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IOF Regionals – 3rd Middle East & Africa Osteoporosis Meeting

Poster Presentation Abstracts

P101

VITAMIN D IN DIABETIC PATIENTS WITH ACUTE CORONARY SYNDROME

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Aims: To determine the relationship of 25-hydroxyvitamin D (25(OH)D) serum concentration with acute coronary syndrome (ACS) with review on subgroup of diabetic patients.
Methods: 60 patients age between 30 and 70 year treated for ACS: STEMI and NSTE-ACS at General Hospital in Slavonski Brod, Croatia, and 60 control subjects free from ACS including DM, obesity, smoking, hypertension, and hyperlipidemia, as a control. All routine laboratory tests and plasma PTH and 25(OH)D done. Analysis was performed by use of the SPSS for Windows 11.0.3 software (SPSS Inc., Chicago, IL, USA). $p<0.05$.
Results: The ACS group included 36 (60 %) patients with STEMI and 24 (40 %) patients with NSTEMI-ACS. Serum levels of 25(OH)D: 35.19±17.54 nmol/L in ACS patients was statistically significantly lower than in controls: 58.08± 16.29 nmol/L, ACS patients had three subgroups regarding coronary disease severity: single(SVCAD) (n=39; 68 %), double (DVCAD) (n=15; 26 %) and multiple vessel disease (MVCAD) (n=3; 6 %) and they had 25(OH)D serum levels of 36.44 nmol/L, 33.65 nmol/L and 31.70 nmol/L, respectively. Statistically significantly was higher rate of vitamin D insufficiency among ACS patients as compared with the control group, Vitamin D deficiency was recorded in as many as 20 % of ACS patients and none of control subjects. In the ACS group, patients with DM female (F) (n=9, 40 %) and male (M) (n=13, 60 %) had the lowest mean 25(OH)D concentration of 30.45±15.05 mmol/L in comparison to all subgroups. A similar tendency toward a lower mean 25(OH)D level of 46.60±19.26 mmol/L in DM patients was also recorded in the control group, and this difference was statistically significant. In diabetic group we found STEMI (N=14;64 %)+NSTEMI (n=8;36 %) and SVCAD (n=15;68 %)+DVCAD (n=6; 27 %)+MVCAD (n=1;5 %).
Conclusion: Patients with diabetes had significantly low levels of vitamin D3 in ACS. Is it an accidental finding or a distorted reflection of atherogenesis due to low levels of vitamin D in diabetes? Perhaps low vitamin D levels only increase atherogenicity and become one of the triggers for the development of ACS. Studies are needed to confirm the need for the normal level of vitamin D for prevention of ACS. Perhaps it is necessary to pay more attention to the level of vitamin D3 in diabetics.
References: 1 Zittermann A et al., Am J Clin Nutr 2012;95:91. 2.von Essen MR et al., Nat Immunol 2010;11:344.

P102

BONE MINERAL DENSITY AND MEASURES OF ADIPOSITY IN SAUDI POSTMENOPAUSAL WOMEN

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Aims: To investigate the relationship between BMD values at 3 skeletal sites and different measures of adiposity and body fat in Saudi postmenopausal women.
Methods: 237 postmenopausal female subjects were randomly recruited from the Department of Internal Medicine at King Abdulaziz University Hospital (KAUH). The study was approved by the KAUH Ethics Committee. Subjects who had

comorbidities known to affect bone metabolism were excluded from the study. Subjects who had a history of vertebral fractures or had used glucocorticoids over the last 5 y, or any hormone replacement therapy were also excluded.
Different adiposity measures including body weight, BMI, waist circumference, hip circumference, and waist hip ratio (WHR). Body fat was evaluated by triceps skinfold thickness, mid arm circumference (MAC), midarm muscle circumference, and mid-upper arm muscle area. BMD determined at the lumbar spine (L1-L4), mean of right and left femoral neck and total hip were assessed using DXA scan with a Lunar prodigy densitometer (Lunar, Madison, WI, USA). BMD (g/cm^2) were compared as T-scores expressed in standard deviations using the peak bone mass from the manufacturer's reference population. Continuous and categorical data are presented as means±standard error and number (percentages), respectively. The level of significance was set at two-sided p-values <0.05. The data were analyzed using SPSS version 20.
Results: Subjects' characteristics are shown in Table 1. The age of study participants ranged from 46 to 88 year and they ranged in BMI from 25 to 54.3 kg/m^2. Among the 237 subjects, 32 % were overweight and 68 % were obese according to BMI values. The whole population is considered obese both in terms of WHR and waist circumference values. The prevalence of osteopenia and osteoporosis according to BMD values at the lumbar spine, femoral neck, and total hip was depicted in Figure 1. Correlation analysis revealed that BMD values at the 3 skeletal sites were significantly and positively related to all body composition except for WHR (Table 2).
Conclusion: Our data indicate that all adiposity measures except for WHR and body fat are positively related to BMD. Whether these indices of adiposity are also protective factors against the risk of vertebral fractures will require longitudinal follow-up. A limitation of our study is the cross-sectional study design, which limits our ability to prove causality. Second, our study was focused on obese postmenopausal women, and our findings cannot necessarily be extrapolated to the general population.

P103

THE RELATIONSHIP BETWEEN BONE MINERAL DENSITY AND DIABETIC WOMEN

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Aims: To compare BMD of pre-and postmenopausal diabetic women.
Methods: A cross-sectional study of 25 premenopausal diabetics and postmenopausal diabetics was carried out, where BMD at forearm, hip and spine were measured and compared with reference values obtained from measurements of normal healthy pre- and postmenopausal women.
Results: The DXA measures in postmenopausal diabetic group at forearm, lumbar spine, hip showed normal results in 56 % at forearm, 32 % at lumbar spine, 28 % at hip, while osteopenia was found in 36 % at forearm, 60 % at spine, 40 % at hip, and osteoporosis was found in 8 % at forearm, 8 % at spine, 32 % at hip. While the DXA measurements in premenopausal diabetic group at forearm, lumbar spine, hip showed normal results in 88 % at forearm, 60 % at lumbar spine, 56 % at hip, while osteopenia was found in 12 % at forearm,40 % at spine, 36 % at hip, and osteoporosis was found in 0 % at forearm, 0 % at spine, 8 % at hip.
Conclusion: Both postmenopausal and premenopausal diabetic women had lower BMD values than normal women in same age.

P104

CIRCULATING SCLEROSTIN, BONE TURNOVER MARKERS AND BMD IN TYPE 2 DIABETIC MEN IN RESPONSE TO THERAPY WITH METFORMIN OR PIOGLITAZONE

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Aims: Sclerostin is involved in the regulation of bone formation through the inhibition of the Wnt/β-catenin signaling pathway. Patients with type 2 diabetes mellitus (T2DM) show an increased risk of fractures that is exaggerated by thiazolidinediones (TZDs) therapy. We hypothesized that abnormal sclerostin production contributes to the pathogenesis of increased bone fragility in men with T2DM treated with TZDs.
Methods: We examined the association between circulating sclerostin levels and the changes in bone turnover markers (BTMs) [including: s-P1NP, s-bone ALP, p-CTX, and u-NTX], and BMD [lumbar spine (L_1-L_4); neck femur] [measured by DXA] among 320 men diagnosed with T2DM and treated with either metformin (MET) (850 mg twice daily) (n=160) or pioglitazone (PIO) (30 mg once daily) (n=160). Baseline values of serum sclerostin, BTMs and BMD were compared with age- and BMI-matched healthy controls (n=360).

Results: Compared with controls, T2DM men showed significantly higher serum sclerostin levels (63.42± 10.75 vs. 49.38±7.92 pmol/L, $P<0.001$), and lower p-CTX ($P<0.001$) and u-NTX ($P<0.001$); but similar s-P1NP and s-bone-ALP levels, respectively. After 12 months of therapy, serum sclerostin levels increased by 62.4 % in PIO-treated and decreased by 29.1 % in MET-treated men ($P<0.0001$); whereas BMD [lumbar spine (L_1-L_4) and neck femur] significantly decreased ($P<0.05$) in PIO-treated (% change, −5.32±2.66 %) with no marked changes in MET-treated men following therapy.

Conclusion: Men with T2DM showed higher serum sclerostin levels compared to age- and BMI-matched healthy controls, which were further increased after therapy with PIO for 12 months, which is also associated with increased p-CTX and u-NTX and decreased BMD values. These findings suggest that higher sclerostin levels may be involved in the pathogenesis of increased bone fragility in men with T2DM in general which maybe aggravated by TZDs therapy.

P105

CHANGES AND METABOLIC CONTROL OF CIRCULATING SCLEROSTIN, DKK-1 AND B-CATENIN IN POSTMENOPAUSAL WOMEN WITH T2DM: A 18-MONTH FOLLOW-UP STUDY

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Aims: Sclerostin is involved in the regulation of bone formation through the inhibition of the Wnt/β-catenin signaling pathway. Patients with type 2 diabetes mellitus (T2DM) exhibit low bone turnover, poor bone quality and increased levels of sclerostin as compared with non-T2DM controls. The objective of the present study is to investigate the impact of improved metabolic control of diabetes on the circulating levels of sclerostin, Dickkopf (DKK-1) and β-catenin in postmenopausal women with T2DM.

Methods: A total of 223 T2DM postmenopausal women were followed up longitudinally for 18 months. Serum sclerostin, DKK-1, β-catenin, bone turnover markers (BTMs), glycated hemoglobin (HbA_{1c}%) and BMD at lumbar spine (L_1-L_4) and neck femur were measured at baseline and 18 months of metabolic control.

Results: T2DM women exhibited higher serum sclerostin (62.3±8.1 vs. 44.9±9.3 pmol/L) and DKK-1 (13.1±4.7 vs. 8.7±5.1 pmol/L) levels and showed lower serum β-catenin (3.1±1.8 vs. 5.8±2.9 pg/ml) levels as compared with age- and BMI- matched non-T2DM controls ($P<0.001$, each), respectively. An improved metabolic control of diabetes (at 18-month follow-up period) (HbA_{1c} <8.0 %) ($n=130$) had significant impact on circulating levels of sclerostin (decreased by 31.6 %), DKK-1 (decreased by 32.4 %) and β-catenin (increased by 96.1 %) as compared with women with poor metabolic control (HbA_{1c} >8.0 %) ($n=123$) ($P<0.0001$, each).

Conclusion: Improved metabolic control of diabetes had a positive impact on the changes of circulating sclerostin, DKK-1 and β-catenin associated with T2DM in postmenopausal women and which may have repaired the Wnt signaling pathway that appears impaired in T2DM.

P106

ENDOTOXIN AND BONE TURNOVER MARKERS IN POSTMENOPAUSAL SAUDIS WITH AND WITHOUT OSTEOPOROSIS

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Aims: To evaluate circulating endotoxin levels and to study the association amongst endotoxin and bone turnover markers in a cohort of Saudi postmenopausal women with or without osteoporosis.

Methods: We determined the levels of endotoxin, bone turnover markers, 25-OH vitamin D total and corrected calcium in 100 Saudi postmenopausal women with osteoporosis and 100 women without osteoporosis were taken under the supervision of qualified physicians in the primary care centers in Riyadh. Serum endotoxin, NTx, osteocalcin, PTH, 25-OH vitamin D total and calcium were analyzed.

Results: Serum NTX and PTH levels in patients with osteoporosis were significantly higher than controls. Serum endotoxin was significantly and positively associated with calcium in all subject and controls. Endotoxin was positively associated with NTX in both groups but not with osteocalcin, PTH or 25-OH vitamin D.

Conclusion: Findings of the present study implicate a role for endotoxin-mediated inflammation in patients with osteoporosis.

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P107
BONE MINERAL DENSITY AND FRACTURE RISK IN DIABETIC PATIENTS HAVING RHEUMATIC DISEASES

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Aims: To assess the association between diabetes and BMD in patients with rheumatic deseases and to evaluate the possible relationship between chronic diabetic complications and bone fractures.
Methods: It is a retrospective study conducted over a period of 11 years since 2004 to July 2015. BMD at the lumbar spine and femoral neck in patients with diabetes having a rheumatic disease were evaluated by DXA. Medical characteristics of the patients were assessed including: hemoglobin A1c level, microvascular and macrovascular diabetic complications, calcium and steroids intakes, BMI. We also evaluated the frequency of osteoporosis and osteopenia as well as the vertebral and peripheral fractures.
Results: The analysis involved 50 diabetic patients. We included (46 women, 4 men), with a mean age of 55.2± 10 year. The most frequently found rheumatic diseases were rheumatoid arthritis, osteoarthritis, septic arthritis, spondylarthritis, and systemic lupus erythematosus, in 48, 22, 10, 10 and 6 %, respectively. Ninety percent of the patients had diabetes type 2 (n=45) with a mean disease duration of 7 y. Hemoglobin A1c median level was 7.9±2.4 % with 40 % imbalance diabetes. 38 % of patients had diabetic complications. Ocular complications were the most frequent in 55.6 %, then peripheral neuropathy in 22 % of patients. The falling risk was increased in 15.2 % when calcium intake and vitamin D deficiency were found in 84.2 % of the cases. Only one patient had a low BMI and 60 % of patients were taking steroids. Overall, 34 % of patients had osteoporosis and 28 % had osteopenia. The mean BMD in lumbar spine and femoral neck were 0.984±0.2 and 0.886±0.15, respectively. Four patients had lumbar spine fractures and one had radius fracture.
Conclusion: Our study suggests that diabetic type 2 patients with rheumatic diseases are exposed to a higher risk of osteoporotic fractures despite having, in some studies, higher BMD. This could be due to the microvascular complications that increase fall risk. Further case–control studies with larger samples would bring more information.

P108
HOMA-β AND PPAR-γ AS TWO EMERGING PREDICTORS OF BONE RESORPTION IN METABOLICALLY UNHEALTHY OBESITY

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Aims: To compare three different bone markers in metabolically healthy and unhealthy obese and nonobese subjects according to different metabolic healthy criteria. Also, we prepared subcutaneous fat from all subjects to compare the levels of some key molecules which involve in metabolic pathways in the study groups.
Methods: In this study, subcutaneous fat was obtained from 40 subjects (mean age 38.72±13.82 year, 10 men); 14 healthy normal-weight and 26 obese subjects. The protein expression levels of peroxisome proliferator-activated receptor γ (PPAR-γ), glucose transporter type 4 (GLUT4) and peroxisome proliferator-activated receptor gamma coactivator 1α (PGC-1α) and gene expression of PPAR-γ were examined on subcutaneous fat as obesity key molecules. The serum levels of osteocalcin, procollagen I aminoterminal propeptide (P1NP), alkaline phosphatase (ALP), and β-crosslaps were analyzed as bone turnover markers, as well as serum levels of 25 (OH) vitamin D3, and PTH. We evaluated all metabolic markers including FBS, insulin, HbA1C, HOMA-IR, HOMA-β (%), Quicki (%), total cholesterol, HDL, LDL to define the best model that may identify MHO individuals. Also we examined the association between different criteria of MHO with bone markers.
Results: The best model providing an association of metabolic status with bone markers in obese subjects was HOMA-β as an index of β-cell function (%B). Based on HOMA-β, all participants were divided into three groups; normal weight (HOMA-β<%100, n=14), obese (HOMA-β<%100, n=14) and obese (HOMA-β>%100, n=12). There were significant differences in BMI (p=0.0001), age (p=0.019), 25(OH)D3 (p=0.04), FBS (p=0.03), Insulin (p=0.0001), HOMA-IR (p=0.015), HOMA-β (p=0.0001), Quicki (p=0.05), and β-crosslaps (p=0.003) among groups. However, there were not statistically significant differences in HbA1C and the serum levels of P1NP, osteocalcin and PTH among groups. After adjusting for age, gender and vitamin D deficiency, multivariate analysis showed significant association of β-cell function (HOMA-β >100 %) in obese subjects with increasing of β-

crosslaps as a bone resorption marker (p=0.021). In this model, there was also significant association between protein levels of PPAR-γ in subcutaneous fat and plasma levels of β-crosslaps (p=0.028).

Conclusion: Our data showed that HOMA-β, as an index of β-cell function, can use in part of MHO criteria. In addition, our findings propose novel role of HOMA-β and PPAR-γ in predicting bone resorption in obese people and a possible new molecular target in this research area. However, further studies will be required to confirm this possibility.

P109

PROCOLLAGEN I AMINOTERMINAL PROPEPTIDE (P1NP): A SUITABLE BONE MARKER LINKING OSTEOPOROSIS IN PATIENTS WITH BOTH CORONARY ARTERY DISEASE AND DIABETES

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Aims: To investigate the bone turnover markers in CAD patients with and without DM in comparison with control subjects without CAD or DM.

Methods: This cross-sectional study was performed on 46 patients undergoing elective heart surgery either for coronary artery bypass grafting or for valve surgery. Epicardial adipose tissue (EAT) was obtained by biopsy during surgery in all subjects. Relative gene expression of VEGF and VDR were determined in EAT. According to angiographic results and history of T2DM, patients were grouped into those with CAD-nonDM (n=20), CAD-DM (n=14) and nonCAD-nonDM (n=12). The serum levels of osteocalcin, procollagen I aminoterminal propeptide (P1NP), alkaline phosphates (ALP), and β-crosslaps, as bone turnover markers, as well as serum levels of 25(OH)D3, PTH, FBS, and lipid profile were analyzed in all participants.

Results: There was a significant difference in mean of age among the studied groups. The CAD-DM group was older than other groups. The serum levels of osteocalcin and β-crosslaps were also statistically significant among the studied groups (p=0.03, p=0.005, respectively). In this regard, serum osteocalcin levels in CAD-DM group were lower than CAD group (p=0.028). In CAD-DM group, β-crosslaps levels were lower compared to nonCAD-nonDM group (p=0.007). In addition, β-crosslaps levels were lower in CAD-DM group than CAD-non DM group (p=0.019). Also, in molecular evaluation of EAT, both VEGF (p=0.04) and VDR (p=0.04) differentially expressed between three study groups. However, there were no statistically significant differences among groups for serum levels of P1NP, ALP, 25(OH)D3 and PTH. After controlling for age and BMI, the associations of β-crosslaps (p=0.048) and P1NP (p=0.033) with risk of diabetes in CAD patients was attenuated. But the difference among groups was disappeared in case of osteocalcin in adjusted model (p=0.1). Importantly, we observed a strong relationship only with P1NP marker in CAD-DM group after adjusting for age and BMI. The linear regression model showed that there was a strong association between relative expression of VDR (P=0.03, β=−1.53) and VEGF (p=0.04, β=1.44) with P1NP independent of sex and age. This relationship specifically was only in EAT of CAD-DM patients.

Conclusion: In CAD-nonDM and CAD-DM patients, there was a significant difference in serum levels of β-crosslaps appeared in crude models, but after adjusting for age and BMI, no association was observed. Interestingly, P1NP was significantly associated with CAD-DM in the adjusted model, suggesting that P1NP would be used as a suitable bone marker in diabetes patients with CAD.VDR gene expressions strongly had relationship with P1NP only in CAD-DM patients. This relationship is most important when serum 25(OH)D3 levels were not significantly changed among groups. These findings clarify VDR independent of vitamin D levels could modify molecular pathways. However, further studies are warranted in this regard.

P111

MECHANICAL ANALYSIS OF PATHOLOGIC FOOT

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Aims: Therapeutic treatments designed to assist in a range of foot conditions including diabetes and gout consist of orthotics, mechanical and electrical stimulation techniques. The aim of this study is to present a more efficient subject-specific computational model of the foot that accounts for the anisotropic tissue variances in a single continuum.

Methods: The muscles, bones and soft tissue layers were digitised separately and used to fit a single continuum representation of the foot for computational efficiency. The Visible Male foot model is extremely useful for sharing and disseminating amongst the scientific community and may be used to study population-based mechanics. However, spatial variation in foot stress is strongly influenced by a subject's geometry. The structure of the host mesh is a three-element parallelepiped in this study providing separate control of the forefoot, midsection and heel regions of the foot. We projected the segmented data set onto the visible male foot creating a new dataset. We then morphed the host using the least-squares fitting procedure previously described to minimise the

difference between the new data set and original MRI cloud of points. The foot, which was embedded within the host, undergoes the same transformation and takes on the shape of the subject data cloud. Customisation highlighted a large difference between the generic model and the subject with different ankle orientation (the subject was imaged in a constrained boot to keep the foot at 90°) and the subject was more flat-footed not having a typical arch, which would influence contact pressure patterns.

Results: Model predictions of plantar pressure and contact area were similar in shape and magnitude within the error bounds of the pressure platform measurements. At heel strike the predicted contact pattern was isolated on the heel with a peak of 389 kPa and contact area of 16 cm^2. At toe-off the model predicted contact across the ball of the foot with a peak on the second metatarsal of 306 kPa. The remaining loading pattern resembled the contact of the digits of the foot with a total contact area of 79 cm^2.

Conclusion: This study has developed a subject-specific framework capable of evaluating foot loading patterns and informing treatment strategies such as orthotics. A consistent outcome from this study is that internal loads are higher than surface pressure and internal von Mises stress increased at a higher rate than surface plantar pressure with increase in tissue stiffness. Hence, injuries in the pathologic foot may initiate in the deep tissue structures and not be detected in the gait lab or when making clinical evaluation.

P112

EPIGENETIC MODIFICATIONS AS THE EMERGING AVENUE LINKING BONE REMODELING WITH DIABETES COMPLICATIONS

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Aims: To assess whether bone turnover markers are associated with diabetes microvascular complications.

Methods: A total of 204 type 2 diabetes patients (53.4 % women, mean age 56.77±6.3 year) were participated in this cross-sectional study. Patients were divided into four subgroups based on their complication status: patients without any microvascular complication, with one two and finally three microvascular complications. The biochemical bone turnover markers (procollagen I amino-terminal propeptide (P1NP), alkaline phosphatase (ALP), osteocalcin, and β-crosslaps) were assessed in all patients as well as metabolic markers In molecular levels, the gene expressions of SIRT1, SIRT 3, SIRT 4, DNMT1a, and PARP-1 were evaluated in relation to bone turnover markers.

Results: In total, 60.8 % of patients had at least one microvascular complication (29.4 % having one, 18.3 % having two, and 13.2 % having three microvascular complications). Among the patients with microvascular complications, 41.2, 27 and 45.5 % had neuropathy, nephropathy, and retinopathy, respectively. The mean±SD diabetes duration and BMI of all patients were 12.88±7.09 year, 29.04±4.97 kg/m^2, respectively. There was a significant increasing trend in serum PTH levels in relation to terms of number of microvascular complications (p=0.001). Although serum 25(OH)D3 levels had a tendency to be lower in diabetes patients with two or three microvascular complications, it was not statistically significant. Our findings showed a significant correlation between serum levels of bone turnover markers with PTH (p=0.001), creatinine and also urine microalbumin: creatinine ratio (p=0.001). Also, serum levels of osteocalcin (p=0.001) and β-crosslaps (p=0.003) were raised with an increase in the number of complications. In the multivariable model, after adjusting for age, sex and BMI, there was not any significant association between three bone turnover markers (osteocalcin, β-crosslaps, P1NP) with metabolic markers including FBS, Insulin, HbA1C, HOMA-IR, HOMA-b, lipid profile, hs-CRP, and uric acid and Michigan neuropathy score, retinopathy and number of diabetic complications. In this model, there was a strong association between albumin: creatinine ratio and serum levels of osteocalcin (p=0.001) and crosslaps (p=0.016). Regarding the molecular markers, there were significant direct associations between β-crosslaps with gene expression of SIRT3 (p=0.02), PARP1 (p=0.009) and DNMT1 (p=0.0001).

Conclusion: Our data suggest that diabetes nephropathy have a significant influence on bone turnover markers (osteocalcin as bone formation, and β-crosslaps as bone resorption marker). This study has also showed the association between epigenetic markers in gene expression levels with serum β-crosslaps levels, reflecting the epigenetic modifications may cause increasing bone turnover in patients with diabetes complications.

P113

COMPARISON OF LOW BMD OF ADULT THALASSEMIC PATIENTS WITH NORMAL ADULT CONTROLS: IS ETHNICITY A DETERMINING FACTOR?

