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Purpose: Subjects with acromegaly (AG) suffers of increased bone fragility and, as reported in literature, have a higher prevalence for vertebral fracture even in subjects with normal BMD. Sparse information exists on the effect of AG on bone microarchitecture and no at axial sites. The aim of our study was to examine bone quality and quantity assessed by TBS and BMD in subjects with AG at lumbar spine.
Methods: In this longitudinal study 46 subjects with AG have been recruited (26 women and 20 men, mean age of 54.9±11.5 years, BMI of 29.3±4.2 Kg/m^2). BMD and TBS were evaluated at lumbar spine (LS) using an iDxa DXA device (GE-Lunar) and TBS iNsight® (v2.1, Med-Imaps, France). Presence of vertebral fracture has been confirmed by Vertebral Fracture Assessment by DXA (VFA).
Results: Among all AG subjects, 41% were in active phase of the disease, 74% suffered from hypogonadism (Hy) and 22% sustained at least a fracture (Fx). BMD and TBS showed high correlation ($p<0.0001$), with 49% of TBS explained by spine BMD. Subjects with Hy have a significant lower BMD and TBS ($p<0,002$). Those with fracture have a lower TBS ($p=0.02$) whereas no difference has been observed on spine BMD ($p>0.5$). TBS and fracture were associated with an odd-ratio per one SD decrease of 2.64 [1.1-6.3] and an area under the ROC curve of 0,71 [0.56-0,84]. BMD, Age, presence of Hy, or duration of Hy were not associated with the presence of the fracture. Compared to normative TBS value, AG subjects have a significant TBS impairment (-6%, $p<0,001$). Those with Hy or fracture have a lower TBS values when compared to normative values: -8% ($p<0,001$) and -13% ($p<0,02$) respectively.
Conclusion: This is the first study reporting changes in BMD and TBS at lumbar spine in subjects with acromegaly. AG induces bone microarchitectural texture impairment at lumbar spine. Presence of hypogonadism or fracture worsens this impairment. As previously obtained, TBS seems to be more sensitive to assess bone architecture impairment than BMD.

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TRABECULAR BONE SCORE IN HEALTHY AGEING

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Objective: To report values of Trabecular Bone Score (TBS) of healthy subjects and to highlight the link between TBS and conventional parameters of bone and body composition by dual-energy x-ray absorptiometry (DXA).
Methods: Two hundred and fifty patients of five age decades (from 20s to 70s, equally distributed for both age and sex) were prospectively recruited. Whole-body and regional densitometric body composition parameters (iDXA, GE Healthcare, USA), including estimate of visceral fat (VAT) assessed by a new software, lumbar DXA and TBS by iNsight (version 2.1) were considered.
Results: A significant decrease of TBS was observed with ageing only in females, while BMD significantly decreased both in males and females. TBS values were slightly correlated with BMI ($r=0.133$, $p<0.01$), total lean mass in males ($r=0.187$, $p<0.05$) and total\regional fat mass in females ($r=0.197$-0.223, $p<0.05$). However lumbar spine BMD ($r=0.870$, $p<0.0001$) predominantly influences TBS values.
Conclusions: This report revealed more influence on TBS by bone "quantity" compared to body composition parameters. Moreover the age and sex-specific reference curves for TBS could help clinicians to improve patient management in the detection of impaired bone mineral status and to monitor microarchitectural changes.

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MORPHOLOGICAL AND BONE STRENGTH INDICES IN GIRLS WITH ADOLESCENT IDIOPATHIC SCOLIOSIS AND THEIR CORRELATIONS WITH LEPTIN AND SOLUBLE LEPTIN RECEPTOR

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Objective: Previous studies suggested that leptin has profound effects on bone metabolism and growth. Abnormal leptin and soluble leptin receptor (sOB-R) levels and their correlation patterns with bone mineral density and trabecular bone micro-architecture were recently found to be distinct in girls with adolescent idiopathic scoliosis (AIS). Structural Model Index (SMI) and data derived from Finite Element Analysis (FEA) are important HR-pQCT parameters that can provide important information on the rod/plate-like configurations in the trabecular bone and bone strength respectively. This study aimed to compare the differences and correlations between SMI, bone strength indices and leptin and sOB-R between AIS and controls.
Material and Methods: 104 AIS girls aged 12 to 14 (Cobb angle 22.7°±6.4°) and 82 age and gender-matched healthy controls were recruited. Subjects with BMI>23.0 kg/m2 were excluded. Anthropometric measurements including body height, body weight, sitting height and arm span were recorded. Sexual maturation was assessed with Tanner stages. SMI and bone strength parameters from FEA were determined at the non-dominant distal radius using HR-pQCT. Serum total leptin and sOB-R levels were measured with ELISA.
Results: Compared with controls, AIS subjects had higher sOB-R level ($p=0.006$), higher SMI value ($p=0.020$) reflecting more rod-like structures within the trabecular compartment, and numerically lower stiffness (-2.03%) and estimated failure load (-3.07%). Significant negative correlation was found between SMI and serum total leptin level in AIS ($r=-0.325$; $p=0.003$) but not in controls ($p=0.533$). Significant positive correlations were found between stiffness, estimated failure load, and serum total leptin in both AIS ($r=0.278$, $p=0.003$; $r=0.268$, $p=0.004$ respectively) and controls ($r=0.462$, $p<0.001$; $r=0.468$, $p<0.001$ respectively).
Conclusion: The higher SMI and numerically lower FEA derived bone strength parameters both reflecting decreased bone strength in AIS. The negative correlation between SMI and serum total leptin level was distinctly only detected in AIS, which indicated possible disturbance in leptin signaling affecting the trabecular bone of AIS. The results of this and previous studies provided strong evidences of deranged bone quality and bone strength and its association with abnormal leptin bioavailability and signaling in AIS.

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CORTICAL MEASUREMENTS OF THE TIBIA FROM HIGH RESOLUTION PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY IMAGES: A COMPARISON WITH MICRO-COMPUTED TOMOGRAPHY

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Objective: High Resolution-peripheral Quantitative Computed Tomography (HR-pQCT) measurements are carried out in clinical research protocols to analyze separately cortical bone and trabecular bone. Micro-computed tomography (micro-CT) is a standard tool for ex vivo examination of bone in 3D. The aim of this work was to evaluate cortical measurements derived from HR-pQCT images compared to micro-CT in a distal position with a sufficient amount of cortical bone (4.2 cm from the distal pilon).
Methods: Twelve tibia specimens were scanned with HR-pQCT using protocols provided by the manufacturer. The standard measured outcomes included volumetric bone density (mgHA/cm^3) of the cortical region