all dose data expressed as a mean standard deviation. Measurement data between the two groups of mean more use of two independent sample t-test; Group before and after treatment of measurement data of mean compare with paired t-test; P0.05 significant for differences.
Results: Two groups of patients after treatment Lysholm knee score and pain in the knee joint were improved $P<0.05$, and the treatment group effect better $P<0.05$.
Conclusion: Cervus and cucumis polypeptide, calcitriol, glucosamine hydrochloride and celecoxib comprehensive treatment with calcitonin for knee osteoarthritis can rapidly improve symptoms, improve patient quality of life, worthy of clinical popularization and application.

P523
SCLEROSTIN AND CORTICAL THICKNESS ARE ASSOCIATED WITH SEVERE VASCULAR CALCIFICATIONS IN HEMODIALYSIS PATIENTS

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Objective: Hemodialysis (HD) patients have a high cardiovascular mortality risk. Severe abdominal aortic calcifications (AAC) are predictive of cardiovascular morbidity. In chronic kidney disease patients, bone biopsies showed that higher AAC score was associated with lower bone turnover. The Wnt inhibitor sclerostin acting on osteoblast to reduce bone formation, may favor adynamic bone. Thus we hypothesized that higher sclerostin may be associated with higher AAC score in HD patients.
Material and Methods: Morning fast serum before HD were used to assay sclerostin and other parameters. Framingham score was computed for each patient. HR-pQCT was performed at the tibia. AAC score was assessed according to Kauppila method on lateral spine imaging using DXA. Our primary criterion was the high AAC score corresponding to the highest quartile of AAC score.
Results: Fifty three HD patients, aged 53 [35–63] median [Q1-Q3] were included. In univariate analysis, sclerostin, age, high Framingham score and cortical thickness were associated with an increased risk of high AAC score. In multivariate, association between serum sclerostin and high AAC score remained significant after adjustment on age, HD duration, diabetes, smoking, 25OH-vitamin D, CRP and cortical thickness (OR[95%CI]=9.62 [1.40–66.05]; p=0.02). In a cardiovascular perspective, we performed another model adjusted on high Framingham score and previous confounders. Sclerostin remained associated with high AAC score (OR= 12.96 [2.12–79.14]; p=0.006) whereas cortical thickness was protective (OR=0.13 [0.02–0.98]; p=0.048).
Conclusion: Sclerostin is associated with AAC in HD patients. Sclerostin may contribute directly or indirectly to the bone-vascular axis in renal deficiency.

P524
THE RELATIONSHIP BETWEEN 25-HYDROXYVITAMIN D AND PTH AND BONE MINERAL DENSITY IN HEALTHY PEOPLE IN PUTIAN AREA IN FUJIAN

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Objective: Through the investigation of Fujian Putian area Chinese healthy people serum 25-hydroxyvitamin D(25OHD) and PTH levels and BMD, analysis of healthy people in Putian area and to evaluate its relationship with BMD in winter vitamin D status

Material and Methods: In 2010, October to December, the investigation of 613 cases of healthy people, male 183 cases, female 430 cases, age 10–94 years, mean age 55.96±15.51. Apparatus and reagents used Roche, blood examination of serum 25OHD, PTH. At the same time, the United States Osdeometer application Medi Tech company production of type DTX-200 bone density measurement, the radial forearm distal ulna 1/3 BMD. The levels of serum 25OHD were divided into severe deficiency as 25OHD less 25OHD more than 20 ng/ml and less than 30 ng/ml, and sufficiency as 25OHD more than 30 ng/ml.

Results: 613 cases of serum 25OHD measuring average value of 15.76±8.88 ng/ml, serum 25OHD had no relationship with gender or age. It positively related to BMD and had no relation with PTH. The number of people with severe deficiency, deficiency, relatively insufficiency, and sufficiency was 122 (19.9 %), 237 (38.66 %), 197 (32.14 %) and 57 (9.3 %), respectively. The total 25OHD deficiency and insufficiency accounted for 90.7 %.

Conclusion: In healthy population in Putian in the winter of the lack of vitamin D, vitamin D nutritional status was significantly associated with BMD, and PTH was not related. BMD associated with vitamin D is consistent with the Changchun City Zhang Mengmeng reported, and PTH is not obvious, and the city of Shanghai Wang pure reported no correlation is consistent. In this study, the serum levels of 25OHD with an average of 15.76±8.88 ng/ml, its value is Chongqing hospital patients is high, but compared to Shanghai's low. Vitamin D deficiency is a risk of osteoporosis and osteoporotic fracture factors is important and independent risk factors, which affected by the impact of sunshine, exercise and nutrition factors.

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RELATION OF PHYSICAL ACTIVITY LEVEL WITH QUALITY OF LIFE, SLEEP AND DEPRESSION IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objective: Knee osteoarthritis (OA) represents a major cause of morbidity due to associated pain and physical disability. We aimed to evaluate the effects of physical activity on quality of life, depression and sleep in patients with chronic knee OA.

Material and Methods: Fifty-five patients (30 females, 25 males) fulfilling ACR diagnostic criteria for knee OA were enrolled. Patients with restricted joint movement or acute knee pain which could affect physical activity level were excluded. VAS was used for assessment of pain severity. International Physical Activity Questionnaire-Short Form (IPAQ-SF), Beck Depression Inventory (BDI), Pittsburgh Sleep Quality Index (PSQI) and SF-36 Health Survey were completed for all patients. Based on IPAQ-SF scores, patients with a score equal to or lower than 600 MET-min/week were included in inadequate activity group (IAG) (n=28) and those with greater scores included in physically active group (PAG) (n=27).

Results: There was no significant difference between IAG and PAG in mean age (72.7±5.9 and 69.8±4.6, respectively), average pain rating by VAS (7.2±1.9 and 6.6±2.3) and BMI (28.8±4.3 and 27.2±4.1 kg/m^2) (all p>0.05). Mean BDI score of IAG (15.6±9.8) was significantly greater than that of PAG (10.2±5) (p=0.015). However, mean PSQI score of IAG (7±4.5) was not significantly different from that of PAG (5.5±3.5) (p=0.242). IAG had significantly lower SF-36 scores in physical health domain (33.7±11.3 and 42±13.3) (p=0.016), physical role subscale (27.7±43.8 and 63.9±47.2) (p=0.008) and physical functioning subscale (46.6±25 and 61.5±28.4) (p=0.04) compared to those achieved in PAG.

Conclusion: Among patients with chronic knee OA with comparable pain severity, those with greater physical activity were found to have a better quality of life and low tendency to develop depression. Regular physical activity should not be neglected during management of knee OA.

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BONE MINERAL DENSITY IN GRAVIDA: EFFECT OF PREGNANCIES AND BREASTFEEDING IN WOMEN OF DIFFERING AGES AND PARITY

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Objective: To evaluate BMD in women of differing parity and lactation histories immediately post-partum to ascertain whether there is a quantitative and/or qualitative difference in BMD (based on T-scores and Z-scores) based on the cumulative months of pregnancies and approximate cumulative months of breastfeeding based on parity and/or age.

Material and Methods: All women still in hospital postpartum were asked to participate. BMD was performed on a standard DXA machine (Hologic, Bedford MA USA) by a single technician. Results included BMD, T-scores, and Z-scores at femoral neck (FN) and lumbar spine (LS).

Results: IRB (Helsinki Committee) approval was received. Of 132 women who participated, 73 (55.3 %) were ≤30 years; 27 (20.5 %) were primiparous; 36 (27.3 %) were grand-multiparous; 35 (26.5 %) never breastfed. Mean FN T-scores and Z- scores were higher than respective mean LS scores, but all means for the group were within the normal range. Mean LS T-scores Z-scores were highest in the grand- multiparas. Only 2 (1.5 %) outliers with low Z-scores might have transient osteoporosis.
Conclusion: In a large cohort of Israeli women with BMD parameters assessed by DXA within 2 days postpartum, mean T-scores and Z-scores at both the LS and FN were within normal range regardless of age (20–46 years), parity (1–13 viable births), and history of prolonged months of lactation (up to 11.25 years).

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DEVELOPMENT OF USE HERBAL REMEDIES FOR POSTMENOPAUSAL OSTEOPOROSIS

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Objective: The study represents an analysis on the use and evolution of using the herbal remedies in postmenopausal osteoporosis in last 3 years (2011–2013).
Material and Methods: Herbal remedies offers natural and noninvasive solutions for patients. Phytotherapy in the treat of the postmenopausal osteoporosis focuses on the use of plants whose main functions are to help calcium absorption and have estrogenic properties that compensate for the loss of the estrogen. More clinical trials indicate that phytotherapy may be a potential treatment for postmenopausal osteoporosis and current evidence suggests that phytotherapy may possess a similar effect on BMD values but is not associated with a high incidence of uterine bleeding and breast pain as is hormonal therapy. In postmenopausal osteoporosis phytotherapy recommends tincture of Anethum graveolens, tincture of Glycyrrhiza glabra, tincture of Salvia officinalis, tincture of Urtica dioica, tincture of Valeriana officinalis, tincture of Melissa officinalis Equisetum arvense herba, gemoderivates of Pinus silvestris (pine buds), gemoderivates of Rubus idaeus, gemoderivates of Rubus fructicosus, gemoderivates of Rosa canina (rosehip buds), gemoderivates of Pinus montana (juniper buds) gemoderivates of Rosmarinus officinalis.
Results: Our results show a continuous increase in the use of herbal products, but especially in the use of gemoderivates, which is observed an increase of 26 % in 3 years. In the same time all herbal products consumption increases with 20 %.
Conclusion: These results can be explained with improving the knowledge about Gemmotherapy, which use only embryonic tissues of plants. These embryonic tissues macerated in a mixture of water, alcohol and glycerine, are used to manufacture solutions in which active principles of plants are concentrated, so have higher therapeutic efficiency.

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TOTAL SERUM 25(OH)D LEVELS MISCLASSIFY VITAMIN D STATUS IN SAUDI MEN AND WOMEN: THE ROLE OF VITAMIN D-BINDING PROTEIN

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Objective: Low levels of total 25-hydroxyvitamin-D [25(OH)D] are highly prevalent among Saudi men and women, most were classified as vitamin D deficient. We hypothesized that changes in the levels of vitamin D-binding protein (VDBP) may explain vitamin D deficiency (VDD) in Saudi men and women. The aim of the present study was to determine whether variations in circulating levels of VDBP and/or genotypes contribute to the observed high prevalence of VDD among Saudi men and women.
Material and Methods: A total of 1985 healthy Saudi men (n=960) and women (n=1025) (age range: 25–60 years) living in the Jeddah area were randomly selected and studied during a health survey. Anthropometric parameters, socioeconomic status, together with serum total 25(OH)D, VDBP, PTH, Ca and PO_4 level measurements were recorded. BMD was measured by DXA. We genotyped participants for two common polymorphisms in the VDBP gene (namely: rs7041 and rs4588). Bioavailabe 25(OH)D was estimated.
Results: The serum level of VDBP was low due to the high prevalence (65.0 %) of the common genetic variant (rs7041) among Saudi men and women. Subjects classified with VDD showed lower levels of VDBP (μmol/L) [(2.71±0.82) and women (2.66±0.89)] resulting in levels of bioavailable

25(OH)D similar to those considered vitamin D sufficient according to total 25(OH)D level classification.
Conclusion: The results suggest that low serum total 25(OH)D levels do not uniformly indicate VDD and call into question routine supplementation in subjects with low serum 25(OH)D and VDBP levels. Racial differences in the prevalence of common genetic polymorphisms of VDBP may contribute to such misclassification of vitamin D status among Saudi men and women.

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LONG-TERM (UP TO 5 YEARS) PERSISTENCE WITH DIFFERENT ANTI-OSTEOPOROSIS MEDICATIONS IN CATALONIA (SPAIN): A POPULATION-BASED COHORT STUDY

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Objective: Most of reports from different countries suggest very low persistence with oral bisphosphonates, but there is a scarcity of data regarding other anti-osteoporosis (OP) medications. Our aim was to compare persistence to all available outpatient oral anti-OP drugs up to 5 years after therapy initiation.
Material and Methods: Population-based retrospective cohort study using data from primary care computerized records in SIDIAP (www.sidiap.org). SIDIAP comprises of primary care electronic medical records and pharmacy invoice data for >5 million people in Catalonia (North-East Spain). We included all SIDIAP participants starting an anti-OP drug at any time between 1/1/2007 and 30/06/2011. Users of any of these drugs in the previous 2 years were excluded. We analysed persistence, rates of discontinuation and switching to alternative therapies at up to 5 years follow-up. Fine and Gray survival modelling was used to estimate risk of therapy discontinuation (sub-hazard ratios= SHR) for each drug compared to weekly alendronate, after adjustment for: age, gender, fracture history, Charlson Index, use of oral glucocorticoids, of aromatase inhibitors, smoking, alcohol drinking, and BMI.
Results: We identified 124,827 patients who started any anti-osteoporotic drug in the study period. The most commonly prescribed drug was weekly alendronate (N=55,399). Persistence at 5 years ranged from 9.3 % (strontium ranelate) to 26.7 % (monthly risedronate). Only monthly risedronate had better persistence than weekly alendronate at 5 years: adjusted SHR 0.80 [95%CI 0.86–0.92]. Conversely, daily drugs were the ones with worst persistence: adjusted SHR 1.45 [95%CI 1.42–1.47], 1.46 [1.42–1.48], and 1.73 [1.57–1.87] for strontium ranelate, daily raloxifene, and daily risedronate, respectively.
Conclusion: 5-year persistence with available therapies for Osteoporosis is very low. Whilst only monthly risedronate has lower cessation rates, all daily drugs have up to 70 % higher cumulative discontinuation rates than alendronate.
Disclosures: Partial (unrestricted) support from Amgen Spain.

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BONE MICROARCHITECTURE (TBS) AND BONE MASS DEVELOPMENT DURING CHILDHOOD AND ADOLESCENCE IN A SPANISH POPULATION GROUP

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Objective: To evaluate bone microarchitectural texture as assessed by trabecular bone score (TBS) and bone mass modification at spine in children of both sexes.
Material and Methods: The study group was composed by 4,126 children and adolescents of both sexes. (2,606 girls and 1,520 boys). Age range 0–19 years. Height, weight and BMI Z-scores were evaluated and compared with Spain growth standards. Pubertal stage was evaluated using Tanner score. TBS was evaluated using TBS iNsight v2.0 (Medimaps, France) from standard DXA spine scanfiles. The areal BMD (aBMD) was assessed at spine L1-L4 using GE-Lunar DXA devices. Pseudo 3D BMD (vBMD) was calculated based on cylindrical model proposed by Kroeger et al. (Bone Miner, 1992). The LMS statistical method proposed by Cole and Green (Stat Med, 1992) was used to drawn TBS, aBMD and vBMD age-related curves using R software (v2.15.3).
Results: Positive significant correlations (p<0.05) exists between TBS and age, BMI, aBMD and vBMD (r=0.45, 0.32, 0.56 and 0.55, respectively). Height, weight and BMI followed normal pattern with age according the standards of Spanish population. aBMD increases with the growth with an acceleration at the puberty. When normalized by the 3D volume, effect of puberty on vBMD is more visible. Before the puberty, vBMD trend seems to be flat. Concerning TBS, we observed that maximum value is reached in the first days of life with similar value in both sexes. Surprisingly, was observed a decreasing phase, reaching a minimum TBS values between 6–8 years in girls and 8–10 years in boys. The texture improves again in both sexes up to 19 years.
Conclusion: DXA can be used to assess trabecular bone microarchitectural texture, as assessed by TBS, in children

with a high degree of reliability. Age-related TBS curve can be useful, in complement to the BMD curve, to help clinician to identify children with bone microarchitectural modifications induced by chronic diseases or drug therapies.

P531
A SINGLE-DOSE STUDY OF DENOSUMAB IN PRIMARY HYPERPARATHYROIDISM PATIENTS

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Objective: Denosumab is a monoclonal antibody that inhibits osteoclast activity through inhibition of receptor activator of nuclear factor κB ligand (RANKL). We have previously shown that serum RANKL levels were variably increased in patients with primary hyperparathyroidism (PHPT) and correlated with both markers of bone turnover and bone loss. Aim: to observe the effects of denosumab on BMD, bone turnover markers and serum calcium in patients with PHPT.
Material and Methods: Five consecutive patients with PHPT were administrated a single subcutaneous injection of denosumab, 60 mg. The patients (mean age 69.6 year) were 1–4 years since diagnosis (mean serum total Ca 10.6 mg/dl; mean serum PTH 134 pg/ml) and were previously treated with various bisphosphonates (BP) for osteoporosis (mean LS BMD=0.818 g/cm^2; mean FN BMD=0.694 g/cm^2). Mean serum 25OHD was normal at baseline (32.4 ng/ml) and during the follow-up. Subjects were followed up to 6 months as follows: serum Ca on days 1, 3, 7, 14, 30 and at 3 month and 6 month; serum intact PTH, C-telopeptide and N-mid osteocalcin (by chemiluminescence) at 3 month and 6 month. BMD at the hip (FN) and lumbar spine (LS) were measured at baseline and at 6 month using a GE-iDXA machine.
Results: At 6 month mean LS BMD increased by 4.37 % and FN BMD by 1.86 %. Serum CTX decreased by 90 % at 3 months, and by 45 % at 6 months; the similar changes for serum osteocalcin were 45 % and 41 %, respectively. In the first 2 weeks, serum total Ca decreased vs. baseline by 0.79–1 mg/dl in four out of five patients. At 6 months mean total serum Ca was significantly increased vs. baseline (11.6 mg/dl vs. 10.6 mg/dl, p=0.01). Intact PTH levels increased by around 50 pg/ml at 3 mo and decreased marginally at 6 mo vs. baseline.
Conclusion: These are the first published observations on denosumab effects in patients with PHPT and they suggest the potential use of this drug in increasing BMD and decreasing bone turnover.

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ONE YEAR AROMATASE INHIBITORS TREATMENT EFFECT ON BONE MINERAL DENSITY: IS IT SIGNIFICANT?

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Objective: To assess the densitometric changes in women treated with aromatase inhibitors in the first year of treatment.
Material and Methods: Subjects were 32 women aged from 60 to 76 years with breast cancer recent history, referred for bone densitometry assessment at the beginning of the adjuvant therapy with aromatase inhibitors. Lumbar spine and femoral neck DXA (Lunar GE Prodigy) was performed at the baseline and after 1 year of treatment with letrozolum.
Results: At baseline evaluation, 11 women had osteoporosis by densitometric criteria, of whom one had a prevalent forearm fracture. After 1 year of letrozol treatment, mean lumbar BMD decreased by 2.3 % (NS) with high variability among subjects. Femoral neck BMD decreased by 0.8 % (NS). Regarding the densitometric criteria for osteoporosis, 7 more out of the 32 patients became osteoporotic during follow up. From the 11 osteoporotic women at the baseline, only 4 experienced BMD decrease and from those with normal BMD at baseline only 3. No significant changes of estimated fat mass was observed in this group.
Conclusion: During the first year of treatment with letrozol, 14 out of 32 women experienced decrease in BMD either at lumbar spine or femoral neck site. In spite of not significance of the lumbar BMD or femoral neck BMD decrease at the group level, a highly variable evolution was noticed, with increase of osteoporosis prevalence from 11 to 18 out of 32 women during the follow up. Our results, in spite of the low number of subjects, suggests particular response in some individuals with determinants which might be interesting to be revealed.

P533
PSYCHOLOGICAL EFFECTS FROM REHABILITATION TREATMENT IN PATIENTS WITH A SPINAL CORD INJURIES

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Objective: Spinal cord injury represents a major event with devastating implications on all aspects of an individual's life. Spinal cord injury to an individual subject to increased risk of negative psychological effects including mood disorders such as depression and low self-esteem.

Material and Methods: The study systematically examined: changing negative psychological states in two groups of patients with spinal cord injury: the first batch that followed in the Medical Rehabilitation Hospital Baile Felix comprehensive recovery program that contains various procedures such as physiotherapy, occupational therapy, psychotherapy electrotherapy, hydrokinetotherapy, massage therapy, thermotherapy, and the second group whose program includes extra assistance recuperatoriu robotic locomotion (using gait rehabilitation robotic device). These programs aim at enhancing patient recovery through developing functional structures, adaptive.
Results: Results were quantified by assessing the patient's quality of life, self-esteem and depressive mood level.
Conclusion: Although no significant differences in the two groups of patients with spinal cord injury, recovery programs made by combining medical and psychological measures psychologically significant improvements including: increased quality of life, self-esteem and reduced provision depression.

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SUTURE ANCHOR FIXATION STRENGTH WITH OR WITHOUT AUGMENTATION IN OSTEOPENIC AND SEVERELY OSTEOPOROTIC BONES IN ROTATOR CUFF REPAIR: A BIOMECHANICAL STUDY

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Objective: To compare the results of various types of anchor applications with or without augmentation in both osteopenic and severely osteoporotic bone models.
Material and Methods: Two different types of suture anchors were tested in severely osteoporotic (SOP) and osteopenic polyurethane (PU) foam blocks using an established protocol. An Instron machine applied tensile loads parallel to the axis of insertion until failure, and mean anchor failure strengths were calculated. The mode of failure (anchor pullout, suture breakage) was recorded. Anchors tested included the corkscrew (CS) (without augmentation, polymethilmetacrylate (PMMA) augmented and bioabsorbable tricalcium phosphate (TCP) cement augmented), and corkscrew FT II (CS FT II) 5.5 mm.
Results: Mean failure loads for both SOP and osteopenic PU foam blocks, respectively, were as follows: CS; 16.2 N and 212.4 N, CS with TCP; 75.2 N and 396 N, CS with PMMA; 101.2 N and 528.8 N, CS FT II; 13.8 N and 339.8 N.
Conclusion: Augmentation of CS with TCP or PMMA would be essential in SOP bones. On osteopenic bone model, although anchor fixation augmented with PMMA is the best fixation method, CS augmented with TCP cement or CS-FT II without any need for augmentation may also be used as an alternative

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PAIN SYNDROME, FUNCTIONAL ACTIVITY AND QUALITY OF LIFE IN POSTMENOPAUSAL WOMEN WITH KNEE OSTEOARTHRITIS DEPENDING ON THE STRUCTURAL-FUNCTIONAL PARAMETERS OF BONE

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Objective: To evaluate the features of pain syndrome in knee joints, functional activity and quality of life in patients with knee osteoarthritis (KOA) depending on the structural-functional state (SFS) of bone.
Material and Methods: We examined 90 postmenopausal women aged 50–79 years with KOA of II-III degree, divided into age groups: the 50–59, 60–69 and 70–79 years old. The diagnosis of KOA was performed according to the criteria of ACR (1995), the stage by Kellgren-Lawrence classification. The parameters of pain syndrome in knee joints and functional activity were assessed by VAS, index Lequense, static balancing and 15-m test; the quality of life was determined by Euro-Qol-5D. BMD was measured by DXA (Prodigy). To analyze the performance it has been allocated the following groups: 1 - patients with osteoporosis and 2 - with normal bone parameters.
Results: In patients with osteoporosis in the age group 60–69 it was found significantly higher levels of pain in the knee joints and lower parameters of functional activity compared with women with normal bone. Thus, the baseline values of pain were 4.1±0.8 and 2.5±0.2 points accordingly (F=5.83, p=0.02), pain during long-term walking - 3.2±1.2 and 2.3±0.2 points (F=5.75, p=0.018), pain during upstairs walking - 5.9±1.1 and 3.7±0.3 points (F=5.23, p=0.024), Lequense index - 13.9±1.4 and 11.2±0.4 points, respectively (F=3.07, p=0.05). Similar data we did not find in the age groups 50–59 and 70–79. All age groups with patients with KOA didn't significantly differ in data of static balancing, 15-m test and quality of life depending on the status of bone.
Conclusion: SFS of bone in women aged 60–69 years with KOA of II-III degree significantly affect the data of pain syndrome and functional activity. Intensified pain syndrome and limitation of functional activity in patients with KOA and osteoporosis should be considered during treatment.

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IS FOOT PAIN CONSIDERED IN THE DECISION TO TREAT KNEE OSTEOARTHRITIS WITH ARTHROPLASTY?

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Objective: The decision to treat knee osteoarthritis (KOA) with arthroplasty is based on severity of knee symptoms. The influence of other symptomatic joints upon this decision has not yet been evidenced. The objective of this study is to describe the variation in pre-operative knee pain and function for different levels of foot pain.

Material and Methods: In a prospective cohort study of patients awaiting knee arthroplasty, a subcohort of $N=147$ underwent foot, ankle and knee examination. Various measures of pain and function were measured for the index limb. Descriptive summaries and plots were produced for these continuous variables based on the appropriate statistical method for the distribution of each variable. These variables were then compared using a t-test or Mann-Whitney test, as appropriate.

Results: Oxford Knee Score (OKS) was significantly worse (mean difference=4.2, 95%CI:0.9–7.6, $p=0.014$) for those with foot pain ($N=55$) compared to those without ($N=63$). None of the other index limb variables (knee flexion range, PainDetect score, Knee pain VAS, Knee fixed flexion deformity) showed significant differences between the two levels of foot pain (none vs. any), but the direction of association for all variables was the same as for OKS (worse in foot pain group).

Conclusion: Early findings suggest that patients with foot pain awaiting knee arthroplasty have worse knee severity symptoms than those without foot pain. The influence of foot pain on the outcome of surgery is not yet known, however these findings suggest the decision to treat KOA with arthroplasty may be taken without consideration of foot pain. Further analysis will be carried out on this cohort after postoperative measures have been collected in order to assess the influence of foot pain on knee arthroplasty outcomes.

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SYNOVIAL FLUID FROM BILATERAL OSTEOARTHRITIS PATIENTS REVEALED IL-1B AS THE PRINCIPLE MODULATOR FOR CARTILAGE DEGENERATION AND INFLAMMATION

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Objective: Inflammation and oxidative stress are closely integrated processes in osteoarthritis (OA), however, pathogenesis of synovitis remains largely unknown. To understand disease associated local flares, we enrolled 7 bilateral OA patients and aspirated synovial fluid (SF) was analysed for different biomarkers. We claim this to be the first report on bilateral SF analysis in Indian demography and uniquely reveal correlation of cartilage degeneration, inflammation and histopathologies involved.

Material and Methods: Inflammatory biomarkers like IL-1β, nitric oxide (NO) were estimated using kits. Glycosaminoglycan (GAG) was measured as cartilage degradation indicator by DMMB based dye binding assay. Antioxidants nitrate/nitrite were estimated using plate based activity assays.

Results: NO, nitrate/nitrites and GAG values remained comparable for both knees of all patients. Interestingly, a 68 years old lady revealed higher IL-1β in right knee SF (SF-R 118.64 ±16.8, SF-L 30.45±2.3 pg/ml). These values were well correlated with radiography and histopathology, showing more cartilage degradation in right knee.

Conclusion: IL-1β was estimated high in all the patients and remained comparable for both knees while above described patient has showed a differential degree of cartilage loss in her knees. IL-1β has multiple actions in OA pathology, including synovitis, leading to accelerated cartilage loss. Elevated IL-1β hampers chondrocyte compensatory mechanism, inhibiting cartilage repair. The degenerating cartilage is further responsible for inducing secondary inflammation, mainly restricted to local tissue. The differential IL-1β levels and variation in cartilage degradation observed in this case both as atypical features of OA. To conclude, among various biomarkers associated with OA pathology, IL-1β suggests strong linkage with synovitis. Its correlation with GAG reflects association between inflammation and cartilage loss which will be discussed with the aid of histopathology slides and flow chart.

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THE RELATIONSHIP BETWEEN ULTRASOUND DIAGNOSED NAFLD AND FEMORAL NECK BONE MINERAL DENSITY: A NHANES III STUDY

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Objective: There have been data, mainly from Asia and Middle East populations, supporting the inverse relationship between BMD and nonalcoholic fatty liver disease (NAFLD). However, this relationship has not been investigated in US population. We therefore investigated this relationship in a national representative sample of US adults.

Material and Methods: Data was taken from the third NHANES database (1998–1994). Fourteen thousand seven hundred ninety-seven participants, aged 20–74, received ultrasound examinations. Thirteen thousand eight hundred fifty-six were diagnosed to have NAFLD. Some participants were excluded due to the following reasons: without valid femoral neck (FN) BMD measurement (n=2545), excessive alcohol consumption (>21 drinks/week in men and >14 drinks/week in women), being hepatitis B or C carrier and transferrin saturation ≥50 %. We further excluded 656 participants with missing data in the multivariable model. Ten thousand six hundred fifty-five participants were included in the final analysis. Ultrasound video images were reviewed by 3 board-certified radiologists specialized in hepatic imaging. NAFLD was categorized into normal versus any degree of steatosis (mild, moderate, or severe). BMD was measured using Hologic QDR-100 x-ray bone densitometer.

Results: Among participants with NAFLD (N=3853), 34.6 % and 3 % of them had osteopenia and osteoporosis (vs. 37.9 % and 3.4 % in participants without NAFLD). Logistic regression showed that NAFLD was significantly associated with reduced odds of osteopenia (OR=0.645; 95%CI: 0.56–0.743; P<0.001) and osteoporosis (OR=0.657; 95%CI: 0.477–0.904; p=0.011), after adjustment for age, sex, and race/ethnicity. After further adjusted for BMI, education, physical activity, smoking and drinking status in the full multivariable model, the association became insignificant for osteopenia (OR=0.931; 95%CI: 0.791–1.096; P=0.384) and osteoporosis (OR=1.194; 95%CI: 0.815–1.749; p=0.357). Analysis stratified by sex revealed similar results. When the group without steatosis was compared to those with severe steatosis, the results were also similar. Among participants with NAFLD, NAFLD fibrosis score was positively associated with FN BMD. However, the association became insignificant after further adjustment in the full multivariable model.

Conclusion: Ultrasound-diagnosed NAFLD and fibrosis score in NAFLD are not associated with FN BMD in US adults.

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TREATMENT OF LOWER LIMB'S FRACTURES NONUNION BY STRONTIUM RANELATE

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Objective: Nonunion is a fracture that does not consolidate in time (beyond 6 months). Strontium ranelate is a molecule used in the treatment of osteoporosis, it has a bone formation and antiresorptive on bone. The objective of this study was to evaluate the efficacy of strontium ranelate on the nonunion fracture of the lower limb.

Material and Methods: Prospective study on eight cases of nonunion member lower evolving for more than 6 months, regardless of the etiology of thereof and the previous treatment received. We excluded patients with infected nonunion and evaluation criterion focuses on the formation of a callus on pain (VAS) and function. Strontium ranelate at a dose of 2 g/day was administered to patients associated with a vitamin and calcium treatment.

Results: Seven men (87.5 %) and one woman are included. Nonunion seat femur in 62.5 % and leg bones in 37.5 %. Mean age of patients was 42±14 years (range: 20–62). The length of the fracture is an average of 20±10.4 months (range: 8–42 months). All patients were treated by osteosynthesis within 4 days after the fracture average. In 75 % of the trauma is severe (traffic accident), 25 % is moderate trauma (fall height). The average duration of treatment with strontium ranelate is 9.87 months (range: 2–17 months). At baseline the patients moved using two crutches unable to support the affected limb. Pain (VAS) is on average 46±12. Patients (87.5 %) treated over a period of 03 months improvement in pain of 50 % (VAS) and function, walking is possible using a single rod. Among those with a decrease of 6 months of treatment is 87.5 %: pain increased on average 10±5. At 12 months and more in all patients walking without a cane, the pain is absent, walking is done with slight limp. Radiologically there is a beginning of consolidation or early healing of the nonunion in 05 patients.

Conclusion: Strontium ranelate appears promising in nonunion. Further studies are needed to confirm this hypothesis.

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A DECADE OF IRANIAN OSTEOPOROSIS OUTPATIENT STUDY (IROSTEOPS): T-SCORE DISCORDANCE

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Objective: Considering the fact that the rate of bone loss differs at different sites, the importance of discordance, defined as the presence of different categories of T-scores in two skeletal sites of a single patient, has been highlighted as it can affect diagnosis and treatment plans. Given this background and considering the need for the estimation of the impact of this phenomenon in our country, the present study was developed to assess the prevalence of T-score discordance and its risk factors in a large sample of female Iranian population.
Material and Methods: The retrospective observational descriptive analytical Iranian Osteoporosis Outpatient Study (IROSTEOPS) was conducted on a database of 13,523 patients referred to a community-based outpatient BMD center between 2000 and 2011. All the individuals underwent BMD using Lunar densitometer (Lunar DPXM, Lunar, 1999). Minor discordance happens when the different diagnostic classes are adjacent (osteoporosis in one site and osteopenia in the other or osteopenia in one site and normal in the other). If the patient is diagnosed with osteoporosis in one site and normal at the other, the discordance however falls into the major class.
Results: 8,146 postmenopausal women with the mean age of 59.0±8.6 years were included. Discordance was noted in 3,741 (45.9 %) of these individuals; from among which about 91 % were categorized as minor discordance. Regression analysis revealed that older ages, higher BMI, higher number of parities, and the use of hormone replacement therapy were linked to higher risk of discordance. This is while sun exposure, higher age at menopause and menarche, the use of corticosteroids and breastfeeding however were not significantly associated with a higher discordance risk in this group.
Conclusion: The agreement between bone loss rates at different anatomic sites is low and thus performing DXA at a single site is not adequate.

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EFFICIENCY OF FORTIFIED VITAMIN D MILK IN ADOLESCENTS: THE COMMUNITY INTERVENTIONAL TRIAL (CITFOMIST)

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Objective: In Iran fortification is not a routine strategy and despite the high prevalence of vitamin D deficiency in the country not many studies have assessed its efficacy. The present study was therefore conducted to assess the efficacy of fortified vitamin D milk in improving vitamin D levels. This is the first study to compare the effectiveness of fortification with two different doses of vitamin D in a group of both guidance and high school students.
Material and Methods: The cluster randomized trial (CITFOMIST) was conducted on 15–19 years old guidance and high school students of both genders from different districts of the Iranian Capital, Tehran. A mixed sampling method consisted of stratified random and 2-stage cluster sampling method was applied. First, Tehran was divided into three strata based on the socio-economic status using the Urban Health Equity Assessment and Response Tool Study. Then a proportional to size allocation method was used to select the boys and girls guidance and high schools in the districts, taking into effect the design effect of 1.85. As a result 36 schools were included. Six thousand two hundred fifty-seven students were recruited to study compliance with milk consumption among adolescents. 25(OH)D levels were measured in 468 of them at two point before and after the milk consumption. The students were randomly classified to receive simple milk, milk fortified by 600 unit vitamin D3/L and milk fortified by 1,000 unit vitamin D3/L for a month.
Results: Baseline mean serum 25(OH)D concentration of the students was 26.2±16.9 nmol/L. Serum levels of vitamin D increased after milk consumption in all the three groups. The increase was significantly higher in the group who used fortified milk but there was no difference between the two dosing (simple: 20.3 vs. 23.5; 600 IU: 22.5 vs. 34; 1,000 IU: 26.2 vs. 40.1). The overall milk consumption in this study was poor.
Conclusion: Milk fortification is an effective strategy in improving vitamin D deficiency among adolescents.

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VITAMIN D STATUS OF IRANIAN ADULTS: A 10-YEAR NATIONWIDE STUDY

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Objective: Several studies have assessed the prevalence of vitamin D deficiency in the Iranian population in the past years. The present study was conducted to compare the data

obtained in the first phase of the Iranian Multicenter Osteoporosis Study (IMOS) conducted in 2000 and that of the third phase performed in 2012.

Material and Methods: IMOS is a population-based study conducted by the Osteoporosis Research Center of the Endocrinology and Metabolism Research Institute affiliated with Tehran University of Medical Sciences in collaboration with the Iranian Ministry of Health and Medical Education in different phases to assess bone health and the prevalence of vitamin D deficiency in different parts of the country. Each phase was conducted in different provinces with various altitudes, latitudes and lifestyle habits, so that the results could be generalized to the country. The first was conducted in five main Iranian cities: Tehran - Shiraz - Bushehr - Mashhad - Tabriz in 2000. The third phase was conducted some 10 years later in 2012 in Arak and Sanandaj.

Results: While about 28 % of the individuals suffered from vitamin D deficiency in phase one, the rate had increased to 82.6 % in phase three. Based on the results, younger individuals of both genders had lower vitamin D levels in both phases (women: 62.99 nmol/L in phase 1 vs. 17.31 nmol/L in phase 3 - men: 70.34 nmol/L in phase 1 vs. 28.14 nmol/L in phase 3). In other words more than 95 % of 20–34 year old women and 90 % of men of the same age group were vitamin D deficient.

Conclusion: The prevalence of vitamin D deficiency has worsened during years in Iran despite nationwide education programs held across the country, pointing out the need for the implementation of nationwide strategies such as fortification to fight the condition. The statistics also show that the severity of the condition is poles apart in different parts of the country mainly due to their diverse environmental, genetics and lifestyle characteristics.

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CELL MEDIATED ASSAY REVEALED INFLAMMATORY POTENTIAL OF SYNOVIAL FLUID OBTAINED FROM OSTEOARTHRITIS PATIENT IN ACCORDANCE WITH THE DISEASE SEVERITY

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Objective: A novel cell-challenge experiment was designed to evaluate inflammatory potential of synovial fluids (SF) obtained from knee osteoarthritis (OA) patients graded using Kellgren-Lawrence (KL) scale. Different biomarkers were assessed for comparison.

Material and Methods: Inflammatory potential of 10 SF samples (9 OA and 1 non-OA), was assessed using a novel cell-challenge experiment. Cultured rat synoviocytes fibroblast (RSF) were challenged with SFs and released NO was recorded for inflammatory response. This enabled us to estimate the cumulative action of different factors present in SF. Pretreated cells with IL-1β or lipopolysaccharide (LPS) was further challenged with SFs to study sustenance of inflammation. SFs were analyzed for levels of biomarkers like IL-1β, Nitric oxide (NO) and glycosaminoglycans (GAG).

Results: We found unique trends in levels of inflammatory biomarkers and patient's KL grade. Elevated levels of IL-1β, NO and its derivatives were found in grade-3 and grade-2 patients whereas GAG level increased in KL-grade-3 SFs. In our cell-challenge experiment, NO release was increased by 5- and 4-fold after 48 and 72 h, respectively, by SFs from KL-grade-2 patients. Cells pretreated with IL-1β and challenged by SF showed 11-fold increase NO (KL-2). Highest NO release after LPS pretreatment was recorded by KL-3 patient's SFs. Unexpectedly, SFs from KL-grade-1 and 0 reduced released NO, indicating a potential buffering action against the inflammatory factors. SF from grade-4 patients failed to increase NO with or without pre-treatment of IL-1β or LPS.

Conclusion: SFs from KL-grade-2 and 3 patients induced more inflammation in cultured RSF as compared to grade-4 and 1. Similar trend was observed in cells pre- treated with either IL-1β or LPS suggesting that SFs from grade-2 and 3 patients maximally accumulate factors responsible to induce and sustain inflammation. Interestingly, SFs from grade 1 and 0, presumably contain factors tolerating inflammation induced by IL-1β and LPS.

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EFFECTS OF TREATMENT WITH PTH(1-84) OR STRONTIUM RANELATE ON BONE BIOMECHANICS IN AN EXPERIMENTAL MODEL OF MALE OSTEOPOROSIS

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Objective: Both strontium ranelate (SrR) and PTH(1-84) have demonstrated their ability to improve BMD and microarchitecture reducing the risk of fracture in postmenopausal osteoporosis (OP). Their effects on male OP are less

well studied. The aim of this study was to evaluate the effects of PTH(1-84) and SrR on bone biomechanics in an experimental model of male OP.

Material and Methods: Sixty 6-month-old male Sprague Dawley rats were divided into 6 groups: SHAM (simulated intervention); OQX (orchiectomized); OQX+PTH50 (OQX treated with PTH 50 μg/kg/day SC); OQX+PTH10 (OQX treated with PTH 10 μg/kg/day SC); OQX+SrR900 (OQX treated with SrR 900 mg/kg/day VO); and OQX+SrR450 (OQX treated with SrR 450 mg/kg/day VO). Treatments started 6 months after orchiectomy and lasted 45 days (SrR) and 90 days (PTH). After sacrifice, right femora were subjected to three-point bending mechanical testing and L5 vertebrae to compression tests.

Results: In the vertebrae, orchiectomy caused a general worsening of the intrinsic and extrinsic mechanical properties, particularly noticeable in the values of work to failure and toughness. In the femurs, however, the parameter showing the greatest decrease in OQX versus SHAM is extrinsic stiffness. SrR treated groups showed similar values to OQX group in all determined mechanical parameters, not being able to improve the biomechanical strength in compression or bending. The lower dose of PTH has not been able to cause remarkable changes in mechanical properties compared to OQX group, but the higher dose increased the values of many mechanical parameters.

Conclusion: None of the tested doses of SrR neither the lower dose of PTH were able to modify the negative effects of orchiectomy on mechanical properties in this model of male OP. However, the highest dose of PTH have demonstrated ability to improve femoral and lumbar mechanical properties, reaching values even higher than SHAM group.

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ASSOCIATION OF MATERNAL VITAMIN D STATUS DURING PREGNANCY WITH BONE MINERAL CONTENT IN OFFSPRING: THE BHSP-CEOR STUDY

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Objective: The role of maternal vitamin D status in pregnancy as a determinant of bone mineral content (BMC) in offspring is controversial. The aim of the present study was to examine the associations between maternal vitamin-D status during pregnancy and offspring BMC at 7–8 year of age among a population-based cohort.

Material and Methods: The study population included 1,024 mother-child pairs living in Jeddah, Saudi Arabia as part of the "Bone Health Study in Pregnancy" (BHSP) at CEOR. Anthropometric measurements, dietary intake, lifestyle measures for mothers during pregnancy were recorded. At 7–8 year of age, anthropometric measurements, dietary intake, and total body (minus head) (TBLH) bone area (BA), BMC and areal BMD (aBMD) by DXA were also collected. Statistical analysis were used to assess the possible associations between maternal serum 25(OH)D (at 3rd trimester of pregnancy) and childhood bone indices.

Results: A total of 605 (59.1 %) mothers had deficient, 258 (25.0 %) insufficient, and 161 (15.7 %) sufficient 25(OH)D levels in 3rd trimester of pregnancy. The mean offspring age was 7.4 years. The TBLH and spinal BMC did not differ among offspring of mothers in the deficient or insufficient as compared with sufficient group as indicated by serum 25(OH)D levels. Maternal 25(OH)D levels in 3rd trimester of pregnancy, was not associated with BMC of offspring or other variable recorded. Multivariate associations of the maternal groups as per 25(OH)D levels [presented as adjusted mean difference in outcome (95%CI) per unit change in serum 25(OH)D levels] in TBLH BMC (g) [−0.4 (−2.1,2.4); 0.5 (−3.4,5.2)]; TBLH BMD (g/cm^2) [(−0.031,0.006); −0.046 (−0.11;0.08)]; spine BMD (g/km^2) [0.001 (−0.009, 0.007); −0.021 (−0.016,0.013)], as compared with sufficient group, respectively.

Conclusion: We found no significant association between maternal vitamin D status at 3rd trimester of pregnancy among Saudi women and their offspring BMC or other bone indices measured at 7–8 year of age.