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Aims: Thalassemia major is a known risk factor for osteoporosis. Prevalence of osteoporosis reported even as high as 50 % in these patients. However as these patients had short life expectancy, studies of bone density in adult patients are sparse. We compared bone density of our patients with results of bone densitometry of participants of a national study, to find if a different result is expected when results of chronic patients are compared to results of a reference population of their own country.
Methods: In 95 adult β-thalassemia major patients (more than 20 years old) of 20–39 years old range, DXA of the spine and femur performed. Results compared with results of 94 one by one age and sex matched normal persons participated in Iranian Multicenter Osteoporosis Study (IMOS), that selected by randomization from normal Tehran citizens. Mean and standard deviation of normal ones achieved and Z-score of patients recalculated based of that results. As BMD of normal participants and thalassemic patients performed by devices of different brands, analyses done based of calculated standard BMD of all participants.
Results: BMD of patients was significantly lower than normal participants (P-value <0.001) in femoral and spinal regions (by means of 0.910 vs. 1.002 in femoral region and 0.865 vs. 1.161 in spinal region). Z-score of patients calculated based on "Measured BMD-Age-matched mean BMD/Young adult population SD" formula. Range of femoral and spinal Z-scores was −2.02–2.58 and −2.44–3.40, respectively. Low BMD (Z-score≤−2), found in 1 and 3 % of thalassemic patients in femoral and spinal region, respectively.
Conclusion: In this study, prevalence of low BMD in our adult thalassemia major patients is very low. Low sample size may be the reason of our findings, but maybe comparison of results of our patients with normal patients of the same ethnicity may a reason for these findings.
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P114
EXAMINING Z-SCORE LOWER THAN −2 AS A CUTOFF POINT FOR LOW BMD IN CHILDREN WITH CHRONIC DISEASE: THALASSEMIA AN EXAMPLE

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Aims: DXA is the gold standard method for diagnosis of osteoporosis. Though ISCD defined Z-score≤−2.0, as the criteria for low bone mineral content in children, some questions such as "how much this criteria is useful for predicting osteoporosis in adulthood among children with secondary osteoporosis" is remained. On the other hand we do not know "how much a positive child for this criteria, that suffering from a chronic disease like thalassemia major, is in the risk of "osteoporosis" or "below the expected range for age" in adulthood. We designed this study to find helpful results for answering these questions.
Methods: In 30 β-thalassemia major children (less than 20 years old), DXA of the spine and femur were performed. All these children did at least another BMD in adulthood (in more than 20 years old). Then, the optimum cutoff point for Z-score in children that is predictive for "below the expected range for age (Z-score≤ −2)" in adulthood determined.
Results: Z≤2 or "low bone density for chronologic age" found in 33 % of children (in femoral neck or L2-L4) and Z-score of −2.0 or lower as "below the expected range for age", found in 66 % of patients after adulthood. Kappa results showed a good correlation between two criteria for low bone mass in childhood and adulthood in femoral region. Using receiver-operating characteristic (ROC) curves, we found a sensitivity and specificity for femoral Z-score≤−2 for predicting femoral low bone mass in adulthood; as 50 and 94 %, respectively. Femoral Z-score of −1 was as the best point of femoral Z-score in predicting femoral low bone mass in adulthood (sensitivity and specificity were 87 and 65 %, respectively). Sensitivity and specificity for spinal Z-score≤−2 for predicting spinal low bone mass in adulthood were 26 and 100 %, respectively. The best point was −0.9 with sensitivity and specificity of 94 and 82 %, respectively.
Conclusion: In secondary osteoporosis, especially in pediatric stage, maybe other cutoff points show better results for prevention and diagnosis of low bone mass. Confirming these results would need larger studies in patients of different groups of chronic diseases.
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P115
VERTEBRAL PAIN SYNDROME IN WOMEN AND MEN: CORRELATION WITH TRABECULAR BONE SCORE

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Aims: To study the correlation between vertebral pain syndrome and trabecular bone score in women and men.
Methods: We examined 798 people aged 30–87 years: 665 women and 133 men. Vertebral pain syndrome was observed in 564 (84.2 %) women and 106 (79.7 %) men. 101 (15.2 %) women and 27 (20.3 %) men did not have vertebral pain syndrome at any sites. The presence and level of pain in different parts of the spine were assessed by 4-component of 10-point visual analogue scale. TBS (L1-L4) was assessed by means of TBS iNsight® software installed on our DXA machine (Med-Imaps, Pessac, France). Statistical analysis was performed using software packages Statistisa 6.0.
Results: People with vertebral pain syndrome have significantly worse TBS (L1-L4) in comparison with people without pain (t=−2.08, p=0.04). In women with vertebral pain syndrome TBS L1-L4 was significantly lower (t=−2.76; p=0.006), which is not found in men (t=0.06; p=0.95) compared with those same sex without back pain. In people with pain in the cervical spine TBS L1-L4 is significantly higher among women (t=−3.18; p=0.002) and men (t=−2.51; p=0.02). The presence of pain in neck part of spine significantly positively correlated with TBS (L1-L4) (R=0.19; p 0.05) only in women.
In persons with pain in thoracic and lumbar parts of spine TBS (L1-L4) was lower in comparison with persons without pain. Moreover in women with pain in thoracic and in the lumbar spine TBS L1-L4 was significantly lower (respectively t=−2.48; p=0.01 and t=−4.28; p=0.0002), in men it was not significantly different.
Conclusion: The significant negative correlation was determined between the presence and level of pain in the thoracic (pain at the time of the survey, the average (the typical), the minimal and maximal) and lumbar (pain at the time of the survey, and maximal pain during prolonged walking and moving up and down stairs) spine in women. In men significant correlation was not found.

P116
BONE MINERAL DENSITY AND TRABECULAR BONE SCORE IN UKRAINIAN WOMEN WITH OBESITY

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Aims: To evaluate BMD and trabecular bone score (TBS) in Ukrainian women with obesity.
Methods: 1025 women aged 40–89 years (mean age 62.7± 9.7 year; mean height 161.4±6.2 cm; mean weight 73.9± 13.8 kg; BMI 28.4±5.1 kg/m^2) were examined. The women were divided into the following groups depending on their BMI: A – 360 women with obesity, BMI≥30 kg/m^2 (mean age 64.0±8.9 year; mean height 160.7±5.9 cm; mean weight 87.6±10.5 kg; BMI 33.9±3.5 kg/m^2), B – 665 women without obesity, BMI<30 kg/m^2 (mean age 62.0±10.0 year; mean height 161.7±6.4 cm; mean weight 66.4±8.9 kg; BMI 25.4± 2.8 kg/m^2). BMD was measured by the DXA method (Prodigy, GEHC Lunar, Madison, WI, USA). TBS (L1-L4) was assessed by means of TBS iNsight® software installed on our DXA machine (Med-Imaps, Pessac, France). The study results are presented in the following manner: M±SD. We performed a one-way ANOVA test, multiple regression and correlation analysis. Significance was set at p<0.05. Statistika 6.0© StatSoft, Inc. was used for data processing purposes.
Results: We found that obese women have a significantly higher BMD of lumbar spine (A – 1.114±0.197 g/cm^2, B – 0.994±0.194 g/cm^2), femoral neck (A – 0.873±0.137 g/cm^2, B – 0.822±0.136 g/cm^2), total body (A – 1.123±0.108 g/cm^2, B – 1.037±0.111 g/cm^2) and ultradistal forearm (A – 0.429± 0.087 g/cm^2, B – 0.371±0.082 g/cm^2) in comparison with women without obesity. When analyzing their BMD depending on age, we determined that the BMDs of lumbar spine, femoral neck and total body significantly differ in the women of age groups 40–49, 50–59, 60–69 and 70–79 years (p<0.05). At the same time, in the women aged 80–89 years the BMD of lumbar spine (p=0.09), femoral neck (p=0.22) and total body (p=0.06) did not differ significantly. The BMD of ultradistal forearm was significantly higher in the women of all age groups (p<0.05). TBS (L1-L4) was not significantly different in obese women compared with women without obesity in all age groups.
Conclusion: Obese women have a significantly higher BMD at all measured sites compared with women without obesity. TBS (L1-L4) did not significantly differ in the examined women.

P117
10-YEAR PROBABILITY OF FRAGILITY FRACTURES IN PERI- AND POSTMENOPAUSAL SAUDI WOMEN ACCORDING TO WHO FRACTURE RISK ASSESSMENT TOOL (FRAX)

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Aims: Osteoporosis is a major global public health problem, associated with significant morbidity, mortality and socioeconomic burden. It is defined as a skeletal disorder characterized by low bone strength, leading to an increased risk of fragility fractures. The greatest bone loss occurs in women during perimenopause, associating with estrogen insufficiency, a condition of menopause. The FRAX tool is developed by WHO in collaboration with IOF to evaluate fracture risk of patients. It is based on individual patient models that integrate the risks associated with clinical risk factors as well as BMD at the femoral neck. The aim of present study was to evaluate the FRAX tool in Saudi context and make Saudi women aware regarding fragility fracture risk. Also this study can be taken as a pilot study to develop FRAX tool for Saudi population.
Methods: A prospective cross-sectional study, conducted in 1 year recruiting 325 cases. They were asked to fill FRAX questionnaire. The fracture risk assessment was done and compared with other laboratory tests for calcium metabolism and BMD. Patients were explained about fracture risk in next 10 years and preventive measures were advised in terms of dietary supplementation, Lifestyle modification and pharmacological interventions. Follow up is planned after every 1 year assessing efficacy of treatment and disease progression.
Results: Approximately 59 % women (192/325) of peri- and postmenopausal age group were found to be either osteopenic or osteoporotic with higher risk of fragility fractures in next 10 years. The 10-year probability of fragility fractures according to FRAX is higher in Saudi peri- and postmenopausal women as compared to that of Western population.
Conclusion: Fragility fractures in postmenopausal Saudi women are one of the leading causes of disability and socioeconomic loss. The extent of problem is much higher in Saudi population than in Western Countries. With the help of FRAX we can estimate the probability of such fractures and can take preventive measures to avoid them.

P118

BONE MINERAL DENSITY IN PEOPLE LIVING WITH HIV/AIDS INFECTION

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Aims: In patients of HIV/AIDS to study the prevalence of low BMD, i.e., osteopenia or osteoporosis.
Methods: This cross-sectional study was conducted in Sir Ganga Ram Hospital, New Delhi, India. Participants enrolled from outpatient department (OPD) and admitted cases in our hospital. DXA) was done in all subjects in the study. The comparison was done between both cases and controls regarding prevalence of low BMD and its risk factors.
Results: Demographic profiles (age, gender and BMI) were matched between study and control groups. Our study included 60 participants in study group and 60 participants in control group. The mean age of study population was 39.82± 11.68 year and of control subjects was 41.08±11.52 year. In study population, total male subjects were 37 (61.7 %) and females were 23 (38.3 %). Among control group male participants were 29 (48.3 %) and females were 31 (51.7 %). Prevalence of bone disease was 83.3 % of which 40 % subjects had osteoporosis and 48.3 % patients had osteopenia. Normal BMD was seen only in 11.7 % people living with HIV/AIDS. Among control group bone disease was present in 31.7 % of which osteopenia was present in 30 % and osteoporosis in 1.7 %. Thus significant population of HIV/AIDS suffered from some form of bone disease (P=0.00, odds ratio=16.26).
Conclusion: The risk of bone disease is high in people living with HIV/AIDS than the normal people. Further studies are needed to evaluate the risk factors low bone density in people living with HIV/AIDS.

P119

EFFECT OF LUMBAR VERTEBRAL POSITIONING ON BONE MINERAL DENSITY MEASUREMENTS BY DXA

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Aims: To evaluate the effects of lumbar vertebral positioning on BMD measurements by DXA in a human cadaveric spine phantom.
Methods: A spine phantom was designed using L1-L4 vertebrae harvested from a 48-year-old male cadaver without coronal or sagittal deformity. The spine phantom was scanned by DEXXUM T bone densitometer in a constant scanning speed of 30 mm/s and resolution of 1.0 mm×1.0 mm. BMD values were measured in a positive and negative lumbar lordosis and kyphosis tilt angles in the sagittal plane, from 0 to 63°, with 7°increments. Also BMD values were measured in axial and lateral rotations with 5° increments.

Results: Projectional DXA readouts are significantly affected by positioning of lumbar spine, more severely affected by kyphotic curvature, but also by axial and lateral rotational scoliosis as well as lordosis curvature. Increasing the severity of lordosis and kyphosis curvatures leads to false reduction of BMD value up to 25.13 and 28.99 %, respectively. Increasing the degree of lateral and axial rotational scoliosis results in false decrease in BMD readouts up to 17.74 and 13.45 %, respectively.
Conclusion: To achieve the most accurate scanning results, error sources and abnormal positioning should be identified and minimized as much as possible. If not correctable, they should be taken into consideration while interpreting the readouts.

P120
BONE LOSS AND CORONARY: ABOUT 46 CASES

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Aims: Osteoporosis as cardiovascular diseases are causes of morbidity and mortality. Several publications have shown a relationship between the OP and coronary heart disease. Their coexistence was considered separate conditions related to age, and was mainly attributed to aging and common risk factors including diabetes, dyslipidemia, and smoking. Our aim is to assess the prevalence of BMD bone loss in patients treated for coronary artery disease compared to a control population.
Methods: This is a prospective, case–control, bicentric longitudinal bearing patients followed for CHU Ibn Rushd Cardiology Service of Casablanca between 2014 and 2015. The exclusion criteria were all patients with pathology weakening the bone. Patients were divided into two groups, one group bearing coronary artery disease and the second control group with normal coronary angiography. All patients underwent a complete physical examination, a complete calcium and phosphate, metabolic, and bone densitometry.
Results: The study was conducted in 46 patients, including 22 men and 24 women. The mean age was 65.7±6.5 year. For the record, they found 34 % had diabetes type 2, 60 % on insulin, 21 % had dyslipidemia, 80 % on statins, 32 % had hypertension and 17 % were chronic tobacco. Of the 46 patients, 10 (21.7 %) had osteoporosis, 19 (41.3 %) had osteopenia, and 17 (37 %) had normal BMD. The prevalence of osteoporosis and osteopenia was significantly greater in group I than in group II.
Conclusion: Several studies have shown the association between osteoporosis and cardiovascular disease. The mechanisms are multiple and still imperfectly understood. It seems legitimate to propose a DXA sick "vascular" and a cardiac evaluation with osteoporotic subjects.

P121
BONE MINERAL DENSITY AND VITAMIN D DEFICIENCY STUDY IN TUNISIA: EPIDEMIOLOGICAL ASPECT OF 389 CASES

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Aims: Vitamin D deficiency is a major source of bone loss and fractures. It is a problem often overlooked in adults, especially in sunny countries. The aim of our study was to evaluate the prevalence of vitamin D deficiency in a sample of Tunisian population and to assess its impact on the bone mass.
Methods: Prospective cross-sectional survey, involving 389 subjects (261 women and 129 men), aged between 20 and 60 years, who received a questionnaire, a dietary survey and laboratory tests, particularly a 25 (OH) vitamin D_3 assessment. The measurement of BMD has been practiced in 173 cases.
Results: Cumulative prevalence of vitamin D deficiency was 47.6 %, statistically higher among women: in particular older, multiparous postmenopausal and veiled. The dietary intake of vitamin D deficiency was significantly associated to hypovitaminosis D. A negative correlation between the levels of PTH and vitamin D levels was objectified. The multivariate analysis of these parameters showed that only multiparity and vitamin D level represented independent predictors of hypovitaminosis. Moreover, the results of the BMD showed a decrease in femoral bone mass (≥−1 SD) in 19 of cases, most commonly in males, those aged between 50 and 60 years, menopausal women, calcium intake deficit with high protein intake, caloric intake deficiency, smoking and low BMI. The latter was the only factor directly related to the femoral bone loss. A decreased bone mass in the spine was found in 39 cases significantly related to age between 50 and 60 years, protein intake (higher among women), menopause and low BMI. These last two factors were directly related to bone loss at the spine in multivariate analysis.
Conclusion: In the light of these findings, our study confirms the frequency of vitamin D deficiency in our country, which is largely related to inadequate intake of vitamin D. Its impact on bone mass was important. It requires, therefore, appropriate measures, such as food fortification with vitamin D and calcium and vitamin D supplementation in patients at risk.

P122

PREVALENCE AND POSSIBLE RISK FACTORS OF LOW BONE MINERAL DENSITY IN TUNISIAN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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Aims: To investigate the prevalence and possible risk factors of low BMD in patients with SLE in Tunisian population.
Methods: 50 patients with SLE were included in this study. All patients fulfilled the 1997 American College of Rheumatology (ACR) revised criteria for the classification of SLE. BMD at the lumbar spine (anteroposterior, L1–L4) and total hip (left femoral neck) were performed by a single trained technician using DXA.
Results: The study group consisted of 42 women and 8 men. The average age of our patients was at 32.9 y, ranging from 16 to 52 years. Our series included 2 cases of familial lupus. The mean disease duration was 6.2 year. The measurement of BMD was made in 30 cases. They were 26 women and 4 men. 100 % of patients in our series were under corticosteroid treatment: with no other treatment in 24 % of cases, in association with an analgesic in 60 % of cases, in combination with an NSAID in 42 % of cases and in combination with an analgesic and an NSAID in 42 % of cases. The results of the measurement of femoral bone mineral showed that bone mass was reduced in 24 patients, divided as follows: osteopenia found in 12 patients and osteoporosis in 12 patients. The femoral bone mass in elderly patients between 50 and 60 years was reduced (F T-score<−1 SD) compared to subjects aged between 20 and 49 years. Obesity and low doses of steroids seemed to be protective factors. In fact femoral bone mass was significantly less decreased among subject with a BMI>27 kg/m^2. The femoral bone mass was more respected in patients who received corticosteroid dose <0.5 mg/kg/d. Postmenopausal women had a femoral bone mass decreased more frequently (14/16). The femoral bone mass was more reduced in subject with a disease duration of more than 5 y. Thus the decrease in BMD F was found in 24 patients; two men and 22 women, 14 of them were postmenopausal. It was present in the elderly over 50 years and in patients with a disease duration of SLE than 5 years. Four of these patients had impaired renal function. All patients received corticosteroids at a mean daily dose of 28.9 mg/d for an average term of 30.6 months. The femoral bone mass was more respected in patients who received corticosteroid dose <0.5 mg/kg/day. Thus the decrease in Spine BMD was found in 11 patients; a man and 10 women, 6 of them were postmenopausal. She was present in the elderly over 50 years and in patients with a disease duration of SLE than 5 y. Lumbar bone mass was more respected in patients who received corticosteroid dose <0.5 mg/kg/d.
Conclusion: Osteoporosis-related fragility fractures represent one of the most important complications that may occur in patients with SLE.

P123

OSTEOPOROSIS AND THE INCIDENCE OF PERIPROSTHETIC FEMORAL FRACTURES AFTER UNCEMENTED PRIMARY TOTAL HIP ARTHROPLASTY

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Aims: Periprosthetic femoral fractures are rare but problematical complications after total hip arthroplasty that require subsequent technically challenging surgery associated with a considerable increase in morbidity and mortality. As the elderly population increases in size, it is expected that osteoporosis will become a common problem faced by surgeons performing primary hip arthroplasty or managing the associated complications. The purpose of this study was to determine whether there is a relationship between the incidence of periprosthetic femoral fractures and the preoperative systemic BMD.
Methods: A number of 64 patients with hip osteoarthritis were treated with uncemented total hip arthrtoplasty using tapered high-grade porous titanium coated femoral stems and ceramic-ceramic bearing surfaces over a period of 2 years. Of the 64 patients between the ages of 67–89 years, 13 had normal preoperative systemic BMD and 51 had osteopenia or osteoporosis. The incidence of periprosthetic femoral fractures was compared with the BMD T-scores, assessed by DXA, Dorr classification and BMI of the patients.
Results: Patients with low systemic BMD, assessed with DXA or indirectly with radiographic features showed a higher incidence of periprosthetic femoral fractures during the first 2 years after surgery than did those with normal BMD.
Conclusion: The positive correlation between low preoperative systemic BMD and a higher incidence of periprosthetic femoral fractures might be a good indicator that those with lower BMD are more at risk of this complication after this type of surgery and open the discussion for measures that can modify this risk factor.

P124

PARTICULARITIES OF TOTAL KNEE JOINT REPLACEMENTS IN PATIENTS WITH LOW BONE MINERAL DENSITY

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Aims: Total knee arthroplasty (TKA) is one of the most applied treatments in knee joint osteoarthritis. The increase of primary TKA increases complications and the number of revision surgery. Primary TKA in osteoporotic conditions has a major risk of implant loosening or periprosthetic fracture. In these conditions special preoperative management and preventive treatment are needed. Our aim was the review of the literature and to study the relationship between the incidence of failure in TKA in osteoporotic and normal BMD patients.
Methods: 24 patients with knee osteoarthritis were treated with TKA, with Genesis II knee joint prosthesis. The patients BMD was determined with DXA using T-score. The measured BMD, was correlated with implant failure or periprosthetic fracture.
Results: Periprosthetic fracture occurred in 3 cases, in one case during surgery. In these cases the BMD showed the lowest values, with a T-score above −2.5. In 14 cases, patients had bisphophonate therapy before TKA, with favorable postoperative evolution in short and midterm follow ups.
Conclusion: Patients with low BMD values has a higher risk of implant failure, either during surgery or short and midterm follow up. Treatment of osteoporosis before and after surgery improves prognosis. The increasing number of elderly people, with osteoporosis, increases the number of TKAs which may require special cemented implants in order to improve the biomechanics and biointegration in these conditions.

P125

EVALUATION OF THE TOTAL ANTIOXIDANT CAPACITY OF PLASMA IN IRANIAN OSTEOPOROTIC WOMEN

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Aims: Bone is a dynamic tissue that is continuously renewed throughout life by the process of bone remodeling. Oxidative stress and antioxidant system might be involved in the pathogenesis of bone loss, so the aim of this study was estimation of the total antioxidant capacity (TAC) of plasma in Iranian osteoporotic women comparing to the control.
Methods: TAC was measured spectrophotometrically by ferric reducing ability of plasma assay (FRAP) in 192 women ($-3.9 \leq$T-score≤ 3.6). Participants were selected by inclusion and exclusion criteria among those who referred to Jamie Clinic in Tehran for BMD evaluation. BMD of the femoral neck and lumbar spine was measured by DXA.
Results: All of participants were normal at plasma albumin concentration as normality index for nutritional and protein status. TAC (mean±SD) was 851.65±262.41 mM in the control group (T-score≥ -1) including 76 women, 941.93± 218.86 mM in the total patients (mild osteopenia+severe steopenia and psteoporosis) (T-score<-1) including 76 women and 972.20±232.04 mM in the patients with severe osteopenia and osteoporosis (T-score<-1.7) including 51 women.
Conclusion: Comparing between control and Iranian osteoporotic women showed that 1) plasma TAC was significantly higher in the patients than in the controls ($P<0.05$). 2) Furthermore, these differences were more between control and patients with severe disease (T-score<-1.7), ($P<0.05$). 3) Femoral neck BMD, adjusted with age and BMI, showed a negative (reverse) and significant correlation with plasma levels of TAC in all subjects($r=-0.195$, $P<0.01$, $n=192$). It seems that a physiological increase in the amount of some antioxidants occurs in osteoporosis, even though this amount may be not sufficient for the human body desires.

P126

BONE DENSITOMETRIC PROFILE IN RHEUMATOID ARTHRITIS: A CASE–CONTROL STUDY OF 346 SUBJECTS

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Aims: Rheumatoid arthritis (RA) is the most common chronic inflammatory disease. Osteoporosis is a well established extra-articular feature of RA. We aimed to investigate BMD in patients with RA, to identify risk factors for decreased BMD in RA and to assess fracture risk.
Methods: We conducted a cross-sectional study during 1 year including 173 patients with RA and 173 age and gender-matched controls. For each patient we have evaluated the parameters related to the disease and the risk factors for osteoporosis. BMD was measured in lumbar spine and femoral neck by DXA.
Results: 173 patients with RA (31 male, 141 female, mean age 54.05±11.04 year) and 173 controls (31 male, 141 female,

mean age 53.71±11.21 year) were included in the study. The disease average duration was 8.2±8 y. The average BMD was significantly lower in the RA patients than in the controls ($p<0.001$). The risk of major osteoporotic fracture and hip fracture was significantly higher in patients than controls ($p=0.002$; $p<0.001$). Bone loss in RA was correlated with age ($p=0.001$), BMI ($p<0.001$), dietary calcium intake ($p<0.001$), menopause ($p<0.001$), disease duration ($p<0.001$), HAQ score ($p<0.001$), erythrocyte sedimentation rate ($p=0.003$), rheumatoid factor positivity ($p=0.004$), structural damage ($p<0.001$), atlantoaxial subluxation ($p=0.002$) and glucocorticoid use ($p<0.001$). Independent risk factors for bone loss were menopause, low calcium intake, ESR and HAQ score. Fracture risk was correlated with age ($p<0.001$), menopause ($p<0.001$), dietary calcium intake ($p=0.002$), BMI ($p=0.001$), disease duration ($p=0.003$), HAQ score ($p<0.001$), structural damage ($p<0.001$), cumulative glucocorticoid dose ($p<0.001$) and duration of glucocorticoid use ($p<0.001$).

Conclusion: Bone loss and fragility fractures are common in RA. The management of patients with RA should include screening and early treatment of osteoporosis.

P127

BONE MINERAL CONTENT OF PAKISTANI YOUTH AND ITS CORRELATES

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Aims: To determine bone mineral status of young Pakistani adults and its relation with socioeconomic factors, dietary intake, physical activity and 25-hydroxyvitamin D (25OHD).

