



# An observational study of the radiofrequency echographic multi-spectrometry (REMS)-based fragility score of the lumbar spine and total fracture risk at 5 years in women

Stoyanka Vladeva<sup>1</sup> · Elena Bischoff<sup>2</sup> · Nikola Kirilov<sup>3</sup> · Fabian Bischoff<sup>4</sup> · Zguro Batalov<sup>5</sup> · Anastas Batalov<sup>5</sup>

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## Abstract

A novel fragility score (FS) parameter, obtained during radiofrequency echographic multi-spectrometry (REMS), was developed to estimate the ultrasound-based skeletal fragility. The aim of our study is to assess the REMS-based FS of the lumbar spine (LS) among the Bulgarian women and to compare their characteristics acquired with REMS between fracture risk classes corresponding to a total fracture risk at 5 years for major osteoporotic fractures (MOF). A total of 100 Bulgarian women, who underwent a screening for osteoporotic fracture risk using the REMS technology, were included in a prospective observational study. The mean age was 60 years (years)  $\pm$  13.9 standard deviations. We assessed the FS of the LS and for each subject. The fracture risk class (R1–R7) was identified using a table combining measured REMS *T* score and FS values. The mean FS was  $36.9 \pm 17.4$  SD (range: 18.5–84.3). Twelve subjects (12%) were classified into the R6 group, twenty-three (23%) into the R5, sixty-one (61%) into R4, and four (4%) into R3. Statistical analysis showed significant difference in age, height, BMD, *T* score, *Z* score, age of menopause, FRAX for MOF, and FRAX for hip fractures between the risk class groups. This is the first study which showed the REMS-based FS of the lumbar spine among the Bulgarian women. *T* score alone is not a good predictor of fractures. Our study showed that its use in combination with the fragility score obtained during REMS offers a robust assessment of the fracture risk at 5 years for MOF.

**Keywords** Fragility score · Lumbar spine · REMS · Fracture risk · Women

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Elena Bischoff, Nikola Kirilov, Fabian Bischoff, Zguro Batalov and Anastas Batalov have contributed equally to this work.

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✉ Stoyanka Vladeva  
drVladeva@abv.bg

<sup>1</sup> Department of Health Care, Faculty of Medicine, Trakia University, Stara Zagora, Bulgaria

<sup>2</sup> Department of Internal Diseases, Pharmacology, Paediatrics, Social Medicine, Emergency Medicine, Computer Technology, Infectious Diseases, Physiotherapy and Rehabilitation, Epidemiology and Tropical Diseases, Faculty of Medicine, University Prof. Dr. Assen Zlatarov, Burgas, Bulgaria

<sup>3</sup> Department of Orthopedics and Traumatology, University Hospital UMBAL Dr. Georgi Stranski, Pleven, Bulgaria

<sup>4</sup> Rheumatology Practice, Stara Zagora, Bulgaria

<sup>5</sup> Department of Internal Diseases, Clinic of Rheumatology, Medical University of Plovdiv, University Hospital 'Kaspela', Plovdiv, Bulgaria