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PARQVE - EDUCATIONAL PROGRAM: 1 YEAR RESULTS

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Objective: To evaluate the effects (changes in BMI, pain, function and quality of life) of an educational program administered to patients with knee osteoarthritis (KOA).
Material and Methods: 202 patients with knee OA were evenly allocated in four groups. Three groups had 2 days of lectures on OA. All groups received printed material to read and a video with all the lectures. Groups 1, 2, and 3, had lectures 1, 2 and 3 months apart, respectively. Group 4 received the educational material only. VAS, WOMAC, Lequesne and SF-36 questionnaires were applied at baseline, 4 and 12 months after lectures and educational material retrieval. Weight and height were measured at baseline and at 1 year after the educational program. BMI was calculated. Schooling years and a coping scale were verified. Participants were asked to diet and to exercise at least three times a week.
Results: BMI was significantly higher in the group 4 with an average BMI of 36.4, while groups 1 to 3 showed BMI of 34.3, 32.8 and 30.1, respectively. All groups that attended classes diminished BMI. Group 4 increased BMI. BMI reduction did not correlate with pain and functional results although among those that reduced BMI, there were a greater number of patients with improved function (WOMAC) than among those that did not reduce BMI. Patient's schooling did not correlate with pain and functional results. At 4 months functional (WOMAC and Lequesne), pain (VAS and WOMAC pain) and quality of life (SF-36) improvements were better than at 1 year being statistically significant (WOMAC, $p=0.006$; WOMAC pain, $p=0.034$, SF-36 MCS, $p=0.009$ and SF-36 PCS, $p=0.044$) whereas at 1 year they were not. A positive correlation was found between coping skills focused on the problem and improvement in the Lequesne functional score at 1 year ($p=0.05$).
Conclusion: The educational program changed habits of patients increasing exercise and reducing BMI, improving pain and function.
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THE FRACTURE UNIT TO BRIDGE THE OSTEOPOROSIS CARE GAP IN ITALY

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Objective: A wide care gap exists between the healthcare needs of older persons with fragility fractures and the diagnostic and therapeutic answers they receive for fracture secondary prevention. The Fracture Unit (FU) is a model of care tailored to bridge the osteoporosis care gap. The aim of this study is to investigate the impact of the activation of a FU model for the secondary prevention of fragility fractures.
Material and Methods: This is a prospective observational study with a pre- and post-intervention phase. Eligible persons are those aged >65 years who underwent fragility hip fracture surgery. The clinical setting is an orthopaedic acute ward. The FU is a multidisciplinary intervention to optimize the identification of persons with fragility fracture, to improve their evaluation through BMD testing and to initiate an osteoporotic treatment, when appropriate. In the pre-intervention phase, the records of 172 participants admitted before activation of FU were evaluated. In the implementing phase, the FU holds multidisciplinary meetings focusing on the diagnostic and therapeutic approaches to fragility fractures and activates specific diagnostic-therapeutic pathways for fracture secondary prevention. In the post-intervention phase, data from 211 participants were gathered. All participants underwent telephone follow-up at 12 months. Descriptive analyses and statistical comparisons between participants enrolled before and after the FU implementation are presented.
Results: Compared to the pre-intervention phase, participants enrolled in the post-intervention phase have higher probability to receive lab diagnostic investigations during hospital stay (from 0 to 44 %, $p<0.0001$), and indications at discharge for BMD testing (from 14 to 49 %, $p<0.0001$), bone specialist evaluation (from 2.3 to 52 %, $p<0.0001$), Ca/vitamin D supplementation (from 15 to 48 %, $p<0.0001$) and anti-fracture drug prescription (from 16 to 48 %, $p<0.0001$). In addition, the FU improves 12 month patient's adherence to diagnostic and therapeutic indications received at hospital discharge.
Conclusion: The FU is a multidisciplinary health care model effective and efficient to optimize the identification, evaluation and treatment of older persons at the highest risk of fragility fracture.

P548
EFFECT OF RITUXIMAB THERAPY ON LIFE QUALITY WITH RHEUMATOID ARTHRITIS PATIENTS

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Objective: To evaluate the effect of rituximab on the life quality with rheumatoid arthritis (RA) patients according to

the results of the overall EQ-5D questionnaire and a specific questionnaire HAQ.

Material and Methods: We observed 98 patients with a documented diagnosis of RA. All patients were randomized into two groups, depending on the basic therapy variant: Group 1 (n=56) - patients with the combined therapy of methotrexate and rituximab; Group 2 (n=42) - patients with methotrexate therapy only. Follow-up was 24 months. To assess life quality (LQ) questionnaires EQ-5D and HAQ were used.

Results: While filling in the EQ-5D questionnaire at baseline, all RA patients noted health problems in varying degrees. After a year of therapy a statistically significant increase in the health index was established both in the group 1 and group 2 - 0.61±0.04 and 0.63±0.07 (p<0.05 and p<0.05, respectively). A statistically significant increase was found with the VAS RA patients in group 1 in 12 months (46.7±6.3 mm, p<0.05) and in 24 months (49.3±11.4 mm, p<0.05) on the initial data. In assessing the HAQ index in 12 months a statistically significant reduction was revealed in the group of patients treated with rituximab, relative benchmarks - 1.125 ±0.08 g/cm^2 (p<0.05). In the group of patients receiving methotrexate monotherapy, a statistically significant change in HAQ index was not obtained. Similar patterns persisted through 24 months.

Conclusion: By EQ-5D questionnaire satisfactory therapeutic effect was observed in the group of the patients with a combined therapy of methotrexate and rituximab, while in the group with MTX only–it's minimal one. When evaluating the HAQ index a pronounced clinical benefit was noted in the group of the patients receiving rituximab while in the group with MTX only–it is a minimal one.

P549

TRABECULAR BONE SCORE, BONE MINERAL DENSITY AND BODY COMPOSITION IN MEN OF DIFFERENT AGES

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Objective: To evaluate the trabecular bone score (TBS), BMD and body composition in men of various ages.

Material and Methods: 300 men aged 40–87 years (mean age - 60.5±0.6 year; mean height - 1.61±0.003 m; mean weight - 84.1±0.9 kg) were examined. The patients were divided into the following age-dependent groups: 40–49 year (n=52), 50–59 year (n=90), 60–69 year (n=88), 70–79 year (n=58), 80–87 year (n=12). The BMD of total body, PA lumbar spine and proximal femur were measured by the DXA method (Prodigy, GEHC Lunar, Madison, WI, USA) and PA spine TBS were assessed by the TBS iNsight® software package installed on our DXA machine (Med-Imaps, Pessac, France).

Results: We observed a significant decrease of TBS (L_1-L_4) as a function of age (40–49 year - 1.161±0.022; 50–59 year - 1.108±0.018; 60–69 year - 1.114±0.016; 70–79 year - 1.061 ±0.024; 80–87 year - 1.105±0.049; F=2.49; p=0.04). We also found the decrease of BMD of lumbar spine (40–49 year - 1.186±0.003 g/cm^2; 50–59 year - 1.128±0.021 g/cm^2; 60–69 year - 1.224±0.026 g/cm^2; 70–79 year - 1.247±0.034 g/cm^2; 80–87 year - 1.131±0.064 g/cm^2; F=3.25; p=0.01) and proximal femur (40–49 year - 1.050±0.021 g/cm^2; 50–59 year - 0.996±0.018 g/cm^2; 60–69 year - 1.032±0.018 g/cm^2; 70–79 year - 1.004±0.021 g/cm^2; 80–87 year - 0.879±0.050 g/cm^2; F=3.34; p=0.01) with age. Significant correlation was observed between TBS and BMD of lumbar spine (TBS= 1.017+0.079×BMD (L_1-L_4); r=0.11; t=1.90; p<0.05) and lean (TBS=1.441–0.000006×Lean mass (g); r=−0.25; t= −4.50; p=0.00001) and fat (TBS=1.33–0.000009×Fat mass (g); r=−0.54; t=−11.04; p<0.001) masses.

Conclusion: TBS and BMD in examined men significantly decreased with ageing. We have also found a significant correlation of TBS and BMD of lumbar spine, lean and fat masses.

P550

BMI AND EDUCATION IN KNEE OSTEOARTHRITIS

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Objective: To evaluate the effects of an educational program of patients with knee osteoarthritis (KOA) by means of BMI change.

Material and Methods: 205 patients with knee OA were evenly allocated in four groups. Three groups had 2 days of lectures on OA. All groups received printed material to read and a video with all the lectures. Groups 1, 2, and 3, had lectures 1, 2 and 3 months apart respectively. Group 4 received the educational material only. Half of the patients (subgroups A) received four telephone calls (3 months apart) after the final lecture or after receiving the educational material (Group 4). Weight, height, were measured at baseline and at 1 year after the educational program. BMI was calculated. Participants were encouraged to maintain a balanced diet and to exercise at least three times a week.

Results: All groups were similar in age, BMI was significantly different in the group that did not attend classes (Group 4). Table 1 shows changes in BMI. All groups that attended

classes (Groups 1 to 3) diminished BMI. Group 3 (higher baseline BMI) decreased BMI the most. Group 4 (educational material only) increased BMI changing from obesity grades I and II, at baseline, to obesity grades II and III (morbid obesity) in 1 year. Among those who lost weight, the higher initial BMI, the greater initial weight loss (p=0.03). Differences were significant between groups:
(1–3) mean=− 1.64, 95%CI (−6.50, −0.77), p=0.006
(1–4) mean=−3.55, 95%CI (−6.27, −0.83), p=0
(2–4) mean=−4.60, 95%CI (−7.35, −1.849), p=0
(3–4) mean=−7.19, 95%CI (−9.94, −4.44), p=0.00
Conclusion: The educational program with its clarification about the importance of healthy eating and exercise improved anthropometric parameters of this population, which adhered to the guidelines.
Acknowledgements: We would like to thank TRB Pharma Brasil for the financial support.

P551
TRABECULAR BONE SCORE, BONE MINERAL DENSITY AND BODY COMPOSITION IN WOMEN OF DIFFERENT AGES

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Objective: The aim of this study was to evaluate the trabecular bone score (TBS), BMD and body composition in women of various ages.
Material and Methods: 494 women aged 41–89 years (mean age - 63.6±0.4 year; mean height - 1.61±0.003 m; mean weight - 74.0±0.6 kg) were examined. The patients were divided into the following age-dependent groups: 40–49 year (n=35), 50–59 year (n=130), 60–69 year (n=177), 70–79 year (n=128), 80–88 year (n=24). BMD of total body, PA lumbar spine and proximal femur were measured by the DXA method (Prodigy, GEHC Lunar, Madison, WI, USA) and PA spine TBS were assessed by the TBS iNsight® software package installed on our DXA machine (Med-Imaps, Pessac, France).
Results: We observed a significant decrease of TBS (L_1-L_4) as a function of age (40–49 year - 1.321±0.021; 50–59 year - 1.245±0.012; 60–69 year - 1.189±0.011; 70–79 year - 1.166 ±0.001; 80–88 year - 1.114±0.033; F=14.28; p<0.001). We also found the lumbar spine BMD (40–49 year - 1.156± 0.038 g/cm^2; 50–59 year - 1.068±0.018 g/cm^2; 60–69 year - 1.022±0.016 g/cm^2; 70–79 year - 1.003±0.001 g/cm^2; 80–89 year - 1.007±0.037 g/cm^2; F=5.11; p=0.0005) and proximal femur BMD (40–49 year - 1.012±0.037 g/cm^2; 50–59 year - 0.940±0.013 g/cm^2; 60–69 year - 0.923±0.011 g/cm^2; 70–79 year - 0.843±0.012 g/cm^2; 80–89 year - 0.741± 0.020 g/cm^2; F=20.09; p<0.001) decrease with age. Significant correlation was observed between TBS and BMD of lumbar spine (TBS=0.93+0.26×BMD(L_1-L_4); r=0.37; t= 8.61; p<0.001), proximal femur (TBS=0.97+0.27×BMD (L_1-L_4); r=0.29; t=6.61; p<0.001) and lean (TBS=1.34–0.000003×Lean mass (g); r=−0.11; t=−2.47; p=0.01) and fat (TBS=1.25–0.000003×Fat mass (g); r=−0.100; t= −2.200; p=0.03) masses.
Conclusion: TBS and BMD of the examined women significantly decreased with ageing. We have also found a significant correlation of TBS and BMD of lumbar spine and proximal femur, lean and fat masses.

P552
FUNCTIONAL IMPROVEMENT BY HOME EXERCISE AND EDUCATIONAL PROGRAM: PARQVE

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Objective: Evaluate the improvement of function and balance in patients with OA undergoing an educational program of a day with multidisciplinary.
Material and Methods: 202 patients with knee OA were submitted to two tests: Timed and Go (TUG) and Five Times Sit to Stand Test (FTSST) at enrolment and 1 year after an educational program (PARQVE). Patients were divided in four groups and received take home written and audiovisual material on OA. Groups 1 to 3 had 2 days of lectures with orthopedic surgeons, physical therapists, psychologists, occupational therapists, nutritionist, physical educators, social workers. Group 4 received the written and audio material. All patients were oriented to exercise at least three times a week. Each group was subdivided in A (received bimonthly telephone calls) and B (no telephone calls).
Results: All groups improved in TUG irrespective of the group they were in with no significant difference between them (p=0.097). When considering only groups 1 to 4, (irrespective of telephone calls) FTSST showed a difference between groups (p=0.037), however ANOVA could not show what group was different. But when comparing groups that had classes (1+2+3) with the group that just received the educational material (4), TUG showed trends of difference p=0.066 and FTSST improved significantly in the class group p=0.012.
Conclusion: Patients improve function and balance with education and attention.
Acknowledgements: We would like to thank TRB Pharma Brasil for financial support.

P553
ANTHROPOMETRIC CHARACTERISTICS OF POSTMENOPAUSAL WOMEN DEPENDING ON APPENDICULAR SKELETAL MASS

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Objective: To evaluate the anthropometric characteristics in postmenopausal women depending on appendicular skeletal mass.

Material and Methods: We examined 8,882 women aged 20–89 years (mean age - 56.7±0.14 year; mean height - 162.5 ±0.07 cm; mean weight - 73.5±0.16 kg), among them anthropometric measures were performed in 79 postmenopausal women aged 40–82 year (mean age - 63.53±1.08 year, mean height - 157.54±0.79 cm, mean weight - 74.75±1.68 kg). Appendicular skeletal mass (ASM) was measured in all four limbs with DXA. We also calculated the appendicular skeletal mass index (ASMI) as ASM/height (kg/m^2). During quartile analysis depending on ASMI the examined women were divided on following groups: Q1 - ASMI<6.38 kg/m^2 (n=20), Q2 - ASMI=6.38–6.83 kg/m^2 (n=20), Q3 - ASMI=6.84–7.36 kg/m^2 (n=20), Q4 - ASMI>7.36 kg/m^2 (n=19). Anthropometric characteristics of the women were evaluated by the method of Bunak V.V. (1941) in the modification Shaparenko P.F. (1994). Lean and fat masses were measured by DXA using a densitometer Prodigy, GE.

Results: Frequency of sarcopenia in women aged 65 year and older was 7 %. Quartile analysis (depending on ASMI) shows that women of Q1 and Q2 groups had significantly lower the following anthropometric characteristics: weight (F=5.24; p=0.002), neck circumference (F=5.68; p=0.001), abdomen circumference (F=11.52; p<0.0001), shoulder width (F=2.22; p=0.09), narrow tibia circumference (F=6.44; p=0.0006). We also observed the significantly lower thorax circumference in women of Q1 group (F=3.82; p=0.01) in comparison with women of Q4 group (F=3.82; p=0.01).

Conclusion: Women with lower ASMI (Q1 and Q2 groups) had the significantly lower following anthropometric characteristics: weight, neck circumference, abdomen circumference, shoulder width, narrow tibia circumference. Thus, we can use the anthropometric measures for determining the groups with the relative risk of sarcopenia and its complications.

P554
HIP-SPINE DIAGNOSTIC DISCORDANCE IN THE UNITED ARAB EMIRATES

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Objective: Diagnostic discordance for osteoporosis is the presence of different T-scores in two skeletal sites in the same subject leading to different WHO diagnostic categories. Discordance is defined as minor when the difference between two sites is no more than one WHO diagnostic class and major when one site is osteoporotic and the other is normal. To determine the percentage of minor and major diagnostic discordance and identify associated factors in patients diagnosed with osteoporosis.

Material and Methods: All Emirati patients ≥50 years old seen in rheumatology clinics of our hospital from 2011 to 2013 diagnosed with osteoporosis were identified through an internal audit. Details of the first DXA during the study period were extracted, including weight, height, T-score at femoral neck and total hip in the right side (RFN, RTH) and left side (LFN, LTH) and T-score at lumbar spine (LS). Differences in T-scores and degree of discordance between sites were calculated. Age, weight, height and BMI were analysed as contributing factors.

Results: One hundred patients with osteoporosis and DXA test were identified. The mean age was 64.2 (±9.4 SD) and 88 % were females. Diagnostic agreement among all skeletal sites was found in 15 % of patients, while 30 % and 55 % showed at least one major or minor discordance, respectively. No significant correlation with age, weight, height or BMI was found. Maximum concordance was found between RFN and LFN (80 %) and minimum (29 %) between LS and LTH or RFN. Minor discordance was present in about half of the patients when comparing spine to any hip site, and around one third when comparing ipsilateral TH and FN sites. Major discordance in LS compared to RTH or LTH was found in 23 % of patients, and in 15 % and 13 % when comparing LS to RFN and LFN, respectively.

Conclusion: Spine-hip major and minor discordance is high in patients diagnosed with osteoporosis, consistent with previous reports. Multiple site measurements seem mandatory for osteoporosis diagnosis.

P555
COULD OVARIECTOMY EXERT DIFFERENT EFFECTS ON BIOMECHANICAL PROPERTIES OF DIABETIC AND NONDIABETIC RAT BONES?

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Objective: Osteoporosis is associated with an increased risk of bone fractures. This study used an animal model of diabetes and osteoporosis to evaluate the impact of diabetes on biomechanical properties of bone.

Material and Methods: Wistar rats (3 month-old) were divided into 4 equal groups (n=28): sham (SH); ovariectomized (OV); diabetes mellitus induced by streptozotocin (DM) and diabetes mellitus+ovariectomized (DM+OV). CTX and PINP serum concentrations were estimated on day 56 post ovariectomy. Body weight and bones diameters were measured. Femoral bones biomechanical properties were evaluated by bending tests. Data were analyzed using Mann-Whitney non-parametric and Spearman correlation tests (statistical significance ≤0.05).

Results: Body weight increased in all groups compared to sham (SH) (p<0.005), being the gain higher in ovariectomized groups (OV and OV+DM). A significant increase in bone turnover was observed in the OV groups when compared to the SH. The ratio PINP/CTX was higher in the DM when compared to OV and SH group (p<0.05). A similar trend was observed in the OV+DM group, suggesting an increased bone formation in diabetic rats. The increased mechanical strength (evaluated by the yield stress and ultimate stress) observed in the DM group did correlate positively with registered bone turnover biomarkers changes. When bone diameter was taken into account on bone mechanical measured parameters no significant differences were detected between groups.

Conclusion: These results show that the increased bone turnover observed in diabetic rats produces strengthen bones. Furthermore, changes on cortical bone due to osteoporosis might not be detect by normalised bending tests used to detect bone changes induced by rheumatoid arthritis(1) in mice and by tocotrienols supplementation in rats(2).

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P556
BODY COMPOSITION AND BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN

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Objective: To evaluate the peculiarities of body composition in postmenopausal women depending on BMD.

Material and Methods: We examined 8,882 women aged 20–89 year (mean age - 56.7±0.14 year; mean height - 162.5 ±0.07 cm; mean weight - 73.5±0.16 kg). Anthropometric measures were performed in 80 postmenopausal women aged 40–82 year (mean age - 63.53±1.08 year, mean height - 157.54±0.79 cm, mean weight - 74.75±1.68 kg), who were divided on the following groups depending on BMD: 1.(N) - 32 women with normal BMD, 2.(OSN) - 28 women with osteopenia; 3.(OSP) - 20 women with osteoporosis. Anthropometric characteristics of the women were evaluated by the method of Bunak V (1941) in the modification Shaparenko P (1994). Lean and fat masses, BMD were measured by DXA using a densitometer Prodigy, GE.

Results: Frequency of sarcopenia in women aged 65 year and older was 7 %. We found that women with osteoporosis had significantly lower the following anthropometric characteristics: weight (N - 81.50 kg, OSN - 72.5 kg, OSP - 69.4 kg; F= 5.62; p=0.005), head circumference (N - 558 mm, OSN - 558 mm, OSP - 541 mm; F=4.59; p=0.01), circumference of the forearm widest part (N - 272 mm, OSN - 252 mm, OSP - 246 mm; F=9.41; p=0.0002), calf diameter (N - 110 un., OSN - 107 un., OSP - 98 un.; F=3.90; p=0.02), shoulder width (N - 89 un., OSN - 82 un., OSP - 80 un.; F=4.09; p= 0.02), transverse diameter of the chest (N - 310 un., OSN - 292 un., OSP - 278 un.; F=4.69; p=0.01). We observed that women with osteoporosis had significantly lower lean (N - 43382 g, OSN - 40042 g, OSP - 40702 g; F=3.73; p=0.03) and fat (N - 36826 g, OSN - 31160 g, OSP - 27323 g; F=6.03; p=0.004) masses.

Conclusion: Women with osteoporosis had significantly lower weight, head circumference, circumference of the forearm widest part, calf diameter, shoulder width, transverse diameter of the chest and lean and fat masses in comparison with women with normal BMD. Thus, we can form the

"anthropometric portrait" of women suffering from osteoporosis and sarcopenia.

P557
AGE-DEPENDENT LOSS OF MICROVESICULAR GALECTIN-3 AND ITS CONSEQUENCES ON BONE FORMATION IN VITRO AND IN VIVO

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Objective: Mesenchymal stem cells (MSCs) counteract the decline of physiologic functions but their regenerative power decreases with age. In particular osteogenic differentiation capacity of MSCs has been shown to decrease with age thereby contributing to slowed down bone formation and osteoporosis. While much is known about cellular aging of MSCs, little is known about extrinsic factors influencing their functionality. Here we set out to identify circulating factors of the aged systemic environment that influence osteogenesis.
Material and Methods: -
Results: While searching for factors extracellular vesicles (EVs) were found. Exposition of MSCs to EVs isolated from plasma of human elderly donors failed to induce osteogenesis compared to EVs of young donors raising the question which age-dependent secreted vesicular components impact on MSCs functionality. We identified vesicular Galectin-3 as an influential component. Plasma and vesicular Galectin-3 levels were reduced in elderly compared to young human donors and we could demonstrate that vesicular Galectin-3 levels indeed impact on osteogenic differentiation capacity of MSCs. Overexpression of Galectin-3 in MSCs was shown to boost osteogenic differentiation capacity while reducing its protein expression by siRNA inhibited osteogenesis in vitro. Moreover intracellular Galectin-3 levels of MSCs correlated with their osteogenic differentiation potential. NanoCT scan on Galectin-3 knockout mice revealed a reduction of femoral cortical as well as trabecular thickness compared to wild type littermates.
Conclusion: We showed that the composition of circulating EVs changes with age and that they deliver factors impacting on the osteogenic differentiation capacity of MSCs. Among other factors vesicular Galectin-3 was shown to be enriched within EVs isolated from young human donors and to enhance osteogenesis. Reduction in vesicular Galectin-3 plasma levels with age might lead to a reduced uptake of Galectin-3 by MSC and therefore contributing to impaired osteogenesis with age.

P558
COMBINING BINDEX® AND FRAX® IN TREATMENT DECISION PATHWAY FOR OSTEOPOROSIS

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Objective: According to National Osteoporosis Foundation (NOF) guidelines, treatment is recommended for osteoporotic patients and patients with osteopenia and high fracture probability (FRAX with BMD over 3 % for hip and/or over 20 % for other fractures). In this study, a pocket size pulse-echo (PE) ultrasound (US) device and FRAX with BMI is used in treatment pathway analysis and compared to NOF guidelines.
Material and Methods: Elderly Caucasian woman (n=427, age=69±9 years) were examined using Bindex® device. Bindex® reports a diagnostic parameter, density index, DI[2]. Previously, the 90 % sensitivity and specificity thresholds for DI were determined along ISCD guidelines[3] in diagnostics of osteoporosis. By using these thresholds, subjects were classified as healthy (green), osteoporotic (red) or in need of DXA examination to verify diagnosis (yellow). Osteoporosis was assessed by proximal femur axial DXA. In addition, FRAX scores with BMD ($FRAX_{BMD}$) and with BMI ($FRAX_{BMI}$) were determined.
Results: A total of 173 subjects (73 osteoporotic) were selected to be treated along NOF guidelines. $FRAX_{BMI}$ was analyzed for patients with DI value in yellow or green area. Subjects with red DI value and yellow DI value with $FRAX_{BMI}$ over 20 % were selected to be treated. Subjects with yellow DI value and $FRAX_{BMI}$ under 20 % or green DI value and $FRAX_{BMI}$ over 20 % were selected for additional DXA measurement. The patients with green DI value and FRAX under 20 % were considered healthy. The sensitivity and specificity of treatment decisions were 84 % and 93 %, respectively. Only 31 % of the patients were found to require additional DXA measurement to verify the treatment decision.
Conclusion: The present results demonstrate that the ultraportable US instrument with $FRAX_{BMI}$ shows strong agreement (89 %) with treatment decisions using NOF guidelines.
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Disclosures: Karjalainen JP and Riekkinen O are employees at Bone Index Finland Ltd.

P559

CORRELATION BETWEEN QUALITY OF LIFE, STRESS AND SELF ESTEEM IN PATIENTS WITH OSTEOPOROSIS

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Objective: To assess quality of life, stress and self-esteem in patients with osteoporosis, and the correlations among them.
Material and Methods: Our study consisted in assessing patients with osteoporosis. We divided the patients in two groups, first group of 25 women, second group of 25 men. The entire group of patients were recruited from ambulatory system Bihor county, Romania. The mean age in the group of women was 63.24±5.31 and in the group of men was of 69.92 ±4.49. The main characteristics of the groups, included educational level were similar in both groups. The inclusion criteria were: fulfilling the WHO criteria for osteoporosis, complying with the principles of medical ethics. The exclusion criteria were: severe diseases, noncompliance. All the patients were assessed for osteoporosis using DXA method. We used Qualeffo 41 questionnaire for assessing quality of life, Levenstein Index for stress and Rosenberg Self Esteem Scale for self-esteem. All the questionnaires that we used were validated in international studies.
Results: Quality of life was low in both groups, but in the group of women with osteoporosis was lower than in men with osteoporosis. The mean stress value was almost similar in both groups, and the mean self-esteem value was lower in the group of women than in the group of men with osteoporosis. We found also correlations between quality of life and stress and self-esteem.
Conclusion: Our study showed that patients with osteoporosis, both women and men have an impaired quality of life, in different degrees. Psychological well-being was also affected by osteoporosis. We found also correlations between quality of life and some psychological factors like self-esteem and stress in patients with osteoporosis. Further studies should be done to develop strategies to cope with stress and low self-esteem as part of psychological wellbeing and health related quality of life in patients with osteoporosis.

P560

INFLUENCE OF VITAMIN D DEFICIENCY ON BONE TURNOVER MARKERS IN MEN OF DIFFERENT AGE

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Objective: The aim of the research is to determine the frequency of vitamin D deficiency and its influence on bone turnover markers in men of different ages.
Material and Methods: There were examined 215 men, aged (54.33±1.74) years. The level of 25(OH)D, iPTH, bone turnover markers (osteocalcin - marker of turnover rate, β-CTx - marker of resorption, and P1NP - marker of bone formation) were evaluated by electrochemiluminescence method (Elecsys 2010, Roche). Vitamin D deficiency was defined as a 25(OH)D below 20 ng/ml (50 nmol/L), and vitamin D insufficiency as 25(OH)D of 21–29 ng/ml (50.1–74.9 nmol/L).
Results: Only 6.0 % of examined men had optimal 25(OH)D level. Vitamin D insufficiency was diagnosed in 18.7 %, and vitamin D deficiency was recorded in 75.3 % observed patients. Severe vitamin D deficiency (25(OH)D level is below 25 nmol/L) was registered in 31.6 %. All observed men were divided into 4 groups according 25(OH)D level: the 1st group included patients with severe vitamin D deficiency, 2nd group - with 25(OH)D level 25–50 nmol/L, 3rd group - with vitamin D insufficiency, and 4th group - with optimal 25(OH)D level. iPTH level was lower in men of 2nd group [37.80 [25.83; 45.33] pg/mL, and significantly higher in observed with optimal 25(OH)D level [43.15 [26.03; 45.90] pg/mL ($p<0.05$). It hasn't been found the significant difference in osteocalcin level and bone formation marker (P1NP) in observed men with different 25(OH)D level. The concentration of β-CTx was lower in patients with optimal 25(OH)D level (0.351 [0.251; 0.493]) ng/mL and significantly higher in group with sever vitamin D deficiency (0.545 [0.400; 0.680]) ng/mL ($p<0.05$).
Conclusion: Only 6.0 % of Ukrainian men has optimal level of 25(OH)D in blood serum. Decreasing concentration of 25(OH)D in blood serum leads to increasing the markers of bone resorption. High level of vitamin D deficiency makes doctors to search the effective treatment and prevention methods of revealed disorders.

P561

INFLUENCE OF VITAMIN D DEFICIENCY TO STRUCTURAL AND FUNCTIONAL STATE OF BONE TISSUE IN SCHOOLCHILDREN

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Objective: To determine the influence of vitamin D deficiency on BMD in schoolchildren.
Material and Methods: There were examined 304 children aged 10–18 years. The boys consisted 55.0 %. The average age of boys was 12.9±0.2 and girls 12.4±0.2 year old. Researches included ultrasound densitometry of calcaneus by SAHARA (Hologic), blood chemistry, 25(OH)D and intact PTH (iPTH) in plasma were determined by Elecsys 2010. Also, it was evaluated the average content of calcium and vitamin D in the diet form the products consumption frequency questionnaire.
Results: Vitamin D deficiency was founded in 92.2 % of schoolchildren, and vitamin D insufficiency was diagnosed in 6.1 % of cases. Secondary hyperparathyroidism was verified in 0.9 % of children. The average level of consumption of calcium and vitamin D in children was below recommended data, and consisted (Me 649 [488.7; 691.86]) mg/day for calcium and (Me 68.69 [58.45; 117.3]) IU/day for vitamin D. Children with vitamin D insufficiency had significantly higher data of structural and functional state of bone tissue in comparison with the data of pupils with severe deficiency of vitamin D: stiffness index 105.03±6.12 vs. 93.7±2.51 % ($p<0.02$); BMD 0.574±0.024 vs. 0.528±0.019 ($p<0.02$) and speed of sound 1573.61±6.70 vs. 1557.2±5.41 ($p<0.01$).
Conclusion: High level of vitamin D deficiency (92.2 %), secondary hyperparathyroidism (0.9 %), low data of ultrasound densitometry in severe vitamin D deficient children make doctors to research the effective methods of treatment and prophylactics of revealed disorders.

P562
VITAMIN D IN ACUTE HIP FRACTURE

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Objective: Vitamin D is considered an important therapy in prevention of fracture in known osteoporosis. Hip fracture is one of the most serious fractures than can occur and confers significant morbidity and mortality. Supplementation in those who are not known to be osteoporotic is controversial though generally recommended in the elderly, institutionalised or known vitamin D deficiency. However vitamin D deficiency itself is not widely screened for. In this study we aimed to establish the prevalence of vitamin D deficiency in consecutive admissions with hip fracture. We also looked at vitamin D levels in those already prescribed supplements for known osteoporosis as a reflection of persistence and efficacy.
Material and Methods: Consecutive hip fracture admissions who were seen by our bone health team had serum vitamin D levels, serum PTH and calcium levels checked. Preadmission medications are also documented.
Results: 152 subjects with hip fractures were admitted to our institution from September 2012 to September 2013. Mean age 77.7 years. 138/152 (91 %) had serum vitamin D levels performed. Mean level was 41.7 nmol/L. Median 32 nmol/L. 90/138 (65 %) were vitamin D deficient with levels <50 nmol/L. 68 subjects (49 %) had levels under 30 nmol/L. Secondary hyperparathyroidism was also evident in this latter group with mean serum PTH levels of 76 pg/ml (15–65) compared to 63 pg/ml in the total study population. 35 subjects were prescribed vitamin D supplementation for known osteoporosis preadmission. 10 (29 %) of these had levels <50 nmol/L suggesting they may not have been compliant.
Conclusion: Vitamin D deficiency is widespread in an older population presenting with hip fracture. Supplementation is not. Compliance is poor in those who are on supplementation. All subjects in this study had vitamin D supplements prescribed by our bone health team during admission for hip fracture. Our next step is to review compliance and vitamin D levels in these subjects when they return for review and DXA.

P563
MEDICATION USE BEFORE AND AFTER HIP FRACTURE: A POPULATION-BASED COHORT STUDY

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Objective: To investigate the changes of concomitant treatments observed before and after hip fracture in the elderly population, in comparison with a matching cohort of subjects without hospitalisation for fractures.
Material and Methods: Design: The data of the study population has been extracted from a large population-based administrative database of the Italian National Health Authorities. Participants: A retrospective analysis was conducted involving female patients (6,431) aged ≥65 years and hospitalised for a hip fracture. The control group comprised age-matched subjects (38,586) not hospitalised for fracture. Measurements: Changes in drug prescriptions 1 year before and 1 year after hip fracture and differences vs. controls.
Results: Prior to the fracture, patients were taking more anti-Parkinsons, antidepressants, medications for chronic obstructive pulmonary disease (COPD), bisphosphonates and calcium-vitamin D supplements, although the intake of the routinely monitored drug classes were significantly infrequent. As compared to controls polypharmacy was less frequent in fractured women before fracture (22 % vs. 25 %, respectively; $P<0.001$), but it was more frequent (30 %,

$P<0.001$) post fracture. The incident fracture was associated with a significant increase in the use of a number of drug classes: insulin, nonsteroidal anti-inflammatory drugs or analgesics, gastroprotectors, loop diuretics, β-blockers, antidepressants, anti- Parkinsons, antiepileptics and drugs for COPD.

Conclusion: Our study confirms a strong association between the use of some drugs (antidepressants, anti-Parkinsons, drugs for COPD) with the risk of hip fracture, but drug use is globally less common than in controls. Hip fracture is associated with a significant increase in drug use suggesting a global deterioration of health conditions.

P564
ASSOCIATION OF TREATMENT COMPLIANCE WITH FRACTURE (FX)-RELATED HOSPITALISATIONS AND THEIR ASSOCIATED COSTS AMONG HUNGARIAN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS (PMO)

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Objective: Low compliance to PMO therapy is associated with increased risk of fx and fx-related hospitalisation. We studied the association of compliance with fx-related hospitalisation costs during the 1st year of PMO therapy in Hungarian women.

Material and Methods: From the 'National Health Insurance Fund Administration' database, we included women ≥50 years old with an osteoporosis diagnosis, who started PMO treatment during 2007–2012. Each patient could have ≥1 observation, with a non-treatment period ≥13 months between each observation. For each observation, compliance was measured using medication possession ratio (MPR); MPR≥80 % considered compliant. From the database, fx-related hospitalisation costs were measured for 1 year after treatment initiation. Mean costs were calculated per fx-related hospitalisation, and per observation (i.e., denominator=number of observations reporting a hospitalisation, and number of observations, respectively).

Results: 185,759 women with 215,376 observations met the inclusion criteria; 42.9 % of all observations met the compliance definition. During the 1st year of treatment, 3.5 % of all observations had a fx, 21.8 % of which resulted in hospitalisation. Compliant observations accounted for 27.1 % of all fx and 30.2 % of all hospitalisations. Compliant compared to noncompliant observations had half the probability of fx (2.23 % vs. 4.49 %) and fx-related hospitalisation (0.54 % vs. 0.94 %). Total fx-related hospitalisation costs for 1st year of treatment were 1.3 billion HUF with compliant observations contributing 26.6 % of these. Mean cost per fx-related hospitalisation was 16.5 % lower for a compliant vs. a noncompliant observation (687 k vs. 823 k HUF). Mean cost per observation was 51.8 % lower for a compliant vs. a noncompliant observation (3719 vs. 7710 HUF).

Conclusion: Patients compliant to PMO therapy have fewer fx and fx-related hospitalisations and lower fx-related hospitalisation costs than noncompliant patients.

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P565
INTER-METHOD VARIABILITY IN BONE ALKALINE PHOSPHATASE MEASUREMENT: CLINICAL IMPACT ON THE MANAGEMENT OF DIALYSIS PATIENTS

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Objective: Bone-specific alkaline phosphatase (BAP) is now recommended to assess bone turnover in hemodialysis (HD) patients. However, little is known about potential variability between methods available to measure BAP.

Material and Methods: We measured BAP in 76 HD patients with six different assays (Beckman-Coulter Ostase IRMA, IDS iSYS Ostase, IDS Ostase enzyme immunoassay, DiaSorin Liaison Ostase and Quidel MicroVue BAP).

Results: We observed a high correlation between all the assays ranging from 0.9948 (IDS iSYS vs. IDS EIA) to 0.9215 (DiaSorin Liaison vs. Quidel Microvue). However, using the regression equations, the equivalent concentration of a Beckman-Coulter Access value of 10 μg/L can range to 7.7–14.4 μg/L and of 20 μg/L can range to 16.9–27.9 μg/L with other assays. According to Beckman-Coulter Access, 13 %, 50 % and 37 % of the patients presented BAP values ≤10, between 10–20 and ≥20 μg/L, respectively. Discrepancies are observed when other assays are used (concordance from 10 to 100 %).

Conclusion: Analytical problems leading to inter-method variation should be overcome to improve the usefulness of this marker in clinical practice. According to correlation results, recalibration of BAP assays is necessary but should not be a major issue.

P566
HYPERURICEMIA, BONE MINERAL DENSITY AND TBS OF UKRAINIAN MEN

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Objective: To determine the prevalence of hyperuricemia affecting the Ukrainian men in relation to BMD and TBS.
Material and Methods: Ukrainian men (n=132), age of the examined patients from 50 to 80 years. Average age of examined patients was 58.2±1.3 years. According to the levels of uric acid in the blood serum, all patients were divided in four quartiles. Uric acid level in blood plasma was determined by the uricase-peroxidase method, BMD by means of the Prodigy unit (CE Medical systems, model 8743, 2005). The TBS was evaluated using the installed TBS iNsight® software for an X-ray densitometer (Med-Imaps, Pessac, France).
Results: The rate of hyperuricemia affecting the Ukrainian men was 23 % in the age group of 50–59 year-olds, 33 % in the age group of 60–69 year-olds, 29 % in the age group of 70–79 year-olds. The frequency of osteoporosis in men with hyperuricemia was lower compared with men who had a normal level of uric acid (4 % and 17 % at the level of the lumbar spine, and 4 % and 15 % at the level of femoral neck). BMD was significantly higher in case of men having the highest levels of uric acid in the lumbar spine (F=2.78; p=0.04), radius 33 % (F=3.96; p=0.01) and total body (F=2.70; p=0.04). TBS was significantly higher in the patients who had the lowest levels of uric acid compared with the patients who had the highest level of uric acid (Q1=1.17±0.02, Q4=1.04±0.02; p<0.05).
Conclusion: We determined that men with the low levels of uric acid had the significantly lower levels of BMD, but the TBS in men who have the highest levels of uric acid is higher.

P567
THE EFFECT OF RITUXIMAB THERAPY ON BONE MINERAL DENSITY WITH RHEUMATOID ARTHRITIS PATIENTS

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Objective: Assess the impact of rituximab treatment on BMD of the femoral neck with rheumatoid arthritis (RA) patients after 4 years of observation.
Material and Methods: We observed 92 patients with a documented diagnosis of RA. The patients were randomized into two groups, depending on the basic therapy variant: group 1 (n=52) - patients who received combined therapy with methotrexate and rituximab, group 2 (n=40) - patients with methotrexate only. BMD was measured by DXA with steady bone densitometer Exceell XR-46 (Norland, USA) once a year for 4 years.
Results: Found that the patients in both groups showed a decrease BMD of the femoral neck (group 1 - BMD 0.7779 ±0.018 g/cm^2, T-score -2.05±0.15 SD, group 2 - BMD 0.7877±0.02 g/cm^2, T-score -1.87±0.18 SD). After 3 years of follow up, a statistically significant increase of BMD and T-criterion of the femoral neck with patients treated with rituximab, relative to benchmarks are received (BMD 0.8381±0.0210 g/cm^2, T-score -1.56±0.15 SD, p=0.033 and p=0.022). In the group of patients treated with methotrexate only, a statistically significant change in densitometric parameters of the femoral neck is not received. A similar positive BMD trend was observed in 4 years of the therapy with rituximab and methotrexate (BMD 0.8422±0.023 g/cm^2, T-score -1.58 ±0.16 SD, p=0.045 and p=0.048).
Conclusion: The positive impact of rituximab on BMD of the femoral neck was significantly determined after three courses of application and maintained after the fourth course.

P568
EVALUATION OF AUTOMATED IMMUNOASSAYS FOR 25(OH)-VITAMIN D DETERMINATION IN DIFFERENT CRITICAL POPULATIONS BEFORE AND AFTER STANDARDISATION OF THE ASSAYS

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Objective: Standardisation of immunoassays for 25(OH)-vitamin D determination is a major problem in clinical practice. A worldwide standardisation program has started to address this and will reduce the bias observed between immunoassays. We aimed to calibrate 5 immunoassays on a LC-MS/MS traceable to the SRM 2972 and the ID-LC-MS/MS 25(OH)D Reference Method Procedure to see if the restandardization would be efficient in a population of 3rd trimester pregnant women (PW), hemodialysis (HD) and osteoporosis (OP) patient.
Material and Methods: 184 serum samples (25(OH)D: 8.4–87 ng/ml) were selected to calibrate the immunoassays (Abbott-Architect, Roche-Elecsys, DiaSorin-Liaison, Siemens-Centaur and IDS-iSYS). Chromsystems MassChrom method was used as the referenced. Serum obtained in 34 PW, 25 HD and 34 OP patients were used as comparatives.
Results: After adjusting to LC-MS/MS, immunoassays had regression slopes nearly identical to 1.0 with intercepts <0.5 ng/ml. However, in special populations, a systematic bias was still observed, excepted for iSYS. Conclusions: re-standardisation of 25(OH)D immunoassay will globally improve the differences. However, patients with different serum matrix will still present significantly different results when they will be run with different methods. For those patients, LC-MS/MS method seems to be the method of choice, even if some immunoassays are less influenced than others.

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P569
MOBILITY AND BALANCE TRAINING IN OLDER FEMALE PATIENTS WITH HIP AND KNEE OSTEOARTHRITIS

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Objective: To improve functional mobility and balance in older female patients with hip and/or knee osteoarthritis.
Material and Methods: 30 female patients with hip and knee osteoarthritis were evaluated for mobility and balance deficits. 23 patients (mean age 66.73±5.24 years) were enrolled and participated in a mobility and balance training program, for 5 months. Patients were evaluated using Timed Up&Go Test, Manual Timed Up&Go and the Four Square Step Test.
Results: All patients had a significant improvement in functional mobility and balance after the 5 months of training. Although an improvement was recorded, results showed that patients over 70 years still had a functional deficit, with an increased risk of falling compared with patients under 70 years.
Conclusion: A mobility and balance training program will improve functional status and reduce the risk of falling in older patients with hip and knee osteoarthritis.

P570
LONGITUDINAL CHANGES IN CALCIUM AND VITAMIN D INTAKES, AND RELATIONSHIP TO BONE MINERAL DENSITY AND BONE ULTRASOUND AFTER FIVE YEARS FOLLOW-UP IN SPANISH OSTEOPOROTIC WOMEN UNDERGOING TREATMENT

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Objective: To study changes in calcium and vitamin D intakes over time, and their longitudinal associations with BMD and bone ultrasound in Spanish osteoporotic women undergoing treatment.
Material and Methods: We followed 184 women aged >50 for 5 years. Participants completed health history and food frequency questionnaires and underwent BMD testing by DXA. Quantitative ultrasound (QUS) measurements were performed using a DBM Sonic Bone Profiler. We studied the rate of bone loss over the 5 years. At the baseline, all the participants were osteoporotic were under treatment.
Results: Calcium and vitamin D intakes did not increase/changed over time. In the whole sample, significant changes of BMD were found in trochanter ($P<0.001$), L3 ($P=0.025$), L4 ($P=0.001$) and L2-L4 ($P=0.007$). We did not observe changes in femoral neck ($P=0.123$) and L2 ($P=0.094$). Significant changes were also detected in QUS ($P<0.001$). The rate of BMD change were respectively of +1.33 %, +0.67 %, +0.71 % and +0.71 % per year for trochanter, L3, L4 and spine. respectively. QUS decreased −0.48 %/year in our sample. After further grouping for Ca intake (<800 mg/day; 800–1,200 mg/day; >1,200 mg/day) no significant changes in BMD were detected in the hip, but increased up to 1.44 %/year in the spine for women with 800–1,200 mg Ca/d intake a figure that doubled the observed for the whole population. A decrease in QUS figures were detected in the <800 mg Ca/d group (−0.62 %) and in the >1,200 mg (−0.65 %) that represent a relative increase of 32.29 % in the bone ultrasound loss when the Ca intake is out of the requirements. At baseline, calcium and vitamin D intake were respectively 1233.19±529.73 mg/day and 424.28±763.16 UI/day.
Conclusion: Although total intakes were out of the recommendations we found some positive associations between total calcium and vitamin D intake and bone health in Spanish osteoporotic women undergoing treatment, mostly in the spine, when the calcium intake is within the recommended ranges.

P571
INFORMATIVE VALUE OF DIFFERENT FRAX MODELS FOR ESTIMATION OF OSTEOPOROTIC FRACTURE RISK IN UKRAINIAN WOMEN

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Objective: In the recent years worldwide, the FRAX is an important tool for assessment of the risk of fragile fractures. Data of the preliminary studies revealed that the FRAX scores used in the NOF guidelines as the criteria set for the treatment initiation could not be used for the estimation of fracture risk and for treatment initiation in the Ukrainian women, because with different models for the postmenopausal women in Ukraine who require treatment the target scores were significantly lower. With the aim to collect the normative data for

FRAX algorithm we've examined 3,757 women aged 40–89. We estimated 10-years risk for all fractures and hip osteoporotic fractures in particular using the FRAX algorithm, applying different country models for analysis (Austria, Sweden, Germany, Hungary, Czech Republic, Turkey, Russian Federation, the United States (Caucasians), France, Spain, Poland).