Methods: Sociodemographic factors of healthy medical students were assessed; validated food frequency and physical activity questionnaires were filled. Quantitative heel ultrasound was done using Osteosys Sonost-3000. Total 25OHD was measured on ADVIA-Centaur; Siemens. Multiple regression analysis was performed to find out the influence of lifestyle factors, biochemical and body composition measurements on heel ultrasound parameters. The model was adjusted for age and sex whereas T-score, z-score, bone quality index (BQI) and speed of sound (SOS) was studied as independent variables.

Results: Mean age was 20.03±0.99 year ($n=97$), 58.4 % being females. The overall mean BMI was 22.16±3.45 kg/m^2 and in accordance with the South Asian Classification of weight status, 13.9 % of the subjects were categorized as underweight 47.5 % as normal, 19.8 % as overweight and 18.8 % as obese. Daily mean energy, protein and fat intake were 2242.0±1090.6 kcal, 75.1±37.6 g/d and 70.2±34.7, respectively, with females having significantly lower levels in all categories as compared to males (p-value<0.001). Daily protein intake was higher than the recommended in both genders. Daily mean calcium intake was 862.8± 457.8 mg/d and was significantly lower in females (p-value<0.001). In 64.3 % subjects average calcium intake was below recommended dietary allowance. Inactivity was more amongst females than males (20.3 vs. 16.7 %), with 18.9 % of the students being inactive. Mean sitting time/day of the study group was 8.09±3.7 h. The overall mean 25OHD levels were 15.02±8.63 ng/ml, 86 % of the study group was found to be vitamin D deficient. No significant association was found between z-scores and 25OHD levels. Out of the total students, 20.6 % had z-scores 2SD below the age and gender matched mean BMD. The males had significantly higher BQI and SOS than females (p-value<0.001). BQI and SOS both correlated positively with weight, height, waist circumference (p-value<0.001). Mean calcium intake was lower in subjects with low z-scores (686±364 mg) as compared to normal z-scores (887±454 mg) (p-value 0.07). Likewise mean protein intake was lower in subjects with low z-scores (77.4±37.7 mg) as compared to normal z-score (60±27.5 mg) (p-value 0.02). Regression revealed students living in apartments/small houses were significantly associated with z-scores, SOS and BQI.

Conclusion: A significant number of healthy students were identified with lower z-scores of BMD, low calcium intake and physical inactivity. Only housing seems to affect z-score of otherwise healthy Pakistani adolescents. Confirmation of our findings with DXA and further research on a larger group is needed to clarify the bone health status of young adults living in this part of the world.

P128

POSTMENOPAUSAL OSTEOPOROSIS: TOLERANCE AND EFFICACY OF DIFFERENT THERAPEUTIC PROTOCOLS

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Aims: Osteoporosis is the most common embrittling bone disease, predisposing the patient to an increased risk of fractures. The therapeutic decision is based on the individual risk of fracture, effectiveness and therapeutic tolerance. However, side effects attributed to treatment may exist. Thus, the benefit and risks of prescription drugs is optimized by the choice of the right time and the right treatment. The objective of the study was evaluation of the safety and effectiveness of osteoporosis treatments referred in 70 patients followed for postmenopausal osteoporosis.

Methods: Descriptive study conducted with 70 patients followed for postmenopausal osteoporosis in

rheumatology department at the University Hospital. The inclusion criterion was any postmenopausal woman with osteoporosis densitometry. Were excluded those with secondary osteoporosis, densitometry osteoporosis before menopause, and those with disturbance of calcium and phosphate, factors that may influence bone metabolism and BMD results. Were identified clinical and laboratory data, supplemented by BMD values at the beginning and the middle of the first therapeutic sequence. The variables studied were the tolerance of different therapeutic protocols referred to bone and their effectiveness in terms of BMD gains between the beginning and the middle of the first therapeutic sequence.

Results: There were 70 patients. The average age was 63 years with a standard deviation of 9.19. The average weight was 69 kg (SD=8.94). 75.70 % were postmenopausal before age 50 years. Nine had a history of fracture with minimal trauma and 8 cases among a first degree relative. The mean BMD values at the entrance of the study were: lumbar spine (2.68 ±0.64), femoral neck (−1.94±0.78), total hip (−2.12±0.99), forearm (−2.48±2.03). Blood calcium and phosphate and uriaire was normal, 25 (OH) Vitamin D to 25 ng / ml and PTH in 45 ng/ml (12.54). The majority of patients was under bisphosphonates (alendronic acid as 48.60, 24.30 and 4.30 % risedronate as zoledronic acid). 17.10 % were under strontium ranelate, 4.30 and 1.40 % in the denosumab as raloxifene. Four patients reported having previously received hormonal treatment of menopause. The median duration of treatment was 24 months. Regarding side effects with treatment, there were 33.33 % in strontium ranelate and 5.88 % by bisphosphonates. There was a densitometric gain at 3 sites significant at the lumbar spine (0.049) and the forearm (0.095).

Conclusion: The various therapeutic means currently available for the treatment of osteoporosis have demonstrated a significant beneficial effect on bone mass and preventing the risk of fractures. However, some drugs may be associated with side effects. Our study showed the effectiveness of different treatments referred to bone densitometry with dice gain the middle of the therapeutic sequence, during the postmenopausal osteoporosis. Few side effects attributed to treatment were highlighted.

P129

REPEATABILITY OF DXA MEASURED BONE MINERAL IN THE MANDIBLE USING SOFTWARE BASED REGION SETTING

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Aims: The mandible – known to have high bone turnover, increased vascularity and greater susceptibility to activity of osteoclast and osteoblast – has long been pursued by DXA as a site from which to monitor early change in response to treatment or disease. Positioning and operator assessment have, however, made good measurement precision difficult to obtain. The current study now examines repeatability with positioning aids and software based region setting.

Methods: Three Norland XR-800 were used to evaluate bone mineral content in the body and ramus of the mandible. Patients were positioned on the scanner laying on their side with the head supported by a positioning platform so that the upper and lower mandibles were well superimposed on each other. A scan region width of 12 cm centered over the mandible was set to start at the level of the eyebrow and end below the level of the chin. Scans were done with a resolution of 1.0 x 1.0 mm and typically completed in a couple of minutes. Eighteen dentate subjects – each undergoing repeated examinations with repositioning – were examined to assess repeatability of paired studies. Evaluating the initial study, software performed searches for the lowest content region within preset search regions in the body and ramus regions. This resulted in placing regions of interest in the body (0.5×2.0 cm) and ramus (1.0×1.0 cm) regions in the first study and then in the same place in follow-up studies. With regions located software completed analysis to assess repeatability of regional bone mineral content.

Results: Studies on the eighteen subjects showed a range of regional bone mineral content between 0.438 and 2.692 g in the body and 0.182 and 1.024 g in the ramus. Pair-based average repeatability was 2.08 % in the body region and 2.75 % in the ramus region resulting in computed least significant change limits of 5.99 % for the body and 7.92 % for the ramus.

Conclusion: The study demonstrates that Norland DXA systems – when using specific positioning tools and automatic region of interest setting software – measures bone mineral in the body and ramus regions of the mandible so that studies can sensitively detect changes over 6 % in the body and 8 % in the ramus allowing swifter assessment of change in response to treatment or disease over time.

P130

EVALUATION OF THE VALIDITY OF THE IOF ONE-MINUTE OSTEOPOROSIS RISK ASSESSMENT TEST FOR POSTMENOPAUSAL PALESTINIAN WOMEN

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Aims: To validate the IOF One-Minute Osteoporosis Risk Assessment Test which includes 18 questions (for women) to detect the risk of developing osteoporosis.
Methods: 380 postmenopausal women aged ≥55 years were recruited from various clinics for BMD evaluation using Prodigy DXA densitometer, 130 out of the 380 (34.2 %) were diagnosed with osteoporosis, 290 women completed the "IOF Arabic Version One-Minute Test".
Results: The percentage of women with osteoporosis that were exposed to sun <10 min were higher than the normal control group [45.8 % (38/83) vs. 23.1 % (48/208), respectively, $p=0.0001$]. Women not exposed to sun from both groups had significantly lower mean BMD and higher negative T-score compared to women exposed to sun. However, mean values of vitamin D, PTH and other bone markers were not significantly different except for mean BMI which was slightly but significantly lower (31.0 vs. 32.5, $p=0.030$). Women with no exercise had higher mean bone resorption marker (CTX1) compared to women who exercised [7567±5238 (99) vs. 6201±3384 (101), $p=0.03$]. Women with amenorrhea before the age of 45 years had significantly lower BMD and significantly higher negative T-score compared to women without interruption of menstrual cycle. Mean bone formation marker (PINP) was significantly higher in women with amenorrhea. Both groups had BMI higher than 30 kg/m^2 (obese). Women who often fell or were afraid to fall because they think they were weak had significantly higher mean CTX1 [7810±5296 (91)] compared to control group [6099±3412 (109)], $p=0.009$, and had lower, but not statistically significant, mean PINP (602 vs. 550, $p=0.313$). They also had lower mean vitamin D levels [13.0±3.62 (94)] vs. [14.8±5.01 (110)], $p=0.003$. However, women who often fell were older compared to controls [64.2±9.29 (140) vs. 61.3±8.21 (151), $p=0.005$]. More women with osteoporosis often fell compared to normal controls but was not statistically significant (56.6 vs. 44.7 %, $p=0.07$). Women who had accidents that caused broken bones had no significant differences in bone markers compared to women who had not broken bones except for having lower BMI (30.9 vs. 32.5). Approximately, 28 % of osteoporosis and normal women had accident that caused broken bones. When the ROC curve was plotted using total score (total number of questions answered yes) and BMD as a gold standard, the area under the ROC curve was 0.625 (95%CI 0.554–0.696). Based on the estimation of the likelihood ratio (LR) and the association criterion of Youden Index *J*, a threshold of total positive answers of 4 questions was estimated with a sensitivity of 0.71 and a specificity of 0.50 with LR+ of 1.43.
Conclusion: Based on the ROC curve and the LR, the IOF One-Minute Test is valid to detect postmenopausal women with high risk of developing osteoporosis with a threshold of at least 4 out of the 18 questions answered yes.

P131

SERUM 25-HYDROXYVITAMIN D AND BONE TURNOVER MARKERS IN PALESTINIAN POSTMENOPAUSAL OSTEOPOROSIS AND NORMAL WOMEN

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Aims: To investigate the association of osteoporosis with serum 25(OH)D_3, PTH, calcium bone formation (PINP) and bone resorption (CTX1) markers, in addition to association with genes.
Methods: 380 women aged ≥55 years were recruited for BMD, bone marker and genetic analysis.
Results: Subjects with osteoporosis had statistically significant lower mean weight, height and BMI and serum calcium ($p<0.05$). No significance difference was detected between the mean values of bone turnover markers (CTX and PINP), 25(OH)D and PTH of the two groups. Severe vitamin D deficiency represented 15.4 % (44/285), the insufficiency 70.1 % (201/285) and the sufficiency 14.0 % (40/285). The optimal cutoff value for vitamin D required to keep PTH below 70 pg/ml was 13.1 ng/ml using the ROC curve analysis. Calcium levels were within the normal range in the three groups ranging from 9.27 to 9.56 mg/dL, whereas PTH was significantly higher among women with vitamin D insufficiency and severe deficiency in comparison to women having sufficient vitamin D levels (79.9, 85.6, and 50.0 pg/ml, respectively). Pearson correlation showed that 25(OH)D was significantly negatively correlated (p 0.05) with PTH ($r=-0.25$), weight ($r=-0.135$)

and BMI (r=−0.147) and positively correlated with calcium (r=0.126). No statistically significant correlations were detected between vitamin D with BMD, age, height, CTX1, and PINP markers. Strong positive correlation was evident between CTX1 and PINP (r=0.86, p 0.01) indicating high rate of bone formation and resorption. This was clear in osteoporosis women and not in normal women. The median BMD was higher in obese subjects compared to overweight and normal subjects (p=0.000). This was also confirmed by the strong relationship (p=0.000) between obesity and total T-score depicted in the decrease in the median of the total T-score of obese compared to overweight and normal weight. The odds ratio (OR) for having osteoporosis decreased with increasing weight (overweight OR= 0.245, p=0.003; obese OR=0.117, p=0.000). However, BMI had a negative correlation with vitamin D (r= −0.148) and a positive correlation with PTH (r= 0.129). Three sequence variations in the promoter and upstream regions of the TNFSF11 gene showed the TC genotype at −643 was significantly associated with normal subjects while the TT genotype was significantly associated with osteoporosis. Interestingly, all subjects exhibited the homozygous genotype [TT] at −290 location and therefore did not contribute to risk of developing osteoporosis.

Conclusion: Mean serum 25(OH) vitamin D, PTH and bone turnover markers were not statistically different between osteoporosis and control subjects. The protective effect of obesity on osteoporosis is complicated by the effect of obesity on vitamin D and PTH. Significant correlation was evident between the TT genotype at −643 of the TNSF11 gene with osteoporosis.

P132

EFFECT OF HORIZONTAL VIBRATION THERAPY ON BONE DENSITY, BONE TURNOVER, PAIN, BALANCE AND QUALITY OF LIFE IN OSTEOPOROTIC WOMEN AGED BETWEEN 45 and 65 YEARS

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Aims: To investigate the effect of horizontal vibration therapy on bone density, bone turnover, pain, balance and quality of life in osteoporotic women aged between 45 and 65 years.

Methods: The trial included 60 postmenopausal women with lumbar or femoral t-score between −2.5 and −3. Could not receive antiresorptive treatment due to reimbursement regulations. The participants in the study group (n=18) received horizontal vibration therapy 30–60 Hz combined with infrared therapy at a wavelength of 550–950 nm for 20 min twice a week, for 3 months. Group two (n=15) received only infrared therapy and group three (n=20) served as the control group without any treatment. Every participant received 1000 mg calcium and 880 IU vitamin D. Demographic characteristics, BMD by DXA (lumbar L2-L4, femoral neck and femur total), bone turnover markers namely serum osteocalcin and bone specific alkaline phosphatase, deoxyprydoline and hydroxyproline in urine, general pain by visual analog score (VAS), balance by Berg Balance Scale (BBS), quality of life with short form-36 (SF-36) were recorded before and after treatment.

Results: After 3 months of study statistically significant improvements were seen on BBS of both groups (p<0,05). There was no significant changes between groups in BMD, bone turnover markers, VAS and SF-36.

Conclusion: 3 months of horizontal vibration therapy applied for 20 min at a frequency of twice a week was not effective in bone density measurement, pain, quality of life and balance scores of osteoporotic women in the 45–65 age group.

P133

SERUM LEVELS OF C-TELOPEPTIDES OF TYPE I COLLAGEN, C-REACTIVE PROTEIN AND BONE MINERAL DENSITY IN PATIENTS WITH PSORIATIC ARTHRITIS

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Aims: Psoriatic arthritis (PA) is a chronic inflammatory arthritis associated with psoriasis that occurs in 0.3–1 % of the population. PA develops in up to one-third of patients with psoriasis and is one of possible reasons of secondary osteoporosis. The prototype of inflammatory arthritis, rheumatoid arthritis (RA), has been extensively researched, and multiple studies reaffirm the decreased BMD in this condition, while the state of BMD in patients with psoriatic arthritis is poorly studied. Aims were to investigate the relationships among serum c-telopeptides of type I collagen (sCTX) levels, BMD and C-reactive protein (CRP) in patients with PA.

Methods: We examined 63 patients with proven diagnosis of PA, 32 females and 31 males, mean age 48.7 [45.7:53.1] years. The control group was made up of 50 healthy individuals comparable to age, height, weight and BMI. BMD was measured by DXA at lumbar spine (anterior-posterior projection at L1-L4). Serum levels sCTX were determined using the chemiluminescent assay (analyzer – Cobas e 411, reagents -

Roche Diagnostics). Statistical data processing is carried out in the program Statistica 8.

Results: There were revealed statistically significant (p= 0.045) differences in showings of BMD at lumbar spine in patients with PA (1.027±0.17 g/cm^2) and controls (1.214± 0.28 g/cm^2). There were no revealed any differences (p= 0.723) of serum sCTX between studied groups: mean level of sCTX in patients with PA was 0.208 [0.209:0.472]; and 0.301 [0.215:0.385] in control group, p=0.02, which corresponds to the reference values. There were no revealed statistically significant correlation between serum levels of sCTX, CRP and BMD, however there has been a tendency to a slight degree of negative correlation (r=−0.16) between sCTX and CRP.

Conclusion: We found decreased BMD in patients with PA at the serum levels of marker of bone resorption (sCTX) within appropriate reference values. However there has been found a tendency to a slight degree of negative correlation between CRP and sCTX which allows to emphasize the role of chronic inflammation. Research continues.

P134

TRABECULAR BONE SCORE AS A SKELETAL FRAGILITY INDEX IN ACROMEGALY PATIENTS

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Aims: Although the data on BMD are controversial, patients with acromegaly have an increased risk of fragility fracture. we examined the lumbar spine TBS to explain the skeletal deterioration in acromegaly patients.

Methods: We included 14 men and 19 women acromegaly patients, who underwent DXA at the time of diagnosis from 2000 to 2014 at Seoul National University Hospital. Ninety-nine age-, sex- and BMI-matched controls were recruited. Biochemical parameters, lumbar spine TBS and BMD at all sites were measured. Gonadal status was evaluated at diagnosis.

Results: Lumbar spine TBS was lower in acromegaly patients than controls in both genders (1.345±0.121 vs. 1.427±0.087, P=0.005 in men; 1.356±0.082 vs. 1.431±0.071, P=0.001 in women). In contrast, BMD at all sites did not differ between the two groups. Hypogonadal acromegaly patients (men, n=9; women, n=12) had lower TBS values compared with controls both in men and women (all P<0.05), although BMD at all sites were similar for the two groups. In eugonadal acromegaly patients, lumbar spine TBS was lower than controls only in women (P=0.041).

Conclusion: Skeletal microarchitecture was deteriorated in acromegaly patients as assessed by TBS, which seems to be a consequence of growth hormone excess as well as hypogonadism, especially in women.

P135

VITAMIN D DEFICIENCY IN CHILDREN ENTERING PUBERTY, ACCIDENTAL OR REALITY?

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Aims: In the study which investigated the association of selected genetic polymorphisms and BMD in boys reaching puberty, we observed influence of nutrition and behaviour patterns on ultrasounds bone mineral parameters too.

Methods: We analysed all ultrasound parameters of calcanues with antrophometrics, biochemics and hormonal state at 168 boys between 11 and 13 years residing in Slavonski Brod, Croatia. Quantitative ultrasound measurements were undertaken with Sahara device (Hologic). We estimated dietary habits and other possible behavioural patterns associated with BMD: TV watching, use of computer, sun exposure/summer/winter/hours per week, fizzy drinks/dl per day).

Results: Significant low levels of serum concentration of vitamin 25(0H)D3 (28.6 nmol/l) was found. The same did not show any statistical association with the ultrasound parameters. Children who took 850 mg of calcium per day had better parameters of BMD. We found that 34 % boys take 5 dl of fizzed drinks daily, 48 % ingest daily 600 mg of calcium and 63 % sits 4 h during computer use. Their physical activity is extremely low (10 % go out about 30–60 min 2x per week); as a sun exposition too (about 1 h during summer at 23 %; on winter about 15 min at 15 %). An alarming fact is that the serum concentration of vitamin D3 that was found was significantly below normal. Blood analysis was done in mid-June after a long sunny period. 63 % of the children spend most of his free time in front of TV or computer. Most children consumed foods low in vitamin D and they are generally less active.

Conclusion: Low serum vitamin D had no effect on bone metabolism? The question is whether the observed children achieved some extraskeletal effect of vitamin D due to this finding. We think it is necessary to consider the status of vitamin D3 in the pediatric population. It is well known the association of vitamin D levels with the development allergic or other autoimmune diseases. The results point out the possible need supplementation with vitamin D through longer period of adolescency.(1,2,3,4)

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P136
MICROSTRUCTURAL DECAY IN SPINAL CORD INJURY

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Aims: Immobilisation is accompanied by bone loss due to a reduction in bone formation by osteoblasts and increased bone resorption by osteoclasts. However, the cell responsible for orchestration of these two executive cells of bone remodelling is the osteocyte, the most numerous and longest living cell in bone. The cell is a mechanosensor that communicates via numerous canaliculi with other osteocytes, with cells lining the intracortical canals traversing the cortex, the endocortical surface lining the medullary canal, and trabecular surfaces. All remodelling which 'turns over' mineralized bone matrix - removes a volume of bone then deposits the same, more or less bone depending the circumstance - is initiated upon these surfaces. If less bone is deposited, bone loss and structural decay occur. One means of modulating the gain or loss of bone is the regulation of sclerostin, a product of the SOST gene. Immobilisation increases levels of sclerostin and this results in reduced bone formation and bone loss. Inhibition of sclerostin stimulates bone formation. This discovery has resulted in the production of a potentially useful treatment of osteoporosis that may play a role in prevention of bone loss in SCI. Antisclerostin antibody (Scl-Ab) administration increases bone formation and reduces bone resorption. Beggs et al. (2015) report that 21 day post-injury, SCI animals has reduced cancellous bone volume at the proximal tibia and distal femur, characterized by reduced trabecular number, thickness and connectivity and deficits in femoral diaphyseal strength. Scl-Ab prevented cancellous bone loss by increasing increased osteoblast surface and bone formation prevented the reduction in cortical bone strength (1).
Methods: We studied 39 men with complete SCI (44.2± 14.5 year, duration of paralysis ranging from 3 weeks to 20 years) and 70 age-matched healthy men recruited from the controls at Austin Health, University of Melbourne. Images of the nondominant distal tibia were obtained using HR-pQCT (Scanco, 82 micron isotropic voxel size). The bone microarchitecture and matrix mineralisation density were quantified using StrAx1.0 (StraxCorp, Melbourne, Australia), a nonthreshold based image processing software separating bone from background and bone into its cortical, transitional zone and trabecular compartments.
Results: Compared to controls, men with SCI had a 43.3 % lower cortical area ($p<0.05$) and 51 % lower cortical thickness ($p<0.001$) and 18 % higher cortical porosity. Total vBMD was reduced by 25 % ($p<0.001$). Trabeculae were fewer by 45 % with a 3.2 fold higher trabecular separation.
Conclusion: Profound and rapid loss of cortical and trabecular bone underlies the risk for fracture. Given the data from animal models, studies are needed to evaluate the effects of antisclerostin antibody in this illness.
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P137
MOLECULAR AND GENETIC MECHANISM OF HEPCIDIN IN REGULATION OF BONE METABOLISM IN ZEBRAFISH

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Aims: Hepcidin is an important factor in transcriptionally upregulated in response to iron overload which is a risk factor of osteoporosis. The phenomenon of bone microarchitecture defects has been described in hepcidin knockout mouse but molecular and genetic mechanisms leading to bone loss are lacking.
Methods: Design, construction and microinjection of hepcidin morpholino. Whole mount embryo staining for iron. RNA isolation, cDNA synthesis and quantitative real-time PCR. Whole mount in situ hybridization. Transcriptome analysis.
Cell culture and transfection.
Results: In the present study, we show that in zebrafish knockdown of hepcidin leading to iron overload results in mineralization loss in early intramembranous bones while cartilage formation is mostly unaffected, but coinjection of hepcidin cRNA partially restored these defects. Quantitative real-time PCR analyses showed downregulation of expression of osteoblast-specific genes (runx2a, runx2b, ALP, and sp7). In vivo analyses using whole mount in situ hybridization show that osteoblast genes (runx2a, sp7)maturation and activity delayed was observed after knockdown of hepcidin. Furthermore, we analyzed expression of bone defects in transgenosis GFP of osteoblast genes (runx2a, sp7). Furthermore, we provide the first functional evidence for a role of hepcidn in regulation of metabolism of osteoblast genes. Luciferase reporter assays

demonstrated that bmp2a enhances runx2a expression. We find that iron overload represses its expression through bmp2a. Cell transfection and co-IP assays revealed that bmp2a enhances runx2a expression through binding to nuclear receptor hjv, but iron overload repress its process. High throughput transcriptome sequencing in the zebrafish of hepcidin knockdown have confirmed its pathways in osteoblast metabolism. Taken together, we show that iron overload decreased bone formation probably by pathway of bmp and hjv affecting runx2 in zebrafish.

Conclusion: Taken together, we show that iron overload decreased bone formation probably by pathway of bmp and hjv affecting runx2 in zebrafish.

P138

BONE MASS ACCRUAL CHANGES IN MOUSE MODELS OF TARGETED PR DELETION IN OSTEOPROGENITOR CELLS

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Aims: Sexual dimorphism in bone is well known; men tend to have higher peak bone mass than women. Our laboratory and another group previously reported that global progesterone receptor knockout (PRKO) mice displayed a high-bone-mass phenotype.

