

# EVALUATION OF THE REMS DIAGNOSTIC ACCURACY IN A POPULATION OF SPANISH WOMEN. PRELIMINARY RESULTS

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The non-ionizing REMS (Radiofrequency Echographic Multi Spectrometry) [1-2] technology is a very innovative approach that allows bone characterization and micro-architecture assessment through a simple echographic scan of the axial reference sites: lumbar vertebrae (from L1-L4) and proximal femur. The examination is very quickly: only 40 or 80 sec for femoral and lumbar investigation, respectively. Data analysis is performed automatically by the software that processes both echographic images and "raw" radiofrequency signals, providing the same diagnostic parameters evaluated by DXA (bone mineral density (BMD), T-score, Z-score) through dedicated spectral and statistical analyses.

A cohort of 197 female patients was recruited at Department of Internal Medicine, Hospital del Mar (Barcelona, Spain) according to the following criteria: 50-70 years, BMI ("body mass index")  $\leq 30 \text{ kg/m}^2$ , no severe walking impairments, medical prescription for a spinal DXA, signed informed consent. All the enrolled patients underwent two examinations: a conventional DXA (Hologic Discovery) on spine or femoral neck and an echographic scan by REMS technology (Echolight Spa) on the same anatomical site.

REMS diagnostic accuracy in discriminating osteoporotic from healthy patients was evaluated through a direct comparison with DXA output.

An accurate check of DXA and REMS reports was performed, excluding all those cases presenting a typical DXA error as identified by recent literature (e.g., incorrect patient positioning, improper image segmentation, presence of artifacts, etc.) [3], or an inaccurate selection of the echographic depth and focus parameters.

The obtained results showed that REMS technique is very accurate in evaluating the presence/absence of the disease. In particular, a sensitivity of 83.3% and a specificity equal to 91.6% in discriminating osteoporotic from non-osteoporotic patients was obtained when REMS was applied to the vertebral site. The diagnostic accuracy of the REMS technique applied to the femur was also very high (sensitivity 88,9% and 94,1% specificity).

REMS technology is accurate, very fast and automatic with a significant beneficial impact on current diagnostic protocols and subsequent patient management.

This technique will also open concrete perspectives for fracture risk estimation, short-term drug efficacy follow-up programs, prevention intervention, and early Osteoporosis diagnosis. It could increase the accuracy of the diagnosis of bone metabolic diseases on the basis of more objective and reliable criteria.

## **References:**

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[3] Messina C, et al. Prevalence and type of errors in dual-energy x-ray absorptiometry *Eur Radiol* 2015; 25:1504-11.