Material and Methods: All women were assigned to 2 groups regarding their need for treatment, according to the NOF Guidelines (2013). Analysis of the results shows a wide range of scores both among the healthy subjects and among the patients who require an antiosteoporotic treatment, although a non-significant overlapping of the low and high quartiles in studied groups could prove the sufficiency of sensitivity and specificity scores of the models.

Results: Thereby, analysis of the obtained results suggests it is possible to estimate osteoporotic fracture risk in the population of Ukrainian women based on the different FRAX models; only target points determined in process of the study are important for the treatment initiation. Age features of the FRAX scores, when different models were used, suggest the necessity of a differential approach towards the FRAX scores in the antiosteoporotic treatment initiation.

Conclusion: Variability analysis of FRAX-all and FRAX-hip, sensitivity and specificity scores also allowed to choose the Austrian model as a priority one to estimate risk of the osteoporotic fractures in Ukrainian women.

P572

LEVELS OF CIRCULATING VESICULAR MICRORNA-31 INCREASE WITH AGE AS WELL AS IN THE CASE OF OSTEOPOROSIS AND INHIBIT OSTEOGENIC DIFFERENTIATION CAPACITY OF MESENCHYMAL STEM CELLS

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Objective: Aging is a complex process that results in the decline of physiologic functions due to accumulation of damage in cells and tissues. Mesenchymal stem cells (MSCs) counteract this decline but their regenerative power decreases with age. In particular osteogenic differentiation potential of MSCs has been shown to decrease with age thereby contributing to slowed down bone formation and osteoporosis. While much is known about cellular aging of MSCs, little is known about factors of the aged systemic environment influencing their functionality.

Material and Methods: Isolation of extracellular vesicles by differential centrifugation followed my immunopurification. Determination of miRNA-31 levels by quantitative real time PCR.

Results: While searching for extrinsic factors of the aged systemic environment that influence osteogenesis of MSCs extracellular vesicles (EVs) were found. Exposition of MSCs to EVs secreted by senescent endothelial cells (senECs), which were shown to accumulate with age in vivo, or isolated from plasma of human elderly donors failed to induce osteogenesis compared to MSCs incubated with secreted EVs of young endothelial cells or plasma derived EVs of young donors. We attributed the age-dependent impairment of osteogenesis by EVs to vesicular miR-31 which was shown to be enriched within EVs of senECs and within plasma derived EVs of elderly donors but also in EVs of patients suffering from osteoporosis. Overexpression of miR-31 in MSCs reduced osteogenic differentiation capacity while inhibiting miR-31 enhanced osteogenesis in vitro. MiR-31s underlying molecular inhibitory effect was illuminated by demonstrating that miRNA-31 targets FZD3, a factor necessary for osteogenic differentiation. Finally we were able to rescue MSCs from the inhibitory effect of EVs isolated from senECs or from plasma of elderly donors by transfecting them with a miR-31 inhibitor.

Conclusion: Summarizing our data suggest that vesicular miR-31 is enriched within EVs of elderly donors as well as in the case of osteoporosis and that it is able to inhibit osteogenesis. Thus it might serve as a diagnostic and therapeutic target whenever osteogenesis is a limiting factor.

P573

ASSESSMENT OF THE POSSIBLE USE OF THE AUSTRIAN MODEL OF FRAX ALGORITHM TO PREDICT FRAGILITY FRACTURE RISK FACTORS IN UKRAINIAN WOMEN

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Objective: In the recent years worldwide the FRAX algorithm is used more extensively to estimate the risk of fragility

fractures. Since 2009, the Ukrainian Scientific Medical Centre on Osteoporosis has been extensively using the FRAX algorithm to estimate the fragility fracture risk. The aim of the study was to establish the normative data for the Austrian model of FRAX algorithm.

Material and Methods: We examined 3,405 women aged 40–89. For the statistical analysis of results the Statistica-7.0 and SPSS-17 softwares were used.

Results: Analyzing the relationship between FRAX-1 and FRAX-2 scores for all fragility fractures and hip fractures we found strong correlations for different subgroups, the results suggest that the FRAX model without the BMD scores has a sufficient informative value and could be used in the decision making on treatment initiation. The analysis of FRAX scores revealed that FRAX-all and FRAX-hip scores of 11.5 and 2.5, respectively, when the Austrian model is applied to the postmenopausal women, are the criteria for the osteoporotic treatment initiation. FRAX-all and FRAX-hip scores of 7.0 and 1.5, respectively, are the criteria for a further investigation with DXA scan. This set of criteria could be used in decision making on the antiosteoporotic therapy initiation, especially if DXA scan is not available. However, the researchers should remember that the BMD score is a significant characteristic of the bone tissue state that could be used in monitoring effectiveness of the treatment.

Conclusion: The results of our study have defined a new approach toward an antiosteoporotic treatment initiation in the Ukrainian women, however, the limitation of this study is explained by using the models developed for different populations, and it could be a source of system error due to the regional features of osteoporosis and its complications in the Ukrainian population. It was a reason to start a multicenter epidemiological survey on fragility fractures prevalence.

P574

OSTEOARTHRITIS, COMORBIDITIES AND FUNCTIONAL LIMITATIONS IN ACTIVITIES IN OLDER POPULATIONS: RESULTS FROM THE EUROPEAN PROJECT ON OSTEOARTHRITIS STUDY (EPOSA)

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Objective: Osteoarthritis (OA) and comorbidities are important contributors to functional impairment in older persons. The objective of this study was to analyze the role of comorbidities and the effect of pain in the association between OA and functional limitations in older European individuals.

Material and Methods: The analyses are performed on the baseline data from the European Project on OsteoArthritis (EPOSA), a study involving six European cohort studies on ageing. The project focuses on the personal and societal burden of OA in older persons. EPOSA is an observational study on older community-dwelling persons aged 65 to 85 years. The interview and the clinical examination included demographic information, both self-reported and clinical OA determinations (knee, hip and hand), body composition evaluation, psychosocial domain and physical functioning (self-reported activity limitations and physical performance), medications. Self-reported and objectively measured diseases were considered as comorbidities. A follow-up evaluation was performed 12–18 months after baseline. To evaluate the association between OA and functional limitations, logistic regression analyses were performed. Analyses were adjusted for age, sex, country, education and number of diseases.

Results: 2,942 persons with a mean age of 74.2 years were included in the baseline assessment. 26.5 % of participant were affected by 3 or more comorbidities. 31.7 % of the overall sample was affected by any of hand, hip or knee clinical OA. The analyses revealed a significant association between hip or knee clinical OA and self-reported functional limitations. This association was only partially affected by the comorbidity [(3 or more diseases) OR=19.9, 95%CI=15.3–25.9)], while it was strongly reduced by self-reported pain (OR=2.2, 95%CI=1.5–3.2).

Conclusion: A strong association between hip or knee clinical OA and functional limitations was observed in these populations. The analysis showed that pain had a significant mediating role in this association.

P575

RELATIONSHIP BETWEEN THE LEVEL OF URINARY CALCIUM EXCRETION AND LEVELS OF BONE TURNOVERS AND 25(OH)D AMONG WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

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Objective: Urinary excretion of calcium is the result of the complex interplay of the gastrointestinal tract, the kidney and bone and is regulated by multiple hormones. The aim of this study was to examine the relationship between the level of urinary calcium excretion and levels of bone turnovers among women with postmenopausal osteoporosis.

Material and Methods: 44 women with postmenopausal osteoporosis were examined. Median age and BMI were 63.1±7.79 years and 26.9±3.68 kg/m^2, respectively. Exclusion criteria were the history of any kind of proved endocrine or rheumatologic disease and calcium supplementation. All the examined were divided into 2 groups according to their levels of urinary calcium excretion: group I (n=23) had normocalciuria=0.34 [4.15:6.74] mmol/day, group II (n=21)

had hypercalciuria=9.6 [8.78:10.9] mmol/day. Hypercalciuria is defined as a urinary concentration of more than 8.0 mmol/day, while patients are on their usual diet. We measured serum levels of calcium, phosphorus, PTH, 25(OH)D, osteocalcin, β- crosslaps.

Results: Group II showed a significantly higher serum level of calcium 2.52 [2.42:2.68] mmol/l than group I, where serum level of calcium was 2.45 [2.38:2.53] mmol/l (p=0.036). There were no statistical differences between the groups of normocalciuria and hypercalciuria for serum levels of phosphorus, PTH, 25(OH)D, osteocalcin and β-crosslaps (p>0.05).

Conclusion: Postmenopausal women with osteoporosis and hypercalciuria showed significantly higher serum levels of calcium than women with normocalciuria.

P576

BONE DENSITY IN EHLERS-DANLOS SYNDROME

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Objective: We know little about BMD in Ehlers-Danlos syndrome (EDS). This case-control design study investigated whether 20–45 years-old women with type III EDS and normal BMI had differences in bone mass and trabecular bone score (TBS) compared with age and BMI-matched controls.

Material and Methods: Twenty-four women were within the 20–34 years age group, and 19 were within the 35–45 years age group. We observed mild scoliosis (<20°) in 17 subjects, but none of included women had spine X-ray osteoarthritic changes. As observed in control subjects, patients had a mean calcium intake above 1 g/day; their caffeine intake was <1 g/day and their alcohol intake less than 3 units a week. We measured by DXA (Hologic Discovery A) their BMD at the lumbar spine L1-4, left hip, and femoral neck. TBS iNsight program computed the trabecular bone score (TBS), a parameter that reflects the average thickness and volume fraction of trabecular bone microarchitecture. Normal reference values are those obtained in cohorts of age-matched normal women included in previous bone density and metabolic studies. Statistics included t-tests and ANOVA with a 0.05 level of significance.

Results: In the 20–34 years age group, EDS women had a significantly (p<0.05) lower mean BMD (g/cm^2) in the lumbar spine (1.005±0.08), the hip (0.891±0.08) and the femoral neck (0.805±0.08) as well as a lower TBS (1.32±0.04). In the 35–45 years age group, EDS also had a significantly (p<0.05) lower mean BMD (g/cm^2) of the lumbar spine (0.935±0.091), hip (0.845±0.010) and femoral neck (0.746±0.11) as well as a lower TBS (1.31±0.04). There was no difference in the mean levels of physical activity (work and leisure) between EDS women and normal control women.

Conclusion: This clinical study identifies a low bone mass in patients with EDS. Results also suggest that patients with EDS also have an abnormal trabecular bone structure.

P577

INFLUENCE OF SNPS VIA THE WNT-B-CATENIN PATHWAY ON THE PHENOTYPE OF OSTEOPOROTIC PATIENTS

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Objective: To identify relationships between the single nucleotide polymorphisms (SNPs) in the genes of the Wnt-β-catenin pathway, and the BMD of postmenopausal women.

Material and Methods: During the research, the DNA samples of 932 Hungarian postmenopausal women were studied. First, their BMD values at different sites (spine, femur neck) were measured, using a Lunar Prodigy DXA scanner. Thereafter, T-score values and the patients' BMIs were calculated, while information about the fracture history of the sample population was also collected. We genotyped eleven SNPs of the following three genes: *LRP5*, *GPR177* and *SP7*, using a Sequenom MASSarray Analyzer 4 instrument. The genomic DNA samples used for genotyping were extracted from the buccal mucosa of the subjects. Statistical analyses were carried out using STATISTICA 11 and R.

Results: The results of this analysis showed a significant correlation between SNPs rs599083 of *LRP5* and patients' femoral T-score values.

Conclusion: Therefore, our findings demonstrate the relationship between LRP5 and bone phenotype, which can be used to reinforce the results of a previous GWAS study. However, our research was unable to reveal an interaction between genotypes of GPR177 and SP7 and bone phenotype in our clinical samples.

P578

BONE MINERAL DENSITY IN THYROID CANCER PATIENTS ON SUPRAPHYSIOLOGIC DOSES OF THYROXIN: AN INSTITUTIONAL REVIEW

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Objective: Thyroid hyperfunction is associated with osteoporosis. Most differentiated thyroid cancer (DTC) patients are put on long term supra-physiologic doses of thyroxin to achieve thyroid stimulating hormone (TSH) suppression. We present a cross-sectional review of the BMD, assessed by DXA of DTC patients, at various stages of treatment and follow up, at our tertiary care cancer center. WHO criteria was applied to define osteopenia and osteoporosis.
Material and Methods: Electronic Hospital information system (HIS) was used to identify 59 thyroid cancer patients who underwent DXA scanning for BMD assessment between September 2012 and December 2013 at the department of Nuclear Medicine.
Results: Out of 59, 48 (81 %) were females consistent with the higher incidence of thyroid cancer in women. Mean age of females was 48.4±11.5 years and males was 43±14.5 years. Out of 59, 23 (39 %) patients had abnormal BMD results. Patients were divided into three groups: premenopausal females (n: 24), postmenopausal (n: 24) and males (n: 11). Each of these groups was further subdivided on the basis of time since on supraphysiologic thyroxin: 3 years, 6 years or >6 years. In the postmenopausal group 17/24 (71 %) patients had abnormal BMD (osteopenia=11 patients, osteoporosis=6 patients). In the premenopausal group 3/24 (12 %) patients had abnormal BMD (all 3 had osteopenia). Amongst the males 4 (36 %) patients had low BMD (osteopenia=3, osteoporosis=1). Out of the 7 osteoporotic patients 5 (71 %) have been on thyroxin for more than 6 years and all belonged to the postmenopausal group, along with the one male patient. Out of the 16 patients with osteopenia 11 (69 %) have been on thyroxin for <6 years.
Conclusion: Based on our preliminary data, post-menopausal females on prolonged thyroxin therapy are more prone to developing osteoporosis. BMD screening in newly diagnosed post-menopausal thyroid cancer patients should be considered.

P579
ANALYSIS OF DIFFERENT THERAPIES IN THE TREATMENT OF KNEE OSTEOARTHRITIS

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Objective: To determine the efficiency of applied th and functional status of patients depending on the implemented.
Material and Methods: The study included 90 patients with OA. Group A-30 patients, in which we conducted outpatient physical th over a period of 8 weeks. Group B-30 patients, who received three applications of ia 1 % hyaluronic acid injections. Group C-30 patients, treated with hondroprotrktory per os for 8 weeks. RTG changes were assessed according to Kellgren-Lawrence classification. Assessment of functional status was performed according to the Oxford knee score. The degree of pain was estimated with VAS.
Results: In A group, the average value of pain according VAS was 8 before, and 6 after the treatment. The average value of the functional score was 22 before and 31 after. In B group, the average value of pain was 9 before and 4 after. The average functional status was 20 before and 39 after. In group C, the average of pain was 9 before and 7 after. The average functional status was 20 before and 23 after treatment.
Conclusion: Patients who received 1 % hyaluronic acid ia injections and then performed physical th have a significant reduction in pain as well as improvement in functional status.

P580
IDENTIFICATION OF OSTEOARTHRITIS PATIENTS WITH INFLAMMATION DRIVEN JOINT DESTRUCTION: POSSIBLY ELIGIBLE FOR AN ANTI-INFLAMMATORY TREATMENT

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Objective: A subpopulation of osteoarthritis (OA) patients experiences chronic tissue inflammation and may benefit from anti-inflammatory treatment. The inflammation marker C-reactive protein (CRP) has shown limited use in predicting progression or response to anti-inflammatory treatment. The aim of this study was to segregate patients into groups dependent on the present/absence of systemic or chronic tissue inflammation and describe these groups by novel serum markers of matrix metalloproteinase-mediated joint destruction.
Material and Methods: The serum markers were measured in a cross-sectional study including 281 patients with symptomatic knee OA (KL0, n=12; KL1-2, n=202; KL3-4, n=57), 60 OA patients undergoing TKR and 30 healthy controls: hsCRP and CRPM (systemic and chronic tissue inflammation), MMP-mediated fragments of type I, II and III collagen; C1M (connective tissue), C2M (cartilage) and C3M (synovium). Patients were divided in quartiles (Q1; low-low and Q4 high-high) based on cut-off values: CRPM 12 ng/mL and hsCRP 5 μg/mL. Data are shown as mean [95 %-CI].
Results: hsCRP was only elevated in TKRs (5.9 [3.6–8.2] μg/mL) compared to controls. The mean CRPM levels were twice as high in the OA group (10–14 ng/mL) than the controls (5 ng/mL). C1M and C2M, but not C3M, were significantly elevated in the TKRs compared to KL1-2 (p<0.001) and

KL3-4 ($p<0.01$). Patients in Q4 had significantly higher KL than patients in Q1 ($p<0.0001$), Q2 ($P=0.017$) and Q3 ($p<0.0001$). C1M, C2M and C3M were lower in Q1 compared to all other quartiles.

Conclusion: OA patients could be divided into quartiles: i) those who may benefit from anti-inflammatory treatment (Q3, Q4), and ii) those eligible for a tissue centric treatment (Q1, Q2). Patients with high chronic tissue inflammation (Q2 and Q4) had higher levels of the tissue degradation markers suggesting that they had elevated tissue turnover. In alignment, those OA patients undergoing TKR had even higher levels of tissue turnover markers, suggesting a distinct TKR serological phenotype.

P581
FUNCTIONAL IMPACT OF LOW BACK PAIN AND COMORBIDITIES

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Objective: To establish the functional impact of low back pain in patients who associate other chronic disorders.

Material and Methods: Between January 2013 and December 2013 we conducted an observational study on 190 patients, all Caucasians, diagnosed with low back pain according to ACR criteria and treated in the Medical Rehabilitation Clinical Hospital Baile Felix, Romania. Information on comorbidities was collected from each patient using the Cumulative Illness Rating Scale. Pain assessment was performed with VAS scale. There were 60 % men and 40 % women, mean age 54.88±13.86 years.

Results: Lumbar disc hernia was confirmed by MRI 9.47 % of cases and two cases had lumbar canal stenosis. X rays revealed dorsolumbar advanced spondylosis in 17.89 % patients, moderate form in 13.68 %, early form in 33.68 %, idiopathic scoliosis in 3.15 %, ankylosing hyperostosis (Forestier's disease) in 5.26 % cases and vertebral anomalies in 15.78 %, of which half were sacralization of L5. 88.94 % of the patients had at least one associated disorder. Morbidity count was 518. Mean number of comorbidities was 2.77± 2.05. The most common comorbidities were obesity and overweight (74.44 %), other musculoskeletal diseases (47.93 %), hypertension (36 %), chronic venous disease (16.8 %), soft tissue rheumatism (15.2 %). To highlight the impact of low back pain on functionality and activities of daily living we used Oswestry disability questionnaire. Mean Oswestry score revealed a moderate disability, with 34 % deficit. Mean Oswestry score was 28.8 % for men and 37.4 % for women. Mean Oswestry score of patients who did not have other comorbidities also revealed a moderate disability, with 32.6 % deficit.

Conclusion: Patients with low back pain often have associated degenerative diseases. Functional impact of low back pain was moderate in all cases, even in those without comorbidities revealing the disabling potential of low back pain.

P582
PAIN ASSESSMENT ACCORDING TO ONSET OF LOW BACK PAIN

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Objective: To assess pain in patients with different duration from the onset of low back pain.

Material and Methods: Between January and December 2013 we conducted an observational study on 190 patients, all Caucasians, diagnosed with low back pain according to ACR criteria and treated in the Medical Rehabilitation Clinical Hospital Baile Felix, Romania. Pain assessment was performed with VAS scale.

Results: There were 60 % men and 40 % women, mean age 54.88±13.86 years. X-rays revealed dorsolumbar advanced spondylosis in 17.89 % patients, moderate form in 13.68 %, early form in 33.68 %, idiopathic scoliosis in 3.15 %, ankylosing hyperostosis (Forestier's disease) in 5.26 % cases and vertebral anomalies in 15.78 %, of which half were sacralization of L5. Evaluation of pain revealed: pain now (baseline 5.87±2.32 and 4.37±2.38 after therapy), maximum pain during last 4 weeks was 7.22±2.19 and mean pain during last 4 weeks 5.89±2.15. Medical rehabilitation ameliorated pain, as demonstrated by VAS index evolution. Mean value for duration of pain was 142.38±128.46 months. We divided the study lot into 4 subgroups according to duration of pain, group 1 with a duration under 35 months, group 2 with duration between 36 and 71 months, group 3 with duration between 72 and 107 months and group 4 with duration over 108 months. Mean pain during last 4 weeks had increasing values, with the increasing of disease duration: 4.6±2.29 in group 1, followed by 5.6±1.53, 6.11±2.52 and 6.13±2.16. Evaluation of pain in women revealed: pain now 6.18±2.28, maximum pain during last 4 weeks 7.59±2.10 and mean pain during last 4 weeks 6.21.89±2.23. In men these values were pain now 5.63±2.35, maximum pain during last 4 weeks 6.96 ±2.14 and mean pain during last 4 weeks 5.62±1.96.

Conclusion: Pain was not concordant with the severity of X-ray changes. Slightly higher VAS values were noticed in

women. Pain increased with the duration of disease, even in the presence of rehabilitation treatment, which was effective for short-term.

P583
MANAGEMENT OF AROMATASE INHIBITORS—INDUCED BONE LOSS IN POSTMENOPAUSAL WOMEN WITH HORMONE RECEPTOR POSITIVE BREAST CANCER

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Objective: In postmenopausal women the use of aromatase inhibitor (AI) increases bone turnover and induces bone loss, leading to an increase of fracture incidence compared to that, seen during tamoxifen use. The bone loss is much more marked in young women with treatment-induced ovarian suppression followed by AI therapy. This therapy is well established in postmenopausal women with hormone receptor-positive breast cancer. The aim of the study is to investigate the ability of oral bisphosphonates (ibandronic acid), intravenous bisphosphonates (zolendronic acid) and denosumab, to protect against AI-induced bone loss.
Material and Methods: Eligible 98 women with hormone receptor-positive nonmetastatic breast cancer treated with adjuvant AI therapy were stratified by duration of AI therapy (>6 months), received supplemental calcium and vitamin D, and received oral bisphosphonates (ibandronic acid) (n=42), intravenous bisphosphonates (zolendronic acid) (n=30) or subcutaneous denosumab 60 mg (n=26). At enrolment, all patients were required to have evidence of low bone mass. The primary end point was percentage change from baseline at month 24 in lumbar spine and total hip BMD.
Results: At 24 month, lumbar spine BMD, respectively total hip increased by 2.73 % and 0.95 % in the oral bisphosphonates group, 5.09 % and 2.3 % in the intravenous bisphosphonates group and 7.2 % and 3.8 % in the denosumab group.
Conclusion: All patients receiving denosumab gained the highest both lumbar spine and total hip BMD compared to oral and intravenous bisphosphonates groups. Such therapy led to significant increases in BMD over 24 months at trabecular and cortical bone and was well tolerated. The early therapy seems to be the preferred treatment strategy vs. delayed administration, as it significantly and progressively increases BMD in postmenopausal women with an early breast cancer. Unsatisfactory increase of BMD after 24 months on oral bisphosphonates should switch to i.v. bisphosphonate.

P584
BISPHOSPHONATES AND THE RISK OF BREAST CANCER IN OSTEOPOROTIC WOMEN: A POPULATION-BASED STUDY

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Objective: Bisphosphonates (BP) are widely used in osteoporosis treatment. By inhibiting the mevalonate pathway, bisphosphonates may affect cell function and survival, including the viability of tumor cells. Recently, a protective effect of bisphosphonates on breast cancer risk has been suggested by several studies, which were unable to exclude the possibility of a confounder effect due to low cumulative exposure to estrogen in osteoporotic women versus controls. The objective of the present study is to assess the association between different levels of bisphosphonate exposure and breast cancer incidence in a cohort of osteoporotic postmenopausal women.
Material and Methods: This historical prospective study was conducted using the computerized databases of Maccabi Healthcare Services (MHS). Included in the study were cancer-free women aged 55–75 who started bisphosphonate therapy between 1998 and 2012. Bisphosphonate exposure was expressed in quintiles of proportion of days covered with BP during follow-up period (PDC). Cancer incidence was ascertained by the Israel National Tumor Registry.
Results: A total of 16,628 eligible MHS members were identified and 275 cases of breast cancer diagnosed during a total follow-up period of 76,710 person-years. Compared to women with a PDC with bisphosphonates of 20 % or lower, the hazard ratio for breast cancer were HR=0.89 (p=0.74), HR=0.74 (p=0.38), HR=0.71 (p=0.29) and HR=1.38 (p=0.21) among women with 20–40 %, 40–60 %, 60–80 %, and 80 % or higher, respectively.
Conclusion: In the present study, we did not find any significant negative association between persistence with bisphosphonates and risk of breast cancer.

P585
CORRELATION OF CIRCULATING ADIPOKINES WITH BONE MINERAL DENSITY IN PATIENTS WITH TERMINAL STAGE OF CHRONIC RESPIRATORY FAILURE

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Objective: To investigate the role of adipokines in formation of osteoporosis in the patients with terminal stage of chronic respiratory failure

Material and Methods: Adipokines, osteopontin, osteoprotegerin (OPG), RANKL and bone biomarkers were determined in 82 patients with end-stage of chronic respiratory failure and 74 healthy. BMD, body composition was measured by DXA at the lumbar spine (LS) and left femoral neck (FN).

Results: Procollagen type I amino-terminal propeptide (P1NP) was higher in lung diseases and osteocalcin was similar between patients and controls. Type I collagen C-telopeptide (CTx) was higher in lung group and was inversely related to FN ($r=-0.64$, $p<0.01$) and was a direct relationship with P1NP ($r=0.71$, $p<0.001$). The adiponectin, resistin, visfatin, TNF-α, IL-6, osteopontin, RANKL were higher; leptin, OPG was low in lung pathology. Where was positive correlation between leptin ($r=0.62$, $p<0.001$; $r=0.54$, $p<0.01$) and negative between adiponectin ($r=-0.49$, $p<0.01$; $r=-0.42$, $p=0.01$), TNF-α ($r=-0.43$, $p<0.05$; $r=-0.41$, $p<0.01$) and BMD in FN and LS; positive correlation between resistin ($r=0.53$, $p<0.01$) in L2-L4 only. Omentin-1 were correlated with BMD at the FN ($r=0.46$, $p<0.05$), BMI ($r=0.51$, $p<0.01$), osteopontin ($r=0.46$, $p<0.05$), OPG and osteocalcin ($r=0.52$, $p<0.05$) and RANKL ($r=-0.54$, $p<0.05$) in lung patients. No correlations were found between visfatin, biochemical, and BMD in both groups. Both total ghrelin ($p<0.01$) and active ghrelin ($p<0.01$) were higher in pulmonary group and were associated negatively with BMI (total ghrelin: $r=-0.56$, $p<0.01$; active ghrelin: $r=-0.47$, $p<0.05$). Resistin showed inverse correlations with FEV1%; FEV1/FVC% and positive with BMI. Visfatin was correlated with FEV% ($r=0.39$, $p<0.05$) and TNF-α in lung group ($r=0.44$, $p<0.05$). There was no significant correlation between visfatin, BMI, body composition and BMD.

Conclusion: Results show possible role of adipokines in the increasing of bone loss at the terminal stage of chronic respiratory failure.

P586

SEASONAL VARIATIONS IN VITAMIN D LEVELS IN PREGNANT WOMEN AND THEIR VERY LOW AND EXTREMELY LOW BIRTH WEIGHT INFANTS

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Objective: Vitamin D has multiple functions critical in growth and development. Increasingly research has revealed that vitamin D deficiency is associated with a lot of health problems during pregnancy: preeclampsia, gestational diabetes, preterm birth with low birth weight babies. There is neither local or national data concerning vitamin D status during pregnancy, nor national recommendations for vitamin D supplementation during this very important period. The aim of the study is to assess 25(OH)D status of mothers and their preterm neonates. To evaluate seasonal variations in 25(OH)D plasma levels in this population.

Material and Methods: 95 mothers and their 108 babies born before 32 weeks of gestation were included in this prospective study held between 09.2011 and 09.2013 in the University Hospital of Obstetrics and Gynaecology. Blood samples were taken from the mother and babies umbilical cord at birth. The 25(OH)D serum levels were measured using immunoassay ECLIA and defined as sufficient >30 ng/ml; insufficient 20–30 ng/ml and deficient <20 ng/ml.

Results: At delivery 25(OH)D deficiency was estimated in 66.3 % of women and 66.6 % of premature newborns with average serum levels of 11.03 ng/ml±−4.9 and 14.39 ng/ml± 9.8, respectively. A strong correlation was observed between maternal and infant 25(OH)D concentrations ($r=0.516$, $P=0.002$). There is a clear seasonal variations in the 25(OH)D serum levels-mothers delivered in the winter were with lower 25(OH)D levels than mothers and babies born in August–October period.

Conclusion: There is a need of systematic screening for 25(OH)D status in pregnant women in the country. Keeping 25(OH)D serum levels in normal limits during pregnancy will have positive influence on the rate of prematurity and on mothers and newborn health. Especially in winter period supplementation will be most important.

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P587

DISABILITY INDICATORS IN LOW BACK PAIN OF DISK ETIOLOGY

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Objective: Over 60 % of the patients with lumbar disk hernia confirmed by MRI get late in a neurosurgery or orthopedics service for surgical intervention. The aim of the study was to

establish the functional impact of lumbar disk hernia related to its treatment.

Material and Methods: The study lot was formed by 206 patients, mean age 48.44±8.55 years, ranging from 21 to 75 years, who met the inclusion criteria, selected from 667 cases diagnosed with low back pain, examined in the Medical Rehabilitation Clinical Hospital Baile-Felix, between January and December 2013. 61.16 % were men and only 32.03 % cases were retired. All patients were investigated by MRI, which confirmed the clinical diagnosis and established the level of disk herniation. We used Oswestry questionnaire for lumbar pain and disability assessment.

Results: According to the applied treatment we have divided these patients into two lots: lot I 54.37 % of cases, with conservative treatment and lot II with surgical treatment, but having lumbar pain±residual radiculopathy. Mean Oswestry score was 49.36 % in group I and 48.43 % in lot II, revealing severe disability in both groups, differences between them not statistically significant. Lumbar pain caused severe disability related to all investigated domains, except personal care activities in lot I, the most important deficits were noticed for pain intensity 68.2 % and weightlifting 62.1 %. Pain intensity ameliorated in lot II (59.1 %), but important deficits were noticed for weightlifting −66 %, sitting 51.9 % or social life 51.1 %.

Conclusion: Lumbar pain affects wellbeing, causing severe disability, the deficit in lot I patients was over two thirds higher than in cases with surgery. Pain caused the most important deficit, almost equal in the two groups, followed by lifting weights and sitting in lot I, but after surgery weight lifting deficit became more important than pain in lot II. Differences between deficits of the items investigated with Oswestry score in the two lots were not statistically significant.

P588

COULD INTERNET USE BE PROMISING IN HEALTH PREVENTION AND PROMOTION IN MENOPAUSALWOMEN? A PRELIMINARY REPORT

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Objective: To assess the interest and the level of Internet use of women regarding menopause health issues.

Material and Methods: Self-administered questionnaires were distributed in a menopause centre (Liège, Belgium) in order to collect the necessary information.

Results: To date, 33 patients have responded to the survey but the survey is ongoing. The average age of respondents is 57.7 years, 54.5 % of them are still professionally active. All women are using the Internet; 54.5 % of them use it every day and 97.0 % of them use it at least two to three times per week. About 75 % of the women reported at least one health problem. In this population, 97.0 % of them seek additional information to that given by their doctors and 78.1 % of them say they use the Internet to search information about their health. Whatever the means of information, once informed, 87.1 % of them need to talk about this with their relatives, friends or physicians. They allocated an average score of 6.4/10 regarding the consistency of information found on the Internet. The use of Internet to search for health information was found to be unrelated to age, socio-economic status or number of health problem.

Conclusion: Menopausal women seem to need to be informed about their health. They are in a period of their life where they could be more physically and mentally frail. In this population, 100 % of them use the Internet and 70 % of them already do it to obtain information on their health. Therefore, the use of a social network on an Internet platform dedicated to Health could be a good way to inform and empower women about their health.

P589

FUNCTIONAL IMPACT OF LOW BACK PAIN AND COMORBIDITIES

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Objective: This study aimed to establish the functional impact of low back pain in patients who associate other chronic disorders.

Material and Methods: Between January and December 2013 we conducted an observational study on 190 patients, all Caucasians, diagnosed with low back pain according to ACR criteria and treated in the Medical Rehabilitation Clinical Hospital Baile Felix, Romania. Information on comorbidities was collected from each patient using the Cumulative Illness Rating Scale. Pain assessment was performed with VAS scale.

Results: There were 60 % men and 40 % women, mean age 54.88±13.86 years. Lumbar disc hernia was confirmed by MRI 9.47 % of cases and two cases had lumbar canal stenosis. X-rays revealed dorsolumbar advanced spondylosis in 17.89 % patients, moderate form in 13.68 %, early form in 33.68 %, idiopathic scoliosis in 3.15 %, ankylosing hyperostosis (Forestier's disease) in 5.26 % cases and vertebral

anomalies in 15.78 %, of which half were sacralization of L5. 88.94 % of the patients had at least one associated disorder. Morbidity count was 518. Mean number of comorbidities was 2.77±2.05. The most common comorbidities were obesity and overweight (74.44 %), other musculoskeletal diseases (47.93 %), hypertension (36 %), chronic venous disease (16.8 %), soft tissue rheumatism (15.2 %). To highlight the impact of low back pain on functionality and activities of daily living we used Oswestry disability questionnaire. Mean Oswestry score revealed a moderate disability, with 34 % deficit. Mean Oswestry score was 28.8 % for men and 37.4 % for women. Mean Oswestry score of patients who did not have other comorbidities also revealed a moderate disability, with 32.6 % deficit.

Conclusion: Patients with low back pain often have associated degenerative diseases. Functional impact of low back pain was moderate in all cases, even in those without comorbidities revealing the disabling potential of low back pain.

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QUALITY OF LIFE IN LOW BACK PAIN OF DISK ETIOLOGY

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Objective: The aim of the study was to establish the compare quality of life in patients with lumbar disk hernia treated by conservative methods vs. surgery.

Material and Methods: The study lot was formed by 206 patients, 61.16 % men, mean age 48.44±8.55 years, examined in the Clinical Rehabilitation Hospital Baile-Felix, between January and December 2013, investigated by MRI. According to the applied treatment we have lot I 54.37 % of cases, with conservative treatment (subdivided in two groups, depending on the presence or absence of radiculopathy) and lot II with surgical treatment with lumbar pain±residual radiculopathy. We used SF-36 for life quality assessment.

Results: Mean SF-36 score in lot I revealing a loss of 46.3 % and in lot II 60.8 %, revealed a severely impaired quality of life, statistically significant differences ($p<0.05$). Lumbar disc hernia (lot I) affects quality of life, in descending order, by limitations due to physical health 50.64 %, body pain 35.02 %, physical function 21.56 %, general health 21.17 %, limitations due to emotional problems 18.8 %, social function 17.01 %, mental wellbeing 11.84 %, vitality 7.06 %. In lot II quality of life was affected, in descending order, by: limitations due to physical health - 72.92 %, limitations due to emotional problems 51.51 %, physical function 48.08 %, social function 39.68 %, body pain 37.88 %, general health 29.28 %, mental health 9.24 %, vitality 7.71 %. Women from lot I have greater activity restriction, except physical function than men. Men from lot II have higher deficits than women, for the items body pain, general health, social function, limitations due to health problems, mental health. Cases over 50 years who had conservative treatment presented, as expected, more severe disabilities than those under this age.

Conclusion: Investigated areas revealed greater impact on quality of life in cases with surgical treatment, except mental wellbeing item. Therapeutical approach in low back pain of disk etiology has different influences on the two genders.

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BONE MINERAL DENSITY AND VITAMIN D LEVEL IN PATIENTS WITH CORONARY ARTERY DISEASE AFTER MYOCARDIAL INFARCTION

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Objective: To study 25-hydroxyvitamin D (25-OHD) and BMD values in patients with angiographically documented coronary artery disease (CAD) and previous myocardial infarction (MI).

Material and Methods: Epidemiological observations suggest links between low BMD, low level of vitamin D and risk of acute cardiovascular events and vice versa. We performed an investigation of BMD, T-score by DXA and blood vitamin D level in the group of 44 CAD patients with the history of MI and in the control group of 42 healthy participants.

Results: We evaluated women and men aged 55–79 years. Patients from study group had a documentary support of MI, an angiography report and were treated in Cardiological Republican Clinic. Patients with comorbidities that could influence BMD results were excluded. After adjustment of age, sex and BMI, severity of coronary artery disease was independently correlated with low BMD (odds ratio 1.28, [95%CI, 1.11–1.62] $p=0.04$) and low level of 25-OHD (odds ratio 1.22, [95%CI, 1.23–1.69] $p=0.03$). Our results showed a significant association between self- reported myocardial infarction and low lumbar spine BMD (odds ratio 1.27, [95%CI, 1.01–1.73] $p=0.03$). Lower 25-OHD concentration was associated with severity of coronary artery disease (odds ratio 1.25, [95%CI, 1.19–1.67] $p=0.03$).

Conclusion: Our investigation confirms the connection between cardiovascular disease (especially CAD and MI) and low spine BMD. The findings suggest that bone status evaluation should be done in cardiovascular patients in order to

identify candidate patients for preventive and therapeutic measures. Also, larger trials and studies are necessary to assess the effect of vitamin D therapy on prevention of CAD in patients with vitamin D insufficiency.

P592
PATELLOFEMORAL OSTEOARTHRITIS AND RADIOLOGICAL PARAMETERS IN AN ASIAN POPULATION

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Objective: To analyse the prevalence, severity and treatment modalities involved in knee patellofemoral osteoarthritis in an Asian population, and to provide basic demographic radiological measurements.
Material and Methods: Surgical cases aged 40 and above who underwent tibial tubercle elevation and discharged from our institution were enrolled. Pre-operative radiographs were reviewed for radiological degree/severity of tibiofemoral & patellofemoral osteoarthritis, Sulcus and Merchant congruence angles were measured for both knees. Clinical data in terms of surgical treatment employed was also recorded.
Results: There were a total of 21 cases enrolled (7 male, 14 female; 16 Chinese, 3 Malay and 2 Indian). Radiological PFOA was seen in 19 cases for the Right knee, 20 cases in the Left knee. Radiological tibiofemoral OA was seen in 19 cases for the right knee and 19 cases in the left. Mean right knee sulcus angle was 135.6°, left knee 136.4°, and mean right knee Merchant congruence angle was 19.5°, left knee 25.6°. Stratified according to Race, Mean sulcus & merchant angles were as follows:
Chinese - 135.4, 23.6 (right); 136.8, 28.9 (left)
Malay - 137.6, 8.6 (right); 135.1, 16.2 (left) Indian - 134.9, 5.1 (right); 135.7, 13.9 (left) Male - 134.6, 10.4 (right); 134.7, 14.3 (left)
Female - 136.2, 24.4 (right); 137.3, 31.3 (left)
Based on analysis, increased knee PFOA grade resulted in a greater Merchant angle for both knees (right: $p=0.000$, Spearman's correlation coefficient 0.824; left: $p=0.004$, Spearman's 0.655). Race, gender the presence/degree of tibiofemoral OA were not statistically significant in determining sulcus or merchant angles.
Conclusion: Patellofemoral osteoarthritis is a frequent condition seen in the Asian population and may occur in the absence of significant tibiofemoral osteoarthritis. This is the first recent Southeast Asian study to show basic radiological measurements for patients with PFOA, and future studies are planned to evaluate surgical outcome and treatment options.

P593
INTRAARTICULAR HYALURONIC ACID TREATMENT IN OSTEOARTHRITIS OF THE KNEE

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Objective: To show our experience in order to determine the effectiveness and possible side effects of intraarticular application of hyaluronic acid (HA) in patients with osteoarthritis of the knee (OAK).
Material and Methods: Twenty consecutive patients OAK have been treated with intraarticular HA of the same manufacturer. We selected patients who had second and third stages of Kellgren-Lawrence classification on radiographs. Administration of the HA was once a week, 3 weeks in a row. Patients were evaluated for pain on the VAS (0–10), and the presence of synovitis (effusion and/or synovial hypertrophy) using musculoskeletal ultrasound (MSUS). Patients were examined before and after 6 months of HA application. Statistical analysis was performed using Student's t-test.
Results: The average age of our patients was 62 years (49–78), 15 (75 %) persons were females. After 6 months there was a statistically significant reduction in VAS pain scale from 6.1 to 4.8 ($p<0.006$) and decrease in synovitis from 56 to 45 %, which was not statistically significant ($p=0.54$). Patients were divided into two groups according to the age: 11 (56 %) over 65 years and 9 (44 %) under 65 years. Pain intensity on the VAS scale in the older group before treatment was 6.2 compared to the younger in which pain intensity was 5.9, which was not statistically significant. After 6 months, pain intensity in older and younger age group was 4.9 and 4.2, respectively. We had no side effects.
Conclusion: Our experience shows that HA viscosupplementation has an impact on the reduction of pain in patients with OAK. This allow patients in longer period to reduce the dose of NSAIDs or completely suspended them. This is particularly significant in the group of elderly patients with gastrointestinal and cardiovascular comorbidities.

P594
25-HYDROXYVITAMIN D AND CENTRAL DXA EVALUATION: A STUDY IN 505 POSTMENOPAUSAL WOMEN

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Objective: The low level of vitamin D as pointed by serum 25-hydroxyvitamin D (25-OH D) is very frequent, especially

in postmenopause. It is difficult to establish if the vitamin D deficient is more frequent in patients with low BMD, regardless the age and geographic area. We analyze the levels of 25-OH D in menopausal women with different WHO DXA groups in order to find out if any group of patients is at higher risk of D hypovitaminosis.

Material and Methods: This is a cross-sectional study in Romanian population. The patients were women in menopause, evaluated between 2009 and 2013. The bone assessment included clinical parameters generally correlated with fracture risk; 25-OH D assay as well as central DXA (Lunar), at least at lumbar site. The exclusion criteria were previous therapy for osteoporosis or fracture risk reduction at any moment of life. No patient with secondary causes of osteoporosis was included. The statistical analysis was performed in SPSS 21 and the statistical significance was at p value <0.05.

Results: 505 women were admitted. The mean age was 57.8 years (ranges 40–80 years). The median 25-OH D was 15 ng/mL (normal levels <30 ng/mL). Less than one third was smokers and mean menopause age was 47 years. The WHO DXA groups were: normal DXA (n=161), osteopenia (227), osteoporosis (n=117). The mean lumbar BMD according to DXA was: 1.2 g/cm^2 (normal DXA group), 1.01 g/cm^2 (osteopenia group), and 0.8 g/cm^2 (osteoporosis). The difference of 25-OH D between these three groups was not statistical significant.

Conclusion: Based on our observations, an overall prevalence of D vitamin deficiency was registered. We mention that the population was not preselected regarding the vitamin D and calcium supplements. All the 25-OH D assays were performed at the same laboratory from CI Parhon National Institute of Endocrinology. Despite the fact that the parathormone (iPTH) was evaluated in a collateral analysis in less than half of these patients, no relationship could be established between iPTH and 25-OH D. Also, the D hypovitaminosis is very frequent in postmenopausal women; there is not a specific prevalence in groups with different levels of BMD (normal/osteopenia/osteoporosis).

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EFFECT OF HIGH FAT DIET ON BONE SEDENTARY OVARIECTOMIZED RATS

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Objective: The aim of this study was to evaluate the effects of high fat diet on BMD and physical properties of bones from ovariectomized sedentary rats.

Material and Methods: 40 female Wistar rats, 8 weeks old and weighing 200 g, were divided into 4 groups (n=10): OVXC - ovariectomized rats with standard diet, OVXH - ovariectomized rats with high fat diet, SHAMC- sham rats with standard diet and SHAMH - sham rats with high fat diet. Bilateral ovarian removal was performed in groups OVXC and OVXH and sham surgery with bilateral exposures of the ovaries in groups SHAMH and SHAMC. After surgery the animals were individually placed in plastic boxes with small space, making them sedentary. Standard diet was used in the groups OVXC and SHAMC, and standard diet with added 30 % of lipids in the groups OVXH and SHAMH. After 12 weeks, the animals were killed and the tibiae were removed, subjected to analysis of BMD and mechanical torsional test at high speed impact. The test parameters used were: 25 cJ impact energy at a speed of 11.5 rads/s, were obtained the fracture angle (°) and the maximum torque (N.cm).

Results: The mean and standard deviation of BMD (g/cm^2) was: OVXP (0.173±0.011), OVXH (0.170±0.009), SHAMP (0.172±0.012), SHAMH (0.173±0.014); the angle of fracture (°): OVXP (19.2±4.1), OVXH (20.8±3.2), SHAMP (13.9±4.4), SHAMH (15.3±4.8); and maximum torque (N.cm): OVXP (0.21±0.05), OVXH (0.23±0.04), SHAMP (0.17±0.06) and SHAMH (0.18±0.05). The ovariectomy influenced and resulted in a statistical difference in the angle of fracture (p<0.000) and the maximum torque (p=0.009), but not in BMD. The diets did not influence any of the variables studied.