Methods: To further elucidate the role of progesterone receptor (PR) in osteoprogenitor cells and osteoblasts, bone-specific PR conditional knockout mice were generated in our laboratory by crossing PR-flox mice to Mx1_cre, Prrx1-Cre or Bglap-cre mice. Bone mass acquisition, bone turnover and bone mechanical properties were evaluated at the age of 2 and 6 months in both sexes.

Results: Results 1. we observed 50–100 % higher trabecular bone volume in distal femurs, as well as significantly higher serum osteocalcin levels, in Prrx1-Cre-driven heterozygous/homozygous male and homozygous female PR knockout mice at 2 and 6 months of age. Bone size and femur length were similar between Prrx1-Cre-driven mutant and WT controls. No significant phenotypic change was observed in cortical bone of femurs from 6-month-old Prrx1-Cre;PR-flox mice by μCT analyses and 3-point bending tests, probably due to the lack of PR expression in the diaphyses. Mechanistically, we found ~40 % higher MSC-like population (CD105+ CD29+Sca1+CD45-) in bone marrow stromal cells from male homozygous Prrx1-Cre;PR-flox knockout mice at 2 and 6 months of age; and the PR-deficient BMSCs exhibited higher osteogenic differentiation in vitro. Further investigations are ongoing to decipher the PR signaling cascades involved in bone formation and attainment of peak bone mass. 2. Using the Mx1-Cre;mT/mG model, we found that majority of cells on bone surface as well as within bone marrow expressed GFP, corresponding to Mx1-Cre activation. Fourteen days post Mx1-Cre activation, PR-deficient calvarial cells and tissue culture showed significantly higher osteogenic differentiation. However, we did not observe Mx1+ cells differentiating into osteocytes in vivo and we failed to detect skeletal changes in distal femurs from both Mx1-Cre;PR-flox male and female mice. 3. We found no significant skeletal change was identified in Bglap-Cre-driven (mature osteoblast-specific) PR conditional knockout mice.

Conclusion: 1. Inactivation of the PR in Prrx1+ osteoprogenitor cells resulted in higher trabecular bone mass and bone formation in both sexes. 2. Blocking progesterone signaling via PRs in calvarial Mx1+ cells promoted osteoblast differentiation in vitro. Mx1+ progenitor cells did not contribute to osteocyte differentiations during long bone development in vivo. Selectively inactivating the PR gene in Mx1+ cells did not affect peripheral skeletal homeostasis. 3. Inactivation of the PR in Bsap cells resulted in no changes in bone turnover or bone phenoype in both sexes. Our results reveal PR in osteoprogenitor cells to be a potential target for bone mass augmentation.

P139

VITAMIN D STATUS IN CHILDREN AND ADOLESCENTS WITH OSTEOGENESIS IMPERFECTA

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Aims: The prevalence of vitamin D deficiency and its consequence on bone in osteogenesis imperfect (OI) is not well characterized in the Middle East. In the present study, we assessed the determinants of vitamin D status in children and adolescents living in Saudi Arabia and examined the relationship between the levels of serum 25-hydroxyvitamin D [25(OH)D] and BMD.

Methods: A total of 106 patients with a diagnosis of OI type I, III or IV (aged 2.6–16.4 year; 39 girls) who had not received bisphosphonate treatment at the time of 25(OH)D analysis were studied in the outpatient clinics at the Center of Excellence for Osteoporosis Research. BMD values were measured by DXA.

Results: Serum levels of 25(OH)D ranged from 6.2 to 142 nmol/L and were <50 nmol/L in 80 patients (75.5 %). Regression analysis showed that age ($P<0.001$), and OI severity ($P=0.005$), but not gender or season, were significant independent predictive factors of 25(OH)D levels. Serum 25(OH)D levels were negatively correlated with serum PTH levels ($P=0.021$) and bone resorption markers (namely: plasma CTX; $P=0.033$ and urinary NTx; $P=0.051$), respectively. Serum 25(OH)D levels were positively associated ($P=0.056$) with z-score LS-BMD after adjusting for OI severity, age and gender.

Conclusion: Low serum 25(OH)D levels are common and positively associated with z-scores of LS-BMD in children and adolescents with OI types I, III and IV.

P140

CIRCULATING SCLEROSTIN IN CHILDREN AND ADOLESCENTS WITH OSTEOGENESIS IMPERFECTA

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Aims: Sclerostin is an inhibitor of bone formation and is a key determinant in bone mass. Recent studies showed that anti-sclerostin antibody treatment into an osteogenesis imperfecta (OI) mouse model resulted into higher bone mass and fewer fractures. Limited information is available on the circulating levels of sclerostin in patients with OI. In the present study, we assessed the circulating levels of sclerostin in children and adolescents with OI, living in Saudi Arabia and examined the relationship between the levels of serum sclerostin and BMD (aBMD) at the lumbar spine (LS).

Methods: A total of 106 patients with a diagnosis of OI type I, III or IV (aged 2.6–16.4 year) were studied in the outpatient clinics at the Center of Excellence for Osteoporosis Research and compared with age- and sex-matched healthy controls ($n=106$). Serum sclerostin and bone turnover markers (namely: plasma CTX and serum P1NP) were measured by ELISA. aBMD values were measured by DXA.

Results: Patients with OI had increased circulating sclerostin levels (mean±SD) (32.6±12.9 pmol/L) vs. healthy controls (18.4±6.5 pmol/L) ($P<0.052$) with low LS-aBMD z-score values ($P<0.001$). Serum sclerostin levels were positively associated with bone turnover marker pCTX ($r=0.56$; $P<0.01$) and serum P1NP ($r=0.39$; $P<0.05$) and LS-aBMD z-score values ($r=0.44$; $P=0.032$), respectively, even after adjustment for other confounding factors.

Conclusion: Increased serum sclerostin levels in patients with OI suggest that bone mass abnormalities among this group of OI patients may be caused by dysregulation of sclerostin.

P141

VITAMIN D BINDING PROTEIN POLYMORPHISMS A CONTRIBUTING FACTOR TO VITAMIN D DEFICIENCY: A PAKISTANI PERSPECTIVE

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Aims: Several single nucleotide polymorphisms linked to vitamin D binding protein (GC) gene have been found associated with blood levels of 25-hydroxyvitamin D (25OHD). The objective of this study was to estimate frequency of rs4588 and rs7041 genotypes and their association with circulating levels of 25OHD.

Methods: Our study includes 85 apparently healthy adults of diverse ethnicity, recruited from the Medical College Participants' demographic information and clinical history was recorded on a predefined form. Genomic DNA was extracted from blood samples using Wizard Genomic DNA Purification Kit (Promega, WI, USA) and was genotyped for GC rs4588 and rs7041 polymorphisms using polymerase chain reaction and restriction enzyme digestion.

Results: A total of 85 participants were enrolled for this study, out of those 61.2 % were females. Their mean age was 20±0.9 year. Majority of the subjects (87.1 %) had vitamin D deficiency (VDD). The population was observed to be in Hardy Weinberg Equilibrium (p-value>0.05). The frequency of rs7041 genotypes (GG, TT, GT) were 23.5, 28.2 and 48.2 %. For rs4588, 9.4 % were genotyped as AA, 42.4 % as AC and 48.2 % as CC. Mean 25OHD for AC genotype was 15.9± 10.9 ng/ml, it was followed by CC (14.1±6.5 ng/ml) and AA (12.8±5.7 ng/ml) genotypes. As for rs7041, mean 25OHD was high in individuals with GT (15.6± 10.7 ng/ml) compared with GG genotype (14.5± 6.7 ng/ml) and TT genotype carrying individuals (13.3 ±5.0 ng/ml).

Conclusion: The most frequently occurring genotypes for rs7041 and rs4588 were GT and CC respectively. Highest mean 25OHD levels were noted in heterozygote individuals while the lowest levels were observed in homozygotes. With prevalent VDD in our population, it is vital to correct this deficiency and conduct further

studies in larger cohorts, to identify relationship between SNPs of other genes involved in the vitamin D metabolism.

P142
CORTICOSTEROIDS, OSTEOPOROSIS AND INFLAMMATORY BOWEL DISEASES

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Aims: Osteoporosis is a frequent and serious complication by patients with inflammatory bowel diseases. Incidence and prevalence of bone density decrease by inflammatory bowel diseases is reported from 30 to 78 %. The cause of bone changes is multifactorial; however, it has several common characteristics - malabsorption of nutrition, vitamins, especially vitamin D, symptomatic hypogonadism, secondary hyperparatyreosis, low body weight, hypomobility, smoking and alcohol. One of the significant risk factors is also the treatment, especially by corticoids. The aim of our work was to retrospectively monitor the bone density decrease by patients with Crohn's disease (MC) and ulcerous colitis (UC) and to assess the dependence of bone density decrease on a cumulative dose of corticosteroids.
Methods: We monitored 57 patients with UC and 71 with MC. Osteoporosis was verified densitometrically (Hologic Discovery) in the lumbar spine and hip area. We used the analysis of axis x dependence on axis y to process the data.
Results: By 71 patients with UC we found a normal finding in hip area by 33 % patients and in lumbar spine by 28 % of patients. We confirmed the bone density decrease in hip area by 67 % of patients (45 % osteopenia and 22 % osteoporosis) and in lumbar spine area 42 % (9 % osteopenia and 33 % osteoporosis). By 57 patients with MC we confirmed a normal finding by 47 % patients in hip area and by 42 % in lumbar spine area. We confirmed the bone density decrease in hip area by 53 % of patients (35 % osteopenia and 18 % osteoporosis), in lumbar spine area by 58 % of patients (39 % osteopenia and 19 % osteoporosis). We confirmed the dependence of bone density decrease on the cumulative dose of corticosteroids by patients with UC and MC.
Conclusion: We confirmed an increased occurrence of decreased bone density by patients with inflammatory bowel diseases. Except for other factors we confirmed the significant dependence of bone density decrease on the cumulative dose of corticosteroids.

P143
IN VIVO PREDICTION OF CYP-MEDIATED METABOLIC INTERACTION POTENTIAL OF FORMONONETIN AND BIOCHANIN A USING IN VITRO HUMAN AND RAT CYP450 INHIBITION DATA

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Aims: Formononetin (FMN) and biochanin A (BCA) are the principal isoflavones present in commercially available extracts of red clover that are widely been consumed for various health benefits including osteoporosis and delaying menopause. We investigated the in vitro effects of FMN and BCA on catalytic activity of human/rat cytochrome P450 enzymes to assess the drug interaction potential of red clover.
Methods: IC_{50} and K_i values of FMN and BCA for CYPs were determined in human/rat liver microsomes.
Results: FMN and BCA showed concentration-dependent inhibition of CYP1A2 activity with IC_{50} values of 13.42 and 24.98 μM in human liver microsomes and 38.57 and 11.86 μM in rat liver microsomes, respectively. The mode of inhibition of human CYP1A2 by FMN was found to be competitive with apparent K_i value of 10.13±1.96 μM. FMN also inhibited human CYP2D6. BCA exerted moderately inhibitory effects on human CYP2C9. The predicted in vivo inhibition for CYP1A2 was insignificant (R value<1.1) at hepatic level while at intestinal level, it was significant (R value >11). The inhibitory effects on other CYPs were found to be minimal.
Conclusion: Red clover may be considered safe to be consumed along with coprescribed medications; however, precaution must be taken while co-administering it with CYP1A2 substrates.

P144
PREVALENCE OF OSTEOPOROSIS IN KIDNEY TRANSPLANTED PATIENTS IN ERBIL/IRAQI KURDISTAN

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Aims: To determine the prevalence and risk factors of osteoporosis after kidney transplantation
Methods: This study was carried out during the period from (February 2011 to January 2012) at the nephrology and dialysis department in Hawler teaching hospital. A total of 63 outpatient renal transplant recipients (38 males and 25 females) were assessed for underlying osteoporosis. All the

patients had stable allograft function (as defined by serum creatinine<2 mg/dl). The Information about the risk factors for low BMD were obtained from patient records: age, gender, duration of chronic renal failure, type of dialysis, time on dialysis, cumulative steroid and cyclosporine A doses which was calculated starting from date of transplantation to the time of evaluation of BMD at which the serum creatinine, calcium and phosphates were measured. BMD of the first to fourth lumbar vertebrae and the BMD of the left or right femoral neck were measured using DXA.

Results: Osteoporosis was detected in 23.8 % of studied patients, and osteopenia in 50.8 %. Results were expressed as Z scores relative to mean normal values for subjects of the same age and gender and as T-scores for sex matched young adults. Pretransplant measurement of bone densitometry was not performed. Rate of osteoporosis was significantly higher in those patients who had BMI less than 25 kg/m^2 (P<0.001). Patients with osteoporosis had more exposure to steroid than those without osteoporosis. Age, sex, duration of transplant, time on dialysis, and cyclosporine cumulative dosages had no significant relationship with bone loss in any of the regions. Also the levels of serum calcium, phosphate, BUN and creatinine had no such relationship.

Conclusion: Osteoporosis is common in our renal allograft recipients, especially in the lumbar vertebrae. BMD measurement should be performed in both pre- and post-transplant period at least once yearly. Dosage of steroids should be titrated cautiously.

P145

FREQUENCY OF LOW BONE MINERAL DENSITY IN NEWLY DIAGNOSED PATIENTS WITH RHEUMATOID ARTHRITIS PRESENTING AT A TERTIARY CARE HOSPITAL

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Aims: To determine the frequency of low BMD in newly diagnosed patients with rheumatoid arthritis (RA).

Methods: In this cross-sectional study, BMD of lumber spine and hip was measured in 55 consecutive RA patients using DXA scan. Disease related variables like disease diagnosis, duration, presence of RF factor, anti-CCP, erythrocyte sedimentation rate (ESR), clinical disease activity index (CDAI) were measured along with outcome measures like low bmd (osteopenia and/or osteoporosis as defined by WHO).

Results: 55 consecutive patients fulfilling the ACR criteria for RA were included in this study. Mean age was 43.62± 11.39 year. Female predominance was higher 49 (89.10 %). Mean BMI and duration of symptoms was 26.03±5.81 kg/m^2 and 5.40±2.38 months, respectively. 30 (54.54 %) patients had normal BMD while 25 (45.45 %) had low BMD. Among low BMD patients, osteopenia was found in 14 (25.50 %) and osteoporosis was found in 11 (20 %) patients. 15 (27.30 %) women were postmenopausal, among them osteopenia was found in 5 (33.3 %) and osteoporosis were also found in 5 (33.3 %) women. Mean BMD of lumbar spine and hip was 0.97±0.21 and 0.88±0.10, respectively. Mean T-score of lumbar spine and hip was −0.98±1.32 and 0.52± 0.86, respectively. Mean CDAI was 14.38±8.40 while mean ESR was 48.69±26.27. Seropositivity was found in 16 (29.10 %) patients. No significant association was found between BMD and ESR, CRP, ASDAS CRP, ASDAS ESR, vitamin D levels, BASDAI, BASFI, modified Schober score or other BASMI parameters, duration of symptoms or presence/absence of syndesmophytes. No significant association was found between BMD and ESR, CDAI, seropositivity or seronegativitiy for RA.

Conclusion: Majority of RA patients have decreased BMD which can be observed at early stages of the disease.

We recommend screening for osteoporosis with DXA scan early in all RA patients to prevent further morbidity.

P146

VITAMIN D DEFICIENCY AND CALCIUM IN OSTEOPOROTIC PATIENTS

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Aims: To characterize the prevalence of vitamin D deficiency and calcium in osteoporotic patients.

Methods: Osteoporosis is a serious, life threatening disease in both men and women increases with age. This disease is characterized by bone fractures, especially of the spine and hip, although any bone can be affected. Calcium is an essential element in the human body and is necessary to many cell functions. Adequate intake of calcium is necessary to maintain this balance. Hypovitaminosis D deficiency is a disease of our time, and leads to serious problems, can result in low bone mass. The effects of vitamin D independent of calcium, magnesium, and phosphate. As a part of the investigational project 988 participants were examined of the University Clinical Center of Sarajevo, age 20–80 during 6 months. For each patient we did personal history, age, DXA, BMI, medications, family history and life style. We have confirmed the presence of osteoporosis with a DXA>−2.5 SD, the results of vitamin D and calcium levels. Serum 25(OH) vitamin D and serum calcium were measured using Rosche Elecsys system on Cobas e 601 analyzers at Clinic for nuclear medicine and Clinical chemistry and biochemisty. Referral values for using this method are D vitamin 30.0–50.0 ng/mL and calcium 2.10–2.55 mg/L. Osteoporosis was diagnosed based on the

BMD T-score values≤−2.5 at the lumbar spine and/or proximal femur measured with DXA.
Results: In investigated group of 988 patients. The frequency of occurrence of osteoporosis is most common 44 % between the ages of 40–59 years. The patients have a vitamin D deficiency 76 % and low-normal calcium levels 69 %. We have found the existence of osteoporosis in 73 % of the female population, compared to men whose osteoporosis occurred only in 27 % of cases. Results of vitamin D were very low at the beginning of the test and stood at about 14.1 ng/mL, after 6 months of therapy of 800–2000 IU/d amounted to around 42.1 ng/mL. Also the results of calcium were low to 6 months of therapy 500–1000 mg daily improvements.
Conclusion: Calcium and vitamin D alone have the ability to prevent bone loss and reduce fracture. Vitamin D deficiency is associated with low BMD in patients who have diagnosed osteoporosis. The effects of vitamin D independent of calcium, magnesium, phosphate and nutrition and have an impact on the incidence of osteoporosis. The prevalence of hypovitaminosis D has public health implications, and requires adequate access to the therapy of vitamin D supplements, calcium and other minerals.

P147

BONE MINERAL DENSITY IN SYSTEMIC LUPUS ERYTHEMATOSUS PATIENTS OF MULTI ETHNIC BACKGROUND

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Aims: Abu Dhabi has a diverse multinational population that is reflected in our cohort of systemic lupus erythematosus (SLE) patients. Osteoporosis and low BMD is one of the comorbidities associated with lupus. The primary objective of this study is to examine BMD and frequency of osteoporosis in SLE. The secondary objective is to identify any ethnic differences associated with increased rate of osteoporosis.
Methods: Total of 145 patients with SLE identified to be followed up in the lupus clinic between January 2011 to December 2014. Demographic and clinical data was retrospectively collected from the hospital electronic medical records and paper case notes. Measures of BMD assessed by DXA, T-scores of hips and lumbar spines used. Patients who underwent DXA assessment identified and results described. Differences described between different ethnic backgrounds.
Results: 145 patients with SLE identified. All fulfilled ACR diagnostic criteria for SLE. 53 (36.5 %) patients qualified for DXA scan assessment request. 44 females and 9 males. Out of these 19 (35.8 %) patients had normal DXA (T-score >1), 19 (35.8 %) had osteopenia (T-score <1 and>−2.5) and 15 (28.4 %) patients had osteoporosis (T-score<−2.5). Of the 43 females who had DXA assessment: 18 Emirati-Emiratis (EE) and 25 Non-Emirati Emiratis (Non-EE). Of the 18 EE: 12 osteopenia, 2 osteoporosis and 4 normal. The 25 Non-EE: 11 ostepenia, 6 osteoporosis and 8 normal. 10 out of 20 males of SLE qualified for a DXA scan. 3 EE (2 osteopenia, 1 osteoporosis). 8 Non-EE (3 osteoporosis, 2 osteopenia 3 normal)
Conclusion: Bone density tends to get neglected in SLE. 64 % of our SLE patients who qualified for DXA had positive result of osteopenia or osteoporosis. All ethnicities affected. Numbers are small to draw conclusions. More SLE patients should be referred for bone density assessment.

P148

BONE MINERAL DENSITY IN SYSTEMIC LUPUS ERYTHEMATOSUS PATIENTS

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[1]Mafraq Rheumatology Allergy and Immunology, Mafraq Hospital, Abu Dhabi, United Arab Emirates

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Results: 145 patients with SLE identified. All fulfilled ACR diagnostic criteria for SLE. 53 (36.5 %) patients qualified for DXA scan assessment request. 44 females and 9 males. Out of these 19 (35.8 %) patients had normal DXA (T-score >1), 19 (35.8 %) had osteopenia (T-score <1 and>−2.5) and 15 (28.4 %) patients had osteoporosis (T-score<−2.5). Of the 43 females who had DXA assessment: 18 Emirati-Emiratis (EE) and 25 Non-Emirati Emiratis (Non-EE). Of the 18 EE: 12 osteopenia, 2 osteoporosis and 4 normal. The 25 Non-EE: 11 osteopenia, 6 osteoporosis and 8 normal. 10 out of 20

males of SLE qualified for a DXA scan. 3 EE (2 osteopenia, 1 osteoporosis). 8 Non-EE (3 osteoporosis, 2 osteopenia 3 normal).

Conclusion: Bone density tends to get neglected in SLE. 64 % of our SLE patients who qualified for DXA had positive result of osteopenia or osteoporosis. Numbers are small for statistical analysis. More patients with SLE should be referred for BMD assessment.

P149

MUSCULUSKELETAL SYSTEM INVOLVEMENT IN HEMODIALYSIS PATIENTS

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Aims: The occurrence of rheumatic disorders in patients treated by long-term haemodialysis (HD) has been emphasized for several years. This study is designed to investigate musculoskeletal system involvement in hemodialysis patients.

Methods: A prospective study about patients receiving maintenance hemodialysis in the Principal Military Hospital of instructions of Tunis. They were interviewed and examined. Venous blood samples were obtained for calcium, phosphorous, alkaline phosphatase and parathyroid hormone measurement.

Results: A total number of 40 patients were enrolled the study: 28 men and 12 women. The mean age was 55.8 year. Hemodialysis duration ranged between 1 and 32 years (mean: 8.75 year). Musculoskeletal symptoms were: carpopedal spasm in 20 (5 %) cases, carpal tunnel syndrome (CTS) symptoms (pain or paresthesia in a distribution that includes the median nerve territory) in 9 cases (22.5 %), joint pain in 8 cases (20 %) and bone pain in 5 cases (12.5 %). Laboratory findings: In 19 cases (47.5 %) there were hypocalcaemia (Ca <8 mg/dl). In 16 cases (40 %) hyperphosphatemia (P>5.5 mg/dl) was seen. Alkaline phosphatase: its mean level was 758±1414 IU/l (3 times more than upper limit of (normal range: 103–7520 IU/l). In 28 cases (70 %) it was upper than normal range (100–270 IU). PTH: the mean value was 422±78 pg/ml (10 times more than upper limit of normal) (range: 15.8–1522 pg/ml) in 30 patients (75 %). Radiographic abnormalities of renal osteodystrophy were found in 23 cases and there were periarticular calcifications in 5. Only one patient had apatite associated knee arthritis and none had gout or calcium pyrophosphate deposition disease. Twenty patients had arthralgias, 3 polyarthritis, and 4 knee effusions all of which were incompletely explained. Muscle cramps were seen in 24 patients, multiple fractures in one, symmetrical distal neuropathy in 18, and carpal tunnel syndrome in 3 cases. Osteoarticular Infections were seen in 4 cases: 1 case of spinal tuberculosis, 1 case of psoas abscess1 case of infectious saroilitis and 1 case of sternoclavicular arthritis

Conclusion: Musculoskeletal system involvement is still common in our hemodialysis patients and required more attention in its prevention and treatment by the physicians.

P150

STUDY OF BONE MINERAL DENSITY IN PATIENTS UNDERGOING HEMODIALYSIS: ABOUT 45 CASES

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Aims: Among the complications of chronic kidney disease affecting bone and mineral metabolism, bone loss is common and mostly silent. It is characterized by a decrease in bone mass, deterioration of bone quality and altered bone microarchitecture and increasing the risk of occurrence of fractures. Our aim was to evaluate bone mineral status in chronic hemodialysis patients by systematic measurement of BMD to determine the prevalence of bone loss in this population and the various factors that the influence.

Methods: Prospective study including 45 patients with terminal chronic renal failure undergoing hemodialysis. Bone mass was measured by DXA. We evaluated the prevalence of bone loss in this population and we sought to determine the main risk factors of bone mass decrease, especially those related to chronic dialysis.

Results: The mean BMD of the entire study population was at −1.133 SD (−0.24 g/cm^2) at the lumbar spine, −0.915 SD (−0.212 g/cm^2) at the left femoral neck and −0.927 SD (−0.219 g/cm^2) at the right femoral neck. We noted 33.3 osteoporosis, osteopenia 37.8 and 28.9 of normal bone status according to the WHO correspondent definitions. Factors correlated with the risk of occurrence of trabecular bone loss osteoporosis were: female gender, low weight, small size and high PTH values and elevated CRP. The female patient age, weight, smoking, age of onset of hemodialysis, the CRP and the presence of an inflammatory syndrome were factors statistically associated with risk of cortical bone loss.

Conclusion: Bone loss is a frequent and early complication in hemodialysis. It affects more significantly cortical bone. Early detection and preventive measures are necessary.

