

COMPARATIVE ASSESSMENT OF A NEW ULTRASOUND-BASED METHODOLOGY FOR FEMORAL NECK DENSITOMETRY AND DUAL X-RAY ABSORPTIOMETRY.

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OBJECTIVE: To perform a preliminary validation of a new ultrasound (US)-based methodology for bone densitometry directly applicable on the femoral neck.

MATERIALS AND METHODS: A cohort of 80 female patients was recruited according to the following criteria: 60-80 years of age, BMI (body mass index) ≤ 40 kg/m², no severe deambulation impairments, medical prescription for a femoral dual-energy X-ray absorptiometry (DXA), signed informed consent. All patients recruited for the study underwent two examinations: a conventional femoral DXA (Hologic Discovery) and an US scan of proximal femur. US data were analyzed by a novel algorithm that processed both echographic images and "raw" radiofrequency signals and calculated the same diagnostic parameters provided by DXA (bone mineral density (BMD), T-score, Z-score). Diagnostic accuracy of obtained results was evaluated through a direct comparison with DXA output as a function of patient age and BMI.

RESULTS: For 87.5% of the patients US diagnosis (osteoporotic, osteopenic, healthy) was the same of the corresponding DXA one. Pearson correlation coefficient (r) between DXA and US measurements was evaluated for each diagnostic parameter, obtaining the following results: r = 0.72 (p<0.001) for BMD, r = 0.72 (p<0.001) for T-score and r = 0.75 (p<0.001) for Z-score, without significant variations as a function of age nor BMI.

CONCLUSIONS: The proposed US approach to femoral bone densitometry showed an unprecedented strong correlation with DXA measurements performed at the same site, indicating that this new non-ionizing method has the potential for being extremely useful for early osteoporosis diagnosis through population mass screenings.

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