Conclusion: Therefore, it is concluded that for sedentary rats, the decrease in estrogen levels after ovariectomy alters bone strength, but the diet with 30 % fat does not change bone properties studied.

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NOVEL MODELS OF OSTEOPOROSIS IN TRANSGENIC MICE OVEREXPRESSING HUMAN RANKL

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Objective: Receptor activator of nuclear factor-κB ligand (RANKL) is a central regulator of bone remodeling by mediating osteoclast-induced bone resorption. Overproduction of RANKL is implicated in a variety of degenerative bone diseases such as osteoporosis. We have recently generated transgenic

mice overexpressing human RANKL (TghuRANKL) in order to model human RANKL-mediated pathologies.
Material and Methods: To achieve a correct pattern of human RANKL expression in the mouse, a 200 kb genomic fragment containing the whole human RANKL gene was used as a transgene.
Results: TghuRANKL mice of both sexes developed early-onset bone loss and the levels of huRANKL expression were correlated with disease severity. Low copy Tg5516 mice expressing huRANKL at low levels displayed a mild osteoporotic phenotype as shown by trabecular bone loss and reduced biomechanical properties. Overexpression of huRANKL, in the medium copy Tg5519 line, resulted in severe early-onset osteoporosis characterized by lack of trabecular bone, destruction of the growth plate, increased osteoclastogenesis, bone marrow adiposity, increased bone remodeling and severe cortical bone porosity accompanied by decreased bone strength. Notably, TghuRANKL mice rescued the osteopetrotic phenotype of mutant mice expressing an inactive form of endogenous RANKL, showing that the human RANKL protein is fully active in the mouse. Interestingly, treatment of TghuRANKL mice with known antiresorptive drugs effectively inhibited bone resorption proving the significance of such mice in preclinical evaluation studies of novel antiosteoporotic compounds.
Conclusion: These novel human RANKL transgenic models of osteoporosis represent a unique tool for understanding the pathogenic mechanisms in bone resorption as well as for the preclinical evaluation of novel inhibitors that target human RANKL and osteoclasts.
References: Rinotas V et al. J Bone Miner Res 2013;doi:10.1002/jbmr.2112.

P597
STRONTIUM RANELATE IMPROVED BONE HEALING IN PATIENT WITH RHEUMATOID ARTHRITIS AND FRACTURE OF TIBIA: A CASE REPORT

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Objective: Evaluation improve bone healing of strontium ranelate in the patient rheumatoid arthritis and fracture of tibia.
Material and Methods: A female patient, 50 years old, 30 years of rheumatoid arthritis and fractured tibia (right). X-ray the leg bone (right), before and after treatment with strontium ranelate 2 g/day, patients treated for 18 consecutive months.
Results: After 18 months of treatment strontium ranelate patients and improve patient advocacy will be strengthened.
Conclusion: Strontium ranelate may be improve bone healing in patients with rheumatoid arthritis and fracture of tibia.

P598
BONE MINERAL DENSITY IN DIABETIC PATIENTS WITH CHRONIC KIDNEY DISEASE

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Objective: Epidemiological studies indicate that many patients with osteoporosis are characterized by diminished glomerular filtration rate (GFR), which indicates various degrees of chronic kidney disease (CKD). This study evaluated BMD in diabetic patients with early stages of CKD.
Material and Methods: A total of 59 (26 male and 33 female) adult cases with diabetes type 2 and 16 control subjects were enrolled for our study. BMD, serum creatinine and other measures were obtained. GFR was estimated using the Cockcroft-Gault formula, with adjustment for body surface area. BMD was measured by DXA at the lumbar spine and the proximal femur.
Results: The prevalence of T-scores≤ -2.5 SD in the group of patients over 50 years was 15.2 % in females and 12.5 % in males. We found a reduction of BMD in comparison with gender- and age-matched normal population values at the total hip (Z-score$=-0.27\pm1.11$) and the femoral neck (T-score$=-0.23\pm1.12$). After adjustment for all variables, multiple regression analysis showed that BMD in the total femur and lumbar spine were positively associated with eGFR in both males and females.
Conclusion: Our preliminary data showed that diabetic patients with early stages of CKD may be at higher risk of osteoporosis. However, larger prospective cohort studies are needed to confirm the etiologic importance of reduced GFR and bone density.

P599
PREVALENCE OF OSTEOPOROSIS AND HIP FRACTURES IN FEMALE-PATIENTS WITH SYSTEMIC SCLEROSIS AND RHEUMATOID ARTHRITIS

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Objective: To analyse the results of bone densitometry and to evaluate the related-fractures in systemic sclerosis (SSc) in comparison to age in female-patients with rheumatoid arthritis (RA).

Material and Methods: The study group included 25 patients with SSc and 43 patients with RA, all postmenopausal. All patients were evaluated for their BMD T-score at the lumbar spine and total hip by DXA.

Results: All patients were women, mean age-58 years, mean disease duration in SSc-18.9 years, in RA-23.6 years, mean menopause duration-8.6 years. There were no differences in BMD measurements between patients with diffuse and limited SSc. Lumbar spine BMD and T-score were similar between groups. Total hip BMD and T-score were significant lower in patients with SSc vs. RA. Hip fractures were lower in SSc group in comparison to RA patients.

Conclusion: Age, disease severity, prolonged menopause and disease duration were identified as risk-factors of hip fractures in SSc patients, comparing to age and corticosteroid treatment that were associated with osteoporosis and hip fractures in RA patients.

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DETECTION OF INCOMPLETE NONDISPLACED ATYPICAL FEMUR FRACTURES BY DENSITOMETER

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Objective: DXA scanners have been used to screen for vertebral fractures using single energy scan mode. We conducted a cross-sectional study to test the operating characteristics of single energy femur (SE-femur) scans to detect incomplete atypical femur fractures (AFFs), using conventional radiographs as a gold standard.

Material and Methods: Patients from the Ontario AFF cohort study as well as patients screened from 3 bone density laboratories were included. All patients received an SE-femur scan using Hologic Discovery A densitometers, scanning from above the lesser trochanter to the medial condylar flare, and a plain radiograph of the affected femur. Two musculoskeletal radiologists blinded to patient identifiers read the SE-femur scans and radiographs independently in 2 batches, with discussion between batches to fine-tune the process. Using plain radiographs as the reference standard, the diagnostic accuracy of SE-femur scans was assessed separately for each reader and then averaged. For each abnormal finding, inter-rater agreement on SE-femur scans and plain radiographs were measured with the kappa statistic.

Results: Results shown in Table.

	Batch 1	Batch 2
Total Number of Femurs	**85**	**110**
AFF Cohort	32	34
BMD Cohort	53	76
Total Number of Subjects	**60**	**84**
AFF Cohort	25	32
BMD Cohort	35	52
Operating Characteristics		
Sensitivity	75%	66%
Specificity	92%	91%
Postive Predictive Values	87%	89%
Negative Predictive Values	82%	73%
Positive Likelihood Ratio	9.3	10.0
Negative Likelihood Ratio	0.28	0.37
Kappa for Abnormal Finding	**Radiographs (95% CI)**	**SE-femur scans (95% CI)**
Focal cortical thickening	**0.61 (0.43 to 0.78)**	0.55 (0.38 to 0.72)
Endosteal thickening	0.53 (0.30 to 0.76)	0.45 (0.22 to 0.68)
Lucent cleft	0.45 (0.13 to 0.77)	**0.63 (0.37 to 0.90)**
Cortical beaking (focal cortical thickening plus lucent cleft)	0.42 (0.02 to 0.82)	0.48 (0.06 to 0.91)
Multiple site involvement	0.09 (-0.18 to 0.37)	0.46 (0.11 to 0.82)
Generalized cortical thickening	-0.05 (-0.11 to 0.02)	0.24 (-0.01 to 0.49)

Conclusion: SE-femur scans are a promising point-of-care diagnostic tool for detecting incomplete AFFs.

P601
SKIN AUTOFLUORESCENCE, A NONINVASIVE MARKER FOR AGE ACCUMULATION, IS ASSOCIATED WITH BONE MINERAL DENSITY IN TYPE 2 DIABETIC PATIENT

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Objective: Although risk of bone fracture increased, BMD is increased rather than decreased in type 2 diabetes. Accumulating evidence suggest that advanced glycation end products (AGEs) could adversely affect the fracture resistance of bone in type 2 diabetic patients. Skin autofluorescence (SAF) is a validated noninvasive measure of tissue AGEs. We hypothesized that SAF is associated with low BMD in type 2 diabetic patients.

Material and Methods: This case-control study was performed in 766 type 2 diabetic patients (F/M: 365/401, 54.4±15 year) and age and sex matched 100 controls (F/M: 58/42, 52.6±11 year). Skin autofluorescence 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.

Results: SAF was higher in diabetic patients (2.1±0.01) arbitrary Units (AU) compared with controls (1.7± 053 AU) (p=0.001). The mean values of SAF for subjects with femur neck BMD T-scores<−2.5 SD was 2.82 ±0.57 AU, and 2.22±0.49 AU for those with normal T-scores, a significant difference (P<0.05). BMD of femur neck was not different between the groups. (0.880± 0.32 g/cm^2 vs. 0.885±0.17 g/cm^2). Femur neck T-score<−2.5 have higher SAF than normal BMD diabetic patients. Correlation analysis showed a negative correlation between SAF and femur neck BMD (r=−0.23, p<0.0001), L1-4 BMD (r=−0.21, p=0.003), Femur neck T-score (r=−0.22, p<0.0001) and a positive correlation between SAF and HbA1c (r=0.32, p=0.002).

Conclusion: Accumulation of skin AGEs is increased in diabetic patients. Higher skin fluorescence and lower BMD indicating a relationship between AGE accumulation and bone strength in diabetic patients. A long-term prospective study is needed to clarify the causality.

P602
RANDOMIZED PLACEBO CONTROLLED TRIAL OF DYNAMIC ELECTRONEUROSTIMULATION EFFICIENCY IN PATIENTS WITH OSTEOPOROTIC SPINE FRACTURES

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Objective: Patients with osteoporotic spine fractures have chronic pain syndrome and functional limitations which decrease quality of life. Dynamic electroneurostimulation (DENS) is non-drug treatment of pain. Aim was to evaluate DENS influence on back pain and quality of life of patients with osteoporotic spine fractures

Material and Methods: 60 postmenopausal women with vertebral fractures were randomized into the main group (n=30) and placebo group (n=30). The mean age was 71.7±7.5 SD years. All women had at least one osteoporotic vertebral fracture and suffered from chronic back pain. Baseline variables in Qualeffo score and VAS scale of back pain were not significantly different between groups. Intervention: Main group - DiaDENS-PC device. An application was carried out in the area of maximal painfulness with 10 Hz frequency during 5 min and then in 77 Hz frequency during next 15 min. Control group–an imitation of DENS-effect by DiaDENS-PC apparatus-placebo. Procedures were accomplished daily or every other day. The course consisted of 10 procedures.

Results: There was improvement in total Qualeffo score in the main group from 51.3 to 46.3 after course, p=0.002, and there were no change in the control group (from 51.1 to 51.4, p=0.12). In the main group quality of life improved in domains: “pain” from 57.8 to 44.9, p= 0.001, “activities of daily living” from 33.3 to 24.2, p<0.001, “mobility” from 41.0 to 35.6, p=0.001. In the control group no changes found in none of the domains. There were significant between-group differences in the domains “pain” and “activities of daily living” after course. VAS of back pain decreased in main group from 61.1 to 45.1, p<0.0001. In the control group VAS of back pain statistically significantly not changed.

Conclusion: DENS reduces a pain, improves quality of life of patients with osteoporotic spine fractures.

P603
TBS NOMOGRAN: A NEW PROPOSED APPROACH TO CATEGORIZE PATIENTS FRACTURE RISK COMBINING BMD WITH MICROARCHITECTURE ANALYSIS

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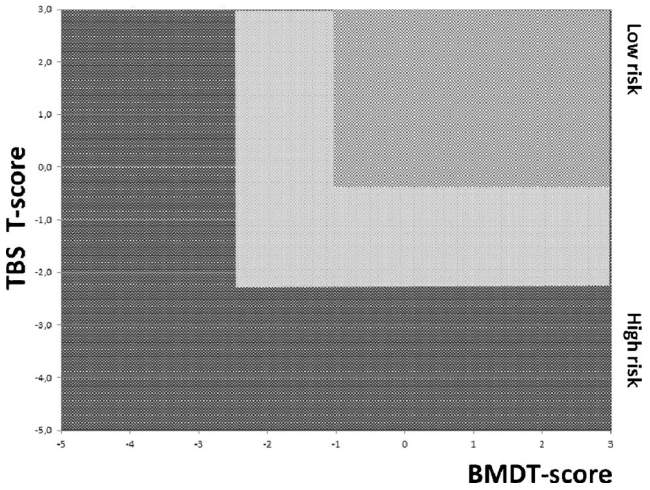
Objective: To develop a method that displays graphically and in combination the status of bone mass and microarchitecture in patients. The diagnosis of osteoporosis prior to fragility bone fractures is based on aerial BMD measurements using DXA. The trabecular bone score (TBS) is a new parameter that is determined from gray-level analysis of DXA images. Major clinical fracture trials confirm that combining the TBS trabecular texture index along with BMD improves dramatically fracture prediction in osteoporotic patients.

Material and Methods: A Cartesian coordinate system was designed to allow graphic display with combining BMD vs. TBS data. This nomogram representing the differences between patient data matched from reference values using standard deviation as units.

Results: The horizontal axis display the spine BMD T-score and the vertical axis the corresponding TBS relative value, calculated comparing the patient result with the maximum value reached in the reference population (TBS=1.385). We have taken as risk thresholds in the X-axis, the BMD T-score WHO diagnostic criteria. On the Y-axis the following classification are displayed: Normal microarchitecture pattern TBS T-score>−0.4 (TBS=1.350); partially degraded pattern −0.4≥TBS T-

score>−2.25 and significantly degraded pattern TBS T-score≤−2.25 (TBS=1.200).



Conclusion: The new graphic method may provide a better understanding of the patient's bone status for clinical users by combining in a nomogram information on BMD and TBS. This approach could be used to build dedicated nomogram for treatment effects and monitoring.

P604

INCIDENCE OF UPPER LIMBS COMPLAINTS IN PATIENTS WITH KNEE OSTEOARTHRITIS: CORRELATION BETWEEN FUNCTIONALITY, PAIN AND GRIP STRENGTH VS. CHANGES IN BODY MASS INDEX IN A EDUCATIONAL PROGRAM OF OSTEOARTHRITIS

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Objective: One hundred ninety-six (50 men and 146 women) patients with KOA were submitted to an education program in OA. Age ranged from 25 to 90 years. Of the 196 patients, 168 (85.71 %) complained of pain in the upper limbs. The Stanford Health Assessment Questionnaire instruments (HAQ), Disabilities of the Arm, Shoulder and Hand (DASH), grip strength and finger pinch were applied and upper limbs pain symptoms were verified at baseline and at 1 year after the educational program.

Material and Methods: One hundred ninety-six (50 men and 146 women) patients with KOA were submitted to an educational program in OA. Age ranged from 45 to 90 years. Of the 196 patients, 168 (85.71 %) complained of pain in the upper limbs. The Stanford Health Assessment Questionnaire instruments (HAQ), Disabilities of the Arm, Shoulder and Hand (DASH), grip strength and finger pinch were applied and upper limbs pain symptoms were verified at baseline and at 1 year after the educational program.

Results: HAQ of patients who did not alter or increased BMI worsened global strength and was statistically worse from those of patients who had a reduction in BMI (which improved global strength) ($p=0.041$). DASH results, and right and left tripod grip strength showed statistically significant mean improvement in all patients, irrespective of BMI change ($p<0.05$). The other force measurements improved but were not statistically significant throughout the study or between groups of BMI variation ($p>0.05$). DASH and tripod grip values had an average improvement throughout the study irrespective of the variation in BMI ($p<0.05$).

Conclusion: The educational program for patients with OA improved upper limb strength and function of patients regardless irrespective of BMI change. Patients who decreased BMI improved global strength.

Acknowledgements: We thank TRB Pharma Brasil for financial support.

P605

ARTHROSCOPIC DEBRIDEMENT & VISCOSUPPLEMENTATION: DO THEY HAVE A ROLE IN MANAGING EARLY OSTEOARTHRITIS OF THE KNEE JOINT?

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Objective: To study the effectiveness of viscosupplementation 3 weeks following a checklist based arthroscopic debridement in select patients with symptomatic knee osteoarthritis by means of a prospective, randomized control study.

Material and Methods: The study included 123 patients who had symptomatic knee osteoarthritis (Kellgren Lawrence grade I, II & III; VAS score more than four). Patients were studied in three subsets. First subset ($n=41$): patients who opted for nonoperative management. Second subset ($n=41$):cases who underwent a checklist based arthroscopic debridement. Third subset: arthroscopic debridement with viscosupplementation (single intra articular injection of Hylan G-F 20), at 3 weeks following arthroscopy ($n=41$). Evaluations were made preoperatively, at 3,6, 12,24 and 52 weeks postinjection, using

a patient satisfaction questionnaire, VAS, and the WOMAC osteoarthritis index.

Results: Mean age: 55±5 years. Percentage of change in VAS was maximum in cases with arthroscopy with viscosupplementation subset. Following viscosupplementation, patient satisfaction, WOMAC and VAS scores were significantly improved in comparison with no injection group. Adverse events were noted in nonoperative subset (gastritis, diarrhea, noncompliance for bracing). No significant adverse events were noted in other subsets. beneficial effects of arthroscopy were prolonged with addition of viscosupplementation.

Conclusion: At the end of 1 year suggest that viscosupplementation following a checklist based arthroscopic debridement is an effective treatment option for select patients with knee osteoarthritis. Beneficial effects of arthroscopic debridement alone are the best at 6–24 weeks postoperatively. The beneficial effects of arthroscopic debridement were prolonged following additional viscosupplementation. Nonoperative management has the risk of noncompliance to the prescribed medications or bracing, adverse events and dependency on analgesics.

P606
IS THE TBS USEFUL FOR TREATMENT FOLLOW-UP?

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Objective: Facing osteoporosis, clinicians have a huge therapeutic arsenal available to them. Monitoring treatment effects is the key point for patient care. These treatments can boost BMD, bone microstructure or both. Until recently, only the BMD evaluation was used to monitor treatment effects. TBS is an index of bone microarchitectural texture extracted from DXA related to bone microarchitecture status. The objective of the study is to assess longitudinal effects of different osteoporosis treatments on lumbar spine.

Material and Methods: We analyzed 301 subjects with basal scan and at least one scan in follow-up with the same treatment. We excluded 31 subjects because they have inconsistent data. Finally we analyzed 271 patients (men: 78; women: 193). We divided by treatment groups (Age-years; and Follow-up-months showed in Table). The follow-up changes were analyzed by T-Test. Variation in% from baseline were assessed and normalized at 24 months. (statistical significance was set at $p<0.05$)

Results: BMD and TBS evolution irrespectively to the treatment are presented Table 1.

	TBS Basal vs. Control	p	BMD Basal vs.Control (g/cm2)	p
Non Treatment (73) Age: 37,8-83,1. Follow-up (months): 32,9	1,271 vs. 1,245 Δ%_24months=-1.5%	**0.00**	1,060 vs. 1,063 Δ%_24months=0.2%	0.72
Vit.D +Calcium (63) Age: 34,3-86,9 Follow-up (months): 22,3	1,216 vs. 1,226 Δ%_24months=0.9%	0.22	0,978 vs. 0,977 Δ%_24months=-0.1%	0.93
Testoterone (40) Age: 47,9-67,9 Follow-up (months): 23,5	1,164 vs. 1,187 Δ%_24months=2.0%	0.08	1,104 vs. 1,151 Δ%_24months=+4.3%	**0.00**
Alendronate (45) Age: 47,7-88,3 Follow-up (months): 23,3	1,220 vs. 1,207 Δ%_24months=-1.1%	0.07	0,908 vs. 0,940 Δ%_24months=3.6%	**0.00**
Risidronate (30) Age: 42,1-78,1 Follow-up (months): 29,7	1,158 vs 1,165 Δ%_24months=0.1%	0.54	0,879 vs. 0,916 Δ%_24months=3.4%	**0,02**
Denosumab (20) Age: 52,4-82,86 Follow-up (months): 19,7	1,211 vs 1,232 Δ%_24months=+2.1%	**0.05**	0,798 vs. 0,845 Δ%_24months=7.2%	**0.00**

Conclusion: Non correlated effects have been observed on BMD and TBS irrespectively to the treatment. As expected from the literature, TBS of non-treated subjects decreased with age. Among these treatments, patients under denosumab exhibit a significant TBS increase whereas no significant effects have been observed under risedronate and alendronate which is consistent with previous presented data. TBS could be better to select patient's treatment.

P607
CAN TRABECULAR BONE SCORE DIFFERENTIATE WOMEN WITH AND WITHOUT FRAGILITY FRACTURES?

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Objective: Bone mass and microarchitecture can influence bone strength. The extreme fragility of the bones due to the diminished mass and the deterioration of microarchitecture may originate an augmented risk of osteoporotic fractures, mainly at the distal radius, at the spine and at the hip, also

associated with increased morbidity and mortality. At this date, DXA scan is the gold standard to measure BMD, in order to diagnose preciously osteoporosis and estimate fracture risk. The decrease in the BMD is positively related to the risk of osteoporotic fractures. TBS, a novel gray-level measurement of lumbar spine DXA image texture, is related to microarchitecture and fracture risk independently of BMD. The aim of this study was to compare the lumbar spine bone microarchitecture as estimated by TBS with the spine BMD scans and the correlation between spine TBS and BMD in post-menopausal women with and without fragility fractures.

Material and Methods: BMD (g/cm^2) at the lumbar spine was measured by DXA (Discovery W, Hologic Inc., USA) in 155 women with (fracture group) and without osteoporotic fractures (no fracture group). Site matched spine TBS was derived for each lumbar spine DXA scan (TBS iNsight software, Medimaps, France). Adequate statistical tests were used with the significance level at $P<0.05$.

Results: No significant difference was detected between the two groups for the mean age, mean height, mean weight and mean BMI. The mean BMD was identical between these groups of women, while the TBS was lower in the fracture group, as compared with the other group. No significant relationship between spine TBS and BMD, in the fracture group was detected.

Conclusion: In the osteoporotic fracture group the lumbar spine TBS was significantly low; however, an overlap of the BMD values was observed in both groups, not differentiating women with and without fragility fractures. These data may indicate that TBS can complement the BMD lumbar spine scans in the clinical routine osteoporosis management.

P608
THE RESULTS OF TOTAL KNEE PROSTHESIS IN PATIENTS WITH GONARTHROSIS

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Objective: To analyze the results of total knee prosthesis TKP in patients with rheumatic diseases.

Material and Methods: 48 patients (42 women, 6 men) with 3–4 radiographic stage of gonarthrosis and persistent joint pain, average age 63.7±19.9 years. The first group consisted of 24 patients with primary osteoarthritis (OA). The second (n=24) group with knee OA on the background of rheumatoid arthritis (RA). In each group, 12 (50 %) patients were treated with nonsteroidal anti-inflammatory drugs (NSAIDs), course 2 days before surgery and after surgery in a stable average daily dose of diclofenac, the other half of patients received NSAIDs on demand only after surgery. Before surgery, and after the 6 months joint pain (VAS), functional capacity index HAQ and WOMAC were assessed.

Results: After 6 months from VAS decreased 2.8 times to 37.9±10.7 mm in OA group and 2.5 times at 32.1±19.3 mm ($p<0.05$) in patients with RA. HAQ decreased from 1.4±0.7 to 0.9±0.6 ($p<0.05$) in the first group and from 1.6±0.9 to 1.0 ±0.8 ($p<0.05$) in the second group, WOMAC score was significantly ($p<0.05$) decreased from 55.1±9.1 to 18.8± 12.1 and 53.1±10.7 to 18.3±11.8 to the first and second groups, respectively. In patients with primary OA receiving NSAIDs before surgery, a positive trend in relation to pain and joint function was greater, but not significantly. In patients with RA treated with NSAIDs in the preoperative period, a VAS decrease was −36.8±18.9 mm, HAQ=−0.7±0.3, which significantly ($p<0.05$) compared VAS those treated with NSAIDs alone after surgery on demand pain VAS=−27.9± 19.7 mm, HAQ=−0.5±0.2. Postoperative complications were recorded.

Conclusion: Total knee prosthesis is an effective method to improve functional capacity, relief of pain in both primary and secondary gonarthrosis. Preventive NSAID analgesia has advantages over NSAIDs only after demand operation, especially when the secondary gonarthrosis amidst inflammation in rheumatoid joints.

P609
INDICATORS OF PHYSICAL ACTIVITY AND THEIR INFLUENCE ON MORTALITY OF PATIENTS WITH HIP FRACTURES

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Objective: The analysis of indicators of physical activity and its influence on survival during 1 year after a hip fracture in patients 50 years and older.

Material and Methods: A prospective study included all inhabitants of Yaroslavl at the age of 50 years and older, with hip fractures occurred from 01.09.2010 to 31.08.2011. Indicators of physical activity were walking duration per day, and also according to the questionnaire by Katz Activities of daily living (ADL). For an assessment of survival Kaplan-Mayer's method was used.

Results: The study included 446 patients: 334 (74.88 %) women, 112 (25.12 %) men (middle age was 76.83± 10.32 years). The general mortality during 12 months was 37.54 %. The mortality was higher at patients who could walk ≤30 min/day before the fracture ($p=0.02$), ≤30 min/day after a trauma ($p<0.0001$), had low values on a scale of daily activity of Katz ($p<0.0001$). Among the survived patients confined to

a bed after during 1 year were 20 (8.90 %), among died patients 61 (81.30 %) people, $p<0.05$. Among the survived patients could go outside 127 (56.95 %), among died patients nobody could go outside, $p<0.05$. Among those who went outside to a trauma, 109 (68.60 %) patients returned to former level of activity, confined to a bed remained 9 (5.66 %) patients. Among the patients who were not going outside before the trauma, in 1 year confined to a bed were 14 (20.89 %) patients ($p<0.05$), 40 (59.7 %) returned to former level of activity ($p<0.05$). The share of the patients with daily activity corresponded as levels A and B (independence in the majority of functions on self-service) in 3 months was 50.00 %, and in 12 months - 77.02 %, $p<0.05$.

Conclusion: The mortality among the patients with hip fractures during a year was 37.54 %. Higher rates of mortality was connected with low level of physical activity. Indicators of physical activity were higher at the patients who were going outside before fracture.

P610
ASSOCIATION BETWEEN SKELETAL MUSCLE MORPHOMETRIC INDICES AND BODY COMPOSITION IN MEN WITH SARCOPENIA

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Objective: Sarcopenia is important cause of frailty, disability and loss of independence in the elderly. There are not sufficient data about muscle fiber composition and morphology in elderly men with sarcopenia. The aim of the study was to analyze the associations of histomorphometric indices of skeletal muscle with body composition in men with age-related sarcopenia.

Material and Methods: This is a cohort study on men aged 70 years and more. Total fat mass, lean mass, and BMD were estimated by iDXA (GE Lunar). Sarcopenia was defined as appendicular skeletal muscle mass divided by stature squared <7.26 kg/m^2. Skeletal muscle needle biopsy (16 gauge) was taken to analyse possible morphological and histochemical changes in myocites. Samples were frozen and stored in liquid nitrogen, the sections were made by cryostat. Stainings with haematoxylin/eosin (H/E), oil red O (ORO), acid phosphatase (AF), cytochromoxydase/succinildehidrogenase (COX/SDH), and adenosine triphosphatase (ATP) were made.

Results: Thirty skeletal muscle microbiopsies were performed on sarcopenic men. On average, the sample was chosen for further analysis of 100 fibers. The average cross-sectional area - 2110±125.6 μm^2. The cross-sectional area of fiber was significantly positively associated with total body lean mass ($r=0.86$, $p=0.02$), leg muscle mass ($r=0.84$, $p=0.03$) and weakly associated with total hip BMD ($r=0.08$, $p=0.05$). No correlations between fat mass and skeletal muscle histomorphometric indices were found. There was no correlation between fiber type and body composition in men with age-related sarcopenia.

Conclusion: Our findings demonstrate that cross-sectional area of muscle fiber of musculus vastus lateralis is positively associated with total body lean mass, leg muscle mass, and weakly associated with total hip BMD in men with age-related sarcopenia.

Acknowledgements: We would like to thank Elvyra Stapcinskiene, Audrone Misiunaite and Edita Merkeliuniene for valuable assistance in this study.

P611
RELATIONSHIP BETWEEN PHYSICAL ACTIVITY, HANDGRIP STRENGTH, FEAR AND RISK OF FALLING IN INSTITUTIONALIZED OLDER ADULTS

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Objective: To investigate relationship between physical activity, handgrip strength, fear and risk of falling in institutionalized older adults.

Material and Methods: This cross-sectional study was conducted on nursing home residents (in Vilnius, Lithuania) aged 65 years and older. Exclusion criteria were musculoskeletal or nervous system diseases or conditions that restricted movements in the upper or lower extremities. Physical activity was assessed using Rapid Assessment of Physical Activity (RAPA) questionnaire. Muscle strength was assessed by handgrip strength (HGS) which was measured using a handheld dynamometer. Fear and risk of falling were measured using Falls Efficacy Scale-International (FES-I) and Morse Fall Scale (MFS). Data were analyzed using SPSS 18.0 for Windows program.

Results: The study population consisted of 20 men and 37 women with a mean age of 80.5±6.8 years, the youngest participant was 67 years old, the oldest—95 years old. In order to compare different level of HGS the score cutpoint of 50th percentile was established. According to this cutpoint men and women were divided into a weak (men ≤20 kg, women ≤10 kg) and strong (men ≥20 kg, women ≥10 kg) HGS groups. The significant differences of MFS score between weak and strong HGS women groups ($p=0.05$) was found greater MFS score in weak group. The study data showed positive correlation between age and FES-I score in

women (r=0.35, p=0.04). In women with weak HGS, negative strong (r=−0.57, p=0.01) correlation between RAPA and MFS scores was observed. In men with weak HGS, negative strong correlation (r=−0.64, p=0.03) between RAPA and age was found.

Conclusion: Our study showed the positive correlation between age and fear of falling in women, and negative correlation between age and physical activity in men with weak handgrip strength. Negative strong correlation between physical activity and risk of falling was observed in women with weak handgrip strength.

Acknowledgements: We would like to thank nursing home "Antaviliai" staff for assistance of this study.

P612
TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS: STATE OF THE PROBLEM IN BELARUS

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Objective: To investigate the characteristics of the treatment of postmenopausal osteoporosis in Belarus.

Material and Methods: 376 postmenopausal women (mean age 61.1±8.35 years) living in different regions of the country were randomly chosen for participation in the study. Measurement of BMD at lumbar spine and femurs was performed by the method of DXA (Lunar Prodigy, GE, USA). Evaluation of risk factors of osteoporosis and fragility fractures was performed by questioning.

Results: According to the obtained clinical and instrumental data 195 (51.9 %) of the examined had osteoporosis, 69 (18.4 %) - osteopenia and normal showings of BMD were detected in 112 (29.7 %) women. 85 (22.6 % of all the examined and 43.6 % of osteoporotic women) had low-energy fractures in anamnesis. The proportion of patients with a history of fragility fractures, to whom antiosteoporotic treatment was prescribed, was 50.5 % (43 patients). Among all the patients with diagnosed osteoporosis only 73 (37.5 %) received antiosteoporotic treatment, 43 (58.9 %) of them were receiving only calcium and vitamin D supplementation, 2 (2.7 %) - calcium with strontium ranelate and 28 (38.3 %) - calcium and bisphosphonates.

Conclusion: The majority of postmenopausal women with established osteoporosis in Belarus do not receive antiosteoporotic drugs, and more than 50 % of patients assigned to treatment only take calcium supplements in combination with vitamin D.

P613
CARTILAGE-SPECIFIC DELETION OF MTOR UPREGULATES AUTOPHAGY AND PROTECTS MICE FROM OSTEOARTHRITIS

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Objective: mTOR (a serine/threonine protein kinase) is a major repressor of autophagy, a cell survival mechanism. The specific in vivo mechanism of mTOR signalling in OA pathophysiology is not fully characterised. We determined the expression of mTOR and known autophagy genes in human OA cartilage as well as mouse and dog models of experimental OA. We created cartilage-specific mTOR knockout (KO) mice to determine the specific role of mTOR in OA pathophysiology and autophagy signalling in vivo.

Material and Methods: Inducible cartilage-specific mTOR KO mice were generated and subjected to mouse model of OA. Human OA chondrocytes were treated with rapamycin and transfected with Unc-51-like kinase 1 (ULK1) SiRNA to determine mTOR signalling.

Results: mTOR is overexpressed in human OA cartilage as well as mouse and dog experimental OA. Upregulation of mTOR expression co-relates with increased chondrocyte apoptosis and reduced expression of key autophagy genes during OA. Subsequently, we show for the first time that cartilage-specific ablation of mTOR results in increased autophagy signalling and a significant protection from destabilization of medial meniscus (DMM)-induced OA associated with a significant reduction in the articular cartilage degradation, apoptosis and synovial fibrosis. Furthermore, we show that regulation of ULK1/adenosine monophosphate-activated protein kinase (AMPK) signalling pathway by mTOR may in part be responsible for regulating autophagy signalling and the balance between catabolic and anabolic factors in the articular cartilage.

Conclusion: This study provides a direct evidence of the role of mTOR and its downstream modulation of autophagy in articular cartilage homeostasis. Targeting cellular homeostasis mediators, such as mTOR and its downstream signaling by autophagy pathway may be a promising therapeutic strategy to achieve chondroprotection and correct the imbalance between catabolic and anabolic processes during OA and related disorders.

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P614
EFFECT OF COFFEE AND CALCIUM ADMINISTRATION IN THE BONE QUALITY

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Objective: To verify if coffee intakes in moderate shots change bone remodeling, what it would impact on BMD, in biochemical and biomechanical characteristics of bone tissue.
Material and Methods: 24 male rats 60 days old Wistar were divided by three experimental groups, making the treatment: Group 1 (control), Group 2 (coffee - 3 ml/kg), Group 3 (coffee - 3 ml/kg + 5 mg calcium) and Group 4 (5 mg calcium). After 56 days of tests, the animals were anesthetized, it was collected 5 ml of blood trough cardiac puncture and analyzed the values of glucose and ionized calcium. After procedure, the animals were euthanized and necropsied, dissecting both femurs. The left femurs were submitted to analysis densitometric and right to bending of head flexion and compression of middle third. Biomechanically, it determined maximum strength and rigidity.
Results: The results showed smaller ionic calcium concentration in the ionic Group in relation to experimental (p=0.0000). The studied glycemic analysis and biomechanical variables had not showed significant differences between the groups. It concludes that coffee intakes in moderate shots can take to BMD diminish without changing bone biomechanical properties and simultaneous calcium consumption does not change this result.
Conclusion: The daily calcium consumption tends to keep ionic calcium level lower, however it is not determinant to interfere beneficially on BMD.

P615
THE RELATIONSHIP BETWEEN HEIGHT, WEIGHT, AGE AND T-SCORE IN PATIENTS 50 YEARS AND OLDER

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Objective: To examine the relationship between T-score of lumbar spine (LS) and femoral neck (FN) and anthropometric data in patients of both sexes aged over 50 years.
Material and Methods: There were examined 14,947 patients aged over 50 years, 13,886 (92.9 %) women and 1,061 (7.1 %) men. T-score was assessed with DXA by Lunar Prodigy in LS (L_1-L_4) and FN. The response variable T-score was assessed by the method of multiple linear regression with stepwise inclusion in the model and test for colinearity using test Durbin-Watson according to the known values of several predictor variables, selected using correlation analysis.
Results: Mean age in the examined women was 65.6± 9.6 years (95%CI 65.0; 662), and in men - 65.4±9.0 years (95%CI 65.3; 65.6). 23.3 % of patients were diagnosed to have osteoporosis, 48.1 % - osteopenia and 28.6 % had normal values of BMD. The anthropometric data in men and women had statistically significant differences in height (169.9±7.1 vs. 157.7±6.3; p<0.001), and weight (80.0± 14.9 vs. 74.7±14.4; p<0.001), thus the regression analysis was performed separately by gender. Constructed multiple linear regression model revealed the relationship between the values of T-score and anthropometric data. The variability of the values of LS T- score can be explained by the meanings of height, weight and age in men and women by 19 % and 21 %, respectively. The calculated predictive value of LS T-score in women was (−4.944) + 0.009*height, cm + 0.046*weight, kg - 0.018*age, years; in men - (−6.702) - 0.001*height, cm + 0.055*weight, kg + 0.031*age, years. The variability of FN T-score was determined by 20 % and 36 % in men and women with the same predictor variables. Predictive value of FN T-score in women was (−2.803) + 0.016*height, cm + 0.028*weight, kg - 0.046*age, years; in men - (−3.197) + 0.003*height, cm + 0.032*weight, kg - 0.019*age, years.
Conclusion: The proposed model allows to predict the values of LS and FN T-score on the basis of anthropometric data in persons aged over 50 years of both sexes.

P616
CHANGES IN APPENDICULAR BODY COMPOSITION CAN BE DETECTED BY PERIPHERAL COMPUTED TOMOGRAPHY ALREADY AT THE INITIAL STAGE OF RHEUMATOID ARTHRITIS

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Objective: Rheumatoid arthritis (RA) causes persistent destructive changes in joints and bone. Detection of early structural damage is vital to predict further joint destruction. In the course of RA a shift in body composition (BC) occurs—lean tissue is substituted with fat while maintaining stable body weight. Our objective was to assess the ability of pQCT to detect a change and quantify the effect of RA on BMD and

hand BC parameters in a prospective study of early RA patients.

Material and Methods: We recruited 32 patients with early RA into the study. Radius trabecular BMD and area, cortical BMD and area, muscle and fat tissue density, cross-sectional area and ratio were measured with Stratec XCT2000 pQCT machine (Germany) twice (at diagnosis and 1 year follow-up). Patients underwent a laboratory panel and thorough physical examination. DAS 28(CRP) value was used to categorize patients to moderate-high (>3.2) and low (<3.1) disease activity groups. Changes in and differences between patient groups were assessed by Wilcoxon signed-rank test. The study was IRB approved.

Results: Mean patient age was 51.8 years (range 23–80), median time from symptom onset 91 (range 9–900) days, 82 % were female. A 25 % increase in fat area (p=0.01) and 11 % decrease in fat/muscle ratio (p=0.03) was seen in the moderate-to-high disease activity group. No BC changes were detected in low disease activity group. Trabecular density was the sole bone parameter where decrements during the first year after disease onset could be detected (−3.5 %, p=0.05).

Conclusion: pQCT detects significant body composition changes (most significant in the body fat compartment) in early RA patients already 1 year after diagnosis.

P617
BONE MINERAL DENSITY, 25(OH)D AND BONE TURNOVER MARKERS IN PATIENTS WITH PSORIATIC ARTHRITIS

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Objective: The aim of this study was to assess BMD and bone turnover markers in patients with PsA, and to investigate the relationship between clinical parameters and markers of bone turnover.

Material and Methods: 71 patients with PsA (32 men and 39 women; mean age 49.22±10.34 years; mean duration of PsA 9.4±5.9 years) without the history of any treatment including glucocorticoid intake and 76 healthy controls (28 men, 48 women, mean age 47.8±9.43 years) were included in the study. Laboratory assessment included evaluation of ECR and C-reactive protein, serum Ca, P, alkaline phosphatase (ALP), serum type I collagen cross-linked C telopeptide (CTX), and 25(OH)D level. Serum levels of 25(OH)D and bone turnover markers were determined using the chemiluminescent assay (analyzer - Cobas e 411). BMD was measured by DXA at lumbar spine (anterior-posterior projection at L1-L4) and femurs. Statistical analysis was performed using the program Statistica 8.

Results: Decreased BMD was detected in 33 patients with PsA: 18 patients (25 % of total) had osteoporosis and 15 patients (20 %) - osteopenia. Showings of BMD in control group were normal. Mean levels of 25(OH)D in patients with PsA were 18.44 [9.90; 27.73] ng/ml and 21.31 [15.79; 30.39] ng/ml in control group, but the differences were not statistically significant. Vitamin D deficiency was found in 66 (92 %) of PsA patients and in 61 (80 %) of controls. Serum CTX, ALP, Ca were not significantly different in arthritic patients and controls (p>0.05). There were no revealed any correlations between vitamin D levels disease activity and BMD. In patients with PsA, the duration of arthritis was negatively correlated with BMD values of lumbar spine and total femur and serum CTX levels, suggesting an association of increased demineralization with the duration of joint disease.

Conclusion: Patients with PsA and longer duration of joint disease may be at risk for osteoporosis, which can require preventative treatment efforts.

P618
UNDERSTANDING BETWEEN PHYSICIAN AND PATIENT WITH OSTEOARTHRITIS AS A KEY FACTOR IN INCREASING THE EFFECTIVENESS OF THERAPY

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Objective: To identify the most significant problems for the patient with osteoarthritis (OA) in order to create a system of effective interaction between physician and patient in future.

Material and Methods: 50 patients with confirmed OA diagnosis (the average duration of the disease 1245± 5.53 years, the average age of patients 49.5±15.82 years) responded to 10 questions concerning their relationship to the disease and the impact on the daily life with the need to evaluate the importance of each question on a scale from 1 to 10. Rheumatologists (n=10) and physicians (n=40) answered the same questions from their point of view, what is important for patients. Responses were ranked and compared.

Results: Physicians and patients opinions coincided in answering the most important question—the forecast for the future in relation to the possibility of movement and overall health. The second most important for patients was the cost of treatment, the third—understanding the causes of the disease and its consequences. Thereafter, patients worried about constant pain and the need to constantly take drugs and possible side effects. In contrast, doctors believed that patients are worried about limitations in everyday life and disability, persistent pain. To a lesser extent they are concerned about the causes of disease and the cost of therapy.

Conclusion: Understanding the patients opinion to their disease will allow to restructure the communication with the patient, educational programs for them. Physician must pay more attention to the explanation of the causes of disease, the

effectiveness and safety of therapy that will improve the quality of life of patients.

P619
LEFLUNOMIDE TREATMENT AND ITS EFFECTS ON SERUM 25-(OH)D LEVELS IN WOMEN WITH RHEUMATOID ARTHRITIS

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Objective: Leflunomide is an immunomodulatory drug that inhibits dihydroorotate dehydrogenase (an enzyme involved in pyrimidine synthesis), and is used for the treatment of patients with moderate to severe rheumatoid arthritis (RA). The aim of this study was to assess the effects of DMARD treatment with Leflunomide on serum concentrations of 25-hydroxyvitamin D (25-(OH)D).
Material and Methods: Thirty-five women were included in the study, mean age 48.4 years, mean disease duration 8.6 years. All of them received leflunomide treatment. Blood samples were taken and the following indices assessed before treatment and at 6 months: serum 25-(OH)D, C-reactive protein (CRP), rheumatoid factor (RF) and anticyclic citrullinated peptide (anti-CCP). During the clinical examination at the 2 checkpoints DAS-28 was calculated. Radiographic images before treatment and at 6 months were assessed using the Sharp van der Heijde Score for joint damage progression.
Results: As was to be expected, after 6 months of DMARD treatment DAS-28, CRP, anti-CCP and RF concentrations decreased considerably. Sharp van der Heijde Score showed no significant changes after 6 months of leflunomide treatment. All 35 patients had decreased 25-(OH)D serum levels (below 50 nmol/l) before starting DMARD therapy. No statistically significant difference was found in comparing 25-(OH)D serum levels before and after 6 months of Leflunomide therapy. After second assessment the majority of them had to be considered for supplementation in order to avoid complications.
Conclusion: This study showed that 6 months Leflunomide treatment had an insignificant effect on serum 25-(OH)D levels. No other associations between 25-(OH)D levels and markers as CRP, RF or anti-CCP were found. Further studies using larger patient lots could show different results, and are needed for a definite conclusion.