P151

THE EFFECT OF PROPHYLACTIC LOW MOLECULAR WEIGHT HEPARIN ON MEAN BONE MINERAL DENSITY IN THROMBOPHILIC PREGNANT WOMEN

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Aims: To determine if the prophylactic low molecular weight heparin use in thrombophilic pregnant patients changes BMD.
Methods: We evaluated 40 pregnant patients diagnosed with a form of thrombophilia who received prophylactic antiaggregant or anticoagulant therapy from weeks 5–6 to weeks 30–31 of gestation, when they delivered premature. Two groups were formed. In group A, we enrolled patients who received Aspirin until the date of birth, while in group C who underwent prophylactic low molecular weight heparin. Postpartum, we evaluated mean BMD, using DXA, in between the two groups.
Results: We analyzed and compared mean BMD in and between the two groups and detected no significant differences: we detected demineralization in 2 patients from group A and 1 pertaining to group C. However, this study was not adequately powered to detect differences in absolute fracture risk.
Conclusion: Prophylactic low molecular weight heparin in pregnancy is not associated with a significant decrease in BMD.

P152

FREQUENCY OF LOW BONE MINERAL DENSITY IN SPONDYLOARTHROPATHY PRESENTING AT A TERTIARY CARE HOSPITAL

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Aims: To determine the frequency and risk factors of low BMD in patients with spondyloarthropathies (SpA).
Methods: In this cross-sectional study, BMD of lumber spine and hip was measured in 25 consecutive SpA patients using DXA scan. Disease related variables like disease duration, diagnosis, presence of HLA B27, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), Bath ankylosing spondylitis disease activity index (BASDAI), Bath ankylosing spondylitis functional index (BASFI), Bath ankylosing spondylitis metrology index (BASMI) were measured along with outcome measures like low BMD (osteopenia and/or osteoporosis as defined by WHO).
Results: 25 consecutive patients fulfilling the Amor criteria were included in this study. Out of which 64 % were males, 76 % had predominant axial involvement and 80 % had duration of disease <10 y. Low BMD at the spine and hip was found in 72 % (n=18). Osteopenia was present in 36 %(n=9) at hip and 32 % (n=8) in spine while osteoporosis was seen in 20 % (n=5) at hip and 36 % (n=9) in the spine. No significant association was found between BMD and ESR, CRP, ASDAS CRP, ASDAS ESR, vitamin D levels, BASDAI, BASFI, modified Schober score or other BASMI parameters, duration of symptoms or presence/absence of syndesmophytes.
Conclusion: Majority of SpA patients have decreased BMD which can be observed in early stages of the disease. We recommend screening for osteoporosis with DXA scan early in all SpA patients to prevent further morbidity.

P153

GLUCOCORTICOID-INDUCED OSTEOPOROSIS SETBACK BY CLADONIA FURCATA METABOLITES IN COMBINATION WITH PROBIOTIC LACTOBACILLUS CASEI: A COMPARATIVE STUDY WITH IBANDRONATE

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Aims: Glucocorticoid-induced osteoporosis (GIO) is a form of osteoporosis caused by use of glucocorticoid medications. They have both direct and indirect effects on bone tissue that lead to bone loss. Clinical evidence suggests role of Cladonia furcata (CF) as a probiotic combination with lactobacillus casei (L. casei) in the treatment of inflammation, viral infection, cancer, ulcer and postmenopausal osteopenia but proof about the osteoporotic efficacy in currently available treatments is still lacking. To clarify this issue, we investigated the effects of CF metabolite with L. casei on bone compared with Ibandronate in experimental GIO.
Methods: Female wistar rat were divided into 5 groups. GIO was induced by daily injections of methylprednisolone (30 $mg \cdot kg^{-1}$ s.c.) for 60 day. GIO animals were injected daily with the methylprednisolone. At the end of the osteoporosis development period, methylprednisolone rats were randomized to receive: vehicle (n=6), CF (100 $mg \cdot kg^{-1}$ p.o.; n=6), L. casei (10^{-8} con. p.o. n=6), CF+L. casei (100 $mg \cdot kg^{-1}$ p.o.; 10^{-8} con. p.o.; n=6) and ibandronate (0.03 $mg \cdot kg^{-1}$ s.c.; n=6). Treatment lasted 60 day. Methylprednisolone animals were treated with vehicle for an additional 60 day. At the beginning and at the end of treatments, animals were examined for BMD and bone mineral content. Bone alkaline phosphatase and

carboxyterminal collagen crosslinks were determined; femurs were removed and tested for breaking strength and histology.
Results: CF combination with probiotic L. casei showed a positive increase in BMD, bone mineral content and in breaking strength than ibandronate and significantly increased bone alkaline phosphatase (bone formation marker), reduced carboxyterminal collagen crosslinks (bone resorption marker), compared with ibandronate. CF and L. casei treatments improved bone histology, histological score and showed antiosteoporotic effect.
Conclusion: CF combination with probiotic L.casei might be an effective therapy for the treatment of osteoporosis caused by use of glucocorticoid medications.
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P154
SECONDARY OSTEOPOROSIS IN PATIENTS WITH DEPRESSION TREATED WITH SELECTIVE SEROTONIN REUPTAKE INHIBITORS

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Aims: To assess the incidence of secondary osteoporosis in patients who are treated with antidepressants, from the group selective serotonin reuptake inhibitors (SSRIs).
Methods: The study included patients who hospitalized the Department of Psychiatry, and treated with antidepressants, from the group selective serotonin reuptake inhibitors. For analyzing the data, we used the univariate statistical analysis.
Results: The study included 40 patients, aged 52–64 years (57.4±3.4). Of these 67.7 % were female and 32.3 % male. All subjects in the treatment take several years SSRIs antidepressants group, an average of 4.4 y. Average daily doses of antidepressants were compared to sertraline 100 mg/dn (82 % of patients), paroxetine 20 mg/dn (15 % of patients) and escitaloparm, 10 mg/dn (3 % of patients). With antidepressants, all subjects were represented in the therapy and benzodiazepines. Of the total sample of 25 % of the patients with central DXA method has generalized osteoporosis. They also monitored parameters of bone metabolism. DXA T-score values L1-L5=−3.2±0.2 in patients with osteoporosis; vitamin D in these patients were 20±0.7, ionized Ca 0.90±0.2, 780±0.1 crosslaps.
Conclusion: Secondary osteoporosis in patients with depression occurs due to elevated levels of serum cortisol, which inhibits the activity of osteoblastic and increased osteoclast activity. The results show that a quarter of our patients treated with SSRIs antidepressants group drugs was identified secondary osteoporosis, bone resorption in a frame of reference for post/menopausal women, but the amount of vitamin D and calcium were significantly lower than in the reference.

P155
EFFECT OF ANTI-OSTEOPOROTIC PHENYLPROPANOIDS FROM MORUS ALBA IN OVARIECTOMIZED RATS

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Aims: Over activity of osteoclasts lead to loss of osteoporosis. It is an imbalance between bone resorption and bone formation. There are lesser known causes of osteoporosis. It is now believed that a combination of causes is often to blame for bone loss, such as estrogen deficiency in women, testosterone deficiency in men, imbalance between parathyroid and growth hormone, low calcium intake, excessive alcohol intake and many more. In this study we investigated the role phenylpropanoids in reducing the increased bone resorption process in ovariectomized rats, whether these prove to be significant in correction of osteoporosis.
Methods: Thirty-two female Sprague Dawley rats were taken. Two animals from each of the four treatment groups were included in every block: 1) sham-operated (sham group); 2) ovariectomized (ovx group); 3) ovx+ extract group; 4) ovx+170-estradiol (10 mg/kg body wt per day). We sacrificed the animals 30 day after surgery; right femurs and fourth lumbar bones were dissected out for bone analysis. After this bone length and density, bone calcium and phosphorus, serum total calcium and phosphate levels were determined.
Results: The four treatment groups started with similar mean body weights, but at the end of the study, the ovx group had a significantly higher than the sham group or the ovx+extract group. Animals in the ovx group had significantly lower densities of the right femurs and the fourth lumbar vertebra compared with the sham group. Extract supplementation had significantly increased mean bone densities of the right femur and fourth lumbar vertebra than rats in the ovx group. Ovx+ extract group had significantly greater bone phosphorus contents of the fourth lumbar vertebra as compared to ovx and sham group. Serum concentrations of total calcium and phosphorus were not significantly influenced by any of the dietary treatments.

Conclusion: The extract alleviated the bone resorption and helped in reducing the imbalance between osteoclastic and osteoblastic activity in bone.

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P156

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

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

Methods: Within group research design was used for studying health related optimism and adherence to treatment in women with postmenopausal osteoporosis. A total of 60 women suffering from postmenopausal osteoporosis were included in the study.

Results: Health related optimism was not significantly related with adherence to treatment in postmenopausal osteoporotic women. Health related optimism was not a predictor of adherence to treatment in postmenopausal osteoporotic women. Family genetics and family system emerged as a predictor of adherence to treatment in postmenopausal osteoporotic women. There were differences in adherence to treatment on the basis of family genetics and family system. The results of the study have practical implications for the patients and health professionals for creating insight about the importance of adhering to medications and keeping an optimistic view of health, in order to spend a better life.

Conclusion: It was concluded from the above discussion and result section that the present study contributed towards understanding the association of health related optimism and adherence to treatment in women with postmenopausal osteoporosis. In the light of results it was found that both of these variables have no significant relationship among them.

P157

VITAMIN D AND ITS CORRELATION WITH BONE MINERAL DENSITY AND DISEASE ACTIVITY IN CHILDHOOD SYSTEMIC LUPUS ERYTHEMATOSUS

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Aims: To determine the effect of vitamin D supplement on BMD in children with systemic lupus erythematosus (SLE) and its correlation with disease activity.

Methods: Children with SLE enrolled in a cross-sectional study evaluated for disease activity, which is completed by using the SLE Disease Activity Index (SLEDAI), vitamin D profile, bone markers and BMD of the lumbar spine (LS) and the whole body (WB) using DXA at enrollment and 6 months later. All patients treated with cholecalciferol (vitamin D3) 2000 IU daily and calcium supplement (caltrate 600) mg twice daily.

Results: Twenty-eight patients (26 female) completed the evaluation. The mean age was 9.7 ± 3.2 y with mean disease duration of 5.4 ± 4.3 y. The mean baseline of 25-OH vitamin D level was 54.1 ± 30 nmol/L, and SLEDAI score was 5.7 ± 4.7. BMD was subnormal in 23 patients, with mean baseline (Z-score) of LS and WB (-1.6 ± 1.1, -0.5 ± 1, respectively). Levels of vitamin D correlated inversely with SLEDAI and positively with bone density but did not reach statistical significance. Bone markers levels were correlated with BMD. After 6 months treatment with cholecalciferol and caltrate, BMD of LS and WB didn't show significant improvement (-1.6 ± 1.2 and WB $-$ 0.6 ± 1, respectively). However, there was significant improvement in disease activity correlating with the improvement of 25-OH vitamin D levels.

Conclusion: Our findings indicate that low BMD is common in childhood SLE. Furthermore, daily vitamin D supplementation could improve the serum levels of 25-OH vitamin D and disease activity. However, there was no improvement in BMD during treatment period with the proposed 25-OH vitamin dose.

P158

HISTOLOGICAL STRUCTURE OF MID-SHAFT ZONE OF TIBIA IN RATS OF VARIOUS AGES AFTER 60-DAY EXPOSURE TO TOLUENE VAPORS

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Aims: To investigate histological features of midshaft zone of tibia in rats after 2-month inhalation of epichlorohydrin (ECh)

vapors and administration of thiotriazoline and *Echinaceae tinctura* as medication.

Methods: The experiment involved 420 male rats of three age groups (young, mature and old). Each age group was further separated into the following groups: intact animals, animals that received daily ECh inhalations as a single 5-h exposure to 10 MPC for 60 d and the groups 3 and 4 received inhalations of ECh and 2.5 % intraperitoneal solution of thiotriazoline in dosage 117.4 mg per kg of body weight and per os *Echinaceae Tinctura* in dosage of 0.1 mg of active component per 100 g of body weight. The middle fragments of tibia shafts were fixed in 10 % solution of neutral formalin, decalcified and embedded into paraffin using routine technique. Bone sections were stained with routine hematoxylin and eosin technique.

Results: By the first day of observation upon ECh discontinue, canals of osteons and bone marrow cavity in young animals increased as compared to the control values by 13.06 and 11.61 % and osteon layer decreased by 11.46 %. In adult animals the same values changed in the same way by 10.01, 12.67 and 11.62 % and in old animals by 8.92, 9.54 and 8.76 %. In readaptation period in young animals exhibited restoration of deranged features by the 60th day of observation, in adult animals alterations persisted up to the 30th day of observation and old animals did not exhibit marked restoration. Administration of thiotriazoline or *Echinaceae Tinctura* reduced negative effects of ECh histological features of midshaft zone of tibia during inhalation and after it. After thiotriazoline administration, deranged features of the histological structure of midshaft zone of tibia restored in young animals by the 1st day to 30th day, adult animals exhibited restoration signs throughout the whole observation period, and in old animals signs of restoration were observed from the 15th up to the 60th day. After *Echinaceae Tinctura* administration, in young animals restoration of the histological structure of midshaft zone of tibia was observed by the 7th to the 30th day of observation, and in adult and old animals by the 15th to the 60th day of observation. Generally thiotriazoline appeared to be more effective than *Echinaceae Tinctura*.

Conclusion: 60-d inhalation of ECh results in alterations of the histological structure of midshaft zone of tibia and increase of resorption activity. Deviations degree and recovery rate depend on age of animals. Faster recovery rate was observed in young animals while old animals exhibited few signs of recovery. Application of thiotriazoline or *Echinaceae Tinctura* reduces negative effects of ECh on the histological structure of midshaft zone of tibia. We proved thiotriazoline to be more effective than *Echinaceae Tinctura*.

P159

THE EFFECTS OF VITAMIN D AND SARCOPENIA ON BONE MINERAL DENSITY IN KOREAN WOMEN

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Aims: An osteoporotic fracture has become a global health issue that causes tremendous impact on mortality as well as heavy socioeconomic burden. Previous studies suggested that vitamin D may prevent fractures by improving muscle mass as well as via increasing bone density directly. The purpose of the study is to determine that the influence of vitamin D on BMD depends on its effects on muscle mass.

Methods: We analyzed the data from Korean National Health and Nutritional Survey IV in 2009. Women older than age 20 were included for the analyses. BMD and muscle mass were measured by DXA. Serum vitamin D concentration was tested.

Results: Vitamin D and muscle mass affected BMD at proximal femur, but not at lumbar spine. Vitamin D deficiency and sarcopenia increased odd ratio for osteoporosis before and after adjusted for multiple variables. The effects of vitamin D deficiency on BMD still remained significant after adjustment for sarcopenia, which was vice versa.

Conclusion: Though vitamin D deficiency and sarcopenia shared common effects on BMD, they have their own effects on BMD independent from each other.

P160

CHEMICAL COMPOSITION OF THE MANDIBULAR RAMUS AFTER IMPLANTATION OF MANGANESE ENHANCED HYDROXYAPATITE INTO THE TIBIA

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Aims: Analysis of chemical composition of the mandibular ramus after implantation of manganese (Mn) enhanced hydroxyapatite into the tibia.

Methods: The study involved 252 male rats with initial body weight of 135–145 g. The 1st group comprised intact animals, the 2nd group comprised animals with 2.2 mm defect in the tibia, and the groups 3 through 6 comprised the animals with the same 2.2 mm defects filled with biogenic hydroxyapatite enhanced with 0.1, 0.25, and 0.5 % share of Mn. Upon expiration of observation terms (the 7th, the 15th, the 30th, the 60th, the 90th, and the 180th day), rami of the mandible were prepared for chemical analysis.

Results: A plain defect in tibia resulted in instability of chemical composition of the mandibular ramus up to the 90th day

of observation with deviations peak by the 15–30 days of observation. In the 3rd group, alterations in comparison with the 2nd group continued manifesting as instability of calcium levels and microelemental exhaust up to the 30th day. Later on, manganese levels by the 90th and the 180th days were higher than those of the second group by 7.18 and 7.17 % respectively and calcium/phosphorus ratio by the 180th day was higher by 6.39 %. Implants with 0.1 % of Mn share had nearly the same effect and few significant differences were revealed. With Mn concentration increase up to 0.25 % restoration rate of structure of lower incisor appeared to be higher beginning from the 30th day. Calcium level and calcium/phosphorus ratio in this group in the period from the 7th to the 30th day were higher than those of the 3rd group by 6.00–8.40 % and 8.93–14.89 %, respectively, and manganese level in the period from the 7th to the 90th day was higher by 4.04–9.55 %. Mn share of 0.5 % did not have positive effect on chemical composition of the mandibular ramus. What is more, in the period from the 90th to the 180th day calcium level and calcium/phosphorus ratio in this group were lower than those of the 3rd group by 7.80 and 6.91 %, and by 10.46 and 10.49 %, respectively, and Mn level in the period from the 15th to the 180th day was higher than that of the 3rd group by 5.74–11.61 %. This can be explained as Mn intoxication.

Conclusion: The results obtained show that a plain 2.2 mm defect in the tibia has adverse effects on chemical composition of the mandibular ramus. Implantation of pure hydroxyapatite produces manifesting instability of macroelemental composition and microelemental exhaust of the mandibular ramus from the 7th to the 30th days. Application of Mn enhanced implants significantly reduces negative effects of bone fracture on chemical composition of the mandibular ramus. Implants with 0.25 % share of Mn proved to be the most effective while implants with 0.5 % share of Mn produced signs of Mn intoxication.

P161

HISTOLOGICAL STRUCTURE OF HUMERUS SHAFT AFTER FORMATION OF DEFECT IN TIBIA AND 60-DAY TARTRAZINE INTAKE

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Aims: To investigate histological features of midshaft zone of humerus in rats with defect in tibia after 60-d per os administration of tartrazine in various concentrations and mexidol.

Methods: The experiment involved 280 male thoroughbred rats with initial body weight of 200–210 g. The first group (K) comprised animals that received daily per os 1 ml of 0.9 % solution of sodium chloride, the second and the third groups (T1 and T2) received per os 1 ml of tartrazine in dosage of 750 or 1500 mg/kg of body weight, the fourth group (D) comprised animals with defect in both tibiae made when in groups 2 and 3 tartrazine was discontinued. The fifth and the sixth groups (DT1 and DT2) comprised the animals who received tartrazine and had defects in tibiae also made after tartrazine discontinue and the seventh and eighth groups also received mexidol in dosage of 50 mg/kg (DT1M and DT2M). Readaptation terms constituted 3, 10, 15, 24 and 45 days. Upon expiration of each term, the respective animals were withdrawn from experiment by means of decapitation under general anesthesia. The middle fragments of humerus shafts were fixed in 10 % solution of neutral formalin, decalcified and embedded into paraffin using routine technique. Bone sections were stained with routine hematoxylin and eosin technique.

Results: In D group resorption processes reached peak by the 2nd day of observation (osteon canals and bone marrow cavity were wider than those of the controls by 10.81 and 6.80 %, respectively, and osteon layer was narrower by 7.06 %). In DT1 group as compared to D group alterations progressed throughout the whole observation period. By the 45th day of observation osteon canals and bone marrow cavity were wider than those of D group by 4.62 and 5.69 %, respectively, and diaphysis was narrower by 3.23 %. In DT2 group alterations were even more expressed and constituted 5.48, 5.30, and 4.37 % by the 45th day, respectively. After administration of mexidol (DT1M and DT2M groups) the negative experimental effects reduced as compared to DT1 and DT2 groups: all morphometrical values were higher than those of DT1 and DT2 groups in the period from the 3rd to the 24th days of observation period and similar to those of D group after the 24th day. Osteon canals in DT1M group were wider than those of D group by the 15th and the 24th days of observation period by 5.52 and 4.66 %, and in DT2M group they were wider by 8.18 and 5.10 %, respectively.

Conclusion: Defect in tibia after 60-d administration of tartrazine is accompanied by decrease the periosteal bone formation in humeral diaphysis as compared with the group without administration of tartrazine. Under dosage of tartrazine of 1500 mg/kg, the severity of the changes was higher than that with the dosage of 750 mg/kg. Simultaneous administration of tartarzine and mexidol in dosage of 50 mg/kg body weight normalized periosteal bone formation in humeral diaphysis after formation of defect in the tibia.

P162

VITAMIN D STATUS IN PATIENTS FOLLOWED FOR CHRONIC LIVER DISEASES

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Aims: Osteoporosis is the musculoskeletal disease, the most common complication of liver osteodystrophy. Combined with vitamin D deficiency, they expose the patient to increased risk of fracture, increased morbidity and impaired quality of life. The objective of the study is to evaluate the vitamin D status and the prevalence of densitometric osteoporosis in 100 patients followed for chronic liver diseases. **Methods:** Prospective study conducted between October 2014 and March 2015. This was a cohort of 100 patients followed for chronic liver disease, gastroenterology department at CHU Ibn Rochd of Casablanca. Were excluded patients with other pathology can induce a debilitating osteopathy (malabsorption syndrome, etc.). All patients benefited from an assessment of BMD by DXA and a calcium and phosphate (serum calcium, urinary calcium 24 h, serum phosphorus, phosphaturia 24 h, 25-OH Vitamin D). The desired outcomes were prevalence of vitamin D deficiency and bone loss and its risk factors.
Results: These were 100 patients. The average age was 53± 16 year. The sex ratio (M/F) was at 0.75. The average duration of evolution of liver disease was 29±31 month. 35 % were followed for chronic viral hepatitis C, 31 % posthepatitic cirrhosis, other causes were undetermined origin type of cirrhosis, chronic viral hepatitis B, primary biliary cirrhosis and autoimmune hepatitis. The average vitamin D was 18.24 ng/ml (SD 8.54), the mean serum calcium was 2.3 mmol/m, urinary 4.7 mmol/24 h, phosphoémie to 2.61 mg/l and urine to 16.03 mmol/24 h. 39 % of patients had osteoporosis and 33 % osteopenia. Among the raised risk factors, there was the low BMI, the alcoholysis and smoking.
Conclusion: Hypovitamin D is common in chronic liver diseases. It is involved in high prevalence of densitometric osteoporosis.12–45 % depending on the series regardless of the etiology. In our study, bone loss was present in more than 2/3 of patients, regardless of the etiology of liver disease: 39–33 % with osteoporosis and osteopenia. The therapeutic management involves systematically general measures including a balanced diet, alcohol and tobacco cessation and regular physical activity and specific treatment with a vitamin and calcium supplementation and bisphosphonates according to precise indications.

P163
THE EFFECTS OF 60-DAY SODIUM GLUTAMATE INTAKE AND IONIZING RADIATION ON HISTOLOGICAL STRUCTURE OF THE LOWER INCISOR IN RATS

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Aims: To investigate the structure of lower incisor in rats after application of sodium glutamate (SG) and exposure to ionizing radiation (IR), and finding possibility of medication with Spirulina (SP).
Methods: The experiment involved 240 rats with body weight of 180–200 g. The animals were distributed into 8 groups as follows: intact animals for the controls, animals that received per os SG in dosage of 30 mg/kg daily for 60 day, animals exposed to IR (total 4 Grey in 4 sessions), received Sp in dosage of 250 mg/kg, combined SG and IR, SG and Sp, Sp and IR, and all three agents simultaneously. The animals were withdrawn from the experiment by the 1st, 7th, 15th, 30th, and 60th day after cessation of experimental influences by means of anaesthetized decapitation. Cross-sections of the lower incisor sampled as a segment next to the second molar tooth were stained with hematoxylin and eosin. Morphometry included measurements of odontoblast layer, predentin, and mature dentin, gross dentin width on the lingual aspect of tooth and mesiodistal size of the tooth.
Results: By the first day of observation upon SG discontinue, width of odontoblasts layer, width of predentin layer and mesiodistal size were lower than that of the controls by 6.78, 7.22 and 6,22 %, respectively; after IR discontinue same values were lower by 7.38, 7.89 and 6.75 %, respectively. After combined action of SG and IR those values were lower by 3.65, 3.89 and 3.31 % as compared to SG. Restoration of registered alterations also depended on influence applied: by the 60th day after SG discontinue significant differences from the control values some differences were still observed, after IR discontinue in the same period most differences were still observed, and after cessation of combined action strength features did not restore completely. Application of Sp in dosage of 250 mg/kg of body weight significantly reduced negative effects of experimental conditions on structure of lower incisor. The best recovery outcome was observed in animals that received only SG and the lowest recovery outcome was yielded in animals exposed to combined action of IR and SG.
Conclusion: 60-d application of sodium glutamate in dosage of 30 mg/kg of body weight and exposure to ionizing radiation (total 4 Grey in 4 sessions) and their combined action results in inhibition of morphological functional activities of dentin secreting structures of the lower incisor that expands even to readaptation period. This fact urges searching for medication and prophylactic measures for such a state. According to our findings Spirulina in dosage of 250 mg/kg of body weight well satisfies this demand.

