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INFLUENCE OF THE VARIATION OF THE OPERATOR, PATIENT POSITION AND DEVICE ON THE MEASUREMENT PERFORMANCE OF RADIOFREQUENCY ECHOGRAPHIC MULTI SPECTROMETRY (REMS)

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Background: The monitoring of bone mineral density (BMD) is a key aspect for patients undergoing pharmacological treatments that might cause BMD changes at non-physiological rates. At present, the short-term follow-up of patients under treatment in terms of BMD change with time remains an unmet clinical need, since the current techniques, including the gold standard dual X-ray absorptiometry (DXA), require at least 1 year between two consecutive measurements [1]. Therefore, an effective strategy for the assessment of BMD should guarantee high accuracy, precision and repeatability of the measurements.

Objectives: The aim is to assess the influence of the variation 1) in patient position, 2) operator (both intra- and inter-) and 3) device on the REMS performance at lumbar spine and femoral neck.

Methods: 210 women were enrolled, divided in 7 groups of 30-patient each for the assessment of the parameters of interest, i.e. inter-device, intra- and inter-operator repeatability for lumbar spine scans and inter-patient position, inter-device, intra- and inter-operator repeatability for femoral neck scans.

All patients underwent 2 REMS scans at lumbar spine or femoral neck, performed by the same operator or by 2 different operators or by the same operator using 2 different devices or in different patient position (i.e. supine without constraints or with a constrained 25°-rotation of the leg). The percentage coefficient of variation (CV%) with 95% confidence interval and least significant change for a 95% confidence level (LSC) have been calculated.

Results: For lumbar spine, intra-operator repeatability resulted in CV%=0.37% (95%CI: 0.26%-0.48%), with LSC=1.02%, inter-operator repeatability resulted in CV%=0.55% (95% CI: 0.42%-0.68%), with LSC=1.52%, inter-device repeatability resulted in CV%=0.53% (95% CI: 0.40%-0.66%), with LSC=1.47%.

For femoral neck, intra-operator repeatability resulted in CV%=0.33% (95%CI: 0.23%-0.43%), with LSC=0.91%, inter-operator repeatability resulted in CV%=0.47% (95% CI: 0.35%-0.59%), with LSC=1.30%, inter-device repeatability resulted in CV%=0.42% (95% CI: 0.30%-0.51%), with LSC=1.16%, inter-patient position repeatability resulted in CV%=0.24% (95% CI: 0.18%-0.30%), with LSC=0.66%.

Conclusion: REMS densitometry is highly precise for both anatomical sites, showing high performance in repeatability. These results suggest that REMS might be a suitable technology for short-term monitoring. Moreover, thanks to its ionizing radiation-free approach, it might be applied for population mass investigations and prevention programs also in paediatric patients and pregnant women.

References: Note: Carla Caffarelli, Giovanni Adami[§], Giovanni Arioli[§], Gerolamo Bianchi[§], Maria Luisa Brandi[§], Sergio Casciaro[§], Luisella Cianferotti[§], Delia Ciardo[§], Francesco Conversano[§], Davide Gatti[§], Giuseppe Girasole[§], Monica Manfredini[§], Maurizio Muratore[§], Paola Pisani[§], Eugenio Quarta[§], Laura Quarta[§], Stefano Gonnelli

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CURRENT PRACTICE AND OPINIONS ON IMAGING-GUIDED INTERVENTIONAL PROCEDURES IN RHEUMATIC AND MUSCULOSKELETAL DISEASES: INTERIM RESULTS OF A MULTINATIONAL MULTIDISCIPLINARY SURVEY TO INFORM EULAR POINTS TO CONSIDER

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Background: imaging is widely used for diagnostic purposes in patients with rheumatic and musculoskeletal diseases (RMDs). In recent years, it is increasingly used also to guide interventional procedures. However, the extent of imaging application for this purpose as well as the different technical standards employed across Europe are not known.

Objectives: To learn how much imaging is used for interventional procedures in RMDs. To explore the technical standards employed in different settings and how important they are rated by users.

Methods: As part of the work of a multidisciplinary EULAR Task Force to develop recommendations for the use of imaging to guide interventional procedures in patients with RMDs, a survey was developed. The survey explored aspects of different interventional procedures (e.g. joint aspiration/injection) such as the use of imaging guide and the technical standards. Respondents provided also a 0-10 rating of how important they considered the same conditions/items with regard to each procedure. The survey was distributed to: rheumatologists across Europe, USA, Central America, South America, Asia and Pacific Area, HPs across Europe, European and American associations of other specialties (e.g. radiology, anaesthesiology). The survey was launched in December 2019. Interim results after 4 weeks are presented.

Results: 200 responses from 36 countries were collected. The respondents were mainly rheumatologists (90%) (Figure 1). 90% of respondents performed interventional procedures related to RMDs and of these, 76% use imaging guide. Ultrasonography (US) is the most commonly used technique (96%) followed by X-ray/fluoroscopy (13%). Among respondents using imaging guide, 60% received training on both imaging and imaging-guided procedures, 20% only on imaging and 16% no training. 49% of respondents perform the whole procedure using direct image guidance, 21% use imaging to find the appropriate anatomical landmark and then perform the procedure blindly. Air and contrast agent to control needle placement are rarely used ($\leq 20\%$). Respondents provided also a rating (0-10) of how important they considered different technical conditions/items for each procedure and an estimate on a Likert scale of how often they used them for each of the procedures (Figure 1 shows an example). In most cases respondents use always/most of the times the conditions/items that they considered important. Discrepancies were mainly due to barriers at their own center.

Conclusion: Imaging, mainly US, is widely used to guide interventional procedures. However, training is not homogeneous and the use of imaging guide as well as technical conditions are based on the operator's opinion/experience. This survey will inform the EULAR points to consider for the use of imaging to guide interventional procedures in patients with RMDs.

Table 1. Characteristics of respondents (n=200)

	N	%
Age		
≤ 30	38	19
31 – 35	56	28
36 – 39	50	25
40 - 49	33	16.5
≥ 50	23	11.5
Gender		
Female	89	44.5
Male	111	55.5
Specialty/Position		
Rheumatology	180	90
Radiology	11	5
Physical medicine and rehabilitation	3	1.5
Pediatrics	4	2
Non-clinical researcher	3	1.5
Health professionals	3	1.5
Other	3	1.5

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