P620
EPIDEMIOLOGY OF OSTEOPOROSIS AND RISK OF FRACTURES IN REPUBLIC OF BELARUS

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Objective: The objective of this study was to define the incidence of osteoporosis and risk of fractures by age and BMD for Belarusian population.
Material and Methods: The measurements of BMD were done in the lumbar spine (LS) and femoral neck (FN) by DXA (Lunar Prodigy, GE, USA) for 14,947 individuals of 50 years and older.
Results: It was revealed 1,003 vertebral (VF) and 2,636 nonvertebral fractures (NF) in the study group. Osteoporosis was verified in 24.1 % of patients: at the age group 50–60 years in 13.3 % cases, 60–70 years - 22.2 %, 70–80 years in 34.0 % and for patients aged over 80 years in 47.6 % cases. The frequency of VF by age groups 50–60, 60–70, 70–80 and 80+ years old was 3.1 %, 6.2 %, 12.0 % and 14.8 %, respectively. The odds ratio (OR) of VF for patients with normal BMD in different age groups was 2.25 (95%CI 1.34–3.72), 3.33 (95%CI 1.90–5.80) and 2.97 (95%CI 1.08–10.56) in comparison with patients of 50–60 years. The risk of VF increase for patient with OP depending on age: for age group 50–60 OR=5.71 (95%CI 3.44–9.31), 60–70 years OR=9.48 (95%CI 6.04–14.44), 70–80 years OR=14.31 (95%CI 9.27–21.32) and the highest OR=15.79 (95%CI 9.73–24.92) for patients aged over 80 years. The NF frequency is higher that VF and was 15.0 %, 23.9 %, 30.8 % and 35.2 %, respectively, by different age groups. The odds ratio (OR) of NF for patients with normal BMD in different age group was 1.39 (95%CI 1.10–1.74), 1.49 (95%CI 1.13–1.98) и 1.75 (95%CI 0.97–3.36) in comparison with patients aged 50–60. The risk of NF for patient with OP by age groups is 2.45 (95%CI 1.90–3.15), 3.42 (95%CI 2.77–4.22), 3.74 (95%CI 3.07–4.56) and for patients aged over 80 years OR=3.75 (95%CI 2.82–4.99).
Conclusion: The prevalence of OP in the Republic of Belarus in patients over the age of 50 years is 24.1 % with a maximum frequency at the age of 80 years and older. The age and BMD are significant risk factors for vertebral and nonvertebral fractures, which should be considered for predicting fractures and determining the treatment plan.

P621
THE INFLUENCE OF UPPER LIMBS DISORDERS ON SELF ESTEEM AND QUALITY OF LIFE

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Objective: To assess self-esteem and quality of life in patients with upper limbs disorders.
Material and Methods: Our group of study consisted in 108 patients with upper limbs disorders. It was divided in two subgroups, first of 54 patients (29 women/25 men), mean age 48.2±11.4 who underwent a complex rehabilitation treatment and the second subgroup of 54 patients (28 women/26 men), mean age 49.7±3.4, with no treatment. All patients were recruited from ambulatory system Bihor county, Romania. The main characteristics of the groups were similar in both groups. The inclusion criteria were: active subjects with specific jobs, complying with the principles of medical ethics. The exclusion criteria were: retired subjects, severe diseases, noncompliance. All the patients were assessed with Short Form 36 Questionnaire and Rosenberg Self Esteem Scale at the entrance in the study and 6 months later.
Results: In the subgroup of patients who underwent rehabilitation program both Physical Component Summary and Mental Component Summary of the SF 36 improved at 6 months than in the second subgroup of sedentary patients which showed no improvement in quality of life. Also self-esteem improved in the group of patients included in rehabilitation program after 6 months than in the sedentary group of patients which did not modify at the end of the study.
Conclusion: Our study showed that patients with upper limbs disorders have a low self-esteem and an impaired quality of life. Rehabilitation program played a beneficial role on both self-esteem and quality of life of such patients.

P622
KNEE OSTEOARTHRITIS DIAGNOSTIC GAP: MOVING BEYOND CLASSICAL RISK FACTORS

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Objective: To study determinants of misdiagnosis in knee osteoarthritis (OA).
Material and Methods: We used data from a national health survey (Portugal, 2005–2008). Subjects were inquired about knee OA diagnosis by self-report. Subsequently, each participant answered 6 questions about nontraumatic joint pain. These items were used to build a validated algorithm to select participants for evaluation by a rheumatologist. Evaluation comprised clinical history, physical examination and radiographic evaluation. Individuals were classified according to the American College of Rheumatology clinical criteria for OA. From the original sample, 265 participants were classified into one of the following groups: accurately reported OA when the clinician confirmed the presence of self-reported OA, previously undiagnosed OA when the clinician diagnosed OA and the participant was unaware of the disease, and over-reported OA when the participant reported a prior diagnosis but there was no clinical confirmation. We estimated the risk of misdiagnosis for specific patient characteristics using multinomial logistic regression. We present odds ratios (OR) and their 95 % confidence intervals ($CI_{95\%}$), adjusted for age, sex, education and BMI.
Results: Among all participants clinically-diagnosed, 41.4 % were unaware of the condition. As expected, these had less severe radiographic changes and complaints than those who accurately reported OA. In participants with clinical disease, underdiagnosed subjects had lower BMI (AdjOR=3.30, $CI_{95\%}$: 1.29–8.45, reference: BMI≥30 kg/m^2) and younger age (AdjOR=1.89, $CI_{95\%}$: 1.01–3.57, reference: age≥ 70 years) than those previously diagnosed. Sex, education, socioeconomic status and healthcare utilization did not predict underdiagnosis. Participants over-reporting OA were not significantly different from confirmed cases.
Conclusion: Narrowing the diagnostic gap to improve management is likely to require searching for less severe cases of patients without classical risk factors such as old age and obesity.

P623
THE RESULTS OF TOTAL HIP PROSTHESIS IN RHEUMATOID ARTHRITIS PATIENTS WITH SECONDARY COXARTHROSIS

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Objective: To review the results of total hip prosthesis according to baseline disease activity.
Material and Methods: Total hip prosthesis was used on 36 RA patients (32 women, 4 men), mean age of 49.5± 15.82 years (disease duration - 12.45±5.53 years). High disease activity by DAS28 was observed in 10 patients (27.8 %), moderate - in 19 (52.8 %), low - in 7 (19.4 %) patients, the mean DAS28 4.5±1.7. At the time of surgery (before and after), 24 (66.7 %) of the patients continued to take basic antirheumatic drugs (DMARDs) - (methotrexate 7.5–15 mg per week - 15, leflunomide - 7, sulfasalazine - 2). 6 (16.6 %) patients received biological therapy: infliximab - 2, adalimumab - 1, rituximab - 3, which were cancelled before the operation in accordance with the terms specified in the national guidelines. 19 (52.8 %) patients received steroids, of which, in combination with DMARDs - 7 (19.4 %). Before the surgery, in the postoperative period and after 6 months VAS, DAS28, index HAQ have been evaluated.

Results: For 6 months after surgery VAS decreased to 31.7± 19.4 mm ($p<0.05$), disease activity decreased (high - 4 (11.1 %), moderate 17 (47.2 %), low -15 (41.7 %)). DAS28=1.1±0.7, HAQ index decreased from 1.63±0.91 to 1.04±0.78 ($p<0.05$). VAS in patients receiving steroids alone ($n=12$) was - 24.9±18.6 mm, steroids + DMARD ($n=7$) - 29.1±19.7 mm, only DMARDs ($n=11$) 34.8±18.9 mm, biological therapy + DMARD ($n=6$) 37.4±20.8 mm. DAS28 - did not depend from treatment. HAQ in patients in the group ($n=17$), receiving DMARDs with or without biological therapy (D HAQ=−0.69±0.34) compared to patients receiving steroids without basic therapy ($n=12$) - D HAQ=−0.48±0.31 was significantly better improved ($p<0.05$).

Conclusion: Total hip prosthesis is an effective way to improve functional capacity, to relieve pain and to reduce the activity of RA. Functional ability after surgery is higher in patients using DMARDs continuously and receiving biological therapy compared to patients receiving steroids.

P624
MAY DOXYCYCLINE-RIFAMPICIN COMBINATION BE THE FIRST-LINE THERAPY FOR OSTEOARTICULAR BRUCELLOSIS?

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Objective: Brucellosis is an infectious disease which can mimic rheumatoid diseases due to its osteoarticular (OA) involvements. Treatment failure and recurrences have not been completely eliminated yet in patients with OA brucellosis. This study aimed to investigate rheumatologic manifestations observed in patients with OA brucellosis and the outcomes of combination therapy with doxycycline and rifampicin (DR) in such patients.

Material and Methods: The study enrolled patients who were diagnosed with brucellosis based on blood cultures and serological examinations conducted for differential diagnosis due to presence of rheumatologic symptoms. Serological tests and radiological examinations were performed for diagnosis of the OA involvements. As for treatment, DR therapy was given for 45 days to patients with OA involvement other than spondylitis and for 12 weeks to patients with spondylitis. Clinical and serological evaluations were repeated at 2 weeks and 1, 2, 3, 6 and 12 months after treatment initiation.

Results: Mean age of the 49 patients enrolled in the study was 44.08±13.04 years. The most common osteoarticular manifestation was spondylitis which was observed in 17 patients (34.7 %). In addition, 14 patients (28.6 %) had sacroiliitis, nine patients (18.4 %) had monoarthritis and 3 patients (6.1 %) had oligoarthritis. Complete recovery was observed in all patients based on clinical and serological evaluations. During follow-up visits up to 12 months, none of the patients had recurrence.

Conclusion: Brucellosis should be considered in the differential diagnosis of the rheumatic diseases, mainly spondyloarthropathies. When administered for a sufficient period of time, DR combination is a powerful therapeutic option for patients with osteoarticular brucellosis including those with spondylitis.

P625
SERUM SCLEROSTIN IN HEPATITIS C VIRUS INFECTED PATIENTS

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Objective: Sclerostin is an endogenous inhibitor of the Wnt/β-catenin pathway secreted by osteocytes. It inhibits osteoblast function, differentiation, and survival. Theoretically, sclerostin tends to decrease bone mass, although several studies show opposite results. In addition, it may be related to insulin resistance and carbohydrate metabolism, as osteocalcin. Hepatitis C virus (HCV)-infected patients may present osteoporosis, and frequently show liver steatosis, in relation with insulin resistance. The behaviour of sclerostin in these patients is unknown. The aim of this work was to analyse the relationship between serum sclerostin and osteocalcin levels and BMD, liver function derangement, the intensity of liver steatosis and biochemical markers of bone homeostasis and insulin resistance in HCV-infected patients.

Material and Methods: Forty HCV patients and 20 age and sex-matched controls were included and underwent bone densitometry. Serum sclerostin, osteocalcin, collagen telopeptide, adiponectin, leptin, insulin, resistin, TNF-α, and IL-6 were determined. Liver fat was histomorphometrically assessed.

Results: Sclerostin levels were slightly higher in patients than in controls, and were directly related to BMD at different parts of the skeleton, to serum telopeptide, and to liver steatosis and TNF-α. On the contrary, osteocalcin showed a significant direct relationship with serum adiponectin, and an inverse one with IL-6.

Conclusion: Therefore**,** serum sclerostin levels were raised in HCV patients, and correlated directly with BMD and serum telopeptide. In addition direct relationships of sclerostin, but

inverse ones of osteocalcin, with variables associated with insulin resistance suggest a role of bone on intermediary metabolism.

P626
THE INFLUENCE OF SUBCUTANEOUS DENOSUMAB ON THE PERIOSTEUM IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS: PRELIMINARY RESULTS

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Objective: To assess the influence of denosumab treatment on the periosteum in patients with postmenopausal osteoporosis.
Material and Methods: A group of 27 patients with postmenopausal osteoporosis, confirmed by lumbar spine and hip DXA, with a T-score of maximum −2.5 was selected. Patients were evaluated clinically, after which they underwent ultrasound examination of the calcaneal periosteum. Using colour and spectral Doppler, the colour fraction and resistance index (an intramuscular thenar artery - sample) were obtained, both at baseline - prior to 60 mg of denosumab, and 6 months after the injection. The normal ranges were adopted from data obtained by Terslev L. et al (1). Also a group of 12 healthy female controls were examined at baseline in a similar manner. Statistical analysis was performed using the software StatSoft 9.0. A Student's t-test was used for data evaluation. The level of significance was $p=0.05$.
Results: In 51.8 % patients at baseline calcaneal periosteal hypoechoic thickening was detected, as well as hypervascularization in 62.9 % patients from the study group. In controls, 8.3 % patients had calcaneal periosteal thickening, and 16.6 % had periosteal hypervascularization. The mean colour fraction in the study group was 0.047±0.16 (range=0.26–0.75) at baseline, compared to a mean of 0.005±0.01 (range=0–0.04) in controls. The mean resistance index was 0.27±0.45 (range=0.1–1) at baseline, compared to a mean of 0.95± 0.09 (range=0.71–1) in controls. The ultrasound analysis performed at re-evaluation yielded a significantly lower mean colour fraction of 0.32±0.12 (range=0.2–0.61), $p=$ 0.047, and a significantly higher mean resistance index of 0.54±0.25 (range=0.2–1), $p=0.049$.
Conclusion: Our preliminary data show that treatment with denosumab in patients with osteoporosis has a beneficial effect on periosteum, reducing its degree of vascularization.

References: 1. Terslev L et al. Ann Rheum Dis 2004;63:644

P627
DIAGNOSTIC ACCURACY OF A NOVEL ULTRASOUND-BASED METHODOLOGY FOR SPINAL DENSITOMETRY ON A COHORT OF FEMALE PATIENTS (45–65 Y)

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Objective: To test the diagnostic accuracy of a novel ultrasound (US)-based method to perform spinal densitometry without employing X-rays.
Material and Methods: A cohort of 345 female patients was recruited according to the following criteria: 45–65 years, BMI <25 kg/m^2, no severe deambulation impairments, medical prescription for a spinal DXA, signed informed consent. All the enrolled patients underwent two examinations: a conventional spinal DXA (Hologic Discovery) and an US scan of lumbar spine. US data were analyzed by a novel algorithm that processed both echographic images and "raw" radiofrequency signals and calculated the same diagnostic parameters provided by DXA (BMD, T-score, Z-score). Diagnostic accuracy of obtained results was evaluated through a direct comparison with DXA output as a function of patient age.
Results: For 88.1 % of the patients US diagnosis (osteoporotic, osteopenic, healthy) was the same of the corresponding DXA one. In particular, diagnostic accuracy showed the following behavior as a function of patient age range: accuracy was 95.0 % in 45–50 year, 88.9 % in 50–55 year, 92.0 % in 55–60 year and 78.6 % in 60–65 year. Pearson correlation coefficient (r) between DXA and US measurements was also evaluated for each diagnostic parameter (BMD, T-score, Z-score) for patients in the same age range: all the obtained values of r were within the interval 0.63–0.84 ($p<0.001$) and their trends against age qualitatively reflected the observed diagnostic accuracy profile.
Conclusion: The proposed US approach to spinal bone densitometry showed a very good agreement with DXA diagnoses. This new nonionizing method has the potential for being extremely useful for early osteoporosis diagnosis through population mass screenings and for therapeutic outcome monitoring.
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P628
PREVALENT FRAGILITY FRACTURES IN 498 MENOPAUSAL WOMEN AND SKELETON ASSESSMENT

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Objective: The fragility (osteoporotic) fractures represent an economical issue, especially in menopausal women. The different fracture risk evaluation tools for a future (potential) fragility fracture vary from golden standard DXA, based on BMD to new tools as 10-year absolute risk of major or hip fracture based on FRAX model (MF or HF). We analyzed the risk of fracture in patients with or without prevalent fractures based on DXA, FRAX, and bone metabolism profile.
Material and Methods: The study design is cross-sectional study. The studied population is Romanian women in menopause (for at least 1 year of menopause). The persons with previous medication for osteoporosis as bisphosphonates, SERMs or teriparatide, denosumab, etc. were not included. Neither was the subjects preciously known with the diagnosis of osteoporosis. The skeleton assessment consisted in: lumbar DXA (L1-4), with a GE Lunar Prodigy device; MF or HF was calculated based on FRAX for Romania (without BMD); serum 25-hydroxyvitamin D (25-OH D); the bone formation marker serum osteocalcin (OC), and the bone resorption markers serum alkaline phosphatase (AP), as well as serum crosslaps (CL). The prevalent fractures were already known from patients' medical history. The statistical significance (SS) was at $p<0.05$.
Results: 498 women were enrolled. The studied group included women with fractures ($n=69$); the control group (fracture free) included 429 women. The patients' age and time period in menopause was SS higher in group 1 (59.4 vs. 57 years; and 13 vs. 10 years). The lumbar BMD was SS lower in group 1 (0.96 vs. 1.02 g/cm^2, $p=0.02$); one third of the women with fractures had osteoporosis and half of them osteopenia. The bone markers were not SS different between the groups. Neither was the 25-OH D, the median value for both groups were in D deficiency area: 14 ng/mL, respective 15 ng/mL. The HF was SS higher in group 1 (3 % vs. 0.9 %, $p<0.0005$), and also the MF (9 % vs. 4 %, $p<0.0005$). As limits of the study we mention that fact that we did not take into account the number of previous fractures, neither the time since the fracture.
Conclusion: Based on our observations, both DXA and 10-year absolute risk of fracture based on FRAX algorithm pointed statistical significant differences between women with and without prevalent fragility fractures, but the bone resorption markers were not different.

P629
EFFICACY AND SAFETY OF STRONTIUM RANELATE IN THE TREATMENT OF KNEE OSTEOARTHRITIS

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Objective: To evaluate the efficacy and tolerability of strontium ranelate in patients with gonarthrosis.
Material and Methods: 40 patients with a documented diagnosis of gonarthrosis: women - 32 (80 %), men - 8 (20 %), mean age - 57.4 years (range 49–72 years). Comorbidities: hypertension - 24 (60 %), ischemic heart disease - in 6 (15 %), chronic gastro - 18 (45 %). All patients had severe pain: VAS 61.2±10.9 mm, WOMAC - 42.9±12.4. All patients received analgesics and NSAIDs. Patients were divided into two groups matched for the main parameters: age, sex, pain intensity, duration of the disease, received therapy. The first group of patients ($n=20$) was appointed as strontium ranelate at a dose 2 g/day in daily intake, the second group of 20 people received supplementation of chondroitin sulphate 2 g/day. Efficacy was assessed in terms of the joint syndrome, WOMAC index after 3 months of therapy.
Results: After 3 months of treatment with strontium ranelate patients showed a significant ($p<0.05$) reduction in pain during movement (VAS 23.2±7.2 mm), WOMAC (24.3±9.0). Dynamics of pain was significantly lower in the group of patients receiving chondroitin sulphate. The effect of treatment was evaluated as good (pain reduction of 50 % or more) in 12 (60 %) of patients receiving strontium ranelate and in 10 (50 %) - the control group, satisfactory (pain reduction of 20–50 %) in 7 (35 %) and 8 (40 %), no effect in 1 (5 %) and 2 (10 %) patients. After 1 month of treatment 10 patients (50 %) of each group did not use NSAIDs and 2 (10 %) of first and 3 (15 %) patients of the second group - continued to take NSAIDs in the same dosage. Serious adverse effects, worsening of comorbidities were not registered.
Conclusion: By observing the results of strontium ranelate has a pronounced analgesic effect which may be caused by the action of the subchondral bone. Strontium ranelate is safe in the treatment of knee osteoarthritis.

P630

EFFECT OF TERIPARATIDE ON BONE MINERAL MASS, VOLUMETRIC BONE MINERAL DENSITY AND BONE GEOMETRY IN POSTMENOPAUSAL WOMEN WITH ESTABLISHED OSTEOPOROSIS: A TIBIA PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY (PQCT) STUDY

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Objective: We assessed the effect of inj. teriparatide 20 mg s.c. daily for 18 months on bone mineral mass (BMC), volumetric BMD and bone geometry in postmenopausal women with established osteoporosis using pQCT of the tibia.

Material and Methods: We reviewed medical records of 76 postmenopausal women with established osteoporosis. Inclusion criteria: 1) Age >50 year, 2) Established osteoporosis as defined by DXA T-score<−2.5 SD (spine/hip) plus at least one vertebral morphometric low energy fracture, 3) pQCT of the tibia at baseline and 18 months after therapy with teriparatide 20 μg s.c. Exclusion criteria: 1) Bone metabolic disorders or conditions affecting bone other than postmenopausal osteoporosis, 2) Malignancies, 3) High-energy fractures. All patients underwent pQCT of the tibia (XCT 2000 scanner, Stratec Medicintechnic, Germany). We assessed parameters of trabecular bone (BMC, BMD and area) at the 4 % slice, and parameters of subcortical and cortical bone at the 14 % and 38 % slice (BMC, BMD, cortical area, cortical thickness, periosteal and endosteal circumference). We performed statistical analysis and data is expressed as mean±SD.

Results: 26/76 patients fulfilled all inclusion and exclusion criteria. 11 women were <70 year (55–69) and 15 >70 year (70–85). 5/26 women had been previously treated with bisphosphonates (mean 2.5 year, range 1–4 year). We found no statistically significant differences after 18 m of teriparatide concerning parameters of trabecular bone, with a tendency for improvement of BMC and BMD. Volumetric Cortical BMD was significantly lower after treatment (1095.40±50.70 vs. 1077.1 ±49.4, p=0.005). Endosteal circumference was found to be reduced in all patients after treatment and the effect was more pronounced in women >70 year (46.19±4.87 vs. 45.49±4.59, p=0.09). No other statistically significant differences in subcortical and cortical bone were observed.

Conclusion: Our results indicate that teriparatide may have differing effects on peripheral sites such as the tibia, and provide evidence of endosteal apposition mainly in elder patients that could explain the mechanism of bone formation induced by the drug in long bones.

P631

MCPIP1 IS A REGULATOR OF INTERLEUKIN-6 EXPRESSION IN HUMAN OSTEOARTHRITIS CHONDROCYTES

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Objective: MCPIP1 or ZC3H12A is a novel protein with CCCH-type zinc-finger domain and a PIN-like RNase domain. Osteoarthritis (OA) is a leading cause of disability worldwide and has complex pathophysiology. IL-6 has recently gained attention in OA pathophysiology because of its high levels in synovial fluid and ability to induce MMP-13. In the present study we determined whether MCPIP1 regulates IL-6 expression in OA.

Material and Methods: Human chondrocytes were prepared from OA cartilage by the enzymatic digestion. RNA fluorescent in situ hybridization (ISH) for *IL-6* and *MCPIP1* expression was performed using RNAScope. Wildtype or mutant MCPIP1 was overexpressed in chondrocytes. Knockdown of IL-6 and MCPIP1 was by using siRNAs. For RNA immunoprecipitation, chondrocytes were stimulated with IL-1ß (1 ng/ml) for 12 h and then treated with 1 % formaldehyde to cross link protein-RNA complexes. Cell lysates were incubated overnight with isotype control IgG or with anti-MCPIP1 antibody. Gene expression of *IL-6, MCPIP1 & IL-6* targeting miRNAs was assessed using TaqMan assays.

Results: IL-1ß induced high levels of IL-6 mRNA in chondrocytes which peaked at 8 h poststimulation while expression of *MCPIP1* mRNA peaked at 6 h poststimulation. Using multiplex RNA FISH, expression of both *IL-6* and *MCPIP1* mRNAs were localized in the nuclei and in the cytoplasm with distinct speckle patterns. Overexpression of wild type MCPIP1 but not of mutant MCPIP1 reduced the expression of *IL-6* mRNA while siRNA mediated knockdown of MCPIP1 elevated the *IL-6* mRNA expression. Analysis of the immunoprecipitated mRNAs showed that anti- MCPIP1 antibody pulled down larger amount of *IL-6* mRNA than control IgG. In majority of cartilage samples analyzed *MCPIP1* expression was downregulated in damaged cartilage but the expression of IL-6 was high.

Conclusion: Expression of *MCPIP1* in human cartilage and chondrocytes is shown. Taken together, our data suggests that MCPIP1 may be an important player in OA pathogenesis.

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A NEW METHOD TO ESTIMATE THE GENERAL OSTEOPOROTIC FRACTURE RISK FROM AN ULTRASOUND SPINAL SCAN

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Objective: To evaluate the performance of a new ultrasound (US)-based method for the prediction of generic osteoporotic fractures.

Material and Methods: 58 female patients (50–70 years; BMI ≤30 kg/m^2) were enrolled, 28 with a recent nonvertebral fragility fracture and 30 controls without fracture history. All the patients underwent two examinations: a conventional spinal DXA (Hologic Discovery) and an abdominal US scan of lumbar vertebrae. US data were analyzed by an innovative algorithm that processed both echographic images and "raw" radiofrequency signals providing as final output a new parameter named Fragility Score (FS), whose value is proportional to the skeletal fragility and, consequently, to the fracture risk. Fracture discrimination power of FS was compared with DXA-measured BMD by calculating areas under the receiver operating curve (AUC) and using unpaired two-sided Student t-test.

Results: Both FS and BMD discriminated significantly between fractured and nonfractured women: FS values found in the fractured patients (56.8±15.2) were significantly higher than the corresponding values found in the control group (46.6±9.3, $p<0.01$) and BMD values of the fractured group (0.846±0.143 g/cm^2) were significantly lower than the corresponding values found in non-fractured women (0.971±0.139 g/cm^2, $p<0.01$). The comparison between the AUC values indicated that BMD (AUC= 0.73) performed only slightly better than FS (AUC=0.71).

Conclusion: The proposed US approach showed a good performance in the discrimination between fractured and nonfractured patients and, therefore, has the potential to become an innovative tool for the estimation of osteoporotic fracture risk through early identification of frail patients.

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EFFECTIVE TREATMENT OF OPPORTUNISTIC INFECTIONS IN PATIENTS WITH RHEUMATOID ARTHRITIS AND GOUT USING BACTERIOPHAGES

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Objective: Patients with rheumatic disease (RD) have long been recognized to suffer a greater burden of serious infection. Risk of serious and non-serious bacterial infections increases during treatment with systemic medications. In most cases, antibiotic treatment is ineffective in these patients. The most important rheumatologic emergencies comprise septic arthritis, gout, etc. The goal of our study was to increase the effectiveness of treatment of opportunistic infections in patients with RD using bacteriophages.

Material and Methods: The study involved 15 patients, 8 men and 7 women with diagnosis of rheumatoid arthritis (5 persons) and gout (10 people), aged 32–57 years. All patients had an exacerbation in the form of synovitis of the knee or hip. Verification of diagnosis, joint aspiration and treatment was performed under ultrasound guidance. To determine the bacterial pathogen using real-time PCR. By using PCR patients' blood were identified *Staphylococcus aureus, Streptococcus spp.*, *Borrelia burgdorferi*, etc. In all patients with gout PCR of blood and synovial fluid were identified *Mycoplasma hominis*. The problem was solved using the method of treatment of synovitis, comprising a puncture of synovial cavity, aspiration of its contents and the introduction into the cavity of polyvalent bacteriophage in volume, slightly smaller than the extracted effusion.

Results: The process was completely arrested after 2 injections of bacteriophage into the joint cavity in cases of 7 patients (47 %) with synovitis, for the rest of patients - after 3 or 4 intraarticular procedures. In heavy cases, treatment was performed by integration using a antibiotics corresponding diagnosed pathology. Polyvalent bacteriophage has a strong analgesic and anti-inflammatory effect. Pain in the joint passes after 3–24 h after injection.

Conclusion: Intraarticular injection of bacteriophage in patients with RA and gout gives stable positive effect. In all cases, treatment with bacteriophages not led to the exacerbation primary disease.

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BODY MASS INDEX AND HEEL QUANTITATIVE ULTRASOUND/DUAL X-RAY ABSORPTIOMETRY: THE RELATIONSHIP IN MENOPAUSAL WOMEN

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Objective: Menopausal status is associated with increased risk of bone loss. One of the most interesting factors associated with the fracture risk (up to some point) is BMI. The fracture risk is evaluated by traditional methods as heel

quantitative ultrasound (QUS) which is still useful especially in countries with low socio-economic profile or by DXA. Our aim is to analyze the correlation between BMI and QUS, on one hand, and DXA, on the other hand.

Material and Methods: The design of the study is transversal. The population is represented by unselected subjects admitted at Parhon National Institute of Endocrinology, from Bucharest, Romania, between 2008–2013, for different diagnosis but not for previously osteoporosis. Women older than 40 years and having at least 12 months of menopause were included if they have never been treated with drugs targeting osteoporosis or osteoporotic fracture risk. BMI was calculated (kg/m^2). Left QUS (GE Achilles Insight) was performed: two measurements, used as mean for stiffness index (STI). DXA was assessed (Lunar Prodigy). Statistical analyses used BMD. The database was created in Excel and the statistical data were obtained using SPSS 21 (statistical significance at $p<0.05$).

Results: The mean age was 57.1 years. The mean BMI in subjects with normal DXA/osteopenia/osteoporosis was: 30.5/28.5/19.4 kg/m^2. The mean STI was 78±17. The linear regression coefficient between STI and BMI was $r=0.24$ ($p<0.0005$). The curbilinear correlation using the third grade equation ($y=39.14+1.39x+0.017x^2 -0.000055x^3$) had a r value of 0.07, ($p<0.0005$). The mean lumbar BMD was 1.03±0.19 g/cm^2.The linear regression between lumbar BMD and BMI was $r=0.12$ ($p=0.03$). The regression using a cubic third grade equation provided a coefficient of correlation of $r=0.2$ ($p=0.0005$). The femoral neck BMD was 0.89 g/cm^2. The linear regression coefficient between femoral neck BMD and BMI was $r=0.27$ ($p<0.0005$). The simple regression coefficient between hip BMD (mean of 0.96 g/cm^2) and BMI was $r=0.32$ ($p<0.0005$).

Conclusion: BMI and QUS or BMI and DXA have similar statistical significant, modest, positive coefficients of correlation. The mean BMI decreases from normal DXA to osteoporosis (from obese to normal weight). Among central DXA sites, the strongest correlation with BMI is for total hip.

P635
EFFECTS OF A DIET RICH IN ANTIOXIDANTS ON BONE METABOLISM IN POSTMENOPAUSAL WOMEN

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Objective: Several studies suggest a critical role of oxidative stress (OxS) in the development of postmenopausal osteoporosis (PO). Indeed, our previous published data showed a correlation between OxS and bone loss. The aim of the present research was to evaluate whether the enrichment in antioxidant content of the habitual diet could positively influence bone metabolism in untreated osteopenic or osteoporotic postmenopausal women with low risk fracture.

Material and Methods: Twenty-five women (mean age 58, mean BMI 24 kg/m^2) were enrolled for this study, and, the habitual diet was modified in order to achieve a priori established threshold of antioxidants (vitamin A, E and C, etc.). The adherence to the prescribed new dietetic regimen was checked by regular and standardized interviews. The diagnosis of osteopenia or osteoporosis were made by DXA and the risk fracture was evaluated with FRAX. To verify the effects of the prescribed diet on oxidative stress and bone, serum markers of OxS (hydroperoxides and total antioxidant power) as well as BAP and CTX-1 were measured at baseline and after 8 weeks.

Results: 54 % of the sample subjects showed a significant improvement in systemic oxidative balance (increase in serum antioxidant and/or decrease in hydroperoxides), 26 % exhibited no variations while only in 20 % the OxS appeared worse. The level of BAP was found to be significantly decreased and remained stable in 40 % and 32 % of women, respectively, whereas CTX-1 was decreased in 27 % and remained unvaried in 30 % of women, respectively.

Conclusion: Taken together, our preliminary data suggest that dietetic intervention used in our study may improve the oxidative balance status and, in the same time, influence bone health. Thus, this approach could be proposed as a nonpharmacological lifestyle intervention in the prevention of osteoporotic risk, particularly in "early" postmenopausal women.

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VERTEBRAL SIZE AND LOW ENERGY VERTEBRAL FRACTURES IN POSTMENOPAUSAL WOMEN

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Objective: The clinical importance of osteoporosis as a skeletal disease lays in the increased risk of fragility fractures. Although BMD is an important predictor of bone strength, other bone characteristics, such as micro- and macroarchitecture also play a role in determining bone quality and its susceptibility to fracture. Some studies on vertebral

fractures show statistically significant difference of vertebral size and geometry between fractured and non-fractured groups, suggesting that vertebral size may be an important risk factor for vertebral fracture.[1] Aim of this study was to assess the difference between vertebral size measured with DXA in patients with and without low energy vertebral fractures.

Material and Methods: 61 postmenopausal women with low energy vertebral fractures identified on Th4-L4 thoracolumbar X-rays and 59 postmenopausal women without vertebral fracture (confirmed on thoracolumbar X-rays) were included in the study. L1-L4 DXA scans were performed on a Lunar DPX NT machine for all patients. Data for vertebral dimensions was extracted from DXA reports.

Results: Average age was 60.8 years in nonfracture group and 68.6 in fracture group ($p<0.05$). There was no statistically significant difference in BMI between groups. L1-L4 vertebrae were 0.14 cm higher in the nonfractured group compared to nonfractured vertebrae in the fracture group. Difference was statistically significant for $p<0.05$. Difference between vertebral area or width was not statistically significant. There was significant difference between stature adjusted T-scores for vertebral height in nonfracture (T-score -0.47) and fracture (−1.23) group with excluded fractured vertebrae. Vertebral height might be an independent risk factor for low energy vertebral fracture.

Conclusion: Vertebral height might be an independent risk factor for low energy vertebral fracture.

References: 1. Link TM Osteoporos Int 2000;11:304

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ASSOCIATED HYPERPARATHYROIDISM AND HYPERTHYROIDISM: CASE REPORT

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Objective: Along with the development of exploratory techniques increased the incidence of primary hyperparathyroidism although it was initial known as a rare condition.

Material and Methods: We report the case of a 53 years old woman which has presented for endocrinological evaluation accusing weight loss, sweating, muscle pain. From her personal antecedents we retain toxic multinodular goiter which was treated 7 years ago with antithyroid drugs and total hysterectomy for uterine leiomyoma without significant heredocollateral antecedents. At this presentation she has multinodular goiter supressed TSH, high fT4, hypercalcemia (total calcium:), hypophosphatemia and slightly elevated glycemia. Thyroid scintigraphy showed cold nodules. In this context PTH was performed and its value was 522.9 pg/ml. 25(OH)Vit D was 14.5 ng/ml and DXA showed lumbar T-score: −0.8 SD, left hip T-score: −1.5 SD and third distal radius T-score: −3.2 SD. Parathyroid scan with 99mTc Sestamibi showed uptake in the inferior projection area of right thyroid lobe and the diagnosis of primary hyperparathyroidism was made. Total thyroidectomy and right inferior parathyroidectomy were performed but the value of serum calcium and PTH have not decreased after surgery (serum calcium: 13.9 md/dl, PTH: 370 pg/ml) and there was no paraneoplasic syndrome. Parathyroid scan was performed after surgery but there was no uptake of 99mTc Sestamibi. Computer tomography of

Results: We recommend surgical exploration of the 6.5/4.2/6 mm. Head and medistinum showed right paratracheal nodule of parathyroid glands and paratracheal area, with the removal of paratraheal nodule and all the suspicious looking parathyroid glands or if no suspicious parathyroid glands are discovered the removal of all parathyroid glands and the implantation of one of them in the forearm.

Conclusion: It is an interesting case in which hyperthyroidism and hyperparathyroidism were associated making the case more difficult to manage.

P638
DEVELOPING A BASELINE PICTURE OF THE BONE HEALTH OF ADULTS WITH AN INTELLECTUAL DISABILITY IN IRELAND

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Objective: To develop a baseline picture of the bone health status of older adults with an intellectual disability.

Material and Methods: Osteoporosis is a systemic skeletal disease and a source of mortality and morbidity throughout the world. People with an intellectual disability (ID) have been reported to present with greater risk for poor bone health. This study examines first wave data from the 753 nationally representative participants in the Intellectual Disability Supplement to The Irish Longitudinal Study on Ageing (IDS-TILDA). There is self-report data on physician diagnosed chronic health conditions, health care utilisation and screening, dietary intake and frequency, medication use and activity levels.

Results: Of the sample ($N=753$) just 8 % ($n=60$) reported a diagnosis of osteoporosis. However only 425 answered a question on DXA screening ($N=425$) with 16.6 % of those reporting having completed a DXA scan. High levels of modifiable risk factors were also evident with 69 % ($n=519$)

reporting they never or rarely participated in moderate exercise and 38 % (n=284) never or rarely drank milk. The prevalence of epilepsy at 30 % (n=229) and the high levels of antiepileptic medication (38.1 %) indicate further increased risk for poor bone health.

Conclusion: The reported low levels of diagnosed osteoporosis was inconsistent with reported diet, sedentary lifestyle, documented epilepsy levels and medication use risks, raising concerns that prevalence of this debilitating condition is hidden for people with ID. Communications difficulties experienced by people with an ID also suggest that reporting of symptoms may be low meaning the prevalence of osteoporosis is far greater. There is a need for further objective investigation of osteoporosis among people with ID.

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10-YEAR PROBABILITY OF OSTEOPOROTIC FRACTURE USING FRAX PROGRAM

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Objective: To assess the 10-year probability of osteoporotic fracture using the program FRAX.

Material and Methods: The study included 90 patients (25 men and 65 women) aged 40–90 years who have applied to the largest clinics in Kazan, for various reasons during the period from January to June 2013. In each of the five clinics (by districts) were randomly selected 30 patients (10 men and 20 women). All patients included in the study were invited to visit Kazan OP centre to perform risk assessment and calculation of the 10-year probability of osteoporotic fractures (femoral neck and total) through FRAX (www.shef.ac.uk/FRAX), validated for this purpose. All patients underwent DXA with determination of BMD at the femoral neck BMD. Continue to seek a 10-year fracture probability-adjusted BMD at the femoral neck. Intervention threshold (beginning antiosteoporotic therapy) considered the 10-year probability of fracture more than 20 % of all sites for fractures and/or >3 % for hip fractures.

Results: 10-year probability of fracture in all locations more than 20 % was observed in 15 (21.4 %) patients (11 (31.4 %) of 35 women and 4 (11.4 %) of the same number of men). 10-year probability of hip fracture over 3 % was observed in 13 (18.5 %) patients (10 (28.6 %) of 35 women and 3 (8.6 %) of 35 men). After the X-ray densitometry 10-year probability of fracture in all locations more than 20 % (adjusted for BMD at the femoral neck) was observed in 19 (27.1 %) patients (13 (37.1 %) of 35 women and 6 (17.1 %) of 35 men). 10-year probability of hip fracture over 3 % (adjusted for BMD at the femoral neck) was observed in 20 (28.6 %) patients (13 (34.3 %) of 35 women and 7 (20 %) of 35 men).

Conclusion: FRAX program to evaluate a 10-year probability of osteoporotic fractures and 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 data on BMD at the femoral neck.

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COMPARISON BETWEEN PERIPHERAL BLOOD AND SYNOVIAL FLUID MIRNA EXPRESSION IN PATIENTS WITH OSTEOARTHRITIS IN REGARD TO THEIR USE AS BIOMARKERS IN CLINICAL PRACTICE

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Objective: Recently several reports have shown that osteoarthritis (OA) is related to abnormal microribonucleic acid (miRNA) expression both in synovial membrane and in joint cartilage. miRNAs play a role in regulating the osteoclastogenesis and the expression of matrix metalloproteinases. The aim of the study is to compare the expression of certain microRNA in peripheral blood and synovial fluid in patients with OA in regard to their clinical presentation and laboratory data.

Material and Methods: Peripheral blood (PB) and synovial fluid (SF) were collected from 30 OA patients and 30 healthy controls (HCs). The PB samples were collected in PAX gene tubes and SF samples were collected and stored with RNeasy Protect Cell Mini kit (according to manufacturer's protocol). MicroRNAs from the samples were isolated and PCR was further performed. The results were analyzed in regard to the clinical picture, ultrasound findings, radiographic stage and laboratory data for each patient.

Results: Our preliminary data showed differences in the expression of the chosen miRNAs between PB and SF in OA patients compared to HCs. The miRNA expression was related to the clinical picture in these patients as well as to the disease stage and activity according to the radiographic and ultrasound findings. The further

statistical analysis will show if these microRNAs could be used as biomarkers in OA.

Conclusion: Correlations between microRNAs expression in PB and SF and patient's clinical presentation will eventually show if microRNAs could be reliable biomarkers for disease activity and severity in OA. Future studies of the functional role of microRNA will reveal potentially new therapeutic targets.

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UREA AND RELATED VALUES OF ANALYSIS AND ITS APPLICATIONS IN GOUTY ARTHROPATHY

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Objective: Acute gouty arthritis is thought to be an inflammatory response to microcrystals of monosodium urate that precipitate in joint tissues from supersaturated body fluids or are shed from preexisting articular deposits. Gout is a metabolic disease characterised by recurrent episodes of arthritis associated with the presence of monosodium urate crystals in the tissue or synovial fluid during the attack. Gout may be associated with other inflammatory, endocrine diseases. Urea values and comorbidities were analyzed for the patients having gout arthropathies.

Material and Methods: The present study was done for 102 patients, 81 male and 21 female, hospitalized in Medical Rehabilitation Clinical Hospital Felix Spa for gout in different forms, mean age 60.67±7.69 with age limits in between 44 and 74. Gouty arthropathy, gouty spondiloarthopathy, uric arthropathy were studied. Urea and other related analysis were investigated.

Results: Morbidity count was 513, and the mean number of comorbidities were 5.02±1.81. The diagnosis of gout was established by an average of 55.85±66.54 months ago. For the patients investigated the average values for uric acid was 7.09±2.30 mg for 100 ml and all the values were higher than usual. But for 17.36 % cases of patients urea was higher than average, respectively 37.91±11.49 mg for 100 ml., 8.8 % from the studied patients had increased value of creatinine and 26.4 % had increased value for cholesterol, higher than the average 219.905±39.56 mg for 100 ml. 47 % from the studied patients had higher level of triglyceride which average levels is 195.61±81.26 mg for 100 ml, 28.58 % were with higher glucose level than normal, 29.41 % cases with higher level of glutamate pyruvate transaminase and glutamate oxalate transaminase.

Conclusion: Patients with gout have multiple comorbidities that complicate the course of treatment. Urea appears to be increased in cases with gout and there is consistent with duration of disease.

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HEARING IMPAIRMENT SEEMS TO BE ASSOCIATED TO A HIGHER DISEASE ACTIVITY IN RHEUMATOID ARTHRITIS PATIENTS. A CASE CONTROL STUDY

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Objective: The aim of this study was to evaluate the pattern of hearing impairment in rheumatoid arthritis (RA) patients compared to healthy controls and to examine associations between hearing impairment and disease activity of RA assessed by the disease activity index-DAS 28.

Material and Methods: This is a cross-sectional study with 2 groups: 22 RA patients (20 women and 2 men, mean age of 44.2 years, disease duration median of 41 months (21, 141)) and 17 healthy subjects (13 women and 4 men, mean age of 41 years) appraised for age and sex. No subject of the 2 groups has had any abnormalities at otoscopic examination. Hearing impairment was evaluated by pure tone audiometry and tympanometry including the static compliance, middle ear pressure, stapedial reflex threshold test. RA disease activity was assessed using the DAS28 (remission was defined by a DAS 28<2.6).

Results: Conductive hearing loss (CHL) was found in 14 patients vs. 2 controls (p=0.05). The stapedial reflex was absent in 10 RA patients vs. none in healthy controls (p=0.04). Sensorineural hearing loss (SNHL) was found in 4 patients and none in controls. Mixed hearing loss was found in 4 patients but none in controls. Hearing loss in RA was more prevalent in RA patients with an active disease (p=0.04).

Conclusion: This study suggests that hearing loss risk is higher in RA patients compared to healthy controls and seems to be associated to disease activity. Audiological evaluation should be performed periodically to identify possible audiological damage. Nevertheless, those results should also be confirmed by larger studies.

P643

ADHERENCE TO BISPHOSPHONATES TREATMENT OF OSTEOPOROSIS

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Objective: Osteoporosis is a serious public health concern and bisphosphonates (BPS) are the most common medications used in its treatment, whose main objective is to reduce the risk of fractures. The aim of this study was to explore the experiences and perceptions of postmenopausal women regarding strategies to improve adherence to osteoporosis therapy.
Material and Methods: A total of 87 postmenopausal women between 45 and 70 years old with osteoporosis, currently taking BSP (30 with alendronate 70 mg/week, 28 with risedronate 35 mg/ week and 29 with ibandronate 150 mg/ month). All patients were interviewed and examined for the gathering of information on perceptions of their osteoporosis medications, their reasons for adherence and nonadherence to therapy, and the effectiveness of strategies they had tried to improve adherence at baseline, month 6 and month 12. Duration of therapy was measured by the count of days of therapy without of interruption of drug purchases greater than 2 weeks. Treatment compliance was evaluated with the Morisky Medication-taking Adherence Scale.
Results: One year after initiating treatment for osteoporosis, 79.6 % of patients with monthly bisphosphonates and 67.0 % of patients with weekly bisphosphonates were not continuing to fill prescriptions. Six variables were associated with compliance: treatment administration frequency, perceptions of long-term treatment acceptability, perceptions of health consequences of osteoporosis, perceptions of knowledge about osteoporosis, exercise and mental quality of life. In multivariate analyses, the risk of adherence failure was higher for weekly BPS versus monthly BPS therapy (HR=2.7, $p<0.01$).
Conclusion: Compliance to antiosteoporosis treatments is poor. The monthly dosage is associated with greater adherence compared to weekly dosage.