P164
CANCER ASSOCIATED HYPERCALCEMIA

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Aims: The mechanisms of paraneoplastic hypercalcemic syndromes are heterogeneous. Neoplastic hypercalcemia without bone metastatic disease is caused by parathyroid hormone related protein, whose action is comparable to parathyroid hormone. The purpose of this work was to describe, in brief, the clinical and biological changes associated with cancer related hypercalcemia.
Methods: This study included patients with hypercalcimia admitted in the internal medicine department of Principal Military Hospital of instructions of Tunis over a period of 22 years.
Results: 71 patients completed the study: 43 men and 28 women. The mean age was 60.8 (range 40–76). The most common clinical findings were: deterioration of general condition in 40.5 %, muscle weakness 40.5 %, bone tenderness 18.9 and constipation in 30.9 %. Laboratory tests showed: moderate hypercalcemia in 40 cases (56.3 %), important hypercalcimia in 22 cases (30.9 %) and severe hypercalcimia in 9 cases (12.6 %). Aetiological investigations showed: solid tumor in 32 cases (45 %) with bone metastases in 25 cases (35 %), multiple myeloma in 32 cases (45 %) and hematologic malignancy in 7 cases (10 %).
Conclusion: Malignancy is one of the most common causes of hypercalcemia. In fact hypercalcemia is reported to occur in 10–20 % of patients with malignancies. It changes dramatically the patient's prognosis.

P165
POSTMENOPAUSAL OSTEOPOROSIS: CLINICAL AND BIOLOGICAL PROFILE, ABOUT 70 CASES

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Aims: Osteoporosis is a systemic skeletal disease characterized by low bone mass and microarchitectural deterioration of bone tissue leading to an increase in bone fragility and susceptibility to fracture. Bone is subject to the influence of exogenous and endogenous hormonal factors capable of modulating the activity of bone cells and mineralization, and also the mechanical stresses. Postmenopausal osteoporosis is the most common primitive osteoporosis. Its diagnosis requires the elimination of secondary and metabolic bone disease. Objective of study: Evaluate the clinical and laboratory profile, especially vitamin D, frequently low in the elderly in 70 patients followed in rheumatology for postmenopausal osteoporosis.
Methods: Descriptive study conducted in patients followed in rheumatology for postmenopausal osteoporosis. Were excluded patients followed for secondary osteoporosis and those with osteoporosis densitometry discovery before menopause may sound on bone metabolism. All patients underwent an interview and physical examination, a complete blood and urine calcium and phosphate. An analytical study was conducted and this thanks to statistical tests Student.
Results: They were 70 patients. The average age was 63 years with a standard deviation of 9.19. The average weight was 69 kg. The age of menopause was below 50 y to 75.70 %, beyond the other cases. 9 fracture histories were recorded. All patients were referred to bone under treatment, especially bisphosphonate orally. The median duration of prescription was 24 months. Mean serum calcium was 93 mg/l (SD=5.85), serum phosphorus in 37.66 mg/l (SD=5.27), urinary calcium of 24 to 125 mg / 24 (SD=34.01), 25 (OH) vitamin D to 25 ng/ml (6.30). However, 51.3 % of patients were taking concomitant vitamin D supplementation treatment. PTH was 45 ng/ml (12.54). Renal function was normal.
Conclusion: Significantly advanced age compared to the definition of the disease, which states that postmenopausal osteoporosis is related to the aging population. The average weight does not reflect the obesity of our population; it does not constitute a bias on vitamin D deficiency found. Laboratory tests, usually normal in osteoporosis are made in the interest rule out other bone diseases. By comparing the results found in our study and physiological values for each analysis, it is concluded that all are in the standards. Thus, the found results are statistically significant.

P166
LINKS BETWEEN 25(OH)D, CALCIUM, PHOSPHORUS, MARKERS OF BONE TURNOVER, SHOWINGS OF DENSITOMETRY AND ANTHROPOMETRIC PARAMETERS IN BELARUSIAN POSTMENOPAUSAL WOMEN

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Aims: To determine levels of total vitamin D, calcium, phosphorus, markers of bone turnover, showings of densitometry and anthropometric parameters in postmenopausal women living in different regions of Belarus, and establish links between these parameters.
Methods: 359 women aged 45–86 years (mean age 61.1±8.3) were surveyed. Determination of serum total vitamin D, carboxyterminal telopeptide of type I collagen (CTX) and osteocalcin (OC) by the method of electrochemiluminescence (Cobas e411, Roche Diagnostic), total Ca and inorganic P in the biochemical analysis were carried out from November 2011 to October 2012. Level of vitamin D was considered as normal for the values of 25(OH)D >30 ng/ml, indicators 20–30 ng/ml were defined as insufficiency, <20 ng/ml as deficiency, <10 ng/ml as severe deficiency of vitamin D. Measurements of BMD were performed in the lumbar spine

(LS) and femoral neck (FN) by DXA (Lunar Prodigy, GE, USA).

Results: Normal level of vitamin D was detected in 21.7 % of women, 33.1 % had insufficiency, 32.1 % deficiency and 13.1 % severe deficiency of vitamin D. Diagnosis of osteoporosis (OP) was verified in 195 (54.3 %) of the examined, 111 (30.9 %) had normal BMD values and 53 (14.8 %) osteopenia. Comparative analysis of women with normal values of 25(OH)D (n=86) and varying degrees of failure (n=298) revealed differences in weight (69.1±10.8 and 75.3±15 kg), BMI (26.9±3.6 and 29.5±5.8), respectively, and serum P (1.2±0.2 and 1.28±0.27 mmol/l). Women with severe deficiency of vitamin D also had lower levels of Ca (2.52± 0.18 mmol/l) compared with women who had normal values of 25(OH)D (2.66±0.25 mmol/l). Analysis of anamnesis revealed that women with low BMD who regularly took vitamin D supplements for more than 3 months at a dose of at least 400 IU/d (n=155) were statistically significantly different from women who did not take vitamin D (n=229) for BMI (26.9±4.9 and 28.5±5.4), height (1.6±0.06; 1.58±0.06), serum Ca (2.7±0.3 and 2.5±0.2 mmol/l), CTX (0.304±0.171 and 0.387±0.181 ng/ml), OC (22.1±12.6; 27.2±14.8) and 25(OH)D (29.8±8.9 and 20.4±11.7 ng/ml). Further analysis revealed statistically significant difference between women with low (n=248) and normal (n=111) BMD in level of 25(OH)D, Ca and P: 24.5±10.4 and 18.9±8.4 ng/ml; 2.67± 0.26 and 2.51±0.18 mmol/l; 1.26±0.23 and 1.16±0.18 mmol/l, respectively. One of the most probable causes of these differences is higher incidence of vitamin D supplementation: among patients with OP 73 persons (30.8 %) regularly took vitamin D supplements while in the group with normal BMD only 12 (10.8 %).

Conclusion: Deficiency of vitamin D in Belarusian postmenopausal women is widespread and is associated with higher BMI, low values of total Ca and inorganic P. One of the most important factors that determine the optimal content of 25(OH)D in the studied sample is a regular intake of vitamin D at a dose of at least 400 IU/d.

P167

DIAGNOSTIC VALUE OF QUANTITATIVE ULTRASOUND AND OSTEOPOROSIS SELF-ASSESSMENT TOOL IN COMPARISON WITH DXA IN DETECTING LOW BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN IN RIYADH, KINGDOM OF SAUDI ARABIA

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Aims: To assess the diagnostic value of quantitative ultrasound (QUS) and osteoporosis self-assessment tool (OST) compared with DXA, and to identify the best cutoff value for determining low BMD among postmenopausal women in Riyadh, Saudi Arabia.

Methods: We conducted a community based cross-sectional study on 224 randomly selected postmenopausal women. Women visited primary healthcare centers for answering self-administered questionnaire and screening for low BMD using QUS technique. OST was calculated based on age and weight. DXA scan was performed for lumbar spine and femur neck at King Khalid University Hospital, Riyadh.

Results: Mean age of participants was 58.05(±8.97)year. The prevalence of low BMD at lumbar spine and femur neck was 56 and 28 %, respectively. The best cutoff value for QUS and OST was≤−1 and ≤2, respectively. QUS yielded sensitivity and specificity of 73 vs. 47 % for lumbar spine (area under curve (AUC) 0.56) and 84 vs. 43 % for femur neck (AUC 0.61). OST yielded sensitivity and specificity of 38 vs. 84 % for lumbar spine (AUC 0.62) and 48 vs. 78 % for femur neck (AUC 0.68). On combining the results, sensitivity and specificity were 81 vs. 41 % (AUC 0.61) for lumbar spine and 89 vs. 35 % for femur neck (AUC 0.70), respectively.

Conclusion: Both QUS and OST, when used alone have limited diagnostic value; hence, the best approach is to utilize both tools in order to screen women with low BMD.

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P168

BONE MINERAL DENSITY STUDY IN 25–35 YEARS OLD INDONESIAN WOMEN: THE RELATIONSHIP BETWEEN WRIST BONE MINERAL DENSITY, MUSCLE STRENGTH AND EXERCISE HABIT

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Aims: To know the profile of low BMD prevalence and study the relationship between wrist BMD, muscle strength and exercise habit.

Methods: This cross-sectional study was done during August 2013 - May 2014. BMD examination was done using DXA machine Lunar type General Electric© on the 3 most frequent sites to have osteoporotic fracture, including wrist, femoral neck and lumbar spine. Muscle strength was evaluated using handgrip dynamometer to assess upper body strength and the exercise habit data was obtained using a questionnaire

specially developed by the researchers. Then the statistical analysis was done using SPSS software for Windows version 20.0.

Results: The subjects of this study were 177 women aged 25–35 years old with normal BMI who lived in Jakarta and its surrounding area. There were 99 subjects (55.9 %) that had low BMD (having a T-score≤−1 SD). Among the 3 sites of BMD examination, the highest prevalence of low BMD was found on the wrist (45.8 % on the radius vs. 23.8 % on the femoral neck vs. 16.9 % on the lumbar spine). On further analysis, a trend was found that subjects with normal wrist BMD had higher result for handgrip strength test though it failed to reach a statistical significant difference (left handgrip: 22.1 kg vs. 21.7 kg; right handgrip: 24.2 kg vs. 23.6 kg; respectively for subjects with normal and low wrist BMD). In addition to that, the statistical analysis showed significant differences of the handgrip strength between subjects who exercise less than 3 times a week and subjects who exercise 3 times a week or more (left handgrip: 21.7 kg vs. 23.9 kg; right handgrip: 23.6 kg vs. 26.6 kg; respectively for subjects who exercise less than 3 times a week and subjects who exercise 3 times a week or more).

Conclusion: There was a trend that wrist BMD in Indonesian women aged 25–35 years old was related to handgrip strength and the exercise habit.

P169

RURAL PATIENTS: LESS FRAGILE?

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Aims: The vast majority of patients taking osteoporosis medications are urban people. How can we describe this difference in figures? What are the causes of the geographical variations?

Methods: We try to quantify in this work the differences in urban vs. rural provenience of patients, using health services and reimbursed medications for osteoporosis.

Results: Urban women are the main consumers of densitometry scans and of partial or total reimbursed medications.

Conclusion: However, former studies have shown some differences among urban versus rural communities in risk factors as well as BMD and fracture rates, these rates do not explain the unproportionally low presence of rural patients among osteoporosis service consumers. Need to identify possible causes of the settlement-linked variations. Are these variations linked to demand or health status or income or accessibility of health services? Or, are they supply driven differences? Further research will clarify.

P170

WORLDWIDE PREVALENCE AND INCIDENCE OF VERTEBRAL FRACTURES

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Aims: Investigate the prevalence and incidence of vertebral fractures across continents/countries.

Methods: A Medline Ovid search retrieved studies published from 1966 to Dec 2014; 59 articles were included in the analysis. Reported studies are of fair to good quality using quality rating approved by all authors, and comparable accepted methods for vertebral fracture definition within the same age groups.

Results: The prevalence of morphometric vertebral fractures in women in Europe aged 50 to 79 years is highest in Scandinavia (26 %) and lowest in Eastern Europe (18 %), with comparable prevalence across genders. Prevalence rates in North America (NA) for White women ≥50 (some >65 year) are between 20 and 24 % in the US and 23 % in Canada. The gender ratio (women/men) is 1 in Canada, but was not reported in good quality studies from the US. The White/Black ratio in US women ≥65 years is 1.6. Rates in women ≥50 years in Latin America are overall lower than Europe and NA: 19 % in Mexico and 11 % in Colombia. In Asia, the rates in women above 65 years are highest in Japan (24 %) followed by Taiwan (18 %), Thailand (13 %) and Indonesia (9 %), with much variability in Hong Kong. In the Middle East Lebanon rates are 20 %. The highest–lowest ratio between countries, both within and across continents, varied between1.4 and 2.6. This variability is not explained by differences in urbanization or development. Vertebral fracture incidence data is less abundant and more heterogeneous than prevalence data. Comparison of incidence rates in studies combining hospitalized and ambulatory vertebral fractures shows the highest age-specific rates in South Korea, US and Hong Kong, followed by Switzerland, Australia, Italy and Germany, and the lowest rates in the UK and Canada. Neither a North–south gradient, nor a relation to urbanization is evident. The incidence of hospitalized vertebral fractures in European patients ≥50 years shows a 3–3.7-fold variability between countries, in both genders. A north–south gradient is evident with the highest rates in Sweden and Denmark, the lowest in Central Europe with a gender ratio of 0.9–1.75. In the US, rates in Whites are approximately 4-fold higher than in Blacks.

Conclusion: There is less variability in vertebral fractures across genders and countries, if one considers hospitalized fractures, than observed with hip fractures, possibly reflecting a lower influence of environmental factors. However, more

accurate conclusions can only be drawn from better quality and more representative studies that use universal/ standardized methods for vertebral fracture definition.

P171
DISORDERS OF PARATHYROID HORMONE GLAND SECRETION IN PATIENTS SCREEN FOR BONE HEALTH PARAMETERS IN PAKISTANI POPULATION

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Aims: PTH disorders are not uncommon and patients may be asymptomatic in early stages. Diagnosis is challenging in asymptomatic stage due to variable/atypical presentation, lack of awareness and difficulty in interpretation of findings. Aim of this study was to assess PTH disorders using bone health screening panel.
Methods: We reviewed laboratory results of 534 subjects and medical records of 111 subjects tested with bone health screening panel (comprising of serum 25OHD, calcium, phosphorus, magnesium, alkaline phosphatase, creatinine, albumin and plasma PTH) from Jan 2011-Dec 2013 in identifying disorders of parathyroid gland secretion. Subjects were classified into following clinical groups, primary hyperparathyroid (PHP) (Ca >10.2 mg/dl, PTH >87 pg/ml), Hypercalcemia with inappropriately normal PTH (HIN-PTH) (Ca >10.2 mg/dl, PTH >25 pg/ml, 25OHD >20 ng/ml), Normocalcemic hyperparathyroidism (NCHP) (Ca >10.2, PTH 16–87 pg/ml, 25OHD >20 ng/ml), Secondary hyperparathyroid (sHPTH) (25OHD <20 ng/ml, Ca <10.2 mg/dl, PTH >87 pg/ml), functional hypoparathyroidism (FHP) (25OHD <20 ng/ml, Ca <10.2 mg/dl, PTH 16–87 pg/ml), and primary hypoparathyroidism (HPP) (Ca <8.6 mg/dl, PTH <16 pg/ml). PTH nomogram by Harvey et al. was applied to calculate max PTH in subjects with atypical presentations (NCHP and HIN-PTH) to determine primary high PTH secretion (1).
Results: Majority of study subjects were females (65 %) with mean age 44.5±17 year. Means of iPTH of 534 subjects was high, vitamin D was insufficient, and other markers were in normal range. High creatinine was found in 7 % subjects.
PTH disorders were classified after excluding high creatinine (n=497). The compensatory response of parathyroid gland (sHPTH) to vitamin D deficient group was seen in 17.7 % while 39, 8, 1 and 0.4 % had FHP, NCHP, PHP and HPP respectively. Symptoms of generalized myalgia, bone and joint pains were predominant findings in 111 cases reviewed. Parathyroid adenoma, osteopenia/osteoporosis, fractures proximal myopathy and renal stones were seen with deranged parathyroid hormone levels. All subjects with NCHP had higher PTH levels than calculated maxPTH. In subjects of HIN-PTH, 6 had low, 2 had equal and 2 had high measured PTH than calculated maxPTH.
Conclusion: A significant number of patients presents with biochemical variables that do not fit the classic description of primary and secondary disorders of PTH secretion and may present a diagnostic dilemma. In such cases PTH-nomogram can enhance diagnostic accuracy by distinguishing between normal and disease phenotypes.
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P172
HYPOVITAMINOSIS D AS THE POSSIBLE MAIN RISK FACTOR FOR OSTEOPOROSIS: DESCRIPTIVE EPIDEMIOLOGY FROM THE UAE

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Aims: To determine the prevalence o of hypovitaminosis D as the possible main risk factor for inducing osteoporosis in an attempt to differentiate between the association of the two conditions and the direct causal relationship.
Methods: Retrospectively, we reviewed the records of 131 adult patients with hypovitaminosis D who underwent DXA scanning. Results of the scan were interpreted according to the T- or Z-scores for patients above and below 50 years of age, respectively. A score of≤−2.5 in one or more of the examined sites indicated the presence of osteoporosis. Other data of interest were age, nationality, 25 (OH) D3, PTH (assayed by CMIA, Abbot), and serum calcium. The study does not include data of patients who are concurrently or recently been on corticosteroids therapy, or patients with autoimmune diseases and others with chronic renal failure.
Results: The majority of the patients were Arab Individuals (77 %) from various Arab states. The rest were Asian and non-Asian individuals. All are residents of Abu Dhabi, UAE. Sixty-eight were females. 28 (21.5 %) were deficient (<12 ng/ml) vs. 103 insufficient (12–30 ng/ml) for the vitamin. 60 individuals had normal outcome of DXA (46 %), 47 with osteopenia (36 %) and 24 (18.5 %) had osteoporosis. The mean age of the latter was (51.2±17.5 vs. 46.4±12 year) in l patients with normal outcome, p=0.15. Osteoporosis in males was determined in 5/63 (8 %) vs. 19/68 (28 %) in females, p= 0.005, whereas more males expressed normal outcome on DXA compared to females (60.5 vs. 32.5 %, p=0.001. However, the mean age of patients with osteoporosis was comparable in males and females, respectively, (43.4±23.4 vs. 53.3±15.8 year, p=0.27). Age was also nondiscriminatory in osteoporotics below and above the age of 50 years (41.5 vs. 58.5 %, respectively, p=0.386). The mean values of 25(OH)D3,serum calcium and PTH were not different in patients with osteoporosis and others with normal outcome (17.8

±5.47 vs.18.3±5.95 ng/ml for 25 (OH) D3, 9.41±0.44 vs. 9.38±0.372 mg, % for serum calcium and 105±65.1 vs. 94.3±53.7 pg/ml for PTH, and 97.6±7.8 vs. 73.2±17.9 U/l for alkaline phosphatase) respectively, P=NS. 67.5 % had secondary hyperparathyroidism vs. 32.5 % with blunted PTH response. Secondary hyperparathyroidism occurred in 15/21 (71.5 %) in patients with osteoporosis vs. 38/54 (70.5 %), in those with normal outcome, p=1.00. Four in the deficient group (14 %) and 20 (19.5 %) among the insufficient had osteoporosis, p=0.78.

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

P173
EFFECT OF OSTEOPOROSIS KNOWLEDGE ON WOMEN'S HEALTH BELIEF AND SELF EFFICACY FOR OSTEOPOROSIS PREVENTIVE BEHAVIORS

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Aims: To study the effectiveness of osteoporosis educational intervention in modifying the health belief and self-efficacy for osteoporosis preventive behaviors and its association with selected demographic variables. Osteoporosis is preventable health problem that predominantly affects women. As osteoporosis remains as a silent disease, until complication occurs, it is a great challenge to motivate women to adopt preventive behaviors.

Methods: The study sample consisted of 280 perimenopausal women living in Tamilnadu, India. Pretest post-test research design was used in this study. The 'Osteoporosis Health Belief Scale', developed by Kim, Horon and Gendler (2011) and the 'Osteoporosis Self efficacy Scale', developed by Horon, Kim and Gendler (2011) were modified and translated into local language Tamil for use in this study with authors' permission. The tool was also back translated and pilot tested for validity and reality.

Results: The study showed significant difference in women's osteoporosis health belief and self- efficacy for osteoporosis preventive behaviors after educational intervention. The women's health belief score had significant improvement with education in perceived benefit of calcium intake ($t_{(279)}$=8.560, p<0.0001) and exercise ($t_{(279)}$=4.538, p<0.0001), whereas as expected perceived seriousness and susceptibility, together computed as perceived threat decreased significantly ($t_{(279)}$= −3.951, p<0.0001) with education. While the perceived barriers to calcium and exercise did not have any difference, women's health motivation ($t_{(279)}$=5.040, p<0.0001), self-efficacy for both exercise ($t_{(279)}$=5.707, p<0.0001) and adequate calcium intake ($t_{(279)}$=3.674, p<0.0001) had significant increase (p<0.0001) in response to the education.

Conclusion: Most women have shown significant interest to adopt osteoporosis preventive behaviors. Public health sector also needs to explore and try to remove the women's perceived barriers for calcium intake and exercise.

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P174
EPIDEMIOLOGY OF LOWER LIMB FRACTURES IN UKRAINIAN POPULATION OF DIFFERENT AGE

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Aims: Lower limb fractures account for approximately one third of all fractures and may result in substantial mortality and morbidity. Age, osteoporosis, road collision, obesity and different diseases (osteoarthritis, Parkinsonism, cataract, dementia, etc.) are the risk factors of lower limb fractures. Fractures are a considerable public health burden but information on their epidemiology in Ukraine is limited.

Methods: We identified 665 subjects from 76,765 citizens, living in Vinnitsa region, who had a first time (incident) diagnosis of lower limb fractures recorded in the regional Hospital database from 1.01.2011 to 31.12.2011.

Results: Frequency the lower limb fractures of was 42.4 % from the total fractures in all patients and 44.4 % from the total fractures in patient aged 50 years and older. The most common anatomic site of lower limb fractures was the tibia and/or fibula (48.9 % of all incident lower limb fractures), followed by the hip (29.5 %), and the tarsal/metatarsal bones (21.6 %). Incidence of fracture in patients 50 years and older was 519.8 per 10,000 patient for lower limb fractures, 212.3 per 10,000 patient for tibia and/or fibula fractures and 226.9 per 10,000 patient for hip fracture. Lower limb fractures were more common among males than among females in the younger age groups (up to 39 years old). Among subjects 50 years and older the incidence of lower limb fractures was higher in women than in men, and the difference increased with increasing age. Incidence of the tibia and/or fibula fractures was 340.7 per 10,000 patient in the age group 60–69 years old, 44.9 per 10,000 patient in age group 70–79 years old, and 102.4 per 10,000 patient in age group 80–89 years old.

Conclusion: Our study provided the new information about the epidemiology of lower limb fractures in Ukrainian population according the age. This information is important for planning of the prevention and treatment strategy in patients of different ages.

