**EULAR 2022**

# Radiofrequency Echographic Multi Spectrometry (REMS) for the assessment of femoral bone health in a male population

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**Background**

Bone mass reach the peak during the third decade of life. By this age, men reach an increased bone mass that starts declining in their fifties, however less rapidly than women after menopause. However, men and women lose bone mass at the same rate by age 65-70, becoming fragile and more likely to fracture.

**Objectives**

This study aimed to evaluate the diagnostic accuracy in osteoporosis diagnosis of Radiofrequency Echographic Multi Spectrometry (REMS) technology applied on the proximal femur in an adult male population in comparison with the Dual-energy X-ray Absorptiometry (DXA).

**Methods**

A cohort of Caucasian males was enrolled in the study. Inclusion criteria were: age between 30 and 90 years, body mass index (BMI) less than 40 kg/m$^2$, no significant walking impairments and proximal femur DXA medical prescription. All the enrolled patients underwent proximal femur scans with both DXA and REMS. The agreement between REMS and DXA-measured BMD was expressed by Pearson correlation coefficient and Bland-Altman method. The classification into patients “with osteoporosis” or “without osteoporosis” was carried out considering the conventional threshold of T-score (-2.5) for both techniques independently. The accuracy was evaluated by the assessment of sensitivity and specificity considering the DXA outcome as reference [1].

**Results**

A total of 219 men were included in the analysis, with mean age of 55.5 (± 15.3) years. The Pearson correlation coefficient between REMS- and DXA-measured BMD values was r=0.94. At Bland-Altman analysis, Bias ± 1.96 Standard Deviation were -0.004 ± 0.04 g/cm$^2$. The REMS capability to discriminate osteoporotic patients from non-osteoporotic ones was very high: a sensitivity of 90.0% and specificity of 91.8% was detected.

**Conclusions**

REMS, applied to the proximal femur site, is a reliable technology for the diagnosis of osteoporosis also in men, thus confirming the diagnostic performance already observed in studies carried out in female populations [1, 2].

**References**

1. Di Paola P et al. Osteoporos Int. 30(2):391-402.
2. Adami G et al. Bone 2020;134:115297

**EULAR 2022**

## Radiofrequency Echographic Multi Spectrometry (REMS) as an alternative approach to bioelectrical impedance analysis (BIA) for the assessment of body composition

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### Background

The evaluation of human body composition is crucial for body weight management, especially in pathological conditions. Patients whose body weight greatly exceeds or remains below the reference range, need regular monitoring to personalise the nutritional treatment plan. To this end, bioelectrical impedance analysis (BIA) is a widely accepted tool, along with ultrasound techniques. Among emerging ultrasound-based technologies, Radiofrequency Echographic Multi Spectrometry (REMS) is a powerful approach that can be effectively used for body composition analysis.

### Aim

The present study aims to assess the accuracy of REMS in comparison to BIA for body composition assessment.

### Methods

The cohort included 141 males and females aged between 60 and 80 years. All subjects underwent body mass measurement by REMS and BIA and both body fat percentage (BFP) and basal metabolic rate (BMR) parameters were assessed.

**Results**

The estimation of BFP measured with BIA resulted in 40.4% (interquartile range [IQR]: 35.5% to 45.2%), which value did not differ from 41.1% (IQR: 36.5% to 47.1%) obtained with REMS (p=0.6). The BMR determined by BIA was 1329.0 kcal/day (IQR: 1270.5 to 1423.5 kcal/day), which was in a similar range as the value of 1323.5 kcal/day (IQR: 1266.0 to 1420.0 kcal/day) assessed by REMS (p=0.7).

**Conclusion**

The present study demonstrated the excellent ability of REMS to accurately determine the body composition, resulting as an alternative approach to conventional BIA.