P644
DERIVATION OF A LUMBAR SPINE TRABECULAR BONE SCORE (TBS) ADJUSTMENT RATIO FOR FRAX: THE MANITOBA BMD COHORT

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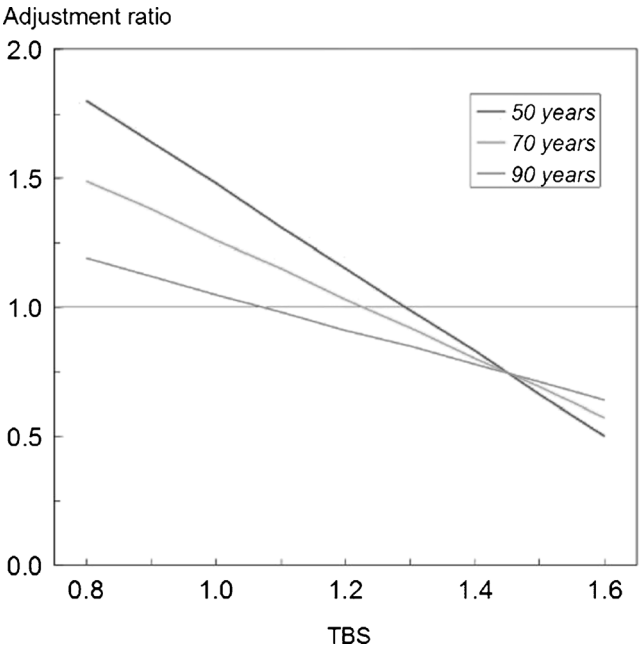
Objective: TBS, derived from lumbar spine DXA image texture, is related to microarchitecture and fracture risk independently of BMD. FRAX estimates the 10-y probability of hip and major osteoporotic fracture (MOF). Our aim was: (a) to determine whether the TBS provides independent information on fracture probability beyond that provided by the FRAX variables; (b) to construct a probability model for incorporating TBS in MOF prediction.
Material and Methods: We studied 33,368 women age 40–100 year (mean 63) with baseline spine and hip DXA (Prodigy, GE Healthcare), FRAX MOF probability estimates (Canadian tool, version 3.7), blinded lumbar spine TBS measurement (TBS iNsight® version 1.8, Med-Imaps), and outcomes to March 31, 2008. The association between TBS, FRAX variables and risk of fracture or death was examined using an extension of the Poisson regression model.
Results: During mean 4.7 year, 1,758 women died and 1,875 women sustained one or more MOFs. For each SD reduction in TBS, there was a 33 % increase in risk of MOF (HR 1.33, 95%CI 1.28–1.39, $p<0.001$) and a 31 % increase in death (HR 1.31, 95%CI 1.26–1.37, $p<0.001$). When fully adjusted for significant clinical risk factors and femoral neck T-score, TBS was still a statistically significant predictor of MOF (HR 1.19, 95%CI 1.14–1.25) and death (HR 1.21, 95%CI 1.15–1.27). An adjustment ratio for 10 year major osteoporotic fracture probability was derived by comparing fracture probability calculated with TBS versus without TBS. A significant age interaction between age and TBS was identified, and was incorporated into the final adjustment: Adjustment ratio=4.807 − 0.0342 × age − 2.801 × TBS + 0.0235 × age × TBS. The adjustment ratio increases with lower TBS, but has a greater effect in younger than older woman. For example, in a woman age 80 year with femoral neck T-score -2 and no additional risk factors, the 10-y major osteoporotic fracture probability is 16.0 %. Low TBS (10th percentile) would increase this to 17.7 %, whereas high TBS (90th percentile) would reduce this to 11.3 %.

Figure Adjustment ratio to 10 year MOF probability (calculated with vs without TBS) for a woman aged 50, 70 or 90 years.



Conclusion: Lumbar spine TBS is a risk factor for MOF and a risk factor for death. TBS is able to predict incident MOF independent of FRAX clinical risk factors and femoral neck BMD even after accounting for the increased death hazard. If validated in other prospective cohorts, a relatively simple arithmetic adjustment to FRAX probability, incorporating lumbar spine TBS and age, may be clinically useful for enhancing fracture prediction from FRAX.
Disclosures: Didier Hans: TBS patent: co-owner. Stock options or royalties: Med- Imaps.

P645
EFFECTIVENESS OF EDUCATIONAL ACTIVITIES FOR PATIENTS WITH OSTEOPOROSIS

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Objective: To evaluate the effectiveness of educational activities (schools) for patients with osteoporosis (OP).
Material and Methods: 55 patients with OP from primary group were trained in the schools (4 sessions per year), 40 patients with OP were in control group, which only visited rheumatologist 4–5 times a year. The groups were matched by sex, age, structure (primary and secondary) and the severity of OP, the presence of fractures, received therapy. At baseline and after 6 months pain intensity on VAS back pain, adherence to treatment were determined. At baseline and after 12 months determination of BMD was measured by DXA.
Results: After 6 months of training intensity of back pain was significantly ($p<0.01$) decreased by 2.5 times in the primary group and by 1.5 times fold in control, 52 % of patients from the primary group, and 37.5 %—in the control wore an orthopedic corset. 95.8 % of patients who visited schools and 90 % of patients in the control group were continuously taking calcium and vitamin D during 6 months, after 12 months—93.7 % and 85 %, respectively. Pathogenetic therapy was applied to all patients, initially these drugs began to take 97.9 % of the study group and 92.5 % of the control group patients, after 6 months of continuous administration of drugs 89.5 % from group trained patients and 67.5 %—the control group continued treatment, after 12 months commitment to therapy was 87.5 % and 42.5 % in the test and control groups, respectively. Densitometry results in dynamics after 12 months showed that the increase in BMD was significantly ($p<0.05$) higher in the group that has been schooled for the patients and was 5.6±6.2 % at the spine, 4.2±4.5 % at the femoral neck in the main group, 3.1±4.8 % and 1.9±3.2 %, respectively, in the control group.
Conclusion: Educational programs improve functional status and quality of patients life, increase commitment to treatment.

P646
UNTREATED MALE OSTEOPOROSIS: CASE REPORT

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Objective: To underline problems connected with osteoporosis in men through case report. There are need to clarify the pathogenesis of osteoporosis and fractures in men and to develop diagnostic criteria as well as establish most effective treatment.
Material and Methods: After low intensive trauma 64 years old man had back pain and pain in left forearm. X-ray show fractures of Th 12 and L2 vertebrae and left forearm. In his personal history there is also after low intensive trauma elbow and hip fracture in ages of 52 and 53. There are no other risk factor in personal and family history. DXA evaluation results: T-score total LS vertebrae −4.7 SD and T-score total −2.4 healthy hip. Laboratory tests: high rate of thyroid hormone and low rate of 25OH vitamin D. We started with treatment.
Results: Osteoporosis is leading causes of morbidity and mortality in elderly. " Silent disease" progress without symptoms until a fractures occurred. Hip fracture is very serious complication. One fifth of it occurred in men but it rise about 10 years later than in woman. In 65–70 ages men loosing bone mass at the same rate as woman and the absorption of calcium decrease in both sex. For men before 65 years and high risk men recommendation is to begin periodic osteoporotic risk assessment and performing DXA. When we have diagnosis it is important to consider and exclude secondary causes of bone loss. It is almost certain lifestyle, diseases and medications. More than 40 % are primary or idiopathic osteoporosis in men. Careful history, physical examination and laboratory tests are enough component for making decision about treatment. Except medication men should be educated about adequate lifestyle measures as the prevention.
Conclusion: Osteoporosis in men is an important and often overlooked problem. The consequences of it are underestimated and the condition is often unrecognised and untreated. There is no sufficient scientific based evidence for men osteoporosis. It is still an important public health problem.

P647
BALNEARY PHYSICAL KINETIC THERAPY EFFECTS OVER GONARTHROSIS SYMPTOMS

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Objective: The aim of the study is to evaluate the effects of balneary physical kinetic therapy on clinical and functional parameters in patients with knee osteoarthritis compared with administration of therapies based on electrotherapy and kinetic therapy.
Material and Methods: We conducted the study on two groups of patients similar in terms of disease severity via Kellgren-Lawrence staging, for Lequesne index and quality of life. Also the lots are homogeneous in terms of age (65–75 years), gender, lifestyle, environment of origin and associated diseases. The first group made electrotherapy and physical therapy program and the second received additional specific thermal water balneotherapy in Felix Thermal Water Resort in Romania. Rehabilitation program was performed in two courses of 3 weeks, with an interval of 3 months. Evaluation was performed at the beginning and in the end of monitoring. We assessed pain by VAS divided into 100 steps; we performed pain and functional Lequesne index, quality of life and perception of patients and physicians over the disease status.
Results: The outcomes assessed before and at the end of the monitoring showed improvement of scores that reach the limit of statistical significance ($p \leq 0.05$) in the group that carried out the recovery program including balneotherapy.
Conclusion: The study demonstrated the superiority of rehabilitation means in knee osteoarthritis that includes balneary physical kinetic therapy in thermal water. The benefits of exercise that is practiced regularly are associated with weight loss. There is an openness and greater efficiency for the elderly, proving the undeniable value of complex functional recovery as being possible to maintain, strengthen and defeat the lack of functionality.

P648
IMPACT OF KNEE OSTEOARTHRITIS ON QUALITY OF LIFE

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Objective: The purpose of this study was to investigate the influence of knee osteoarthritis (OA) on the quality of life (QoL) in patients with nonendstage knee OA using the Moroccan version of the OA knee and hip QoL questionnaire (OAKHQOL). We suggest also to examine factors associated to different domains of QOL assessed by OAKHQOL.
Material and Methods: The Moroccan versions of WOMAC and OAKHQOL were administered to Moroccan patients with symptomatic knee OA, fulfilling the revised criteria of the American College of Rheumatology. Because of the high percentage of illiteracy in Moroccan population, OA patients were interviewed individually (using face-to-face technique).
Results: Fifty women with knee OA women were enrolled in this study (mean disease duration of 24 months (12.72). The mean VAS pain (0–100) was 54.6[10–80]±21.2. The average WOMAC score was 34[3–93]±16.9. The mean Lequesne score was 10.1[3–19]±4.2. The average scores of the OAKHQOL domains were as following: social support 44.5, social functioning 45.8, physical activities 47, mental health 62.2 and pain 62.3. Correlation analysis showed fair to good correlation between 3 dimensions of OAKHQOL (physical activities, mental health, pain) and VAS pain, Lequesne and WOMAC scores ($p<0.05$).
Conclusion: This data describe a burden of knee OA on QoL in patients suffering from nonendstage knee OA. A fair to a strong correlation was found between 3 dimensions of OAKHQOL (physical activities, mental health, pain) and VAS pain, Lequesne and WOMAC scores. These results should be confirmed by larger studies.

P649
MANAGEMENT OF MYOFASCIAL SYNDROME IN OSTEOPOROSIS

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Objective: Myofascial pain syndrome is a painful muscle condition characterized by chronic pain or radiation located at the level of point-to-trigger, comprising a muscle or group of muscles. Myofascial pain occurs very frequently and almost as eCare man develops trigger points at some stage of life. Myofascial syndrome is the most common cause of pain in the upper portions of the column vertebral, due to insufficient understanding of the pathophysiology of muscle pain but often remain undiagnosed in the osteoporosis.
Material and Methods: Myofascial syndrome is explained by exceeding the limits of normal physiological responsiveness to stress factors. Trigger points are discrete points focal hyperirritable with typical location strained muscle fiber.
Results: The pain caused by trigger points, causing decreased muscle length at rest and reduced joint mobility. Vasoconstriction generate muscle spasm, localized ischemia, occurring metabolites nerve irritation properties.
Conclusion: Informing patients and awareness of the correlation between stress and muscle tension, between muscle tension and pain can improve their condition and complex approach to the problem by rheumatologists, general

practitioners, medical and psychological rehabilitation would lead to optimize the treatment of patients with myofascial syndrome is a condition miofascial. Myofacial syndrome is not fatal but can reduce significantly the quality of life and also are a major cause of limiting the ability employment of people affected, causing great economic damage to society.

P650

ALENDRONATE SODIUM/VITAMIN D3 COMBINATION TABLET VS. CALCITRIOL FOR OSTEOPOROSIS IN CHINESE POSTMENOPAUSAL WOMEN: A RANDOMIZED, OPEN-LABEL STUDY

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Objective: To investigate efficacy and safety of alendronate 70 mg/vitamin D_3 5,600 IU combination tablets (ALN/D5600) vs. calcitriol in osteoporotic Chinese postmenopausal women.

Material and Methods: A 6-month, randomized, open label, active-comparator study with 6-month extension (clinicaltrials.gov NCT01350934). Postmenopausal women aged >55 years with osteoporosis (low BMD with/without prior nonpathological fracture) from 13 centers in China. Patients were randomized to ALN/D5600 once weekly or calcitriol 0.25 μg daily. Primary efficacy endpoint:% change from baseline in lumbar spine BMD at Mo 6. Hypercalcemia and hypercalciuria were safety events of special interest.

Results: 219 patients (ALN/D5600 $n=111$; calcitriol $n=108$) were randomized. Baseline characteristics were similar, 30.3 %: baseline 25(OH)D ≤15 ng/mL. At Mo 6 and 12, changes in lumbar spine BMD from baseline were 3.54 % vs. 1.59 % and 5.17 % vs. 2.26 % for ALN/D5600 vs. calcitriol (both $p<0.001$), respectively. At Mo 12, 25(OH)D was <15 ng/mL in 1.0 % (ALN/D5600) vs. 25.5 % (calcitriol) ($p<0.001$). Between-group differences in P1NP and s-CTx mean% changes from baseline at Mo 6 were −42.37 % and −52.03 %, respectively (greater with ALND/5600, $p<0.001$). Overall safety profile was similar between groups. Incidence of hypercalciuria (24-h urine Ca >300 mg) was 8.4 % (ALN/D5600) vs. 13.9 % (calcitriol) (p=NS) over 12 month. One patient (calcitriol) had hypercalcemia.

Conclusion: ALN/D5600 produced greater increases in BMD at the lumbar spine, greater decreases in bone turnover markers, and less vitamin D insufficiency vs. calcitriol in osteoporotic Chinese women. Safety was similar and consistent with established profiles.

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P651

PHYSICAL PERFORMANCE DOES NOT DIFFER BETWEEN RIGHT AND LEFT FOOTED YOUNG SOCCER PLAYERS: FIELD AND ISOKINETIC TESTS ANALYSIS

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Objective: To compare physical performance using field tests and isokinetic muscle strength between right and elite young soccer players.

Material and Methods: Forty-nine young, healthy, male soccer players (mean±SD age:±, range: to) who were scholarship holders of the Moroccan academy Mohammed VI of soccer served as subjects in this study. Players were divided into 2 groups: right dominant limb (group 1) and left dominant limb (group 2). All participants received the same entrainment schedule.

Soccer players underwent a clinical examination (weight, height and BMI), field tests (30 M sprint, TUB II and vertical

jump) and evaluation of knee flexor and extensor muscle strength of their dominant limb on an isokinetic dynamometer. To ensure consistent and accurate measurements, each parameter was evaluated by the same examiner utilizing the same methods.

Results: Field tests results show no differences between players of the 2 groups. Muscular strength did not differ between right and left footed as well at low as at speed velocities.

Conclusion: This study highlights that physical performance tests, including field tests and isokinetism, did not differ between right and left footed young soccer players. During the 90-min of soccer game, numerous explosive bursts of activity are required, including jumping, kicking, tackling, turning, sprinting, changing pace, and sustaining forceful contractions to maintain balance and control of the ball against defensive pressure. Briefly, soccer performance improves need not only physical but also technical and tactical development. Further studies on large samples should be conducted. It's extremely important that those studies integrate a complete analysis of soccer performance including physical, technical/biomechanical, tactical and mental proprieties. Then, we can get out the independent factors eventually associated with better performance in soccer players according their side lateral dominance.

P652

ASSESSMENT OF BONE RESORPTION AFTER WITHDRAWAL OF LONG TERM IBANDRONATE THERAPY

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Objective: There is a controversial question in the length of bisphosphonate treatment. The concept of drug holiday has been introduced from medical (prevention of "frozen bone") and economic reasons as well. International guidelines discuss the length of the treatment and recommendations after withdrawal for alendronate and risedronate, respectively. However, a few data is available for assessment of bone resorption after long term ibandronate treatment and for the management (laboratory and densitometry follow up) after its withdrawal and for safe duration of drug holiday, respectively. The aim of our study was to assess the degree of suppressed bone remodeling after withdrawal of long term therapy with ibandronate.

Material and Methods: Ibandronate administration (150 mg p.o. once monthly) was introduced in our bone metabolism unit in autumn 2006. Since that time 2,402 patients have been treated with ibandronate. However, the criteria of at least 5 year treatment and bone remodeling markers available before treatment initiation and 1 year after ibandronate withdrawal were fulfilled only by 28 postmenopausal women treated in accordance with good clinical practice.

Results: Bone resorption marker B-crosslaps (CTX) was 598 ±230 ng/l before treatment initiation, at the moment of ibandronate withdrawal 220±105 ng/l and 1 year after the withdrawal 363±112 ng/l. One year after ibandronate withdrawal CTX increased in 65 % in comparison with the level at the end of long term ibandronate therapy ($p<0.000001$) and they remain at 61 % of initial levels (before the treatment was introduced).

Conclusion: Bone resorption does not remain deeply suppressed 1 year after ibandronate withdrawal which should be considered in the post-withdrawal management of the patients and in assessment of the safe length of drug holiday.

P653

DIAGNOSIS OF LOW VITAMIN D AMONG SAUDI ARABIANS: DID WE OVERSHOOT THE RUNWAY?

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Objective: Reports indicate that deficiency of vitamin D in the Saudi Arabian population is reaching an epidemic. Our objective was to compare the accuracy of three commonly used 25-OHD assays among sample of Saudi population.

Material and Methods: This cross-sectional study was carried out during the period between January 2011 and December 2012. After an informed consent, blood samples for measurement of 25-OHD level was extracted from 200 adult patients attended the outpatients clinics of King Fahd Hospital of the University, AlKhobar. Patients receiving vitamin D supplements and those with advanced organ failure were excluded. Vitamin D level of each patients was determined using chemiluminescence immunoassay (CLIA), Radioimmunoassay (RIA) and liquid chromatography-tandem mass spectrometry (LC-MS/MS) methods. Between assay agreement was examined using regression analysis and Bland-Altman plots. Assays were also compared using commonly used cut points for classification of vitamin D deficiency.

Results: The average age of all patients was 45.7±16.1 years. There were 50 males (48.1±17.1 years) and 150 females (44.8 ±15.7 years) patients. Significant difference between the three

assays was found. The mean 25-OHD levels were highest for the LC-MS/MS (21.65 ng/mL, 95%CI 19.74–23.56), intermediate for RIA (16.607 ng/mL, 95%CI 14.8718.32) and lowest for CLIA method (13.864 ng/mL, 95%CI 12.109–15.618). Using a 30 ng/mL as cut-off value, 6 %, 9 % and 22 % were found to have normal levels of 25-OHD using CLIA, RIA and LC-MS/MS, respectively.

Conclusion: This study revealed that levels of 25-OHD and the prevalence of vitamin D deficiency are dependent on the assay used. The reported high prevalence of hypovitaminosis D among Saudi population possibly related to the use of an assay which underestimates the vitamin D level, due to false positive results of deficiency.

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P654
THE BENEFITS OF REHABILITATION PROGRAM IN POST-TRAUMATIC PATHOLOGY OF THE HIP

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Objective: Lately, the hip is developing a new category of "traumatic injury" and that is balance operated. Rapid increase in the number of orthopedic interventions did that after fracture surgery have the highest incidence. The present study was to evidence the benefits of the rehabilitation program in patients with post-traumatic pathology of the hip.

Material and Methods: We introduced a study of 55 patients with traumatic hip pathologies, resulting from sprains, fractures or acquired postoperative recovery that followed treatment in Felix Medical Rehabilitation Hospital. Evaluation of patients was done on day 0 and after 3 weeks. The objectives of rehabilitation therapy were: pain control, maintaining and strengthening the hip stability, maintain and increase joint mobility.

Results: Pain relief, assessed subjectively by the patient, increase joint stability, assessed objectively by muscle testing, increase joint mobility, assessed objectively by joint testing. Pain score decreased from 7.46 to 5.22 (percentage of improvement being 30.02 %). Average cumulative physical dysfunction shows an improvement of 14.99 %. Average improvement was 24.22 % disability. The overall score is statistically significantly improves the rate of improvement being 24.12.

Conclusion: Functional recovery by physical methods has its well defined role in completing the treatment phase after exceeding orthopedic surgery.

P655
STUDY OVER PHONOPHORESIS WITH CAPSAICIN IN KNEE OSTEOARTHRITIS

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Objective: There are numerous methods of administering drugs to the body, both passive and active. A recent review of the literature on phonophoresis reports that 75 % of the studies reviewed reported positive effects, ultrasound energy with drugs like gel or cream can travel through body tissue. Capsaicin was the active ingredient in hot chilli peppers has selection actions on unmyelinated C fibres and thinly myelinated A primary sensory neurons. We underwent an observational prospective study to propose measurement of phonoporesis with capsaicin on pain of the knee, in comparison with phonoporesis with ketoprofen applications.

Material and Methods: The study included 60 patients aged 45 years and over with clinical and radiological osteoarthritis of knee according to ACR criteria. All the patients were included in the standard therapy program (drugs and rehabilitation) over a period of 10 days. Group A - 30 patients was taken phonoporesis with capsaicin and Group B - 30 patients was taken phonoporesis with ketoprofen, both intensity was 0.6 W/cm^2 on the knee, 6 min every day. The assessed parameters at hospitalization and discharge were pain, joint mobility, muscle strength and WOMAC scale.

Results: In group A patients presented a significant improvement of pain according VAS scale, on the other group B who present an insignificant improvement of pain for the short time.

Conclusion: We can consider phonoporesis with capsaicin a significant method of therapy in knee osteoarthritis with an important benefit towards long term pain relief for the patient.

P656
QUANTITATIVE ULTRASONOMETRY OF THE PHALANGES IN POSTMENOPAUSAL WOMEN WITH TYPE 2 DIABETES MELLITUS: THE FIRST RESULTS OF A THREE-YEAR LONGITUDINAL STUDY

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Objective: Type 2 diabetes mellitus (T2DM) is associated to higher risk of fractures despite a normal or increased BMD [1]. The purpose of this 3-year longitudinal study was to assess the changes of quantitative ultrasound (QUS) parameters in a group of postmenopausal women with T2DM and in healthy controls.
Material and Methods: The analyses were performed on a group of 35 postmenopausal women attending to the OSTEOLAB at ISBEM Research Institute (Brindisi, Italy) within the PROF project (Prevention of Osteoporosis and Fracture) in collaboration with the Local Health Authority of Brindisi. We selected 17 women affected by T2DM and 18 healthy controls, aged 55–70 years old. Subjects had baseline and 40 months follow-up measurements of phalangeal ultrasonometry performed by using DBM Sonic Bone Profiler 1200 (Igea®) as well as information about medical history, current drug therapy and risk factors for fractures.
Results: At the baseline, only ultrasound bone profile index (UBPI) was significantly lower in T2DM group ($p<0.05$). In this latter group, we found at follow up (40 months) a significantly lower bone transmission time (BTT) ($p<0.01$) and amplitude- dependent speed of sound (AD-SoS) ($p<0.02$). During the study period, we found a decrease of both BTT and UBPI, which was significantly higher in T2DM group ($p=0.01$ and $p=0.03$, respectively).
Conclusion: Diabetic and control patients did not show any difference in AD-SoS, the ultrasound parameter which is usually associated to BMD, thus representing the most used predictor parameter of fractures risk in clinical practice. At the opposite, BTT and UBPI, that give information about bone mineral quality, resulted decreased in T2DM subjects, presenting a possible future role in the clinical practice for the diagnosis of alterations of bone micro-architecture in T2DM subjects.
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OSTEOPOROSIS AND ITS RISK FACTORS IN RHEUMATOID ARTHRITIS FEMALE PATIENTS

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Objective: Rheumatoid arthritis (RA) is very often complicated with osteoporosis (OP). About 0.5–1 % of the population in the whole world suffers from RA, which is the most common form of inflammatory arthritis. The aim of this study is to assess osteoporosis and its risk factors in RA female patients.
Material and Methods: A cross-sectional study was performed during the period of time 2012–2013 on 60 women with RA, from 48 to 65 years old. Based on their BMD status, they were separated in two groups: with and without osteoporosis. All the evidence of OP and its presumable risk factors were registered. In addition, in order to compare the two groups, the T-test was utilized for quantitative variables and χ^2 for qualitative variables.
Results: The patients had the average age 52.7±9.1. The disease had lasted 10.1±6 years. The T-score≤−2.2 was found in 39 of patients (65 %) respectively (60.1 %) in the lumbar spine and (39.9 %) in the femoral neck region. The cardinal factors related to OP were the age ($p=0.02$) and BMI $p=0.01$. In patients with hysterectomy and oophorectomy, the menopause induced by these interventions was conversely related to OP of femoral neck ($p=0.03$). Principally, OP in femoral neck region was associated with seropositivity for RF ($p=0.05$) and BMI ($p=0.02$). The correlation between fractures of femoral neck and osteoporosis was $p=0.02$.
Conclusion: OP was found in more patients than it was thought. Aging, low BMI, menopause and seropositivity were the most important risk factors of osteoporosis.

P658
STUDY ABOUT INFLUENCE OF ULTRASOUND THERAPY FOR TREATING PES ANSERINE BURSITIS

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Objective: Inflammation of the conjoined insertion of the sartorius, gracilis and semitendinosus muscles along the proximal medial aspect of the tibia is recognized as pes anserine bursitis and was first described almost 70 years ago. These muscles are primarily flexors of the knee and have a secondary internal rotational influence on the tibia, protecting the knee against rotatory as well as valgus stress. The purpose of this study was to determine the role of ultrasonotherapy in pes anserine bursitis.
Material and Methods: 15 patients with pes anserine bursitis were studied (9 females and 6 males, mean age 50.4 years) between March and August 2008. Patients presenting knee pain suspected to be due to internal derangement and detected on MRI. The commonest clinical presentation was pain along the medial joint line mimicking a medial meniscal tear. For evaluated the long effect we used a 10-point categorical scale, asking patient to appreciate the level of pain after 10 ultrasonotherapy applications.

Results: 10 patients reported diminuated pain and 5 reported no pain relief.
Conclusion: An accurate diagnosis of pes anserine bursitis on MRI and initiate early treatment will help prevent unnecessary arthroscopy.

P659
PARATHYROID GLANDS RESPONSE TO LOW VITAMIN D LEVELS IN HEALTHY ADULTS: A CROSS-SECTIONAL STUDY

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Objective: To assess the correlation of serum PTH and vitamin D (25OHD) levels of healthy Saudi Arabians living in east coast.
Material and Methods: A cross-sectional study was conducted in 200 patients (150 women and 50 men) between January 2011 and December 2012, in the age group of (18–69 years) attending outpatients clinics of King Fahd Hospital of the University, AlKhobar. Serum calcium, phosphorous, alkaline phosphatase, PTH and 25OHD were performed. 25-OHD was assessed using levels using chemiluminescence immunoassay (CLIA), Radioimmunoassay using Wallac 1470 Gamma Counter and HPLC -LC.MS/MS (high performance liquid chromatography- liquid chromatography with mass spectrometry. The data was collected and entered in the database and analyzed using SPSS Inc Version 14.
Results: The mean age was 45.8±15.8 (18–74) years, Calcium Level was 9.09±0.63 mg/dl. Alkaline Phosphatase was 88.91±35.94 (34–302) IU, Parathormone 6.7±3.06 (1.35–21.2) (1.3–6.8 pmol/L). 188 were either insufficient or deficient CLIA 11.85±6.14 (2–29.6) and 91 (48.4 %) of them had secondary hyperparathyroidism 9.48±4.55 pc/L (CLIA 25OHD normal levels had normal PTH levels, insufficiency 4/21 (19 %) had raised PTH levels and 81/166 (48.79 %) deficiency had raised levels), whereas with HPLC 156 were either insufficient or deficient 97 (with PTH level of 7.41± 4.2.). Patients with Insufficiency by HPLC-LC MS-MS 13 /41 (31.7 %) had raised PTH. All patients with vitamin D deficiency as diagnosed by HPLC-LC-MS/MS had secondary hyperparathyroidism.
Conclusion: The association of secondary hyperparathyroidism and Vitamin D deficiency is common and definite. Reports which give no association probably comes from inaccuracy of the assays in the assessment of vitamin D levels.

P660
REHABILITATION AFTER A DISTAL RADIUS FRACTURE EPIPHYSES IN PATIENTS WITH OSTEOPOROSIS

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Objective: Osteoporotic fractures represent one of the most common cause of disability and one of the major voice in the health economic budget in many countries of the world. The present study was to evidence the importance of the rehabilitation program in patients with distal radius fracture epiphyses.
Material and Methods: Our study included 20 outpatients attending to Medical Rehabilitation Hospital Felix with distal fracture epiphyses. The parameters studied were: age, joint testing, muscle testing, using VAS pain, response to balneokinetictherapy. Data were analyzed using SPSS pack and tests of statistical significance by Student method (t test) and χ^2. We used 10 days cure period with balneokinetic therapy in oligomineral thermal water specific of Baile Felix Resort, antialgic electrotherapy, thermo therapy, and physical exercise.
Results: They observed an improvement of the functional tests during the observed period, improvement that is obtained only with a continuous and systematic practice of physical therapy ($p<0.05$) and the occupational therapy. The physical training centered on customary gestures with occupationally therapy obtained the biggest improvement and 100 % compliancy.
Conclusion: Rehabilitation program is of utmost importance in distal radius fracture epiphyses so it should be applied soon after the orthopedic treatment.

P661
CARDIOVASCULAR RISK FACTORS IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM

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Objective: To assess cardiovascular risk factors in patients with primary hyperparathyroidism.

Material and Methods: 64 consecutive patients (4M/60F), aged 56.8±12.2 years were retrospectively assessed. Serum intact PTH was measured by immunoradiometric assay and 25OH vitamin D by radioimmunoassay. Resting ECG was performed. Statistical analysis: independent sample t-test and Pearson correlation test were used.

Results: Average total calcium serum levels at diagnosis were 11.3±1.3 mg/dL (range 9.3–18.4), median PTH level was 147.7 pg/mL (range 64.2–1982.3). Average 25OH vitamin D was 16.6±8.7 ng/dL (range 4–36.2);. 16 out of 64 patients (25 %). showed asymptomatic primary hyperparathyroidism and were conservatory treated. In the whole series, average BMI was 27.2±4.9 kg/m^2; 29 patients (45.3 %) were overweight and 12 patients were obese (18.8 %). Age at diagnosis positively correlated with BMI (r=0.335, p=0.007). Type 2 diabetes mellitus was recorded in 3 patients (4.7 %), dyslipidemia in 34 cases (53.1 %). PTH levels positively correlated with triglycerides (r=0.374, p=0.006); PTH negatively correlated with HDL-cholesterol (r=−0.415, p=0.016). Arterial hypertension was present in 37 patients (57.8 %). Hypertensive patients were significantly older than normotensive ones (59.4±11.5 vs. 53.4±12.4 years, p=0.05). In hypertensive patients, serum calcium and PTH levels tends to be higher than in normotensive ones, and 25OH vitamin D tends to be lower. Pheochromocytoma was associated in one case and ACTH independent Cushing syndrome due to bilateral adrenal hyperplasia in one patient. Ischemic heart disease with resting ECG signs was present in 14 patients (21.9 %). Arrhythmia was present in 5 patients (7.8 %).

Conclusion: There is a high prevalence in cardiovascular risk factors in patients with primary hyperparathyroidism, especially in elderly ones and in patients with high PTH levels.

P662
10-YEAR ABSOLUTE RISK OF FRACTURE BASED ON FRAX AND QUANTITATIVE ULTRASOUND IN ROMANIAN POSTMENOPAUSAL WOMEN

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Objective: The relationship between a traditional method of fracture risk assessment as heel quantitative ultrasound (QUS) and a new method as the 10-year probability of fracture based on FRAX model is complex since the methods are independent. This aspect might have a good economical profile especially in regions with socio-economic issues since the methods are especially useful in screening population at high risk of fracture as women in menopause. We analyze the correlation between QUS and 10-year absolute risk of fragility fractures based on FRAX results in menopausal women.

Material and Methods: This is a retrospective analysis in women. The inclusion criteria were menopausal status; at least one evaluation of clinical fracture risks as pointed by FRAX, a central DXA assessment (at least femoral neck, a Lunar Prodigy device), and heel QUS (Achilles Insight device) available data. The exclusion criteria were pretherapy for osteoporosis or osteoporotic fractures at any moment of life. The statistics used SPSS 21, with statistical significance at p<0.05. The patients' data were from 2008 to 2013. Since Romanian data in the FRAX model were provided from 2011, we retrospectively calculated the 10-year absolute fracture risk of major fractures (MOF) and hip fractures (HIF) based on FRAX in patients enrolled before this.

Results: 197 women in menopause were included (median of 57 years, ranges between 41 and 79 years). Some of the risk factors included in FRAX were: 4 % previous prednisone use, 30 % smokers, 15 % with prevalent fragility fractures. The linear correlation between stiffness index (QUS) and MOF was r=−0.3 (p<0.0005) or r^2=0.1 (p<0.0005). The simple correlation between stiffness index and HIF was r=−0.3 (p<0.005) or r^2=0.2 (p<0.0005). The same correlations were analyzed after adjusting for years of life: for MOF r=−0.2 (p<0.0005), respective for HIF r=−0.2 (p<0.0005); and after triple controlling for age (years), period of time in menopause (years) and BMI for MOF r=−0.18 (p=0.01), and for HIF r=−0.14 (p=0.04).

Conclusion: Week, negative, statistically significant correlations were found between stiffness index provided by heel QUS and 10-year absolute risk of fracture based on FRAX model. The correlation does not improve when adjusting for age, years since menopause, BMI. The data were similar for major osteoporotic fracture risk as well as hip fracture risk.

P663
DO DEPRESSIVE SYMPTOMS IMPACT FUNCTIONAL OUTCOME IN HIP FRACTURE PATIENTS?

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Objective: Depression is the most common of mood disorders in elderly people, and one of the most prevalent comorbidities in older people with hip fracture. The aim of the present study was to evaluate if depressive symptoms assessed on hospital admission impact early functional outcome after hip fracture surgery.

Material and Methods: We studied 112 patients who underwent surgery for hip fracture during a 6 month period. Depressive symptoms were assessed on admission to the acute setting using the 30-item Geriatric Depression Scale (GDS). Multidimensional assessment included sociodemographic characteristics, general health status, cognitive status, functional status prior to injury, and perioperative variables. The primary outcome measure was motor-FIM at discharge.
Results: Adjusted multivariate regression analysis revealed that presence of moderate to severe depressive symptoms (GDS ≥20), older age, and female gender were independently related to motor FIM at discharge.
Conclusion: Adjusted multivariate regression analysis revealed that presence of moderate to severe depressive symptoms (GDS ≥20), older age, and female gender were independently related to motor FIM at discharge.
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P664
PROGRESSION OF VERTEBRAL COMPRESSION FRACTURES IN THE FIRST SIX MONTHS OF ANTIOSTEOPOROTIC THERAPY

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Objective: In the conservative treatment of a vertebral compression fracture (VCF) in postmenopausal women, an antiosteoporotic drug is recommended. But their relationships with healing processes are still debated. The aim of this prospective study was the evaluation of radiographic progression of one or more VCF during assumption of risedronate, strontium ranelate or teriparatide.
Material and Methods: Women with recent osteoporotic VCF verified through magnetic resonance were assigned to receive either risedronate (RIS group, n=26) or strontium ranelate (SR group, n=22) or teriparatide (TPTD group, n=34) following guidelines of Italian regulatory agency. Serum and urinary bone turnover markers and lateral thoracolumbar spine X-rays were obtained at 0, 1, 3 and 6 months of therapy. Morphometric parameters were digitally acquired with specialized software. Lumbar BMD was measured by DXA before and 6 months after treatment initiation.
Results: Lumbar BMD increased at 6 month in all groups and significantly in TPTD group. An inconstant progression in VCF on radiograms were detected in RIS and SR groups. The D7 and D12-L1 were more involved of others. A significant correlation has been found between the progression and low formation markers. At time 0 serum markers of bone formation alkaline phosphatase, osteocalcin (OC) and of bone resorption desoxipiridoline (DPD). Between 1st and 3rd month within the consolidation process, OC initially peaked in TPTD group decreases, while those in RIS group and SR group remained significantly lower. DPD remained high in TPTD group, while in the others significantly reduced in 6 months.
Conclusion: In recent osteoporotic VCF a divergence between the formation and resorption markers has been revealed between antiosteoporotic therapies with a different radiographic progression. The clinical relevance is the possibility of choice different antiosteoporotic treatments on radiographic and metabolic behaviour of VCF.
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P665
FACTORS INFLUENCING BALANCE RESTORATION IN ELDERLY AFTER HIP FRACTURE

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Objective: The risks of second fracture among patients with initial brittle fracture are substantial. Secondary prevention is very important as treatment of osteoporosis and also as balance restoring, motor functional rehabilitation and fall-down prevention training. The purpose of this study was to evaluate effectiveness of our rehabilitation program in balance improvement measured by Berg Balance Scale (BBS) and to determine factors of influence on balance restoration after hip fracture in patients above 65 years.
Material and Methods: We have evaluated 203 patients that were referred to Institute for Rehabilitation in Belgrade for rehabilitation treatment after hip fracture. Eligible participants were evaluated by BBS at admission, at discharge, 3 month post discharge and 6 months post discharge. We observed balance improvement by BBS regarding age, sex, duration of time from operation to admission, comorbidity measured by Cumulative Illness Scale for Geriatrics (CIRS-G), type of fracture (femoral neck or trochanteric region), type of operation (osteosynthesis or endoprothesis) and type of rehabilitation program (with or without hydrotherapy).
Results: There is significant increase (p<0.001) in balance measured by BBS in observed period (admission-24.61± 14.94; discharge −34.1±7.47; after 3 month R-37.98±10.09, after 6 months-39.44±11.08). We found out significant correlation between increase of BBS and age (R −0.3628, p=

0.0004), comorbidity measured by total score of CIRS-G (R −0.4675, p=0.0005), duration of time from operation to admission (R −0.4617, p=0.0004) ad type of rehabilitation (R −0.5632, p=0.0000).

Conclusion: We have demonstrated that our inpatient rehabilitation program significantly improves balance in elderly after hip fractures. Younger patients with less comorbidity, started with rehabilitation earlier after operation, and included in rehabilitation program with hydrotherapy has better chances to restore their balance and to prevent fall-down and second osteoporotic fractures.

P666
CHRONIC INFLAMMATION IS THE KEY MECHANISM RESPONSIBLE FOR DETERIORATED BONE METABOLISM IN CHILDHOOD OBESITY

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Objective: Some reports show a beneficial role of adiposity in maintenance of skeletal mass, whereas others demonstrate an increased fragility related to overweight. The aim of this cross-sectional study was to evaluate effect of adipokines and inflammation on bone metabolism and bone mass in obesity.

Material and Methods: In 40 obese boys and girls aged 7.1–17.6 y (BMI SDS: 3.12±1.6) and 30 non-obese controls (BMI SDS: −0.31±0.7), total and lumbar BMD and body fat/ lean mass were determined using DXA. Serum lipids, calcium (Ca), 25-hydroxyvitamin D (25OHD), PTH, insulin and glucose (HOMA-IR), leptin, adiponectin, osteocalcin (OC), osteoprotegerin (OPG), RANK-ligand (RANKL) and high-sensitivity CRP (hsCRP), reflecting inflammation, were measured.

Results: Increased levels of leptin, hsCRP, Ca, PTH (all p<0.001) were found in obese children. Adiponectin and OC were lower in obese individuals (p=0.005), with simultaneous increased RANKL/OPG ratio (0.51±0.5 vs. 0.32±0.5; p=0.01). Bone mineral apparent density (BMAD) adjusted for skeletal size and body composition in obese children was lower than in normal weight individuals (0.080 vs. 0.084 g/cm^3). There was an association between excessive adiposity and hsCRP level which correlated with RANKL (r=0.61, p<0.001) and RANKL/OPG ratio (r=0.49, p=0.003). Inflammation, ascertained with composite models including BMI, FM and LM, was an independent risk factor of increased bone resorption (β=0.415, p=0.001). In obese individuals, hsCRP was associated with a higher PTH (52.5±17.9 vs. 32.0±10.0 pg/ml; p<0.001) and higher serum Ca levels (2.47±0.13 vs. 2.39±0.12 mmol/L; p=0.01). No differences in 25OHD concentrations between the groups were observed.

Conclusion: Chronic low-grade inflammation with altered adipokine levels may be responsible for inadequate bone metabolism in childhood obesity. Higher PTH and calcium concentrations may reflect moderate parathyroid hyperactivity as a potential mechanism responsible for bone resorption in obese individuals.

P667
PHYSICALTHERAPY IN TREATMENT OF PATIENTS WITH GLENOHUMERAL OSTEOARTHRITIS

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Objective: A large number of patients develop glenohumeral osteoarthritis (OA) after dislocation or fracture of a shoulder and are treated with different physical therapy modalities. We evaluated the effect of different combinations of physical therapy modalities on pain and shoulder range of motion in patients with glenohumeral OA.

Material and Methods: 30 patients with moderate glenohumeral OA with pain and reduced forward flexion and abduction, were randomly allocated to two groups with 15 in each. Group A had exercises and breaststroke swimming, with galvanic current therapy and paraffin therapy for a period of 3 weeks. Group B had exercises and breaststroke swimming with low level laser therapy (LLLT) and transcutaneous electrical nerve stimulation (TENS) for a period of 3 weeks. Patients were not allowed to use paracetamol or NSAIDs. The outcome assessment was performed before and after treatment using: 1) VAS for pain evaluation and 2) measurements of shoulder range of forward flexion and abduction.

Results: Group A included 7 women and 8 men with a mean age of 59.3±6.2. Group B included 5 women and 10 men, with a mean age of 56.2±8.1. The groups were comparable with regard to pain and forward shoulder flexion and abduction before therapy (p>0.05). Both groups showed statistically significant improvement for pain (p<0.01), forward flexion (p<0.001) and abduction (p<0.01) after therapy, compared to basic values. Statistical analyses showed more improvement in group B than in group A for pain (p<0.05), and there was no difference between groups for forward shoulder flexion and abduction (p>0.05).

Conclusion: Both combination of physical therapy modalities led to a significant decrease in pain and increased in shoulder range of motion in patients with glenohumeral OA, but related to the pain application of LLLT and TENS was more effective

than the application of galvanic current therapy and paraffin therapy.

P668
FUNCTIONAL ASSESSMENT IN POSTTRAUMATIC ANKLE OSTEOARTHRITIS

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Objective: The objective of this paper was to assess a lot of patients with posttraumatic ankle osteoarthritis before and after rehabilitation treatment. Our purpose was also to study the effect of an individualized treatment on patients with the mentioned pathology.
Material and Methods: We evaluated 50 patients with posttraumatic ankle osteoarthritis. All patients were evaluated before and after rehabilitation treatment clinically and functionally using Ankle Osteoarthritis Scale (AOS). The rehabilitation treatment was 6 months long and involved physical therapy and exercises (kinetotherapy). Every patient had an individualized rehabilitation treatment according to age, physical possibilities, traumatic lesion which caused the osteoarthritis, other pathologies and the functional assessment made.
Results: After 6 months of treatment the total AOS score decreased significantly (p=0.04). The pain subscale score improved more than dysfunction subscale score. The subjective functional scale and the clinical assessment showed significant improvements. After rehabilitation treatment patients still had some problems with climbing and descending stairs.
Conclusion: The rehabilitation treatment mainly based on individualized kinetotherapy and physical therapy is important in patients with posttraumatic ankle osteoarthritis decreasing pain as well as dysfunction.

P669
DIGITAL ULCER MANAGEMENT IN SYSTEMIC SCLEROSIS: A SINGLE CENTER EXPERIENCE

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Objective: Systemic sclerosis is a multisystem disorder of unknown aetiology. Pulmonary and cutaneous manifestations of the disease cause significant morbidity, affect quality of life and are resistant to therapeutic interventions. Digital ulcers in systemic sclerosis remain a significant problem. They tend to recur and are difficult to treat. Recently, there have been advances in the management of digital ulcers in systemic sclerosis. In particular, new therapeutic developments such as the dual endothelin receptor antagonist bosentan have been introduced in the management of digital ulcers in patients with systemic sclerosis. The aim was to present the experience within a single center in the management of patients with systemic sclerosis and digital ulcers.
Material and Methods: Within a period of 1 year, 8 patients, 5 with systemic sclerosis and 3 with limited scleroderma, aged 37–68 years, mean age 55.1 years, 7 female and 1 male, were studied. All patients developed digital ulcers.
Results: All patients received bosentan 62.5 mg twice daily initially increasing to 125 mg twice daily. In all patients digital ulcers improved over a period of a year. In 2 patients a rapid response to the treatment with bosentan was observed. In some of the patients iloprost iv was simultaneously administered and in some hyperbaric oxygen was also applied.
Conclusion: Systemic sclerosis is a multisystem disorder which was treated symptomatically until recently. Digital ulcers, which may appear during the course of the disease, are resistant to treatment and even if treated they may recur. New therapeutic achievements, such as the dual endothelin receptor antagonist bosentan have made possible the successful treatment of digital ulcers in patients with systemic sclerosis. In some of the cases described the rapid response of the digital ulcers to the administration of bosentan is noted.