P175

DIFFERENCES IN VITAMIN D STATUS AND VOLUMETRIC BONE MINERAL DENSITY (VBMD) AT THE RADIUS AND TIBIA IN PREMENOPAUSAL CAUCASIAN, SOUTH ASIAN, AND ARAB FEMALES LIVING IN UK

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Aims: Current studies on ethnicity bone health indicate Middle Eastern females are at high risk of vitamin D deficiency and low bone density among premenopausal groups[1]. However, limited data is available regarding the young female groups with comparison of other ethnic population. This study is a follow up measurement where pQCT scans analysis of Arab females (summer 2012) have been measured to be compared with previous pQCT scans (summer 2010) to investigate the differences between volumetric BMD (vBMD) between Caucasian (C), South Asian (SA), and Arab (A) women.
Methods: Fifty-seven healthy premenopausal women (22 C, 19 SA and 16 A), age range 18–55 years, were studied. Blood samples were taken for measurement of 25(OH)D; pQCT measurements were taken at the radius and tibia (nondominant) using a Stratec XCT 2000 pQCT scanner.
Results: C group had highest vitamin D status 80.91 (20.08), whereas SA was 31.52 (16.32) and A was 36.67 (23.21) nmol/l. SA had significantly higher total density at 4 % tibia than C and A women but significantly lower cortical density at 1 % tibia site than C and A women. There was no significance differences in vBMD observed between the ethnic groups in radius sites. However, at 4 % radius C has significant higher bone mass ($p<0.01$) and total area ($p<0.05$) and trabecular area ($p<0.05$) than SA and A women.
Conclusion: Our novel findings for differences in the radius and tibia sites C, SA, and A premenopausal women require further investigations as there are no data examining this bone site in ethnic groups.
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P176

POSITIVE CORRELATION BETWEEN MAXIMAL OXYGEN CONSUMPTION AND BONE MASS IN OVERWEIGHT CHILDREN

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Aims: Although several studies have shown associations between physical performance variables and BMD in normal weight children and adults [1–4], little is known concerning the relation between aerobic power and BMD in overweight children. The aim of this study was to explore the relationship between maximal oxygen consumption (VO_2 max) and BMD in a group of French overweight children.
Methods: 57 overweight girls and 67 overweight boys whose ages range from 7 to 17 year participated in this study. Informed written consent was obtained from the participants and their parents. Body weight and height were measured, and BMI was calculated. VO_2 max was determined by direct measurement while exercising on a bicycle ergometer (Ergoline 500, Bosch). Whole body bone mineral content (WB BMC), whole body BMD (WB BMD), lumbar spine BMD (L2-L4 BMD), total hip BMD (TH BMD), and femoral neck BMD (FN BMD) were measured by DXA (Hologic QDR-4500 A).
Results: In girls, VO_2 max (expressed as L/mn) was positively correlated to WB BMC ($r=0.61$; $p<0.001$), WB BMD ($r=0.63$; $p<0.001$), L2-L4 BMD ($r=0.62$; $p<0.001$), TH BMD ($r=0.61$; $p<0.001$), and FN BMD ($r=0.58$; $p<0.001$). In boys, VO_2 max (expressed as L/mn) was positively correlated to WB BMC ($r=0.68$; $p<0.001$), WB BMD ($r=0.67$; $p<0.001$), L2-L4 BMD ($r=0.64$; $p<0.001$), TH BMD ($r=0.75$; $p<0.001$), and FN BMD ($r=0.68$; $p<0.05$). In both sexes, the positive associations between VO_2 max (L/mn) and bone variables (BMC and BMD) remained significant after adjustment for age ($p<0.01$) or lean mass ($p<0.05$).
Conclusion: This study suggests that VO_2 max (L/mn) is a positive determinant of BMC and BMD in overweight children. Aerobic power seems to be a determinant of BMC and BMD in overweight children. Up to our knowledge, it is the first study to show strong associations between absolute VO2 max (L/mn) and bone variables in overweight children. Our results may be useful for the prevention and early detection of osteoporosis and/or osteopenia.
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P177
OSTEOPOROSIS AND OSTEOPENIA IN LUNG DISEASE: A CLINICAL SERIES

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Aims: More attention has been made over the last 50 years in studying the relation between chronic lung disease and low MBD**.** Osteoporosis and osteopenia have become increasingly recognized as debilitating extrapulmonary manifestations of several chronic lung disease. The role of various risk factors, including inflammation, cigarette smoking glucocorticoids therapy, nutrition, vitamin D deficiency, hypoxia and sedentary habits has also been identified.
Methods: We span through a diverse cases belonging to patients with bronchiectasis, lymphangioleiomyomatosis, asthma in osteochondrodystrophy, COAD,ILD and post lung lobectomy who expressed low BMD on DXA scanning as well. Various additional risk factors to bone disease have been identified in these cases.
Results: Osteoporosis and osteopenia in patients with chronic lung disease are highly multifactorial and bear cumulative disability effect in these patients. It is plausible therefore that while managing chronic lung disorders is to think of the bone health as well.
Conclusion: Early screening and attention to BMD status may reduce the health burdens in these patients.

P178
SOFT TISSUE CALCIFICATION AND OSSIFICATION IN THE CLINICAL PRACTICE: A PICTORIAL REVIEW AND COMMENTARY

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Aims: When tissue is damaged, the body responds to injury in a nonspecific manner by invoking the inflammatory responses reaction. Sometimes this ends with calcification of the damaged tissue and probably usually, only microscopic, but occasionally it is enough to be visible radiographically. This study projects on several examples of patterns of calcification and ossification in patients with different pathological background. The purpose here is to revive the importance of these changes in the daily clinical practice.
Methods: Diverse conditions such as CTD, metabolic, endocrinological, genetic, parasitic, and other miscellaneous yet sharing various patterns of calcifications are presented in this report.
Results: Although the soft tissue calcifications and ossification may appear as sequel of the underlying pathological processes in several instances, in others however, they provide clue/s towards or aid the right diagnosis.
Conclusion: Although the soft tissue calcifications and ossification may appear as sequel of the underlying pathological processes in several instances, in others however, they provide clue/s towards or aid the right diagnosis.

P179
HYPOVITAMINOSIS AND OSTEOPATHY: THE PTH LINK

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Aims: There is a high prevalence of hypovitaminosis D (HD) in the UAE population and this may be complicated by secondary hyperparathyroidism (HD-SHPT). The latter has a pivotal role in the pathogenesis of low bone mineral disease. To investigate the relationship between these conditions and the BMD among residents of Abu Dhabi (UAE).
Methods: 117 adults, predominately (80.5 %) Arab individuals (age 15–76 year) with HD were selected for the study, of whom 25 (21.5 %) were deficient (HD), and 78 (66.5 %) also had HD-SHPT. Both T- and Z-scores were used in the evaluation of DXA findings. Data of patients with chronic renal failure and autoimmune disorders and recent or current therapy with corticosteroids were excluded.
Results: The mean age, gender distribution, BMI, mean of 25-OH D and the mean of alkaline phosphatase (AP) in patients with HD-SHPT were not significantly different to others with normal PTH. Both T- and Z-scores also failed to show any significant differences in normal outcome, osteopenia and osteoporosis (47.5 vs. 41 % p=0.55, 33.5 vs. 43.5 % p=0.10 and 19 vs.15 % p= 0.79) in the two groups, respectively. However, a lower mean of serum calcium yet within eucalcemia was observed in HD-STHP (9.39±0.395 vs.9.59±0.355 mg/dl, p=0.025). The range in these two groups was (8.58–10.6 and 8.89–10.4 mg/dl), respectively. The mean of each of the age, 25-OH D, calcium and AP in osteoporotic patients of both groups were not different also, p= NS.
Conclusion: HD-SHPT is not always a prerequisite for the development of low BMD in patients with HD. The low BMD in the others with normal or low PTH invites further investigations and understanding.

P180

SERUM LEPTIN LEVELS ARE ASSOCIATED WITH BODY FAT IN YOUNG PAKISTANI ADULTS: AN IMPLICATION FOR BONE HEALTH

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Aims: Accumulating epidemiological evidence suggests that hypovitaminosis D may be associated with obesity and related metabolic risks. Aim of this study was to determine the association of body composition, caloric and nutrient intake and physical activity with serum leptin and 25-hydroxyvitamin D (25OHD) in Pakistani adults.

Methods: Body fat analysis was done using bioelectrical impedance scale and reference ranges for young adults were used to categorize participants referring to Tanita's official website and literature. Caloric and nutrient intake and physical activity were elicited with validated regional food frequency and physical activity questionnaire. Serum leptin was measured using DIAsource kit on ELISA and 25OHD on ADVIA-Centaur; Siemens.

Results: Mean age of the group (n=100) was 20.03± 0.99 year, 58.4 % were females. Mean BMI was 22.16± 3.45 kg/m^2. Overall 13.9, 19.8 and 18.8 % subjects were underweight, overweight and obese, respectively. Mean total body fat%, muscle mass and bone mass of the subjects were 20.04±8.15 %, 46.84±8.77 kg and 2.49±0.44 kg, respectively. According to body fat% 27.5, 57.8, 9.8 and 2.9 % subjects were under-fat, healthy, over-fat and obese, respectively. Visceral fat% of all subjects was within the healthy range. In 20.7 % females and 21.4 % males the metabolic age was higher than actual age. Mean energy, fat and protein intake/day of the subjects was 2242±1090 kcal, 61.8±167 g and 75.1±37.6 g, respectively. Mean daily energy intake of females was significantly lower than their counterparts (p<0.05). Moderate and low physical activity was observed in 51.5 and 18.8 % students, respectively. Overall 8 % of the subjects (all females) had high leptin levels when compared to their BMI. Females, had higher median leptin levels (2.55 (0.100–25.4 ng/ml)) compared to their counterparts (0.786 (0.06–3.59 ng/ml), p<0.001). Total body fat% was positively associated with BMI (r=0.6) and waist circumference (r=0.3). Leptin was positively associated with total body fat% and metabolic age and negatively with muscle mass, daily energy, fat and protein intake. 25OHD levels were inversely associated with body fat% and leptin levels.

Conclusion: The cross-sectional nature of this study could not elucidate causal relationships; however it outlines important interplay between circulating leptin and nutrient and energy intake, body composition and 25OHD. Young age is a time of change in body composition and further research is needed to confirm role of leptin as a biochemical marker of obesity in this age group.

P181

LYCOPENE SUPPLEMENTATION DECREASES OXIDATIVE DAMAGE AND BONE-RESORBING CYTOKINES DURING OSTEOGENESIS

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Aims: Reactive oxygen (ROS) is a significant pathogenic factor of osteoporosis. Lycopene is a potent antioxidant and found to be bone protective. We examined the potential antiosteoporosis effects of lycopene and its underlying mechanism.

Methods: We produced an oxidative damage model induced by hydrogen peroxide (H_2O_2) in osteoblastic MC3T3-E1 cells to test the essential antiosteoporosis effects of lycopene in vitro.

Results: The results demonstrated that treatment of 1.25 to 10.00 μM promoted the proliferation of MC3T3-E1 cells, improved alkaline phosphatase (Alp) expression, increased calcium mineralization and mRNA expression of *Alp*, *Col1a1*, *osteocalcin* and *osteopontin* against oxidative damage induced by H_2O_2. Interestingly, lycopene downregulated the expression levels of *RANKL* and *IL-6* and inhibited the H_2O_2-induced production of ROS. The in vivo study indicated that the lycopene-treatment for 12 weeks partially decreased blood malondialdehyde activity and increased the activity of reduced glutathione in ovariectomized mice. Moreover, lycopene improved the microarchitecture of trabecular bones and increased BMD of the 4th lumbar vertebrae and the distal femur.

Conclusion: These findings demonstrated the potential antiosteoporosis effects of lycopene were linked to a decrease of oxidative damage and bone-resorbing cytokines, which suggests that lycopene might be effective in preventing osteoporosis.

P182

LYCOPENE TREATMENT AGAINST LOSS OF BONE MASS, MICROARCHITECTURE AND STRENGTH IN RELATION TO REGULATORY MECHANISMS IN A POSTMENOPAUSAL OSTEOPOROSIS MODEL

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Aims: Lycopene supplementation decreases oxidative stress and exhibits beneficial effects on bone health, but the mechanisms through which it alters bone metabolism in vivo remain unclear. The present study aims to evaluate the effects of lycopene treatment on postmenopausal osteoporosis.

Methods: Six-month-old female Wistar rats (n=264) were sham-operated (SHAM) or ovariectomized (OVX). The SHAM group received oral vehicle only and the OVX rats were randomized into five groups receiving oral daily lycopene treatment (mg/kg body weight per day): 0 OVX (control), 15 OVX, 30 OVX, and 45 OVX, and one group receiving alendronate (ALN) (2 mg/kg body weight per day), for 12 weeks. Bone densitometry measurements, bone turnover markers, biomechanical testing, and histomorphometric analysis were conducted. μCT was also used to evaluate changes in microarchitecture.

Results: Lycopene treatment suppressed the OVX-induced increase in bone turnover, as indicated by changes in biomarkers of bone metabolism: serum osteocalcin, serum N-terminal propeptide of type 1 collagen, serum crosslinked carboxyterminal telopeptides, and urinary deoxypyridinoline. Significant improvement in OVX-induced loss of bone mass, bone strength, and microarchitectural deterioration was observed in lycopene-treated OVX animals. These effects were observed mainly at sites rich in trabecular bone, with less effect in cortical bone. Lycopene treatment downregulated osteoclast differentiation concurrent with upregulating osteoblast together with glutathione peroxidase, catalase and superoxide dismutase activities.

Conclusion: These findings demonstrate that lycopene treatment in OVX rats primarily suppressed bone turnover to restore bone strength and microarchitecture.

183

PREGNANCY OUTCOMES IN PATIENTS WITH OSTEOPOROSIS

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Aims: To detect pregnancy outcomes in patients with anticonception diagnosis of osteoporosis.

Methods: We retrospectively analyzed a group of 75 fertile patients, with ages between 21 and 45 years of age, previously diagnosed with osteoporosis by DXA. Pregnancy occurred in less than 12 months in all the patients enrolled in this study. We evaluated the outcomes of osteoporosis on pregnancy.

Results: The mean age of the patients enrolled in this study was 34.1 years of age. We observed that 41.33 % of the patients received prophylactic low molecular weight heparin due to the fact they were diagnosed with thrombophilia. 17.33 of the patients analyzed were diagnosed with a form of arterial hypertension and required specialized management and treatment. A third of the pregnant patients delivered premature (before 37 weeks of gestation). 65.33 of the patients delivered by Caesarean section, in most cases due to dystocia, cephalopelvic disproportion and malpresentation.

Conclusion: Patients with osteoporosis have an increased rate of maternal and fetal complications. This potential risk is exponentially increased in patients with other comorbidities.

P184

BMI AND BONE MINERAL DENSITY IN YOUNG WOMEN WITH ANOREXIA NERVOSA

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Aims: Anorexia nervosa is a dangerous eating disorder that can negatively affect bone mass and bone strength [1,2]. This disease involves excessive weight loss, low BMI, and is usually found more in females than in males. The aim of this study was to explore the relation between BMI and BMD in a group of young women with anorexia nervosa.

Methods: 56 young women (aged between 15 and 34 years) with anorexia nervosa participated in this study. Being with anorexia nervosa was defined according to Diagnostic and Statistical Manual of Mental Disorders-IV criteria. Weight and height were measured, and BMI was calculated. Whole body BMD (WB BMD) and lumbar spine BMD (L1-L4 BMD) were determined by DXA using a Hologic discovery machine.
Results: Age and height were not significantly related to BMD values. Weight and BMI were also not significantly correlated to BMD values.
Conclusion: This study suggests that body weight and BMI are not positive determinants of BMD in young women with anorexia nervosa. Body composition, previous physical activity level, duration of amenorrhea and many hormonal factors may influence BMD in young women with anorexia nervosa.
References: 1. Legroux-Gérot I et al., Osteoporos Int 2012;23:2855. 2. Legroux-Gérot I et al., Osteoporos Int 2010;21:1715.
Acknowledgement: We thank the subjects who participated in this study. In addition, we thank all of the physicians and nurses who participated in recruiting the study subjects at the hospital of Lille, France.

P185
VISCERAL FAT MASS AND BONE MINERAL DENSITY IN OVERWEIGHT CHILDREN

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Aims: We have previously shown that being overweight is associated with higher BMD values in overweight children [1]. However, the relationship between visceral fat mass and BMD in overweight children has not been fully elucidated. The aim of this study was to investigate the relationship between visceral fat mass and BMD in a group of French overweight children.
Methods: 53 overweight boys and 63 overweight girls whose ages range between 7 and 17 years participated in this study [2]. Weight and height were measured, and BMI was calculated. Body composition, bone mineral content (BMC) and BMD were measured by DXA. BMC and BMD were measured at whole body, lumbar spine (L2-L4), total hip and femoral neck. Trunk fat mass measured and percent trunk fat [(trunk fat/total fat)×100] was calculated as previously described [3]. Percent trunk fat was used as a surrogate for visceral fat mass [3].
Results: In both sexes, age, lean mass, fat mass and trunk fat mass were positively correlated to BMC and BMD values ($p<0.05$). Visceral fat mass was not correlated to bone variables in both sexes. Using multiple linear regression models, visceral fat mass was negatively correlated to WB BMD after controlling for lean mass.
Conclusion: This study suggests that, in overweight children, visceral fat mass is not beneficial to BMD.
References: 1. Rocher E et al., J Clin Densitom 2013;16:244. 2. Bouglé D et al., Int J Pediatr 2010;2010:580897. 3. Ackerman KE et al., J Pediatr Endocrinol Metab 2011;24:497.

P186
GENETICALLY ENGINEERED FLAVONOL ENRICHED TOMATO FRUIT MODULATES CHONDROGENESIS TO INCREASE BONE LENGTH IN GROWING ANIMALS

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Aims: Externally visible body and longitudinal bone growth is a result of proliferation of chondrocytes. In growth disorder, there is delay in the age associated increase in height. Present study evaluates the effect of extract from transgenic tomato fruit expressing AtMYB12 transcription factor on bone health including longitudinal growth.
Methods: Constitutive expression of AtMYB12 in tomato led to a significantly enhanced biosynthesis of flavonoids in general and the flavonol biosynthesis in particular. Prepubertal ovary intact BALB/c mice received daily oral administration of vehicle and ethanolic extract of wildtype (WT-TOM) and transgenic AtMYB12-tomato (MYB12-TOM) fruits for 6 weeks until growth plate fusion.
Results: Administration with MYB12-TOM resulted in no inflammatory cells in the hepatic tissues with normal sinusoidal Kupffer cell morphology. MYB12-TOM extract significantly increased tibia and femur bone growth and subsequently improved the bone length as compared to vehicle and WT-TOM. Histomorphometry exhibited significantly wider distal femur and proximal tibial growth plate, increased number/size of hypertrophic chondrocytes in MYB12-TOM which corroborated with μCT and expression of BMP-2 and COL-10, marker genes for hypertrophic cells.
Conclusion: <etabolic reprogramming of tomato by AtMYB12 has the potential to improve longitudinal bone growth thus helping in achievement of greater peak bone mass during adolescence.

P187

THE ASSOCIATIONS BETWEEN VITAMIN D, BONE MINERAL DENSITY, MUSCLE MASS AND FALLS IN ELDERLY

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Aims: To analyze the associations between vitamin D, BMD, muscle mass and falls.

Methods: Persons who have visited to the National Osteoporosis Center were invited to participate in this study. Inclusion criteria were: the age of 60 years and older, voluntary consent to participate in the study. Exclusion criteria were: an objection to any procedure, conditions and diseases known to affect muscle metabolism and muscle strength, malignant tumours of various localizations, mental disorders, current/past using of any medications likely to affect muscle and bone metabolism. Falls were defined as "landing on the floor or ground without violent causes from standing height". Serum 25-hydroxyvitamin D (25(OH)D) and PTH were measured by automated immunoassay (Cobas E411, Roche Diagnostic). Bone mineral content, BMD, lean mass, regional muscle mass were measured by DXA (iDXA, GE Lunar, USA). Statistical analysis was performed using Windows software package SPSS 18.0.

Results: A total of 392 individuals, 151 (38.5 %) men (from 60 to 95 years) and 241 (61.5 %) women (from 60 to 89 years) were included in this study. Significant positive associations between vitamin D and muscle mass in the all measured areas (appendicular muscle mass, lean mass, arm muscle mass, leg muscle mass) were found in men. These relations were not significant in women. We have found that bone mineral mass, lean mass, arms, legs, and appendicular muscle mass were significantly lower of people who experienced falls, comparing to non-fallers. Vitamin D levels did not differ statistically significantly between the groups, but parathyroid hormone levels (51.43±23.24 pg/ml) was statistically significantly higher of fallers comparing with group of patients that did not experience falls during the past year (59.13±38.36 pg/ml, p=0.023). Cluster analysis showed that the group of the most frequent fallers consisted of women, whose vitamin D levels in the blood were low (12.2 ng/ml), they also featured low muscle mass and low total hip BMD (0.842 g/cm^2). The nonfaller group consisted mainly of men, whose vitamin D levels in blood were close to optimal (28.65 ng/ml), they also had high muscle mass and hip BMD (1.031 g/cm^2).

Conclusion: Vitamin D statistically significantly positively associated with muscle mass of men, as well with BMD in elderly people of both gender. Muscle mass were associated with falls of elderly people. The group of the most frequent fallers consisted of women, whose vitamin D levels in the blood were low, they also featured low muscle mass and low total hip BMD.

P188

ULTRASTRUCTURE OF BIOMINERAL OF THE MANDIBULAR RAMUS IN RATS OF VARIOUS AGES AFTER 60-DAY EXPOSURE TO TOLUENE VAPORS

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Aims: To analyze ultrastructure of biomineral of the mandibular ramus in rats of different ages after 60-d inhalation of toluene vapors and administration of thiotriazoline (T) and *Echinaceae tinctura (ET)* as medication.

Methods: For the purposes of study we selected 420 male rats of three ages. The animals were split into the groups as follows: the first group comprised intact animals (the controls), the second group comprised the animals that received inhalations of toluene in dosage of 10 MPC as a single 5-h exposure per day, the third group received inhalations of toluene and intraperitoneal T in dosage of 117.4 mg/kg of body weight, and the fourth group comprised the animals that received inhalations of toluene and intragastric *ET* in dosage of 0.1 mg of active substance per 100 g of body weight. Burned and powdered mandibular rami were taken to X-ray scatter analysis (V.I. Luzin, 2005). The X-ray device employed Kα copper radiation with wavelength of 0.1542 ηM; anode voltage and amperage were 30 kV and 20 A, respectively.

Results: By the first day upon toluene discontinue, crystallytes dimensions in young animals increased as compared to the control values by 9.23 % and microtexture coefficient decreased by 7.33 %. In adult animals the same values changed in the same way by 7.16 and 11.28 % and in old animals by 5.35 and 6.24 %. In readaptation period young animals exhibited restoration of deranged features by the 60th day of observation, in adult animals alterations persisted up to the 30th day of observation and old animals yielded but little of signs of restoration (crystallites dimensions increased as compared to the control values by 4.71 % and microtexture coefficient decreased by 5.71 %). Administration of T or *ET* reduced negative effects of toluene as compared to the 2nd group during inhalation and after it (diminishing of elementary cells and crystallites and increase of microtexturing coefficient). After T administration, deranged features of the crystal lattice restored in young animals by the 7th day of observation, adult animals exhibited restoration signs throughout the whole observation period and in old animals signs of restoration were observed by the 7th and to the 60th days. After *ET* administration, in young animals restoration of the crystal lattice was observed by the 7th day of observation, in adult by the 15th day of observation, and in old animals by the 30th

and the 60th days of observation. Generally T appeared to be more effective than *ET*.

Conclusion: 60-d inhalation of toluene results in derangement of the crystal lattice of bone mineral. Deviations degree and recovery rate depend on age of animals. Faster recovery rate was observed in young animals while old animals exhibited few signs of recovery. Application of T or *ET* reduces negative effects of toluene. We proved T to be more effective than *ET*.

P189
MIR-133A IN HUMAN CIRCULATING MONOCYTES IS A POTENTIAL NOVEL BIOMARKER ASSOCIATED WITH OSTEOPOROSIS

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Aims: Osteoporosis as a systemic skeletal disorder is characterized by increased bone fragility and risk of fractures, and many patients at risk of the disease or osteoporotic fracture will be missed using BMD assessment alone. Circulating monocytes play essential roles in osteoclastogenesis by acting as osteoclast precursors and secreting several osteoclastogenesis factors. Recent studies showed that microRNAs (miRNAs) as possible new diagnostic biomarkers in various diseases. The objective of the present study is to identify significant miRNA biomarkers in human circulating monoctyes in patients with osteoporosis.

Methods: Isolated miRNAs were examined from circulating monocytes of 30 patients with osteoporosis that were transcribed and the samples were studied among (15 females and 15 males) and 30 age- and sex-matched nonosteoporotic samples. ABI TaqMan miRNA array analysis followed by qRT-PCR validation in circulating monocytes were used to identify novel miRNA biomarkers. Bioinformatic target gene analysis was performed to identify potential target genes. Pearson correlation analyses between the expression levels of various miRNA and the potential target genes among samples studied were performed.

Results: Among the miRNAs studied, we selected miRNAs that were expressed at least 8 samples from each group for the analysis. Accordingly, 172 qualified miRNAs were subject to statistical analysis with miRNA-133a and miRNA-382, showing significant upregulation in osteoporotic patients compared to corresponding control group. miRNA-133a displayed a 7.25-fold change between patients with osteoporosis (mean ±SD) (5.37±1.86) vs. control (0.75±0.55) (P=0.04), and miRNA-382 showed 5.10-fold change between patients with osteoporosis (3.66±2.11) vs. control (0.72±0.60) (P=0.021), respectively. Three target genes related to osteoclastogenesis were identified, and miRNA-133a showed negative correlations with identified three target genes.

Conclusion: The present study demonstrates that miR-133a in circulating monocytes is a potential novel biomarker for patients with osteoporosis.

P190
IN VITRO ASSAY FOR OSTEOINDUCTIVE ACTIVITY OF DIFFERENT DEMINERALIZED FREEZE DRIED BONE

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Aims: Osteoporosis is one of the risk factors for periodontal diseases and there are multiple bone graft materials that are being used for periodontal tissue regeneration. Demineralized freeze dried bone allograft (DFDBA) is a widely used bone substitute. The current widespread use of DFDBA is based on its potential osteoinductivity. Due to the lack of verifiable data, the purpose of this study was to assess the osteoinductive potential of three commercially available DFDBA allografts, in vitro.

Methods: Sarcoma osteogenic (SaOS-2) cells (human osteoblast-like cells) were exposed to 8 mg/ml and 16 mg/ml concentrations of three types of DFDBA (Osseo+, AlloOss, and Cenobone). The effect of these materials on cell proliferation was determined using the 3-[4,5-dimethylthiazol-2-yl]-2,5-diphenyltetrazolium bromide assay. The osteoinductive ability was evaluated using alizarin red staining, and the results were re confirmed by evaluating osteogenic gene expression using reverse transcription polymerase chain reaction.

Results: Osseo+and Cenobone significantly increased SaOS-2 cells proliferation after 48 h of exposure at 8 mg/ml but significantly decreased cell proliferation at 16 mg/ml concentration (P<0.001). Alizarin red staining results demonstrated 16 mg/ml concentration of all three tested DFDBA induced complete morphologic differentiation and mineralized nodule production of SaOS-2 cells. RT-PCR results revealed osteopontin gene expression at 16 mg/ml concentration and not at 8 mg/ml concentration of all three test groups.

Conclusion: Three commercially available type of DFDBA tested in this study are capable of decreasing proliferation and increasing osteogenic differentiation of SaOS-2 cell line and have osteoinductive activity in vitro; so they can be potentially used for the regeneration of periodontal diseases especially when it is involved with osteoporosis.

Acknowledgement: Hamanandsaz baft company

P191
FOOT MORPHOLOGICAL CHARACTERISTIC OF HABITUALLY UNSHOD RUNNERS

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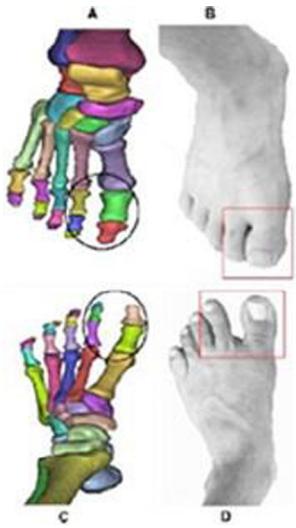
Aims: To analyze the foot skeletal morphological characteristics between habitually unshod runner and shod runner through inverse modelling.
Methods: A total of eight subjects, including four habitually unshod runners and four habitually shod runners participated in the computed tomography foot scanning test and Mimics was utilized to rebuild foot model and the intermetatarsal angle, metatarsal-phalangeal angle, and interphalangeal distance were measured to illustrate the morphology difference.
Results: Foot morphology has been reported that habitually unshod feet have a wider forefoot than habitually shod feet. Participants in this study show the aforementioned difference in the forefoot part, even habitually unshod feet illustrated an abducted hallux compared with adducted hallux of habitually shod runners (Figure 1), as the illustration of early Hominin foot morphology. Figure 1 shows top view of skeletal model and foot of habitually shod foot (A&B) and habitually unshod foot (C&D).



Conclusion: Skeleton of foot has difference between habitually unshod runner and shod runner through inverse modelling in this study. The growth of foot will affected with shoes in long-term. In addition, the researchers pay attention to the first metatarsal-phalangeal Angle, but ignore the fourth and fifth HVA. In future research, this method and results maybe provide a new view to explore difference between shod runners and unshod runners.

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P192
THERAPEUTIC IMPASSE IN A PATIENT WITH MULTIPLE CAUSES OF OSTEOPOROSIS AND COMPLEX PATHOLOGY

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Aims: We present the case of a male patient, 70 years old, who is hospitalized in the Rheumatology Clinic in May 2015 for left hip pain and petechial lesions all over his body.
Methods: The patient is known to our clinic from 2008, when he presented for painful and swollen joints and was diagnosed with rheumatoid arthritis. During this time he was treated with disease modifying antirheumatic drugs and corticosteroids, but he had frequently high activity levels of the disease. In May 2010 the patient was diagnosed with osteoporosis (T-Score −3 of the hip) and started treatment with bisphosphonate, calcium and vitamin D3.
From the patient's history we mention total right hip prosthesis for aseptic osteonecrosis of femoral head without a definite cause (1998), bladder cancer (2006), left Backer cyst fused and operated (2009), chronic myeloid leukemia treated with imatinibum (2011), surgical intervention for lumbar spine herniated disc (2012), complete left subtrochanteric fracture that required intramedullary nail fixation after a minor traumatism (2014). Following investigations conducted in May 2015, we found severe thrombocytopenia and pelvic radiograph showed intramedullary nail without signs of fracture strengthening and no callus. The orthopedic surgery is temporized and after consultations with hematologists physicians, we decided to start treatment with rituximab.
Results: Although the patient is treated with biphosphonate, calcium and vitamin D3 for osteoporosis since 2010, he presented fracture on fragile bone, causes of osteoporosis being multiple: rheumatoid arthritis with vasculitis, treatment with corticosteroids, long periods of inactivity for the patient.
Conclusion: Given the important associated pathology and immunosuppressive therapy (imatinbum, rituximab, corticosteroids) can we may take into consideration antiosteoporotic biological treatment (denosumab) in this patient? Could we have another option?

P193

BENEFICIAL EFFECT OF STRONTIUM RANELATE ON FUNCTIONAL OUTCOMES OF ANKLE FRACTURES' OSTEOSYNTHESIS

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Aims: Prospective randomized research had aim to check two null-hypothesis: H01 – strontium ranelate (SrRan) at daily dose 2.0 g for 1 year after osteosynthesis does not accumulate at fracture site; H02 – SrRan has no effect on fracture healing and damaged joint's functional outcome.
Methods: Data collected at Rostov-na-Donu Center for Trauma and Orthopaedic Surgery with permission of ethics committee. Computer generated random numbers divided patients into groups: even – control group A, odd – treatment group B. Patients underwent osteosynthesis within 48 h after trauma according to clinical guidelines for ankle fractures. Method of osteosynthesis was a choice of surgeon on the base of AO recommendations. All patients received calcium 1500 mg/d and colecalciferol 1200 mg/d per 1 year. Patients at group B received SrRan 2.0 g daily per year. Implants removed in 350±15 d after primary surgery if X-ray consolidation's was proof. Routing clinical examination, X-rays, ECG, hemostatic panel were performed. Bone microspecimens collected during primary osteosynthesis and implant removal (36 specimens at group A, 48 specimens at group B). Size of bone specimens were 5–7 mm3. Morphology of surface investigated by scanning electron microscopy (SEM with 3 kV). Microelement content of samples estimated by energy-dispersive X-ray spectroscopy (EDX with 25 kV). EDX results presented as weight and atomic percent of revealed elements. Within 1 month after discharge, DXA performed to estimate BMD. AOFAS scale used to register ankle joint function at 7–10, 50–60, 180–190 and 365–400 days interval. Data processed by IBM SPSS Statistics 19.
Results: 314 patients with low energy ankle fractures (AO/OTA 43, 44) sequentially hospitalized between 2013 and 2014. Research enrolled 52 persons eligible to inclusion/exclusion criteria (male - 18, avg. age 61±4.5; female 34, avg. age 63±5.5). 42/52 persons had performed research (gr. A - 18 persons, gr. B - 24 persons). 3 patients recalled permission, 7 were not compliant. All selected patients had osteopenia or osteoporosis, but difference between groups A and B had no statistical significance (T-score A=−2.6, std. dev.=0.44; T-score B=2.4, std. dev. 0.42; $U_{Mann\text{-}Whitney}$=0.415). There were no difference between groups on Sr and Ca content at primary procedure. At implant removal bone samples had statistically significant difference on Sr (avg.% Sr_{grA}=0.85, std. dev.=0,04; avg.% Sr_{grB}=4.48, std. dev.=2,0; $U_{Mann\text{-}Whitney}$=0.00) and Ca (avg.% Ca_{grA}=29.30, std. dev.=5.50; avg.% Ca_{grB}=24.38, std. dev.=6,60; $U_{Mann\text{-}Whitney}$=0.008). Bone's specimens at gr. B had more solid matrix, hypertrophy of Haversian tubules. AOFAS score at group B was noticeably higher (avg. $AOFAS365_{grA}$=81, $AOFAS365_{grB}$=93, $U_{Mann\text{-}Whitney}$=0.00).
Conclusion: Strontium ranelate 2.0 g daily per 1 year improves functional outcomes after osteoporotic ankle fractures by influencing on bone structure at fracture site. Adverse effects of SrRan had not registered during this research.

P194

EFFECTS OF MULTIDISCIPLINARY REHABILITATION ON KINESIOPHOBIA AND FEAR AVOIDANCE BELIEFS OF PHYSICAL ACTIVITY AFTER OSTEOPOROTIC FRACTURES IN THE ELDERLY PATIENTS

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Aims: After post-fall fractures fear of falling with kinesiophobia and fear avoidance beliefs of physical activity can significantly impair mobility, physical function and limit the ability to live independently in the elderly. The aim of this study was to assess the effects of multidisciplinary rehabilitation treatment and interventions on possible modifying risk factors for falls including kinesiophobia and fear avoidance beliefs of physical activity after fractures in the elderly.
Methods: The study included 46 patients, 25 women and 21 men, mean age 76.14±4.47 year, referred for physical therapy and rehabilitation after hip, thigh or spine fractures. In addition to the standard treatment, also were included interventions on the modifiable risk factors for falls such as: exercise training and education about safety, mobility, balance, gait and assistive devices. Before and at the end of treatment, patients completed two questionnaires used today not only in low back pain but also in the various musculoskeletal disorders: 1) The Tampa Scale of Kinesiophobia-11(TSK-11) with the responses to the 11 items (score 0 to 44) for assessment of fear of movement/re-injury and 2) Fear Avoidance Beliefs Questionnaire for Physical Activity (FABQ-PA) a 4-item scale (score 0 to 24).
Results: At the end of treatment there were significantly lower mean values scores of TSK-11 and FABQ-PA than at the beginning: TSK-11=35.23±3.84 vs. 26.72±3.12 ($p<0.05$) and FABQ-PA=18.78±2.43 vs. 12.18±2.15 ($p<0.05$).
Conclusion: Multidisciplinary rehabilitation treatment including interventions on the modifiable risk factors for falls can produce favourable effects on kinesiophobia and fear avoidance beliefs of physical activity with improving of mobility and physical activity and therefore should be included in treatment after post-fall fractures in the elderly patients.

P195

INFLUENCE OF OSSEIN HYDROXYAPATITE COMPLEX ON CLINICAL MANIFESTATIONS OF OSTEOPOROSIS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Aims: To compare the effect of a standard combination of calcium carbonate/vitamin D versus combination of ossein hydroxyapatite on BMD in patients with rheumatoid arthritis.
Methods: We examined 47 patients with RA, 19 men and 28 women, mean age 51.60±5.62 y, midscore of DAS28 is 2.78 ±0.35, randomized into 2 groups. As basic therapy 20 patients (42.55 %) received methotrexate 7.5–15 mg/week, 23 patients (48.94 %) combined methotrexate with glucocorticoids 5–10 mg/d, 4 patients (8.51 %) received leflunomide 20 mg/d. Patients of the first group (n=23) along with basic therapy were treated with osteogenon, the second group (n=24) basic therapy and calcium with vitamin D. The average level of BMD in first group was 0.959±0.031, in second group 0.962±0.033. Pain syndrome was assessed according to visual analogue scale before treatment and after 1, 3 and 6 months. BMD was determined by DXA.
Results: Pain decreased by 35.4 % (p<0.05) in the group of patients receiving osteogenon and in the group receiving standard combination of calcium and vitamin D to 9.1 % (p<0.05). Bone mineral density increased in the group receiving osteogenon (+6.9 %, p<0.001) after 6 months of treatment, in contrast to second group, in which was not observed reliable dynamic (+1.35 %, p>0.05).
Conclusion: More significant improvement of BMD was registered in first group in comparison with a group of patients that received the standard combination of calcium with vitamin D at recommended doses. In this way ossein hydroxyapatite complex can be recommended as a first line medicine for treatment of osteoporosis in patients with rheumatoid arthritis.

P196

EFFICACY AND SAFETY OF TWO TERIPARATIDE FORMULATIONS: OSTEOFORTIL® AND FORTEO® CLINICAL COMPARISON

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Aims: Osteoporosis is characterized for bone fragility. Teriparatide is a peptide produced by recombinant DNA technology corresponding to the 1–34 fragment of human parathyroid hormone ($hPTH_{1-84}$). Teriparatide have the same anabolic properties on bone formation than $hPTH_{1-84}$ and is utilized once daily to increase bone mass. To develop Osteofortil® (Biosidus S.A., Buenos Aires, Argentina) a biosimilar containing teriparatide, EMA guidelines were used. We report preliminary data corresponding to the comparison on efficacy and tolerability with the reference product (Forteo®, Eli-Lilly, Indianapolis, IN, USA).
Methods: In a single center, a randomized simple blind trial was designed. Inclusion criteria: postmenopausal women between 50 and 81 years old, with osteoporosis defined by mineral bone density (MBD) on lumbar spine (LS)<−2.5 (T-score) or lumbar fracture with MBD<−2 on LS, femoral neck or total hip. The IRB, an ethics committee and the national drug regulatory agency of Argentina (ANMAT) approved the trial, also registered in clinicaltrials.gov (NCT 01945788). A comparative 6-month initial phase was followed by an extension in which all patients were invited to receive Osteofortil® for 6 months. Teriparatide dose was 20 μg/d. A total of 192 patients were enrolled and 100 met inclusion and exclusion criteria, 95 and 70 completed the comparative and the extension phase, respectively. Osteocalcin levels (O), N-terminal propeptide of procollagen type 1 (P1NP), C-terminal cross-linked telopeptide of type I collagen (CTX) were measured by Roche E411 ECLIA Electrochemi-luminescence, at baseline and months 1, 3, 6, 9 and 12. BMD was assessed after 6 and 12 months of treatment with DXA by Lunar Prodigy™, GE Healthcare, Madison, WI, USA. The induction of anti-teriparatide antibodies was evaluated by ELISA.
Results: The mean age was 65.6 years, no differences on menopause years, previous use of bisphosphonates, vitamin D and the presence of fractures at baseline. At 6 months, Osteofortil® increased O levels 60.3±30 mg/ml, P1NP 146.8±98 mg/ml, CTX 816.2±467 pg/ml, whereas corresponding figures for Forteo® were 67.8±29.4 mg/ml, 179± 97 mg/ml and 1015±656 pg/ml, (p 0.46, 0.56, 0.45), respectively. At 12 months the Ostefortil® values were O=60± 36 mg/ml, CTX 725±322 pg/ml P1NP 155±100 mg/ml, vs. Forteo® values of 62.6±35.9 mg/ml, 786±459 pg/ml and 166 ±109 mg/ml, respectively. No differences between groups were found. The increase in mineral density in LS at 6 and 12 months was 6.3 and 7.63 % with Forteo®, 4.3 and 6.58 % with Osteofortil® (p=0.22). There was no induction of anti-PTH antibody with any product. The most frequent adverse events were hypercalciuria, vitamin d deficiency, hypocalciuria, upper respiratory infections without significant differences between booth products.
Conclusion: Both products resulted in similar increase in bone markers and mineral bone density in the lumbar spine. Both depicted similar safety

P197

EFFECTS OF TREATMENT WITH TERIPARATIDE AND QUALITY OF LIFE IN A GROUP OF ELDERLY PEOPLE SUFFERING FROM SEVERE OSTEOPOROSIS

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Aims: Today in Italy live about 5 million people affected by osteoporosis. Observing the increase in life expectancy that has characterized the last decades, we notice the tendency to a higher incidence of this disease. In light of the above, our study was aimed to focus on teriparatide. It assesses the effects of the drug on a group of elderly patients affected by severe osteoporosis, in particular the arrest of bone loss as well as the reduction of new fractures. In addition, the study aims to highlight the influence that the aforementioned therapy can determine the quality of life of these patients.

Methods: We conducted a study over 24 months on a sample of elderly patients affected by severe osteoporosis; we enrolled 81 subjects, including 73 females (F) and 8 males (M), mean age 69.73 y±11.05 SD. The subjects enrolled in the study were examined with DXA of L1-L4 and femur, morphometric analysis and calculation of the SDI on the base of latero-lateral X-ray imaging of the thoracolumbar spine (T4-L4) and questionnaires to assess the presence of peripheral fractures and survey on quality of life QUALEFFO-41, all this at the beginning of treatment (t0) and at the end of the 24 months of therapy (t24). In order to compare the results recorded before and after treatment we used the paired *T*-test and the Wilcoxon matched-pairs signed rank test, after making the test of normality Kolmogorov-Smirnov.

Results: After 24 months of treatment with teriparatide, patients showed a significant recovery of BMD at the level of spine and femur in terms of t-score (L1-L4 $p<0.0001$; femoral neck $p<0.0001$; total femur $p=0.024$), z-score (L1-L4 $p<0.0001$; femoral neck $p<0.0001$; total femur $p<0.0001$) and BMD (L1-L4 $p=0.0304$; femoral neck $p<0.0001$; total femur $p=0.0575$) with a significant reduction in the incidence of both vertebral and peripheral fractures. It was also shown that this treatment is able to obtain an improvement on the subject of the quality of life in toto ($p<0.0001$).

Conclusion: The findings from our study allow us to confirm the clinical efficacy of the therapy with teriparatide in the treatment of severe osteoporosis in elderly patients. The therapy results effective in protecting against new vertebral and peripheral fractures; it increases both spine and femur bone density, in terms of t-score, z-score and BMD. These advantages appear to be of great importance especially when considering the studied subjects target - elderly and very often suffering from polypathology and at high risk of complications, such as falls and related fractures, which may reduce their life expectancy. Also it should be noted that the positive effects that the teriparatide determines are included pain reduction and improvement of ability to walk and to perform normal activities of daily living. All this argues for greater participation in social life and a smoother socialization that help to preserve the elderly from mood disorders, which are also potentially disabling.

P198

CLINICAL SIGNIFICANCE OF SERUM 25-HYDROXYVITAMIN D IN FEMALE PATIENTS WITH RHEUMATOID ARTHRITIS

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Aims: To evaluate the level and clinical significance of serum 25-hydroxyvitamin D in female patients with rheumatoid arthritis (RA).

Methods: Totally 82 untreated RA female patients (RA group) and 32 healthy females (control group) were enrolled. According to the disease activity score in 28 joints (DAS28), patients in RA group were divided into remission stage group (<2.6 scores, 32 cases) and active stage group (>2.6 scores, 50cases). The levels of serum 25(OH)D were measured and compared between groups. The correlations of 25(OH)D level with related indicators were analyzed.

Results: ①The levels of serum 25(OH)D in RA group were significantly lower than those in control group [(13.15±6.68) ng/ml vs. (26.55±5.32) ng/ml] ($P<0.01$). ②The levels of serum 25(OH)D in females RA active stage group were significantly lower than those in control group [(12.51±6.29) ng/ml vs. (26.55±5.32) ng/ml] ($P<0.01$). The levels of serum 25(OH)D in females RA remission stage group were significantly lower than that in control group [(14.15±7.24) ng/ml vs. (26.55±5.32) ng/ml] ($P<0.01$). ③The levels of serum 25(OH)D were not significantly different between remission group and active group [(12.51±6.29) ng/ml vs. (14.15±7.24) ng/ml] ($P>0.05$) in female RA. The levels of serum 25(OH)D were not significantly different between premenopausal and postmenopausal in active stage group [(12.22±7.34) ng/ml vs. (12.79±5.18)ng/ml] ($P>0.05$). ④There was a negative correlation between serum 25(OH)D level and C reactive protein (CRP), erythrocyte sedimentation rate (ESR), DAS28 score ($r=-0.575$, $r=-0.528$, $r=-0.354$, $P<0.05$) in female RA active stage group, but not in female RA remission stage group ($P>0.05$). ⑤In active stage group, the 25(OH)D levels of premenopausal RA were negatively correlated with CRP, ESR, DAS28 ($r=-0.707$, $r=-0.625$, $r=-0.487$, $P<0.05$), but not in postmenopausal RA ($P>0.05$).

Conclusion: The 25(OH)D levels in serum were reduced in female patients with RA. Serum 25(OH)D levels were

negatively correlated with disease activity in RA female patients with active disease, especially in premenopausal female patients; serum 25(OH)D level can be a marker to monitor the disease activity in RA female patients.

P200

PREOPERATIVE PREDICTORS FOR GOOD POSTOPERATIVE SATISFACTION AND FUNCTIONAL OUTCOME IN LUMBAR SPINAL STENOSIS SURGERY WITH A FIVE AND TEN YEAR FOLLOW-UP

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Aims: In this study our aim was to evaluate the preoperative predictors in lumbar spinal stenosis (LSS) for a good postoperative outcome (satisfaction with surgery and functional improvement) with a 5 and 10 year follow-up.
Methods: At baseline total of 102 LSS patients were operated (mean age 62 years, 59 women and 43 men). In the 5-year follow-up study there were 74 LSS patients (mean age 67 years, 48 women and 26 men) and in the 10-year follow-up study there were 72 LSS patients (mean age 69 years, 45 women and 27 men). In this prospective clinical study patients completed a questionnaire before surgery and 2, 5 and 10 years after the surgery. Preoperative patient-related predictors, self-rated health, comorbidities, use of analgesic and previous lumbar operation were assessed. A good functional outcome was determined as more than 30 % relative improvement compared to score before the surgery in the Oswestry Disability Index (ODI). Satisfaction with the surgical outcome was determined to be good if the patient response was either "totally cured" or "condition has considerably improved". Satisfaction was evaluated with a seven-category scale and the other five responses ("condition has slightly improved" or worse) were determined as a worse outcome.
Results: The predictor for the good improvement in the ODI was regular preoperative analgesic use 12 months or less (OR 3.372; 95%CI 1.081–10.521; p=0.036) at the 5-year follow-up. At the 10-year follow-up the predictors for the good improvement in the ODI were regular preoperative analgesic use 12 months or less (OR 4.428; 95%CI 1.313–14.934; p= 0.016) and nonsmoking (OR 5.830; 95%CI 1.422–23.894; p=0.014). There were not statistically significant predictors for the postoperative satisfaction at the five and 10-year follow-up.
Conclusion: In summary, regular analgesic treatment preoperatively for 12 months or less predicted a good postoperative functional improvement in LSS after 5 and 10 years. Also nonsmoking predicted a good postoperative functional improvement after 10 years.

P201

A PILOT ANALYSIS OF EXTERNAL BINDING MANIPULATION ON TOES FUNCTION

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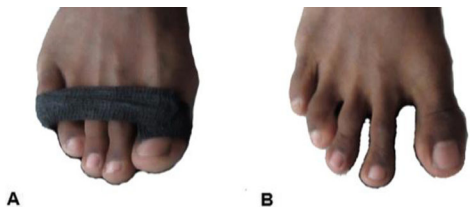
Aims: To investigate the toes gripping (ambulatory) function while running in natural (separate) and deformed (compressed) positions.
Methods: Seven habitually barefoot male runners participated the running test under toes binding and nonbinding conditions, and Vicon and Novel insole plantar pressure measurement were conducted synchronously to collect kinematics and foot loading.
Results: Ankle showed larger range of motion in the frontal plane while running with toes nonbinding, though no obvious significance existed. And medial forefoot had smaller force time integral with hallux had larger force time integral than those of running with toes binding.



Conclusion: While running with natural positioned (nonbinding) toes, medial forefoot loading (impulse) was smaller with hallux bearing parts of body weight loading. This could attribute to the toes ambulatory or gripping function, thus enhance the effect of windlass mechanism. The active function of toes should be encouraged for foot injuries (plantar fasciitis and metatarsal fracture) prevention and running performance improvement.
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P202

MISS FOR OSTEOPOROTIC VCF: THE CURRENT "STATE OF ART"

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Aims: To present the results of the surgical treatment using the spinal instrumentation to resolve the osteoporotic vertebral

compression fracture (VCF) in the elderly patients having the clinical symptoms of pain and the neurological compromise.
Methods: Sixty-two elderly patients who underwent the surgical treatment of the osteoporotic vertebral compression fracture were retrospectively reviewed. Their average age was 71 years; the range was 60–91. The average follow-up period for these patients was 4.3 y; the range was 3–7. Twenty-four patients were performed by the posterior stabilization enhanced by the pedicle screws and rods with the transpedicular bone grafting. Thirty-two patients were performed by the anterior corpectomy with the interbody fusion and the anterior spinal instrumentation. Four patients were performed by two-step surgical treatment: firstly the posterior stabilization enhanced by pedicle screws and rods-MISS, and finally, the anterior corpectomy with the interbody fusion or VBA. The sagittal Cobb angle and the back pain were improved in all patients.
Results: The neurological deficits were improved in 13 out of the 16 patients. Twelve patients had postoperative complications: late implants loosening in 5 patients, subcutaneous wound infections in 4 patients, painful neuromas at thoracic cage in 2 patients and incisional hernia in one patient. Although the surgical treatment with spinal implants in the osteoporotic compression fracture was performed in the selected patients, the complication rate was still high, i.e., 20 % for conventional surgeries. All of them, nevertheless, were not the mortal complications.
Conclusion: The anterior column support could maintain the sagittal alignment better than the posterior spinal fusion alone in the long-term follow up period while the VAS of pain was improved in the similar results mainly by VBA percutaneously as MISS.