P670
WNT SIGNALING IS INVOLVED IN HUMAN ARTICULAR CHONDROCYTE DEDIFFERENTIATION IN VITRO

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Objective: Osteoarthritis is the most prevalent form of arthritis in the world. Certain signaling pathways, such as the wnt pathway, are involved in cartilage pathology. Osteoarthritic chondrocytes undergo morphological and biochemical changes that lead to chondrocyte dedifferentiation. We investigated whether the Wnt pathway is involved in dedifferentiation of human articular chondrocytes in vitro.
Material and Methods: Human articular chondrocytes were cultured for four passages in the presence or absence of IL-1 in monolayer or micromass culture. Changes in cell morphology were monitored by light microscopy. Protein and gene expression of chondrocyte markers and Wnt pathway components were determined by western blotting and qPCR after culture.
Results: After culturing for four passages, chondrocytes exhibited a fibroblast-like morphology. Collagen type II (col II) and aggrecan protein and gene expression decreased, while collagen type I (Col I), matrix metalloproteinase (MMP) 13, and nitric oxide synthase (eNOS) expressions increased. Wnt molecule expression profiles changed; Wnt5a protein

expression, the Wnt target gene, c-jun, and the Wnt pathway regulator, sFRP4 increased. Treatment with IL-1 caused chondrocyte morphology to become more filament-like. This change in morphology was accompanied by extinction of col II expression and increased col I, MMP13 and eNOS expression. Changes in expression of the Wnt pathway components were also observed. Wnt7a decreased significantly, while Wnt5a, LRP5, β-catenin and c-jun expressions increased.

Conclusion: Culture of human articular chondrocytes with or without IL-1 not only induced chondrocyte de-differentiation, but also changed the expression profiles of Wnt components, which suggests that the Wnt pathway is involved in chondrocyte dedifferentiation in vitro.

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MUTATION IN OSTEOACTIVIN ENHANCES RANKL-MEDIATED SIGNALING, PROMOTING OSTEOCLAST DIFFERENTIATION AND SURVIVAL

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Objective: The novelty of osteoactivin (OA) in bone regeneration has been characterized and reported by our group. Recent study demonstrated that OA/Gpnmb is highly expressed by osteoclasts (OCs) in vitro. To specify the critical role and mechanism of action of OA in osteoclastogenesis, we characterized the osteoclastic phenotype in a mouse model with natural mutation in the OA gene. We hypothesized that mutation of OA increases OC formation and decreases its activity.

Material and Methods: For our purpose, we used a genetically modified D2J mouse model at age of 8 weeks. D2J mice are mutant for OA. Mouse femurs were evaluated by μCT, histology and histomorphometric analyses. Mice sera were examined by ELISA for bone resorption markers. Bone marrow-derived hematopoietic stem cells were differentiated into osteoclasts using RANKL and MCSF. OC differentiation was evaluated by TRAP activity and staining. OC resorptive function was examined using corning disc osteoassay. For osteoclast survival, cells were cultured for two additional days in the presence of RANKL. Markers of OC differentiation were tested by qPCR. MAPK and AKT signaling pathways in osteoclast were examined by western blot analysis. Statistical analysis was carried out by student-t-test.

Results: μCT analysis of D2J femur diaphysis showed increased cortical thickness, while cortical bone surface as well as porosity were reduced in comparison to WT. Serum ELISA of TRAP and RANKL/OPG ratio were not altered, however CTX-1 was significantly lower in D2J compared to WT mice. Differentiation of D2J OCs was substantially increased, marked by OC number, TRAP activity and surface area, compared to WT. In addition, qPCR analysis showed upregulated expression of TRAP and key regulators of OC. Moreover, the survival of mature OCs was improved in D2J marked by reduced caspase-3/7.

Conclusion: Taken together, these data suggest that OA/Gpnmb acts as a negative regulator of osteoclast differentiation and survival by inhibiting the ERK/AKT signaling pathways.

P672
THE ROLES OF CANONICAL AND NONCANONICAL WNT SIGNALING IN HUMAN DEDIFFERENTIATED ARTICULAR CHONDROCYTES

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Objective: Osteoarthritis is the most prevalent form of arthritis in the world and it is becoming a major public health problem. Osteoarthritic chondrocytes undergo morphological and biochemical changes that lead to dedifferentiation. The involvement of signaling pathways, such as the Wnt pathway, during cartilage pathology has been reported. Wnt signaling regulates critical biological processes. Wnt signals are transduced through at least three intracellular signaling pathways including the canonical Wnt/β-catenin pathway, the Wnt/Ca2 pathway and the Wnt/planar cell polarity pathway. We investigated the involvement of the Wnt canonical and noncanonical pathways in human articular chondrocyte dedifferentiation in vitro.

Material and Methods: Human articular chondrocytes were cultured through four passages with no treatment, or with sFRP3 treatment, an inhibitor of Wnt pathways, or with DKK1 treatment, an inhibitor of the canonical pathway. Chondrocyte- secreted markers and Wnt pathway components were analyzed using western blotting and qPCR.

Results: Inhibition of the Wnt pathway showed that the canonical Wnt signaling is probably responsible for inhibition of collagen II expression, activation of metalloproteinase 13 expression and regulation of Wnt7a and c-jun expression during chondrocyte dedifferentiation in vitro. Our results also suggest that expressions of eNOS, Wnt5a and cyclinE1 are regulated by noncanonical Wnt signaling.

Conclusion: Understanding the exact role that each wnt pathways plays in osteoarthritis is of major importance. This will clarify what role of each of these molecules during the processes of proliferation, differentiation or de-differentiation.

P673
EFFECT OF HYDROTHERAPY VS. CONVENTIONAL LAND-BASED EXERCISE IN PATIENTS WITH HIP ARTHROPLASTY FOR OSTEOARTHRITIS

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Objective: Hydrotherapy (HT) is usually employed in physical medicine and rehabilitation. Underwater exercises strengthen weak muscles, restore joint motion and pain. The study evaluated the functional outcome following hip arthroplasty in patients who underwent hydrotherapy 6 months after discharge from a rehabilitation unit.
Material and Methods: A total of 58 patients with recent hip arthroplasty (<14 days) for osteoarthritis were referred to our rehabilitation unit. All participants were discharged and returned to their home at the end of the rehabilitation program (12 days). Twenty-eight participants were randomly assigned into the hydrotherapy group and thirty participants into the conventional exercise group. Participants were interviewed with WOMAC Index at admission, at discharge and after 6 months.
Results: The WOMAC subscales for pain, stiffness and function improved in both groups. Statistical analysis indicates that scores on all subscales were significantly lower for the hydrotherapy group. The benefits gained by the time of discharge were still found after 6 months.
Conclusion: In this trial, hydrotherapy proved to be a better treatment than conventional exercise for patients with hip arthroplasty, since pain, stiffness and function impairment were significantly lower for the hydrotherapy group.

P674
REGULATION OF INTERLEUKIN-6 EXPRESSION BY A RIBONUCLEOTIDYL TRANSFERASE ZCCHC6 IN HUMAN CHONDROCYTES

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Objective: Interleukin (IL)-1β is the major cytokine involved in osteoarthritis (OA) pathogenesis and induces the high levels expression of IL-6. Ribonucleotidyl transferases catalyze the addition of nucleotides to the 3′ end of mRNAs. However, their expression or role in cytokine regulation in OA is unknown. We investigated whether ribonucleotidyl transferase ZCCHC6 is expressed in OA cartilage and whether ZCCHC6 is involved in the regulation of IL-6 expression in OA chondrocytes.
Material and Methods: Chondrocytes derived from OA patients (n=14) were stimulated with IL-1β (5 ng/ml) or Actinomycin D or NF-κB inhibitor SC514 or a JNK inhibitor. Total RNA was used to quantify ZCCHC6 or IL-6 mRNA expression using TaqMan assays. SiRNA-mediated knockdown of ZCCHC6 was used to study the effect on inflammatory cytokine expression using a cytokine array. Protein expression of ZCCHC-6 and IL-6 was studied using western immunoblotting and by ELISA.
Results: Expression of ZCCHC6 and IL-6 was high in damaged cartilage compared to unaffected OA cartilage. IL-1β stimulation showed significant increase in the expression of ZCCHC6 and IL-6 mRNA and protein in chondrocytes. ZCCHC6 depletion significantly decreased IL-6 mRNA and protein expression in IL-1β-stimulated chondrocytes. Cytokine array analysis of culture supernatants from control or ZCCHC6 siRNA treated and IL-1β-stimulated chondrocytes showed a substantial decrease in a subset of cytokines including IL-6. In chondrocytes with depleted ZCCHC6 IL-6 mRNAs had shorter poly-A tails and also showed a decrease in constitutive IL-6 mRNA and protein expression. Inhibition of NF-κB had no effect on ZCCHC6 expression but inhibition of JNK blocked ZCCHC6 expression in OA chondrocytes.
Conclusion: Taken together our results demonstrate that ZCCHC6 is highly expressed in damaged OA cartilage and modulates IL-6 expression at the post-transcriptional level by possibly influencing cytokine mRNA stability. These results identify ZCCHC6 as a potential therapeutic target for the treatment of OA.
Disclosures: Grants from NIH (RO1 AT-003267, RO1 AT-005520, RO1 AT-007373) and funds from Neomed University.

P675
INFLUENCE OF VITAMIN D STATUS ON FRACTURES IN SPANISH ELDERLY WITH HIGH PARATHYROID HORMONE LEVELS

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Objective: To analyze whether there is an association between serum PTH and the prevalence of fractures and to assess the influence of serum 25-hydroxyvitamin D (25OHD).
Material and Methods: A total of 248 Spanish elderly (149 females and 98 males) were recruited. Serum PTH and 25OHD concentrations, as well as fracture prevalence were recorded. Serum PTH was divided into quartiles, and elderly were grouped into those in the highest quartile (>132.8 pg/ml)

and those below. Serum 25OHD levels were stratified in 4 categories (>40, 20–40, 10–20, <10 ng/ml).
Results: Mean PTH and 25OHD values were similar between males and females (103.5±65.4 vs. 107.6±65.3 for PTH and 11±7 vs. 12±8 for 25OHD (P>0.05 both)). Values lower than 10 ng/ml 25OHD were found in the 34.6 % of the males and in the 65.4 % of the females. Within the males the prevalence of fractures was of 43.8 % in the 10–20 ng/ml, 48.8 % in the <10 ng/ml and 12.5 % within the 20–40 ng/ml 25OHD groups, respectively. In the female group, prevalence of fractures increases to 47.1 % in the <10 ng/ml, with lower figures of 25.6 % for both the 20–40 ng/ml and the 10–20 ng/ml 25OHD groups, respectively. Stratification of males by PTH levels showed the highest prevalence in the 10–20 ng/ml 25OHD within the top quartile of serum PTH with a 66.7 % vs. 38.5 % observed in those below. The highest prevalence in women was observed in the <10 ng/ml 25 OHD group with a 50 % of the fractures within the highest quartile group of PTH with similar figures (45.8 %) in those below. No significant increases in fracture risk were observed in patients with high PTH levels (P>0.05 in all cases). After further stratification by 25OHD levels, lack of increased risk was also observed (P>0.05 in all cases).
Conclusion: Elevated PTH levels are not associated with increased prevalence of fractures in Spanish elderly. Our results indicate that most of the fractured patients had vitamin D insufficiency/deficiency, suggesting that his condition may be closely associated with fracture in elderly people.

P676
EFFICACY OF VISCOSUPPLEMENTATION WITH INTRA-ARTICULAR HYALURONIC ACID IN KNEE OSTEOARTHRITIS

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Objective: The standard pharmacological treatment of osteoarthritis with nonsteroidal anti-inflammatory drugs is essentially symptomatic, aiming at relieving pain. Viscosupplementation with intra-articular hyaluronic acid is an alternative to the treatment of symptomatic knee osteoarthritis. The aim of this study was to assess the safety and tolerability profile of intra-articular sodium hyaluronate in patients with symptomatic knee osteoarthritis over 24 weeks.
Material and Methods: The study included 56 patients (36 women and 20 men), aged between 42 and 76 years, with confirmed primary or secondary knee osteoarthritis. All patients underwent weekly intra-articular injections with hyaluronic acid for 5 consecutive weeks and were followed up for 19 additional weeks with control visits at week 6, 12, 18 and 24. The patients had to answer an adverse event (AE) questionnaire and the WOMAC OA Index questionnaire at each visit. The WOMAC total score and the three WOMAC subscores (pain, stiffness and physical function) were analyzed. All analgesics, nonsteroidal anti-inflammatory drugs or corticosteroids were suspended up to the end of the study.
Results: The WOMAC score was significantly reduced after 2 weeks of treatment (from 4.32±1.85 to 3.65±1.96, p=0.011), decreased by the end of the injection series (2.67±1.91; p<0.0001) and maintained during the follow-up (2.35±1.1.68; p<0.0001). The WOMAC subscores were also significantly reduced from week 2 for pain and from week 5 for stiffness and physical function. The most frequent AE was pain at the injection site (6.2 % of the injections).
Conclusion: These results confirm the evidence of efficacy and safety of efficacy and safety of intra-articular hyaluronic acid in the treatment of symptomatic knee osteoarthritis.

P677
ANALYSIS OF TWO FUNCTIONAL POLYMORPHISMS IN THE LRP5 GENE IN RELATION TO BONE MINERAL DENSITY AND FRACTURE RISK IN MALTESE POSTMENOPAUSAL WOMEN

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Objective: The low-density lipoprotein receptor-related protein 5 (LRP5) is involved in osteoblast differentiation and bone formation, making it an important determinant of bone mass and strength. The influence of two functional missense single nucleotide polymorphisms (SNPs) A1330V (rs3736228; C>t) and V667M (rs4988321; G>a) were analysed in relation to BMD and different low-trauma fractures in Maltese postmenopausal women.
Material and Methods: 1,040 women aged 40 to 79 years were recruited and their BMD measurements were performed by dual-energy X-ray absorptiometry. Subjects without a history of a fragility fracture were subdivided in three groups: normal (n=228), osteopenic (n=266) or osteoporotic (n=280) according to their BMD results. Women with a fracture history were classified as cases (n=266). Genotyping of the A1330V polymorphism was performed by PCR followed by restriction enzyme digest, whereas real-time PCR was performed for the V667M SNP.
Results: Using logistic regression analysis adjusted for age, the A1330V SNP was associated with reduced BMD at the lumbar spine (TT: p=0.02; CT: p=0.01) and to a lesser extent reduced femoral neck BMD (TT: p=0.07; CT: p=0.01). Fracture cases carrying one or both copies of the minor allele T had an increased fracture risk compared to women with the CC

genotype (CT: $p=0.04$; TT: $p=0.05$). The TT genotype was the most common among subjects with a wrist, humerus or hip fracture; nonetheless the difference was not significant ($p>0.05$). The haplotype with both risk alleles (AT) was associated with reduced BMD ($p=0.05$) as opposed to the haplotype-reference (GC) which was strongly linked to a high BMD ($p=0.002$).

Conclusion: The results indicate that the A1330V and V667M polymorphisms within the LRP5 gene are associated with reduced BMD and/or increased fracture susceptibility in Maltese postmenopausal women.

P678
CLINICAL AND HISTOMORPHOMETRICAL ASSESSMENT OF BONE QUALITY IN HIP OSTEOARTHRITIS AND OSTEOPOROSIS

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Objective: Osteoarthritis (OA) and osteoporosis (OP) are two diseases characterized by the alteration of bone quality that affect mainly elderly people reducing their quality of life. Although an inverse relationship between has been shown by some studies, other reports supported the coexistence of these pathologies. In this study we combined clinical (Harris Hip Score) and structural features (BMD and bone histomorphometry) to clarify the relationship between OA and OP.

Material and Methods: Among all the patients who underwent a total hip arthroplasty in our hospital between June 2011 and March 2013, we selected 120 patients divided into 4 groups according to BMD values and diagnosis, femoral neck fractures ($n=30$, mean age 71.9) or OA ($n=90$, with normal/osteopenic/osteoporotic BMD; mean age 72.1 years). X-rays of the hips were also taken to establish the grade of OA through the Kellgren-Lawrence scale and OA patients were also evaluated by HHS to assess the functionality of the hip. During surgery, a double osteotomy of the femoral head was performed and the samples were used for histomorphometry through Bio Quant software.

Results: Clinical and histomorphometric features were compared between fractured patients and OA patients stratified according to BMD values. Histomorphometrical analysis show that bone volume fraction (BV/TV) was significantly lower in subjects with femoral neck fracture (20.77±4.33 %) than subjects with OA and normal BMD (36.49±7.73 %; $P<0.01$) or osteopenic BMD (32.92±6.82 %; $P<0.01$), while no difference between fractured subjects and those with combined OA and OP (20.71±5.23 %) was detected.

Conclusion: Our findings show that low bone mass is accompanied by an impairment of bone histomorphometrical properties, which were comparable between osteoporotic OA patients and subjects with femoral fracture. This study support evidence from the recent studies indicating impaired bone quality in OA and absence of protective effect against OP.

P679
MECHANICAL AND STRUCTURAL PROPERTIES OF HUMAN FEMORAL HEADS IN DIFFERENT STAGES OF OSTEOARTHROSIS

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Objective: Structure and mechanical properties of human bone tissue adjust to changing load conditions. The structure of bone tissue is related to mechanical properties and adjustment of mechanical properties to changing load conditions causes changes in the bone tissue structure. The knowledge of those properties is important to understand the mechanism of pathological bone changes. The main purpose of the conducted studies was to determine a correlation between structural and mechanical properties of human trabecular bones with osteoarthrosis (OA).

Material and Methods: The subject of the studies was eleven human femoral heads. The material was divided into 3 separate groups, based on classification of OA proposed by Outerbridge. In order to determine both structural and mechanical properties 60 cubic specimens (10×10×10 mm) of cancellous bone were prepared from each head. Mechanical properties were measured in uniaxial compression test using material testing machine 858 MTS MiniBionix with strain rate 0.01 s^{-1}. Additionally, for each of the specimen the physical density was determined using electronic weighing machine RADWAG. To find correlation between mechanical and structural properties we conducted linear and multilinear regression analysis.

Results: Our results show strong correlation between physical density and strength ($R^2=0.8$) The highest values of structural and mechanical properties were obtained for specimens with III grade of OA. The femoral heads from this group were also characterized by loss of cartilage to the subchondral bone and deterioration of bone. In this case we observed appearance of cysts as well as bone remodeling.

Conclusion: The results show that values of structural and mechanical properties depend on the grade of osteoarthritis. In the case of femoral head with III grade of OA we obtained the

highest values of physical density, strength and Young's modulus even in comparison with healthy bone tissue.

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P680
BILATERAL FEMORAL NECK INSUFFICIENCY FRACTURES: AN UNEXPECTED CAUSE OF PAIN IN A POSTMENOPAUSAL WOMAN

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Objective: Older patients tend to suffer from osteoporosis. In such cases, several types of fractures can easily occur. We report a case of bilateral femoral neck insufficiency fractures in a postmenopausal woman.

Material and Methods: We report a case of bilateral femoral neck insufficiency fractures in a postmenopausal woman diagnosed in our hospital.

Results: The patient is 79 years old postmenopausal woman and in osteoporotic condition, suffered from the unknown sudden onset hip pain and edema of lower extremities more than a month before our first examination. She complained of the bilateral hip pain when she move her hip joint, especially when she stand up or walk, but it became less when they lay down. Not only the patient herself but also her families were all fear of some kind of malignant disease. At first examination by X-ray and MRI, there was no obviously clear cause of pain. Because of her persisted pain, 2 weeks later, we took second X-ray and found bilateral femoral neck fracture (Garden Stage IV). We performed bilateral bipolar hip arthroplasty and her quality of life was improved.

Conclusion: When older patients complain of any discomfort around their hip joint without any injury, femoral neck insufficiency fractures must be considered. If the diagnosis were delayed, it is better to take care that femoral head dislocation might occur secondly. The patients with femoral neck insufficiency fracture suffered from osteoporosis, so other fractures on their pelvic ring might be easily occurred.

P681
ADULT STILL'S DISEASE: SUCCESSFUL TREATMENT WITH CANAKINUMAB

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Objective: Adult Still's disease is a systemic inflammatory disorder. Still's disease was first described in children, but it has been now been described also in adults and is known as adult Still's disease. The aim was to describe the case of a patient with adult Still's disease who was successfully treated by the administration of canakinumab.

Material and Methods: A female patient, aged 38, presented with adult Still's disease. During the 31st week of a pregnancy she developed dyspnea, intense cough and fever. She was submitted to caesarean section and gave birth to a healthy infant. Subsequently, she developed fever, cholestasis, increased liver enzymes, arthralgias, myalgias, a salmon colored rash and enlarged lymph nodes.

Results: Methylprednisolone was administered at a dose of 32 mg daily with partial remission of the disease. She was then given anakinra 100 mg sc daily, however the rash recurred. Subsequently canakinumab 180 mg/month was administered. Complete remission of the disease was induced and the dose of corticosteroids was reduced.

Conclusion: Adult Still's disease may respond to anti-inflammatory drugs as well as to corticosteroids. However, in cases of disease resistant to treatment new agents are being applied. The recombinant human monoclonal antibody to interleukin-1β canakinumab induced remission in this case of adult Still's disease.

P682
MECHANICAL AND STRUCTURAL DEGREE OF ANISOTROPY OF HUMAN OSTEOARTHRITIC TRABECULAR BONE

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Objective: It is a common knowledge that the cancellous bone changes its structure when exposed to external loads. Osteoarthritis (OA) is degenerative joint disease caused by the breakdown of cartilage and is most frequent in hips. As OA progress the mechanical stress on joint increases, cause degeneration and deformation of a femur head. Due to changes of mechanical conditions in the joint the structure of bone adapts to new loads. The main purpose of the study was to investigate the mechanical and structural properties of the human femoral bone tissue in different stages of osteoarthritis in order to determine correlation between the degree of mechanical anisotropy (DMA) and the structural anisotropy (DA).

Material and Methods: The material study consisted of 26 human femoral heads in different stages of OA that were divided into two groups: form region under the cartilage C and distal D, the nominal size of specimens was 10×10×10 mm.

Structural measurements were conducted using X-rays scans from microtomography SkyScan1172, Bruker ®, while the

mechanical degree of anisotropy was determined by uniaxial compression test in three orthogonal axis.
Results: Results show that the degree of structural anisotropy of the trabecular bone specimens from under the cartilage is grater then the degree of mechanical anisotropy. With the progression of the disease distinction between DA and DMA from region C and D became lower.

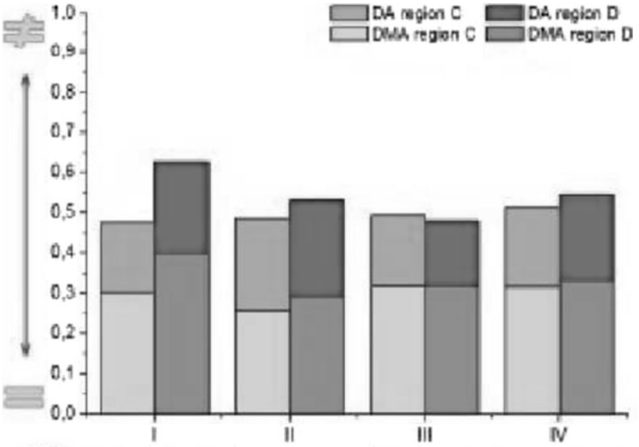

Fig. 1. Mechanical and structural degree of anisotropy for femoral trabecular bone specimens from different stages of osteoarthritis

Conclusion: Results unveil strong correlation between mechanical and structural parameters of the osteoarthritic trabecular in all stages of the OA.
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P683
PREVALENCE OF OSTEOPOROSIS/OSTEOPENIA, VERTEBRAL FRACTURES AND KYPHOSIS IN PATIENTS WITH NONADVANCED BREAST CANCER DUE TO RECEIVE AROMATASE INHIBITORS

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Objective: The treatment with aromatase inhibitors (AI) may reduce bone mass and increase the risk of vertebral fractures (VF). Our aim was to analyze the prevalence of osteoporosis/osteopenia, VF and kyphosis in women with non-advanced breast cancer who were to receive AI.
Material and Methods: 121 women (median age 62 years, 34–80) were prospectively included in the study. A lateral X-ray of the dorsal and lumbar spine was obtained in all patients before treatment to assess VF and kyphosis, as well as a DXA scan.
Results: 7.4 % of X-rays displayed at least one VF (9/121): two at T7 (grades IC and IIIC), one at T8 (IC), one at T12 (grade IA), two at L1 (grades IIA and IIB), one at L2 (grade IIC), one at L4 (grade IIA) and one with multiple fractures at L1, L3 and L5. 38.8 % of all the patients had a normal bone mass, 43.8 % had osteopenia and 17.4 % osteoporosis by OMS criteria. Fractures before treatment were more prevalent in women older than 65 years (16 % vs. 1.4 %, p=0.004). All women with VF had abnormal bone mass: osteoporosis (5/9) or osteopenia (4/9) (p= 0.001). Women with VF before treatment had a nonsignificant trend towards diminished lumbar bone mass (p=0.052), whereas the bone mass at the femoral neck and total hip was significantly decreased. 8 of the 9 patients with VF (6.6 % of all X-rays) showed some degree of kyphosis (median 11°, 5–20). One of the VF patients had 0° kyphosis.
Conclusion: Our prevalence of VF is slightly lower than that of general population of a similar age. All women with VF had low hip bone mass. The lack of significance of the decreased lumbar bone mass may come from the reduction in vertebral body height in cases with VF. Our results highlight the relevance of this problem in this specific subset of patients who may already have low bone mass and VF before beginning AI.

P684
VITAMIN D DEFICIENCY AND ITS RELATION TO PHYSICAL CAPACITY IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

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Objective: Osteoporosis is an important comorbidity in patients with chronic obstructive pulmonary disease (COPD). One important risk factor is Vitamin D deficiency. Vitamin D status was associated with BMD and functional exercise capacity in COPD patients in a previous study in the Netherlands (Romme et al. 2012). Therefore, we studied the prevalence of vitamin D deficiency and its possible relationship with physical function in German COPD patients.
Material and 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 (informed consent). Blood samples and physical function data were obtained at the beginning of the hospital stay. 25-hydroxyvitamin D (25-OH-D) was measured in serum by an automated method (Roche Diagnostics). Further, all participants were tested for the maximum inspiration force (PI) and for the 6-Minute-Walking-Distance (6MWD).

Results: 376 participants were studied (245 males, 131 females). The serum 25-OH-D was 40±30 nmol/l (nM), mean ±SD. The minimum was 5 nM and the maximum 169 nM. There was no gender difference and no significant correlation with age. 73 % of the participants had vitamin D deficiency (defined as a serum 25-OH-D concentration below 50 nM). 25-OH-D exhibited a slight seasonal variation (32±30 nM in winter vs. 48±28 nM in summer, $p<0.05$). There was no significant association of 25-OH-D with 6MWD ($p=0.33$). However, the patients with vitamin D deficiency (25-OH-D <50 nM) exhibited a positive association between serum 25-OH-D and maximum inspiration force (PI), $p<0.01$.
Conclusion: We found a high prevalence of Vitamin D deficiency in German COPD patients. This is not only important for the risk of secondary osteoporosis, but probably also for the pulmonary function. Vitamin D deficiency was associated with less inspiration force. However, a causal relationship has yet to be proved.
References: Romme et al. Ann Med 2013;45:91

P685
BONE MINERAL DENSITY EVALUATION IN RATS SUBMITTED TO DAILY DIET OF COFFEE AND SOFT DRINKS

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Objective: To investigate and compare the effects of coffee and soft drinks (Coca-Cola and Guaraná) in bone metabolism in male and female rats, by assessing BMD.
Material and Methods: A total of 80 rats (Rattus norvegiau Albinus, Wistar), 40 males and 40 females were used, 8 groups of 10 animals each were divided into: Group 1 and 2: control group which received only water, Groups 3 and 4: water management and coffee; Groups 5 and 6: water and Coca-Cola soft drink; Groups 7 and 8: water and guaraná soft drink. All the left femora from each animal were dissected and examined by DXA and the BMD was obtained. Data were tabulated and statistical analysis was performed using ANOVA and Tukey test.
Results: For females, significant differences were found when all groups except for Coca-Cola X guarana ($p>0.01$) were evaluated. No differences between groups were found for males. Comparing sexes, there were differences for all groups except for the control group ($p>0.01$).
Conclusion: BMD of rats was unaffected by coffee or soft drinks. For females BMD was significantly affected by soft drinks and coffee intake being the coffee which caused more bone reduction, thus representing a risk factor for bone quality of the femoral region studied.
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Acknowledgements: CAPES-Brazil

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OSTEOPOROSIS PROGRESSION AT PATIENTS WITH RHEUMATOID ARTHRITIS IN DIFFERENT TYPES OF TREATMENT—EXTENSIVE STUDY

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Objective: We evaluated the progression of osteoporosis at patients with rheumatoid arthritis and osteoporosis in therapy with bisphosphonates at two groups of patients; one in remissive treatment with leflunomid or methotrexate versus biological agent, in a retrospective study for a 6-year period of time, 2007–2013.
Material and Methods: We have analyzed a number of 54 patients split in two homogeneous groups - each with 27 patients; all the patients have been diagnosed with osteoporosis. The A Group has received a treatment with 20 mg of leflunomid daily and non steroidal anti-inflammatory drugs or methotrexate, 20 mg per week. The B Group has received a treatment with biological agents. Both groups have received bisphosphonates in therapeutic doses being evaluated for osteoporosis. We also mention that at 12 patients treated with leflunomid there was necessary corticosteroids therapy in doses of 16 mg/day with a diminishing level of 8 mg on a period of 2 up to 6 months; the patients with methotrexate did not need corticoids therapy during the study. Patients in biological therapy did not need corticosteroids therapy.
Results: The A group of study presented the maintenance of median of T-score at −2.9 SD. The B Group of study presented the diminishing of the level of osteoporosis from a T-score from −3.9 to 3.0. These levels showed osteopenia in the witness group a T-score from −1.8 to −2.4 with a passing to osteoporosis at 6 patients who needed to receive bisphosphonates.
Conclusion: The diminishing level of osteoporosis with 0.2 SD per year at the group of patients in therapy with biologic agents as compared to the group treated with leflunomid proves the fact that despite the beginning of the first group with lower values it obtained better results in both reducing the level of disease activity and the pathogenic immune inflammatory context. The patients treated with methotrexate

have received the same result as group threated with biological therapy.

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CHANGES IN BONE MASS, VERTEBRAL FRACTURES AND KYPHOSIS IN PATIENTS WITH NONADVANCED BREAST CANCER TREATED WITH AROMATASE INHIBITORS, CALCIUM, VITAMIN D AND IBANDRONATE

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Objective: Aromatase inhibitors (AI) can decrease bone mass and increase the risk of vertebral fractures (VF). This secondary effect can be prevented at least partially with a concomitant treatment with calcium, vitamin D and bisphosphonates. Our aim was to study the evolution of bone mass, VF and kyphosis in women with nonadvanced breast cancer who had begun AI and calcium, vitamin D plus monthly ibandronate.

Material and Methods: 118 women (median age 62 years, 34–80) were prospectively included in the study. A lateral dorsal and lumbar spine X-ray and a DXA-scan were obtained at the onset of treatment and after 1 year. Differences in bone mass between patients with or without VF, changes in VF pattern and kyphosis progression were studied.

Results: Treatment adherence was 99 %. Baseline lumbar, femoral neck and total hip bone mass increased significantly ($p<0.0001$) after 1 year of treatment without significant differences between patients with and without VF (P=NS). Women with baseline VF exhibit a higher risk of subsequent fractures in the X-ray at 1 year (77.8 % vs. 22.2 %, $p<0.0001$). Two X-rays (1.7 %) displayed VF not present in baseline X-ray (one at L1 grade IIB and one at L3 grade IIC). Two (1.7 %) X-rays showed progression in fracture grade (from IA to IIA, from IC to IIIC) and three demonstrated increase of the degree of kyphosis. Globally, five patients showed new fractures or some kind of fracture worsening.

Conclusion: The treatment with calcium, vitamin D and ibandronate increases bone mass in patients with nonadvanced breast cancer treated with AI. Despite that fact, two patients had new VF and about one third of our patients with previous VF exhibited fracture worsening. These data can be useful both in primary and secondary prevention in this specific subset of patients, including other therapies like preventive vertebral body cementation in women with fractures at the onset of treatment.

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BONE MASS AND FRACTURE RATE IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE

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Objective: Patients with inflammatory bowel disease (IBD) suffer 20 % more fractures than healthy people. The risk of fracture in IBD increased by 59 % for hip and 74 % for vertebral fractures, but the pathomechanism of these fractures has not yet been clarified. Our study aimed to study the bone mineral mass in IBD patients and looking for the role of low bone density in the increased fragility.

Material and Methods: 110 IBD patients (54 men and 56 women, aged 35.2±17 years) with IBD (80 colitis ulcerosa and 30 Crohn's disease) were involved into the study. 110 age- and sex-matched patients with suspected metabolic bone disease due to other reasons and regularly referred for BMD measurement were used for comparison. BMD of the lumbar spine, hip and proximal forearm were measured by Prodigy (GE Lunar) densitometer, and Z-scores were evaluated. Previous low- trauma fractures were also registered.

Results: 23 patients with IBD has suffered fractures (RR: 1.41, CI 1.27–1.56). Normal bone density was found in the total IBD group (Z-scores as follows: spine: −0.67, femoral neck: −0.44, total hip: −0.51, radius: −0.48, $p>0.1$) as well as in the 31 IBD patients of age more than 40 years (Z: −0.65, −0.38, −0.25, −0.39, respectively, $p>0.1$). Bone mass of IBD patients with fractures showed a borderline decrease of BMD (Z: −0.79, −0.57, −0.67, −0.55, respectively, $p=0.05$). Patients with suspected other bone diseases had significantly lower BMD for spine, femoral neck and radius than that of IBD patients.

Conclusion: IBD patients have normal BMD, in spite of their higher fracture rate. Compared to other metabolic bone diseases, IBD produces higher fragility by a different mechanism which seems to be independent of bone mineral mass.

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MORBID OBESITY, VITAMIN D DEFICIENCY AND DESTRUCTIVE OSTEOARTHRITIS

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Objective: Morbid obesity is known to be associated with impaired glucose tolerance, arterial hypertension and fatty liver infiltration. Morbid obesity is, however, also associated with musculoskeletal disorders, in particular destructive inflammatory osteoarthritis. The aim was to describe a cohort of 10 patients with morbid obesity, vitamin D deficiency and destructive osteoarthritis.
Material and Methods: All patients were women, 3 premenopausal, 7 postmenopausal. All had morbid obesity, BMI>40 and metabolic syndrome. All had vitamin D deficiency. Rheumatoid factor was negative and C-reactive protein was mildly increased.
Results: All had destructive inflammatory osteoarthritis manifesting with severe pain and causing mobility impairment. In 2 of the patients successful dieting had as a result weight loss. Subsequently painful inflammatory osteoarthritis went into remission. The patients were able to stop the anti-inflammatory and analgesic agents they were taking.
Conclusion: We hypothesize that the adipose tissue, especially the abdominal adipose tissue, produces inflammatory cytokines which are responsible for the development of severe destructive inflammatory generalized osteoarthritis. Additionally, in these patients vitamin D deficiency is observed, which may be due to the acute inflammatory response observed in patients with morbid obesity and may contribute to the painful musculoskeletal disorder.

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CLINICAL AND SUBCLINICAL HYPERTHYROIDISM IN ADULT MEN: IMPACT ON THE BONE MINERAL DENSITY AND SOFT TISSUE COMPOSITION

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Objective: Hyperthyroidism associates to reduced BMD and/or osteoporosis and to fragility fractures. In subclinical hyperthyroidism (normal thyroid hormones, suppressed TSH), bone deleterious effects can already be detected due to both bone formation and resorption inhibition by the TSH alone. Moreover, the negative impact of the disease on the lean mass can worsen the risk of falls, which is crucial in the physiopathology of osteoporotic fractures. Evaluation of the subclinical and overt hyperthyroidism effects on the BMD and in the body soft tissue composition of elderly men.
Material and Methods: A group of 86 men older than 50 years were divided in the subclinical (n=13), the overt hyperthyroidism (n=30) and two control groups (n=13 and n=30). The BMD (g/cm^2) at the lumbar spine (L_1-L_4), at the hip, at the distal radius (1/3 or 33 %) and at the whole body, as well as the total body soft tissue composition (lean and fat masses, kg) were evaluated by DXA (Hologic QDR Discovery W). Fasting blood collection was performed to measure: TSH, FT4, FT3, pituitary hormones levels and bone remodelling markers. The hyperthyroid subgroups were paired to otherwise normal men (control subgroups). No patient was previously treated for hyperthyroidism or low bone mass/osteoporosis. Descriptive, Anova and regression analysis statistical tests were used.
Results: The means of the total body masses and the BMD between the subclinical hyperthyroidism and the control were identical. Overt hyperthyroidism subgroup, the mean BMD in all skeletal regions except L_1-L_4 (total hip g/cm^2 1.019 (±0.1) vs. 0.934 (±0.1) p0.0053; distal radius g/cm^2 0.762 (±0.05) vs. 0.706 (±0.08) p0.0086); the mean total lean mass (57.4 (±8.2) vs. 53.1 (±6.1) kg, p0.0337) were significantly lower.

Table 1. The mean (±SD) anthropometric data, the mean total body lean mass and the mean BMD at several skeletal sites in the overt hyperthyroidism and respective control subgroups.

Subgroups / Variables	CONTROL (n=30)	OVERT HYPERTHYROIDISM (n=30)	P
Age *years*	63.7 (±8.0)	63.7 (±7.9)	NSD
Weight *kg*	80.3 (±13.4)	73.0 (±10.8)	0.0284
Height *m*	1.69 (±0.06)	1.69 (±0.06)	NSD
Total body lean mass *kg*	57.4 (±8.2)	53.1 (±6.1)	0.0337
BMD total hip *g/cm²*	1.019 (±0.1)	0.934 (±0.1)	0.0053
BMD distal radius *g/cm²*	0.762 (±0.05)	0.706 (±0.08)	0.0086
BMD whole body *g/cm²*	1.174 (±0.1)	1.115 (±0.1)	0.0283

Conclusion: The results of this study suggest that the body composition in a group of subclinical hyperthyroid adult men is similar to normal, while in the overt hyperthyroidism there are significant decreases in the cortical bone and in the lean mass.

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VITAMIN D DEFICIENCY IN HUNGARIAN CHILDREN WITH TYPE 1 DIABETES MELLITUS OR IMPAIRED GLUCOSE TOLERANCE

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Objective: A growing body of data suggest that vitamin D status has a significant impact not only for bone health but also for the general health, including the avoiding of some malignancies, autoimmune or metabolic diseases. Diabetes mellitus is one of the largest social-medical problem worldwide, and vitamin D status probably plays an important role in the development of this disease. The aim of our study was to estimate the occurrence of vitamin D deficiency in Hungarian children with type 1 diabetes mellitus (DM-T1) and in impaired glucose tolerance (IGT).
Material and Methods: 180 children (healthy, DM-T1 or IGT) of both genders between 4 and 18 years of age were involved into the study (BMI 3-97 percentiles). Fasting serum level of 25OHD3 was determined in all cases. BMD for lumbar spine and for total body were also measured by a Hologic Discovery bone densitometer.
Results: Normal 25OHD levels (>30 ng/ml) were found in 17 % of healthy, 18 % of IGT and 18 % of DM-T1 children. Insufficient vitamin D status (25OHD: 20–30 ng/ml) was found in 83 %, 31 % and 44 %, respectively. Vitamin D deficiency (25OHD <20 ng/ml) was not detected among healthy children while it occurred in 42 % of IGT and 36 % of DM-T1 participants. Severe vitamin D deficiency was found in 5 % of IGT and 2 % of DM-T1. All differences were significant between the pathologic and the healthy groups while no difference was shown between the IGT and DM-T1 groups. BMD Z-scores were found below −2 in 37 % of IGT and in 25 % of DM-T1 but only 0.3 % in healthy children. Relationship between vitamin D status and bone mass is under evaluation.
Conclusion: These results provide further argument that vitamin D deficiency has harmful potential to the development of DM-T1 not only in adults but in childhood as well. Parallel detection of low bone mineral mass suggest that these pathologic conditions in the period of body and bone development can play an important role in the higher fragility observed in adults with diabetes mellitus.

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CINACALCET IN THE TREATMENT OF PRIMARY HYPERPARATHYROIDISM

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Objective: Primary hyperparathyroidism is currently recognized with increasing frequency by routine calcium measurement in biochemical examinations. Primary hyperparathyroidism may be due to a parathyroid adenoma, parathyroid hyperplasia and, rarely, parathyroid carcinoma. Cinacalcet is used in the medical management of primary hyperparathyroidism. The aim was to assess the role of cinacalcet in the treatment of primary hyperparathyroidism.
Material and Methods: Patients with primary hyperparathyroidism (n=20) (aged 56–85 years) were studied. Amongst them 4 patients had parathyroid hyperplasia and 16 had a parathyroid adenoma. Calcium and PTH levels were increased in all patients. All patients had ultrasonography and a ^{99m}Tc-Sestamibi scan. In 16 patients a parathyroid adenoma was observed either on ultrasound or on scanning or in both. In 4 of the patients a parathyroid adenoma was not localized by imaging.
Results: Cinacalcet was used in all 16 parathyroid adenoma patients to normalize serum calcium levels prior to surgery. In 10 of the parathyroid adenoma patients the adenoma was surgically excised, in a female aged 56, hyperparathyroidism recurring a year after surgery. Sequentially, cinacalcet was administered at a dose of 30 mg twice daily and serum calcium levels normalized. Within the group of patients with a parathyroid adenoma 6 were elderly, aged >75 years, with comorbidity and cinacalcet was administered at a dose of 30 mg twice daily in 3 and 60 mg twice daily in 1 to avoid surgery. In the group of patients with parathyroid hyperplasia cinacalcet was used for the treatment of hypercalcemia. Within the whole group, 2 patients experienced mild gastrointestinal symptoms, but discontinuation of the drug could be avoided.
Conclusion: Cinacalcet may be used for the treatment of primary hyperparathyroidism. It can be used for the normalization of serum calcium prior to surgery, if surgery is not an option, in the event of recurrence after surgery and in parathyroid hyperplasia.

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JAW OSTEONECROSIS IN A PATIENT WITH POSTMENOPAUSAL OSTEOPOROSIS ON ANTIRESORPTIVE TREATMENT

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Objective: Postmenopausal osteoporosis is a common condition affecting many women. Management of postmenopausal osteoporosis involves the administration of vitamin D, calcium and antiresorptive agents. The long-term management of postmenopausal osteoporosis with antiresorptive agents may present some dangers and adverse effects such as bone necrosis or atypical bone fractures. The aim was to describe the case of a female patient with postmenopausal osteoporosis who presented with acute pain in the jaw and was diagnosed with jaw osteonecrosis.

Material and Methods: A female patient, aged 68, presented with acute pain in the left side of the mandible after a tooth extraction. X-ray examination revealed jaw osteonecrosis. The patient had postmenopausal osteoporosis. She had presented with premature menopause at the age of 40 and had been treated with oestrogens. Thereafter alendronate had been administered. Alendronate was discontinued and a year later denosumab was initiated. The patient presented with acute jaw pain lasting for a month. As she had periodontitis, she attributed the pain to this affliction.

Results: CT examination revealed osteonecrosis of the mandible. Antibiotics were administered and oral hygiene with chlorhexidine was instructed. The patient adhered and the pain improved, not ceasing, however, completely.

Conclusion: Jaw osteonecrosis is a rare adverse effect of antiresorptive therapy for postmenopausal osteoporosis. It is known to occur especially in patients with poor oral hygiene and may be related to excessive suppression of bone turnover. It can cause diagnostic difficulties as the intense pain may be attributed to various dental problems that the patient may be experiencing. Management of jaw osteonecrosis involves the administration of antibiotics, oral hygiene with chlorhexidine and in some cases surgical removal of the affected bone.

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CHRONIC OSTEITIS DUE TO CANDIDA ALBICANS IN AN IMMUNOCOMPETENT PATIENT

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Objective: Osteoarticular fungal infections are rare. Their occurrence is favored by invasive procedures, surgery, diabetes, broad spectrum antibiotics and immunosuppression.

Material and Methods: We report a case of chronic osteomyelitis of the leg to Candida albicans in a young immunocompetent patient.

Results: Z.S. 37 years old, with a history of Crohn's disease, adrenal insufficiency, chronic osteomyelitis of the left fibula in 2003, a bone graft in 2011 and a bacterial bone infection in 2013, was hospitalized for fever, bone pain at the left leg. Physical examination is a painful inflammatory closet at the outer side of the left leg with a fistula making welling of yellowish serous fluid. Biologically, she had leukopenia 3,600/mm^3, CRP 36 mg/l. Radiography of the leg showed images of osteolysis and a periosteal reaction to the tibial and fibular level. The diagnosis of bacterial osteomyelitis was raised and the patient was treated with two antibiotics (cefotaxime and fosfomycin). The evolution was marked by persistent fever with worsening local inflammatory signs. The patient was then operated. The mycological examination of intraoperative specimen isolated *Candida albicans*. Antifungal therapy (fluconazole) at a dose of 400 mg/day for a total period of 6 months was established. The outcome was favorable.

Conclusion: Bone and joint infections due to *Candida* are rare. They are dominated by spondylodiscitis. The osteitis of long bones are less frequent. Their clinical presentation is nonspecific. Their diagnosis is often delayed. The prognosis depends on the terrain and the time of initiation of appropriate antifungal therapy.

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THE RISK OF OSTEONECROSIS OF THE JAW IN TAIWANESE OSTEOPOROTIC PATIENTS TREATED WITH ORAL ALENDRONATE OR RALOXIFENE

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Objective: To explore the possible association between osteonecrosis of the jaw (ONJ) and oral alendronate or raloxifene used for osteoporosis and to estimate its absolute and attributable risks in Taiwanese population.

Material and Methods: Using an electronic medical records system and manual confirmation of ONJ, we identified patients who began taking alendronate or raloxifene for osteoporosis and developed ONJ between January 2000 and April 2012.
Results: The frequency of ONJ related to oral alendronate over a 12-year period was 0.54 %. The incidence rate of ONJ attributed to alendronate exposure was 280 per 100,000 persons per year. On multivariate Cox proportional analysis, adjusting for the potential confounders, alendronate remains an independent predictor for ONJ occurrence (HR 7.38 [1.01–53.78]) compared with raloxifene. Advanced age, drug duration, coexisting diabetes and rheumatoid arthritis are contributing factors to the development of oral alendronate-related ONJ.
Conclusion: We provided the evidence to support the association of ONJ with oral alendronate used in treating or preventing osteoporosis.

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SERUM CTX AND P1NP AND THEIR CORRELATION WITH BMD IN POSTMENOPAUSAL WOMEN WITH LOW BONE MASS: DATA FROM ARZOXIFENE GENERATION TRIAL

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Objective: Bone turnover markers (BTMs) have been used in clinical trials to understand the therapeutic agents' mechanism of action, to evaluate adherence to treatment, predictors of changes in BMD loss and fracture risk. The objective of this study was to evaluate serum BTMs in postmenopausal Brazilian women with low bone mass.
Material and Methods: The source was a subset from the phase III trial of Arzoxifene Generation Trial (n=619), comprised of low bone mass patients, 60–85 years old. Measurements of serum P1NP (Orion Diagnostica, Espoo, Finland), serum CTX (Crosslaps ELISA Nordic Bioscience Diagnostics AS, Herlev, Denmark), alkaline phosphatase, ionized calcium, creatinine and baseline BMD (lumbar spine, neck and total hip) were measured. Statistical analysis was performed by program SPSS 17.0. Median (minimum and maximum) were calculated for all parameters and Spearman correlation, when appropriate, as well as distribution of BTMs.
Results: Median (minimum and maximum) for age, CTX and P1NP were, respectively, 66.0 (60–85) years, 0.580 (0.099–1.929 ng/mL) and 47.9 (8–158.0 μg/L). Distribution of CTX and P1NP with percentiles 5, 25, 50, 75 and 95 % was, respectively, 0.24, 0.42, 0.58, 0.78, 1.15 and 24.1, 36.9, 47.9, 61.7, 90.3. Both BTMs were in the normal range of each method (0.142–1.351 ng/mL and 16–96 μg/L, for CTX and P1NP, respectively). Correlation between both BTMs was high (r=0.72). Both BTMs are correlated with alkaline phosphatase: CTX (r=0.36) and P1NP (r=0.46). Negative correlations were noted between CTX (r=−0.20, p<0.001) and P1NP (r=−0.18, p=0.001) with lumbar spine T-score. CTX (r=−0.13, p<0.001) and P1NP (r=−0.12, p=0.001) were correlated with age.
Conclusion: Median BTMs were in the normal range. Negative correlation between BTMs and lumbar spine and age was found. These values can help as a Brazilian reference database for postmenopausal women with low bone mass.
Disclosures: Dr. Chiang is Eli Lilly's employee.

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ANALYTICAL STUDY ON JAPANESE HEALTH EDUCATION TEXTBOOKS FOR ELEMENTARY AND HIGH SCHOOL STUDENTS ON OSTEOPOROSIS

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Objective: As appropriate habits and behaviors from a young age can help prevention of osteoporosis, school health education is important. We observed and evaluated the description content on osteoporosis in Japanese health education textbooks.
Material and Methods: All the health education textbooks in use in elementary, junior and senior high schools in Japan were analyzed for comparison.
Results: All the textbooks for lower grades of elementary students (ages 9–10) devote 2–3 pages for a unit named "Better Body Growth" which contains the sentences, "calcium makes the bone and tooth" and "exercise makes bone strong", those basic and important facts. There is nothing described in the textbooks for higher grades of elementary students (ages 11–12) on bone health. All the textbooks for junior high students (ages 13–15) have 2 pages each for "diet and health" and "exercise and health", there contains the sentences, "exercise increases bone mass/density", "young time behavior dictates bone growth" and 3 out of 4 of them shows figures of osteoporosis bone, but only one textbook describes the word "osteoporosis". All the senior high textbooks have the word "osteoporosis" related with aging or life time health. Calcium deficiency is mentioned in two textbooks of each high school, and two of senior high textbooks are mentioned "phosphorus prevents absorption of calcium". Figure of osteoporosis bone is not found in the senior high textbooks.
Conclusion: Very basic issues of bone development both on nutrition and exercise are described for the lower primary students which should be valued for the early education.

And also there are not a little scientific description on bone health in high school textbooks relevant to many aspects of the life stage. Although uninterrupted education supposed be considered in higher grades of elementary years which is important period for the bone growth.

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RADIOLOGICAL AND CLINICAL PROFILE OF OSTEOARTHRITIC PATIENTS UNDERGOING TOTAL KNEE REPLACEMENT SURGERY

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Objective: Arthritic conditions are extremely painful for the patient and are associated with a significant reduction in health related quality of life (HRQOL), mainly in term of physical and functional impairment. Therefore, the demand for total joint replacement (TJR) is increasing. The objective of the present study was to access the demographic information, radiological and clinical presentation of osteoarthritic patients undergoing of total knee replacement surgery.
Material and Methods: We analyzed the demographic information, preoperative radiologic (Kellgren-Lawrence score) and clinical status (HRQOL - EQ-VAS) of 279 consecutive patients undergoing total knee replacement for symptomatic osteoarthritis of the knee. We compared also the clinical parameters in 2 groups according to age (≤ or >65 years). Specific HRQOL was assessed with the WOMAC Index and the health with the EQ-VAS. These questionnaires were administered preoperatively. Student t-tests were used to compare mean values of BMI, duration of complaints, EQ-VAS and WOMAC in the two age groups. ANOVA was performed to compare mean values of EQ-VAS and WOMAC according to the Kellgren-Lawrence score.
Results: Our cohort included 127 men and 152 women aged from 39 to 86 years (mean 66.8±8.9 (SD)) and with a BMI of 29.3±4.7. 123 of them received left knee prosthesis and 126 of them right knee prosthesis. 124 (44.4 %) were ≤65 years and 155 (55.6 %) were >65 years.
The mean duration of complaints was 3889.2 days±3890.8 or 10.7 years±10.7 years. They were all diagnosed with primary OA following the ACR criteria. Mean BMI and mean duration of complaints were statistically different (higher in patient's group ≤65 years) in the two age groups. 272 pre-operative X-ray assessments were available and analyzed. Out of the 272, 4.4 % (n=12) were presenting with a KL-score of 1; 15.8 % (n=43) were presenting with a KL-score of 2; 68.8 % (n=187) with a KL-score of 3 and 11 % (n=30) with a KL-score of 4. There was no difference in the two age groups. The mean WOMAC score values were 10.9±3.7 for pain, 4.5±1.9 for stiffness, 36.4±12.8 for physical function. The total WOMAC score was 51.9±16.9 (0–96). The mean value EQ-VAS health was 64.9 (mean)±16.2 (SD).
There was no difference in the two age groups. Mean EQ-VAS value and WOMAC were not statistically different between the various KL-score groups:

KL-Score	Mean EQ-VAS	Mean WOMAC
1 *n=12 (4.4%)*	59.6 ± 11.4	62.6 ± 15.6
2 *n= 43 (15.8%)*	66.3 ± 18.3	50.4 ± 15.5
3 *n= 187 (68.8%)*	65.3± 16.3	51.7 ± 17.4
4 *n= 30 (11%)*	65.8 ± 16.6	54 ± 18.4
	P = 0.65	*P = 0.15*

Conclusion: We concluded that patients undergoing total knee replacement in a University setting, in Belgium, do present with a moderate to severe radiological OA. Independently of the age and the radiographic stage, all patients undergoing total joint replacement have similar symptomatic features. The patients aged <65 years had higher BMI and longer duration of complaints. Surgical decision process is mainly related to impairment of pain and function.

P699
TRABECULAR BONE SCORE (TBS) IMPROVES IDENTIFICATION OF OSTEOPENIC POSTMENOPAUSAL WOMEN SUSCEPTIBLE TO OSTEOPOROTIC FRACTURES: POLISH STUDY

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Objective: Most osteoporotic fractures occurs in patients classified as osteopenia according to WHO definition. The aim was to assess whether TBS can differentiate postmenopausal osteopenic women with previous osteoporotic fractures from those without and to estimate how TBS can improve assessment of fracture risk in these patients.
Material and Methods: 392 female patients of Osteoporosis Specialty Outpatient Clinic in Poznan, Poland were recruited to the study. For each of them fracture status was reviewed in medical record and vertebral fractures (VFs) were identified by VFA. Spine DXA images of all subjects (Lunar Prodigy) were reanalyzed using TBS iNsight software. Further analysis

considered only women with -1.0<T-scores<−2.5, who were compared in terms of TBS, fracture status and location. 3 recommended thresholds of TBS were applied.

Results: In 145 osteopenic women aged 50–92 (mean 70.1 years), we identified 50 previous major osteoporotic fractures (osteoFx), including 24 VFs Genant grade 2/3. Mean TBS for osteoFx was 1.13 vs. 1.21 for nonfractured (p=0.005); In VFs, patients mean TBS was 1.08 vs. 1.20 in women without VFs (p<0.0003). 68 % of osteoFx subjects were below the lowest TBS tertile and 10 % were over the highest one. In women with VFs 87.5 % had TBS<1.200 and only 4 % TBS>1.350. The difference was significant (p=0.0005). Comparing women with and without osteoFx depending on TBS thresholds, ORs were respectively: 3.6 for L vs. H tertile (p=0.014) and 2.7 for L vs. M tertile (p=0.016). Risk of VFs was 9.90 for L vs. H tertile (p=0.009) and 8.52 when compared L vs. M tertile (p=0.001). There was no difference between tertiles M and G.

Conclusion: 1. The relationship between TBS and fractures in women with osteopenia is significant - the probability of fracture increases with TBS decrease.

2. TBS improves fracture risk assessment in osteopenic female patients, particularly identification of women susceptible to vertebral fractures.

3. In osteopenia TBS<1.200 is related to 10 times higher risk of vertebral fracture as compared to TBS>1.350.

P700

THERAPEUTIC EFFECT VISCOSUPLEMENTA AND LOCAL INFILTRATION OF CORTICOSTEROID IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objective: To evaluate the therapeutic effects of infiltration corticosteroids (C) and hyaluronan sodium in patient suffering from knee osteoarthritis.

Material and Methods: Clinical study included 45 patients (27 women and 8 men) between the ages of 41–68 year, an average of 54.5±8.2 treated at the Institute of rheumatology. The duration of illness ranged from 0.6 to 5 years, the average 2.8.g. (3.1±0.5). Length of the last deterioration was 2–7 months (6.2± 1.2). The study included patients with knee osteoarthrosis II and III level by Kellgren-Lawrence without effusion, who previously did not have a positive therapeutic response to analgesics and NSAIDs or physiotherapy. The diagnosis was based on clinical, X-ray and ultrasound examination. The patients were based on clinical findings randomly divided into two groups: Group I included 20 patients who received local intraarticular infiltration of corticosteroid (dyprophos amp. 7 mg/ml betamethasone) at baseline. II group of 25 patients received intraarticular infiltration of lubricant (GO- ON 25 mg/2.5 ml sodium hyaluronate for three consecutive weeks). Both groups had the same exercises therapy. Clinical evaluation was performed at the baseline, after 1 month and 6 months later. To assess the functional state used the Lequesne index. For statistical analysis of data there were applied SPSS Windows 16.

Results: In both groups of patients after a month of therapy, there was statistically significant improvement of Lequesne index p<0:000. Significant remission was maintained after 6 months I group p<0.002 and II group p<0.000. Comparing the results between I and II groups using Pearson correlation test, II group showed statistically better value p<0.005.

Conclusion: Analysis of the data showed that infiltration of hyluronan was significantly better in patients with knee OA in II and III stage of disease by Kellgren-Lawrence and significantly improves the functional capacity of the knee joint and thereby reducing the progression of the disease.

P701

INFLUENCE OF THE SHARED EPITOPE IN BONE MINERALE DENSITY IN RHEUMATOID ARTHRITIS

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Objective: The most important genetic risk factor for rheumatoid arthritis (RA) is the HLA-class II alleles. In particular, the HLA-DRB1 alleles. The aim of this study is to focus on the association between RA, HLA class II gene (DRB1 and DQB1) and osteoporosis.

Material and Methods: This prospective study was performed on a total of 81 Tunisian patients with RA including 67 women and 14 men (sex ratio 4.78). All patients fulfilled the American College of Rheumatology (ACR 1987) criteria for RA. RA associated with other auto-immune pathologies have been excluded from the study. For each patient BMD was measured in lumbar spine, femoral neck, trochanter, and Ward's triangle. The DNA was extracted from lymphocytes using a commercial kit (Qiagen). The HLA class II (DQB1 and DRB1) was performed by PCR technique specifying-sequence primers (PCR-SSP). The specific products of PCR were analyzed by 2.5 % agarose gel electrophoresis.

Results: Demographic traits of the patients were: mean age 49.17±11.21 years (age 24–78). The disease average duration was 7.44±2.12 years (4 months–29 years), 82.71 % were women and 17.29 % men. Seropositive RA were 80.24 %, and 71 % of RA have anti CCP positive antibody. HLADQ*0201, *0301, *0501 and *0601 were associated with seropositive RA. HLADQB1*0401 and *0302 were also associated with seropositive RA, but with less significance. Four DRB1*0401 were homozygotes and all of them were seropositive RA. The occurrence of osteoporosis is not correlated with the presence of shared epitope (p=0.6). However, the number of patients carrying the shared epitope and with osteoporosis is much lower than in patients without (41

patients against 9). The shared epitope in single dose appears to be a protective factor against osteoporosis ($p<0.001$).

Conclusion: Our results indicate that, in addition to HLA-BRB1 alleles, HLA-DQB1 alleles also augments the genetic susceptibility to seropositive RA.

P702
ANATOMICAL DAMAGE OF WRISTS AND BONE MINERAL DENSITY IN FEMALE PATIENTS SUFFERING FROM RHEUMATOID ARTHRITIS

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Objective: To study the level of anatomical damage on wrists and BMD in female patients suffering from RA, and then to study as to whether there is a correlation between these changes.

Material and Methods: The cross-sectional study covered 100 female patients suffering from RA, who were treated on the Institute of Rheumatology, Nov 2006–Nov 2007. On all the female patients osteodensitometry was performed in the first year after the diagnosis had been made and X-ray images of wrists were also made. The level of anatomical damage on wrists was monitored and assessed applying the Larsen method. A higher value of the Larsen index indicated a poorer condition of the analyzed wrists. Thereafter, a correlation was made between the values of the T-score and the values of the Larsen index.

Results: In the studied sample of female patients, the total value of the Larsen score was 40.46±18.38. By stratification of the values of the scores for the left and the right wrist, it was noticed that the value of the left wrist Larsen score was 20.11±9.27 and, of the right one, it was 20.35±9.44, without a statistically significant difference ($t=-0.696$, $p=0.488$). The total value of the Larsen index was 2.05±1.02. By stratification of the values of the scores for the left and the right wrist, it was noticed that the value of the left wrist Larsen index was 2.23±1.03 and, of the right one, it was 2.26±1.05. BMD was measured in all the female patients and, in 32 (32 %), osteoporosis was established (the T-score -3.35±1.35). From the moment of verification of osteoporosis, 3.41±1.80 years (from 1 to 5 years) passed on average.

Conclusion: Osteoporosis was diagnosed in 32 female patients suffering from rheumatoid arthritis. The Larsen index is statistically highly significantly correlated with the values of the T-score.

References: Larsen A. J Rheumatol 1995;22:1974

P703
PHYSICAL FUNCTION OF PATIENTS WITH KNEE OSTEOARTHRITIS AFTER ARTHROPLASTY

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Objective: Osteoarthritis of the knee is one of the leading causes of disability in the elderly population. Total knee arthroplasty has been shown to be an effective procedure in improving of physical function of these patients. Clinical assessment of patients before knee arthroplasty could predict physical function of patients with knee osteoarthritis after arthroplasty. The aim of this study was to establish correlation between physical function 6 weeks after knee arthroplasty and early rehabilitation with clinical parameters (age, BMI, physical function, pain and stiffness) before arthroplasty.

Material and Methods: Prospective research includes 96 patients (average age 67.5±9.2 years, range of 45–78 years) that underwent total knee arthroplasty after preoperative rehabilitation. Early program of kinesitherapy and occupational therapy was performed. Instrument used for assessment of the physical function, pain and stiffness is modified version of WOMAC Index. All patients completed the questionnaires preoperatively and 6 weeks postoperatively. Pearson test of correlation was used to analyze numerical data.

Results: Physical function 6 weeks after arthroplasty shows significant correlation with physical function preoperatively ($r=0.219$, $p<0.05$), but with age, BMI, pain and stiffness was not.

Conclusion: Results of our research show that physical function of the patients with knee osteoarthritis before arthroplasty influences on the level of physical function after total knee arthroplasty. These findings can be important for creating the program of preoperative rehabilitation and for assessment of indications for knee arthroplasty.

P704
RHUPUS: THE COEXISTENCE OF SYSTEMIC LUPUS ERYTHEMATOSUS AND RHEUMATOID ARTHRITIS

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Objective: The term rhupus is traditionally used for description of the coexistence of systemic lupus erythematosus (SLE) and rheumatoid arthritis (RA). Within a group of 103 SLE cases 10 had rhupus. In 5 of these patients lupus characteristics appeared first and arthritis followed whereas in the rest arthritis appeared either simultaneously or before lupus

characteristics. The aim was to describe two cases of patients with coexistence of SLE and RA or rhupus syndrome.
Material and Methods: Two cases of rhupus, coexistence of SEL and RA are described. Both patients were female, aged 43 and 57 years, respectively. The first patient had the typical clinical picture of RA for 15 years, ulnar hand deviation and typical radiologic RA characteristics. She developed proteinuria, hematuria, leucopenia, low complement C_3 and C_4 levels and positive ANA and anti-dsDNA. Renal biopsy revealed hyperplastic glomerulonephritis. The second patient had SLE for 20 years with positive ANA, light sensitivity, fatigue and diffuse arthralgias. She had taken low dose corticosteroids and hydroxychloroquine. Approximately 6 months ago she appeared with the clinical picture of seropositive RA with symmetric polyarthritis and positive anti-CCP antibodies.
Results: In the first patient, with the appearance of SLE and glomerulonephritis, methylprednisolone and cyclophosphamide pulse therapy was administered with good response. Subsequently, low dose corticosteroids orally and mycophenolate mofetil were given. Arthritis remitted. In the second patient, with the appearance of RA methotrexate 7.5 mg/week and golimumab 50 mg/4 week sc were administered. The patient is now well and inflammation indices are negative.
Conclusion: Two cases of rhupus syndrome are described. In the first RA appeared first and SLE features with renal involvement appeared many years later, whereas in the second SLE features appeared first and RA characteristics appeared 20 years later. In patients with rhupus arthritis is a predominant feature.

P705
IMPACT OF THE SHARED EPITOPE ON THE BONE MINERAL DENSITY IN RHEUMATOID ARTHRITIS

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Objective: It is at present widely accepted that both genetic and environmental factors contribute to the susceptibility and severity of the disease. Indeed, HLA genes have been implicated in one third to one half of RA cases. In particular, the HLA-DRB1 alleles encoding for the shared epitope (SE). The aim of this study is to focus on the association between RA, the shared epitope and osteoporosis.
Material and Methods: This prospective study was performed on a total of 81 Tunisian patients with rheumatoid arthritis including 67 women and 14 men (sex ratio 4.78). All patients fulfilled the American College of Rheumatology (ACR 1987) criteria for RA. RA associated with other autoimmune pathologies have been excluded from the study. For each patient BMD was measured in lumbar spine, femoral neck, trochanter, and Ward's triangle. The DNA was extracted from lymphocytes using a commercial kit (Qiagen). The HLA DRB1 was performed by PCR technique specifying-sequence primers (PCR-SSP). The specific products of PCR were analyzed by 2.5 % agarose gel electrophoresis. All tests include positive and negative controls appropriate for each blood sample.
Results: Demographic traits of the patients were: mean age 49.17±11.21 years (age 24–78). The disease average duration was 7.44±2.12 years (4 months–29 years), 82.71 % were women and 17.29 % men. Seropositive RA were 80.24 %, and 71 % of RA have anti CCP positive antibody. Four DRB1*0401 were homozygotes and all of them were seropositive RA. The occurrence of osteoporosis is not correlated with the presence of shared epitope (p=0.6). However, the number of patients carrying the shared epitope and with osteoporosis is much lower than in patients without (41 patients against 9). The shared epitope in single dose appears to be a protective factor against osteoporosis (p<0.001).
Conclusion: Our results indicate that, the shared epitope alleles augments the genetic susceptibility to seropositive RA.

P706
IMPACT OF THE SHARED EPITOPE IN THE PRESENCE OF ANTI CITRULLINATED PEPTIDE IN RHEUMATOID ARTHRITIS

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Objective: To focus in the association between the shared epitope (SE) and rheumatoid arthritis (RA), and to investigate the involvement of these antigens in predisposition to RA, in the severity of the RA and in the production of anti-CCP antibodies.
Material and Methods: This prospective study was performed on a total of 81 Tunisian patients with RA including 67 women and 14 men (sex ratio 4.78). All patients fulfilled the American College of Rheumatology (ACR 1987) criteria for RA. RA associated with other auto-immune pathologies have been excluded from the study. For each patient BMD was measured in lumbar spine, femoral neck, trochanter, and Ward's triangle. The DNA was extracted from lymphocytes using a commercial kit (Qiagen). The HLA DRB1 was performed by PCR technique specifying-sequence primers (PCR-SSP). The specific products of PCR were analyzed by 2.5 % agarose gel electrophoresis. All tests include positive and negative controls appropriate for each blood sample. The phenotypes of patients were obtained through the Software One Lambda DNA/Software (SSP2L-generic DRB).
Results: Through this work we have confirmed the involvement of the SE in the susceptibility to RA. We also proved that there is a strong correlation between the alleles carrying the SE

(DRB1*0101, *0401) and the presence of anti-CCP. This correlation is particularly strong for HLA-DRB1*0401.
Conclusion: Through this work we confirmed the involvement of the SE in the susceptibility to RA. We also demonstrated that there is a strong correlation between the alleles carrying the shared epitope (DRB1*0101, 0401) and the presence of anti-CCP. This correlation is particularly strong for the HLA-DRB1*0401 allele.

P707
INCREASING TRENDS AND SIGNIFICANCE OF HYPOVITAMINOSIS D: A POPULATION-BASED STUDY IN THE KINGDOM OF SAUDI ARABIA

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Objective: To determine the prevalence and significance of Vitamin D deficiency in Saudi population and to help develop national consensus for its prevention, screening, and management.
Material and Methods: This was a retrospective observational study which involved 10,709 patients, recruited from the department of Family Medicine & Polyclinic, King Faisal Specialist Hospital and Research Centre (KFSH&RC), Saudi Arabia, over a period of 5 years. The endpoints included overall status of vitamin D level and severity of vitamin D deficiency. Serum measurements included 25-hydroxyvitamin D (25(OH)D), parathormone, calcium, phosphate, alkaline phosphatase, albumin levels, eGFR levels, BMD.
Results: A total of 10,709 patients were analyzed; 31.4 % were males and 68.6 % were females, with a preponderance of Saudis (68.5 %) compared to Non-Saudis (31.5 %). The prevalence of vitamin D deficiency was 83.6 % (31.9 % severe, 32.0 % moderate and 19.7 % mild), when cut points of less than 25, 50 and 75 nmol/l, respectively, were used. Mean serum 25(OH)D was 44.58±34.80 nmol/l. There was significant difference in severity of Vit D deficiency stratified by age, gender and nationality. More females had severe 25(OH)D deficiency compared to males (35.6 vs. 23.7 %, $p<0.000$). Severe 25(OH)D deficiency was markedly high among adolescents as compared to other age groups (49.2 % vs. 30.9 %, $p<0.000$). More Saudis were found to be vitamin D deficient compared to Non-Saudis (37.2 % vs. 20.3 %, $p<0.000$).
Conclusion: The prevalence of hypovitaminosis D is significantly high among Saudi population, especially among women, despite abundant sunshine. Vitamin D screening is strongly recommended at an earlier age especially among women and children.

P708
BONE MINERAL DENSITY IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM AFTER PARATHYROIDECTOMY

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Objective: Low BMD and osteoporosis in PHPT is the result of the acceleration of bone metabolism with overproduction of parathyroid hormone and the rate of resorption exceeds bone formation. Progressive decrease in BMD with microarchitectonics deterioration increased bone fragility and risk of fracture. Objective: studying bone mineral density in patients with PHPT after 1 year of surgery.
Material and Methods: We studied 63 patients with PGPT (100 % of men were in the age group up to 50 years, 14 women were of childbearing age and 47 postmenopausal women) general medical examination has been made, indicators of calcium-phosphorus metabolism (PTH, Ca, Ca^{2+}, P) bone markers (alkaline phosphatase, osteocalcin, β-CTX), sonography of the thyroid and PTG, scintigraphy PTG, BMD was also examined. BMD was measured by DXA. Patients with comorbidities and conditions associated with low BMD were excluded from the study.
Results: In the group of postmenopausal women low BMD was detected in of 83 %. In the lumbar spine low bone mass was 74.4 % (1 year after parathyroidectomy positive trend was observed in 44.8 %, 2 % - no changes, 2 % noted progression of osteoporosis). In 59.5 % of patient low bone mass localized at the femoral neck with the positive dynamics after parathyroidectomy in 100 %. In fertile women low bone mass was registered in 14 % of cases, increase of bone density was noted in 100 % after surgery. In men younger than 50 years low bone mass was registered in 100 %, increasing bone density was noted in 100 % after operation.
Conclusion: The findings suggest that 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.

P709
VITAMIN D IS A REGULATOR OF ENDOTHELIAL NITRIC OXIDE SYNTHASE AND ARTERIAL STIFFNESS IN MICE

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Objective: Epidemiological data in humans have shown that vitamin D insufficiency is associated with hypertension, left ventricular hypertrophy, and increased arterial stiffness. However, the underlying pathophysiological mechanisms remain largely unexplained. We aimed here to further elucidate the role of vitamin D in the regulation of cardiovascular function.
Material and Methods: We examined male 3- and 9-month-old mice with a nonfunctioning vitamin D receptor ($VDR^{\Delta/\Delta}$). To normalize mineral homeostasis, the mice were kept lifelong on a rescue diet enriched with calcium, phosphate, and lactose. Central arterial pressure, arterial stiffness and cardiac hemodynamics were assesed using a SPR-671NR pressure catheter. Serum and urinary nitric oxide (NO) concentration was assesed by colorimetric assay (Cayman). mRNA and protein levels of endothelial NO synthase (NOS3) were analysed in aortic material using a quantitative RT-PCR and western blotting. Direct effects of vitamin D signaling on *NOS3* transcriptional activity was asssed in HEK cells after double transient transfection with human *VDR* and *NOS3* plasmids.
Results: Elderly but not young $VDR^{\Delta/\Delta}$ mice showed increased heart/body weight ratio and left ventricular muscle mass. Mean arterial pressure as well as renal renin expression and serum aldosterone were unchanged in young and older $VDR^{\Delta/\Delta}$ mice on rescue diet. However, arterial catheterization revealed profoundly increased central pulse pressure together with increased arterial stiffness, increased aortic impedance, structural remodeling of the aorta, and impaired systolic and diastolic heart function in elderly, but not in young $VDR^{\Delta/\Delta}$ mice. Furthermore, young and older $VDR^{\Delta/\Delta}$ mice were characterized by lower bioavailability of the vasodilator NO, and showed decreased aortic expression of endothelial NOS3, the main regulator of vascular NO levels. Conversely, incubation of mouse aortic rings with $1,25(OH)_2D_3$ increased *NOS3* mRNA abundance in vitro. Finally, stimulation with $1,25(OH)_2D_3$ significantly increased NOS3 expression in HEK cells transfected with human *VDR* and *NOS3* plasmids indicating that $1,25(OH)_2D_3$ is a direct transcriptional regulator of NOS3.
Conclusion: Our data demonstrate the importance of intact VDR signaling in the preservation of vascular function, and may provide a mechanistic explanation for epidemiological data in humans showing that vitamin D insufficiency is associated with hypertension and endothelial dysfunction.

P710
ULTRASONOGRAPHY AS A TOOL IN THE ASSESSMENT OF FEMORAL CARTILAGE IN RHEUMATOLOGY PATIENTS

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Objective: To compare the femoral cartilage thickness values in patients with osteoarthritis (OA), rheumatoid arthritis (RA), systemic lupus erythematosus (SLE) and ankylosing spondylitis (AS) using ultrasonography.
Material and Methods: Twelve patients with OA, 10 patients with RA, 7 patients with SLE and 6 patients with AS were enrolled in this cross-sectional study. The mean age was 63.41 ±5.03 in OA group, 50.1±10.32 in the RA group, 38.71±6.01 in SLE group and 42.83±4.35 in the AS group. The thickness of femoral articular cartilage was measured using an ultrasound high frequency linear probe, having the patient in supine position, with knees fully flexed, taking three midpoint measurements: at the lateral condyle, intercondylar area, and medial condyle.
Results: The SLE and AS patients had thicker cartilage values than the RA and OA groups at all measurement sites. There was a correlation between the presence of the corticosteroid treatment and the cartilage thickness values in RA and SLE patients. Patients with RA, without CS treatment tend to have a thinner cartilage, comparable to patients in OA group.
Conclusion: These findings could be explained by the fact that the mean age of the SLE and AS patients is lower than in the other groups and by the fact that the corticosteroid use could be protective for the cartilage and could lead to an increased thickness, probable through favorable effects on chondrogenesis.

P711
OSTEOPOROSIS ASSESSMENT IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objective: Taking into consideration the fact that osteoarthritis (OA) and osteoporosis (OP) can lead to important change in the quality of patient's life and to increased medical care costs, a possible relation between them is highly relevant for the appropriate management. Aim: To measure BMD in primary knee osteoarthritis and to detect if there is difference between mild and severe deforming symptomatic OA.
Material and Methods: This is a cross-sectional study which involved 30 consecutive patients diagnosed with primary knee OA. Using a Kellgren-Lawrence score on the bilateral

anteroposterior weight bearing position knee radiographs, the OA was classified based on joint space width in medial compartment as follows: mild knee OA when the space is >1.5 mm and advanced knee OA, when the space is <1.5 mm. All the patients were assessed by DXA in the lumbar spine, femoral neck and arm.

Results: Based on the joint space we had 21 patients with mild knee OA and 9 patients with severe knee OA, with mean age of 63.0±6.66 and 72.11±11.06 years. When evaluating the osteoporosis in the femoral neck, we took into consideration the side with highest T-score. In patients with mild OA, the T-score in the femoral neck was −2.18±0.7 and −2.88±0.78 in severe OA. Mean lumbar spine T-score in mild OA group was −1.93±0.61 and −2.3±0.32 in severe osteoarthritis respectively. DXA of the arm showed a T-score of −1.96±0.56 in the mild OA and - 2.03±0.46 in the severe OA.

Conclusion: Femoral neck was significantly more osteoporotic in severe osteoporosis by T-score possibly due to inactivity of the limbs induced by pain and deformity. We found a significant correlation between severe knee OA and BMD of femoral neck and lumbar spine, but no significant relation between the severity of the knee OA and BMD in the arm. In this way a diagnosis of severe OA of the knee should always point to an assessment of the osteoporosis.

P712

EFFICIENCY OF TREATMENTS FOR THE OSTEOPOROSIS IN WOMEN WITH AND WITHOUT THYROID DYSFUNCTION IN RELATION WITH WEIGHT AND SOMATIC SITUATION

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Objective: Attending to somatic and corporal composition, the study focus in efficiency of osteoporosis treatments in women with normality or thyroid dysfunction.

Material and Methods: Study realized at Foundation Jiménez-Díaz of Madrid on 381 women. The IBP have followed, for the anthropometric measures, tetrapolar bioimpedance to study body composition, the BMD has been realized by DXA, with reference to lumbar column (L2-L4) and neck of femur the categories according with T-score values. Two successive measurements spaced 12 months was made.

Results: The presence of hypothyroidism is 16.8 %. Hypothyroid women have significant major muscular mass ($p>0.017$), fat mass ($p>0.05$). The values of BMD and T-scores increased significantly top both in relation with first measure, but in case of the women with thyroid dysfunction positive evolution of BMD is shows only in the area of the hip (femoral neck BMD, $p=0.017$ and hip T-score, $p=0.043$). Normal women also increased lumbar column. Type of treatment not differ in both groups. Treatment in osteoporotic women with hypothyroidism is effective, but has a lower sensitivity.

Conclusion: The differences in body composition may be affecting BMD and thus the frequency of osteoporosis in women with hypothyroidism, affecting the sensitivity of the treatment of osteoporosis.

P713

THE INFLUENCE OF VITAMIN D STATUS ON THE VALUE OF BETA-CROSSLAPS IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

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Objective: The aim of this research was that women with newly diagnosed postmenopausal osteoporosis to determine vitamin D status and the level of initial influence of vitamin D on the value of β-crosslaps during 12 months of bisphosphonate therapy.

Material and Methods: The study included 121 patients with newly diagnosed postmenopausal osteoporosis. Determined: β-crosslaps (β-CTx) and levels of 25(OH)D in serum, BMD at the lumbar spine and hip. During the 12 months followed the patients were treatment: bisphosphonate (alendronate 70 mg/week), 800 IU vitamin D per day, and 500 mg Ca per day. The group consisted of 108 patients with postmenopausal osteoporosis and insufficiency and deficiency of vitamin D. The control group consisted of 13 patients with normal status of vitamin D.

Results: Normal vitamin D status was found in 13 subjects, vitamin D insufficiency in 97, deficiency of vitamin D in 11. Value β-crosslaps in patients with vitamin D deficiency before therapy averaged 1.100±0.49 ng/ml after 3 months was significantly decreased to 0.700±0.40 ng/ml, and after 12 months 0.600±0.40 ng/ml. Women with vitamin D insufficiency average the level of β-crosslaps was 0.800±0.34 ng/ml, after 3 months was significantly decreased to 0.400±0.10 ng/ml, and after 12 months decreased to 0.300±0.10 ng/ml. In patients with normal vitamin D status an average level of β-crosslaps was 0.700±0.31 ng/ml, 0.300±0.20 ng/mL after 3 months and 0.200±0.12 ng/ml after 12 months of treatment. In all three measurements of the levels of β-crosslaps a women with vitamin D deficiency was highest, in the group of patients with normal vitamin D status of the lowest, but the

differences between the examined groups were not statistically significant ($p>0.05$).

Conclusion: The negative correlation of vitamin D status with values β-crosslaps. Greatest decrease in the value of β-crosslaps was in patients with normal vitamin D status but no statistical significance between the groups were compared.

P714
STRONTIUM RANELATE ACCELERATES MLOY4 OSTEOCYTE LINEAGE WOUND HEALING

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Pre-osteocyte wound healing plays an important role in bone fracture or microcrack repair. We have recently settled a wound healing experiment on in vitro cell culture. This experiment permits subsequent study of cell proliferation and migration during the healing process. Strontium Ranelate (SrRan) is known to act on the bone forming lineage. Purpose: The aim of the present study was to investigate the wound healing process on MLOY4 cell culture with or without SrRan. Method: Osteocyte woung healing was analysed by a MLOY4 cell culture in 24-well plates each containing inserts (Wound healing assay kit, Cell Biolabs). Cells were incubated 3 days with or without SrRan (0, 0.1, 1 and 5 mM) before removing insert to generate a wound field. 2 pictures per well were taken every hour during 72 h. Changes in cells density between T0h and T48h were avaluated by counting the number of cells per well. Results: MLOY4 cells were multiplied by 5.7 and 4.8 at T48h compared to T0h respectively for 0 and 0.1 mM groups and by 3.4 for both 1 and 5 mM groups. Concerning MLOY4 culture healing, all wound fields with SrRan were closed at T35h after baseline. While, the control group (0 mM) was not completely haeled at T35h nor at T48h. The healing kinetics showed a dose effect of SrRan. Conclusions: SrRan has a positive dose dependent effect on wound healing and negative dose response on cell density in MLOY4 cell cultures. Whether this effect is related to proliferation or migration (or change in their balance) remains to be evaluated.

P715
MAJOR OSTEOPOROTIC FRACTURE IN OLDEST OLD PATIENTS: FUNCTIONALAND CLINICAL DIFFERENCES WITH YOUNGER POPULATION

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Objective: To describe the clinical and functional profile of oldest old patients (patients of 85 years and more) with major osteoporotic fracture; to analyze the similarities and differences compared to young old (65-74) and middle old patients (75-84).

Material and Methods: Retrospective epidemiological study concerning patients admitted in an Orthogeriatric Unit due to major osteoporotic fracture (Jul 2013-Jan 2014). Statistical analysis SPSS 15.0.

Results: 106 patients (women 79.2%; mean age 85.21 ±7.92). 58.5% of our sample over 85 years. Major osteoporotic fracture type: pertrochanteric 53.8%, subcapital hip fracture 34%, proximal humerus fracture 7.5%, others 3.8%. Previous fracture: 40.6%. Diabetes Mellitus type 2: 14.2%. Cardiovascular events (stroke, angina, myocardial infarction): 23.6%. Cognitive impairment: 31.6%. History of previous falls: 72.6%. 80.6% of our sample with polypharmacy (according to MHO criteria). No statistically significant differences among young old, middle old and oldest old patients. Functional assessment: Katz index: 1.54±2.33 (young old); 1.89±1.95 (middle old); 2.45±1.83 (oldest old). No statistically significant differences among the three groups. Barthel Index: 84.23±26.83 (young); 78.25±24.76 (middle); 69.41±25.10 (oldest) (p value less than 0.05). Lawton Index: 4.23±3.21 (young); 3.88±2.79 (middle); 2.26±2.64 (oldest) (p value less than 0.05). Red Cross Index: 1±1.18 (young); 1.81 ±1.03 (middle); 2.30±1.09 (oldest) (p value less than 0.05).

Conclusion: 1. Due to high life expectancy, oldest old are usual patients in our wards. Despite they commonly suffer higher rates of comorbidity and chronic diseases, patients with major osteoporotic fracture in our sample have the same rates of diabetes, cardiovascular events and cognitive impairment compared with younger groups. 2. It is remarkable the high prevalence of recurrent falls and previous fractures in our sample. This could be explained due to the good prior functional status of these patients, with no differences regarding age. 3. In our study there are no significant differences between the three groups for basic activities performance (using Katz Index), but we find significant worst functional outcomes in Barthel and Lawton Indexes for the oldest old.

P716
EFFICACY OF A 6-MONTH TREATMENT WITH STRONTIUM RANELATE 2G/DAY IN OSTEOPOROTIC PATIENTS IN THE IMPROVEMENT OF LONG BONE FRACTURES WITH DELAYED UNION OR NON-UNION

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Objective: In an open label study, strontium ranelate has been suggested to improve fracture healing. In this complementary analysis, the efficacy of strontium ranelate 2 g/day was assessed in a subgroup of osteoporotic patients with aseptic delayed union or non-union. These fractures are of particular clinical importance as they are causes of high disability and pain in this elderly population.

Material and Methods: International, phase III, open label single arm study with a treatment duration of 6 months. Primary endpoint was the qualitative radiological status of the fracture (progress to union, union, failure to union) assessed by two independent central readers (Pr Feron, Pr Laredo, France). The assessment criteria established that if the two central readers reported an identical evaluation, this would be the results considered. In case of differences the two central readers will meet to decide which one will be considered.

Results: 22 patients were osteoporotic at inclusion 6 males and 16 females. Mean age at inclusion was 62.6±12.4 years. Among them 13 (59.1 %) patients had a delayed union fractures and 9 patients (40.9 %) had a non-union fracture. The qualifying fracture was localised for 15 patients in the lower limb, and for 7 patients in the upper limb/clavicle. The mean duration of the qualifying fracture was 24±37 months.

Seventeen osteoporotic patients were included in the ITT population. The majority of osteoporotic patients improved (12 patients; 70.6 %), with 8 patients (47.1 %) reaching a full union and 4 patients (23.5 %) improving and rated as of progress to union over 6 months.

Patients reported a trend toward a decrease in pain, with a mean decrease in VAS from baseline (41±28 mm) to last post-baseline value of −10±22 mm (p=0.0885) and a trend toward improvement in quality of life assessed by the EQ5D© (p=0.0797).

Conclusion: This open label study suggests a beneficial effect of a 6-month treatment with strontium ranelate (2 g/day) in osteoporotic patients on healing of aseptic delayed or non-united fractures of the limbs or of the clavicle.

P717
CUMULATIVE EFFECTS OF LOW DOSE OF ANTI-SCLEROSTIN ANTIBODY AND PHYSICAL ACTIVITY ON BONE REMODELLING AND STRENGTH IN OVARIECTOMIZED RATS

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Sclerostin antibody represents a promising new therapeutic approach for medical conditions such as in fracture healing and osteoporosis. Bone formation, and, consequently, BMD are enhanced by physical activity, and sclerostin expression has been reported to be affected by the mechanical load.

Purpose: Investigated the effects of a combination of small dose of Scl-Ab and physical activity on bone formation.

Methods: Sixty female Wistar rats, aged 8 months were randomly assigned to five groups: (1) (SH): sedentary rats injected twice a week with saline, (2) (OVX): ovariectomized rats injected twice a week with saline, (3) (OVX+E): ovariectomized rats injected twice a week with saline and trained on a treadmill (5 times/week, one hour/day), (4) (OVX+E+S): ovariectomized rats injected twice a week with 5mg/kg Scl-Ab and trained on a treadmill and (5) (OVX+S): ovariectomized rats, injected twice a week with Scl-Ab. After 14 weeks of treatment, body composition and areal BMD were determined by DXA and serum were collected for analysis. Bone microarchitecture were analysed at the distal femur metaphysis using µCT. Osteocalcin and NTX were measured in the serum by ELISA. Bone bending strength was assessed at the femur midhshaft.

Results: Ovariectomy decreased whole body and femur areal BMD. Only Scl-Ab prevented these effects and increased areal BMD. OCN was significantly higher in all groups compared to Sham. Only Scl-Ab prevented the OVX-mediated decrease in ultimate load and stiffness. However, only exercise reduced NTX.

Conclusion: Low dose of Scl-Ab resulted in similar increases in bone formation, bone mass, and bone strength in OVX rats with or without exercise. Exercise did not alter the effects of Scl-Ab treatment, suggesting that although sclerostin expression may have changed in response to mechanical stress, it did not significantly affect the ability for Scl-Ab to increase bone formation in this model.

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World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2014): Satellite Symposium Abstracts

Innovative Therapeutic Strategies for Patients with Osteoporosis and Fragility Fractures
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SY1
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2. Understand the peculiar effects of bone forming agents vs. antiresorptive agents on bone tissue, in particular on cortical bone. Consider the limitations of techniques for the evaluation of bone mass and strength at the cortical bone.
3. Evaluate the clinical profiles of antiresorptive and anabolic medications
4. Formulate treatment regimens for fragility fracture patients that involve combination or sequential treatment to reduce the risk for future fractures, increase bone strength, and improve quality of life

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