

## Musculoskeletal ultrasound among rheumatologists in Portugal: state of practice and training

Neto A<sup>1,2,3</sup>, Figueiredo G<sup>4</sup>, Saraiva F<sup>5</sup>, Falcão S<sup>3,2</sup>

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Over the last years, musculoskeletal ultrasound (MSUS) has been increasingly integrated by rheumatologists into clinical practice. Nowadays, it is considered an important imaging modality for the diagnosis, monitoring, and prognosis of various rheumatic diseases, along with its role in the guidance of interventional procedures<sup>1-5</sup>. Parallel to the widespread use of MSUS, there is a growing need for education and formal training to ensure a skilled and safe practice by rheumatologists. This is reflected in the wide variety of available scientific papers addressing the standardized use of MSUS<sup>6-8</sup>, and in the distinct training programs that have been developed in many European countries<sup>9</sup>. The ultrasound school of the Portuguese Society of Rheumatology (ESPER/SPR) was created in 2009 and, since then, has organized several national multilevel courses in MSUS.

Although MSUS is becoming a consolidated imaging tool in rheumatology care, there is a lack of data about its practice by Portuguese rheumatologists. Therefore, we performed a study to assess the current state of practice and training of MSUS in Portugal, as well as to identify potential obstacles for its implementation. A Portuguese-language questionnaire consisting of 54 items was designed, for practitioners and non-practitioners of MSUS, and sent by e-mail to all members of the SPR. Data were collected through the portal Ad-Hoc Research AskIt®. A Field Research Manager was responsible for quality control, project monitoring and validation. The results were then compared with those found in another survey conducted in 2015<sup>10</sup>.

Table I summarizes the main results obtained in this survey and in the previous one performed in 2015.

Concerning the present survey, a total of 81 out of 225 (36%) questionnaires were returned: 19 partially filled and 62 fully completed. Most respondents (89%) worked in, at least, a public hospital. In 81% of cases, practitioners reported that the rheumatology department provides its own facilities for the practice of MSUS and, of these, only 18% are shared with other specialties. Furthermore, 91% of practitioners reported that rheumatology departments have their own MSUS equipment, which is shared among colleagues in 87% of cases. The available equipment is mostly from General Electric (72%) and has multi-frequency linear transducers (4-18 MHz), of which 6% operate only in low frequency (4-8 MHz). They all comprise Doppler mode.

Most practitioners consider important or very important to have a practice support tool to enhance continuous training and standardized activity registry. In fact, 43% of practitioners rated the development of a national registry platform for MSUS practice as important or very important, and 50% intend to use it in the future.

Among respondents, 59% often or always use MSUS as a diagnostic tool, 66% as a technical support to therapeutic intervention and only 35% often or always use it for monitoring purposes. The most common indications for diagnostic examinations were periarticular disorders, followed by undifferentiated arthritis and rheumatoid arthritis (RA). On the other hand, osteoarthritis, vasculitis and polymyalgia rheumatica were the diseases for which MSUS was less often performed aiming at diagnostic purpose. Overall, MSUS practitioners requested this imaging method more often than non-practitioners.

Regarding RA, 72% of 64 respondents consider that MSUS is superior to clinical examination in the evaluation of patients, and is particularly useful in patients at risk or with suspected RA, or in the setting of thera-

1. Serviço de Reumatologia, Hospital Central do Funchal, Funchal, Madeira

2. Serviço de Reumatologia, Hospital de Egas Moniz, Centro Hospitalar de Lisboa Ocidental, Lisboa

3. Centro de Estudos de Doenças Crónicas (CEDOC), NOVA Medical School/Faculdade de Ciências Médicas, Universidade Nova de Lisboa, Lisboa

4. Serviço de Reumatologia, Hospital do Divino Espírito Santo, Ponta Delgada, Açores

5. Serviço de Reumatologia e Doenças Ósseas Metabólicas, Hospital de Santa Maria, Centro Hospitalar Universitário de Lisboa Norte, Centro Académico de Medicina de Lisboa, Lisboa

**TABLE I. CHARACTERIZATION OF RESPONDENTS, THEIR MSUS TRAINING AND PRACTICE, IN THE QUESTIONNAIRES OF 2015 AND 2019**

	2015	2019
Number of questionnaires sent	202	225
Number of questionnaires returned	63	81
Number of questions	28	54
Respondents' characterization		
Female (%)	54	63
Age, years (mean $\pm$ SD)	41.5 $\pm$ 11.5	40.0 $\pm$ 11.1
Attending physician (%)	75	74
Duration of clinical practice, years (mean $\pm$ SD)	12.2 $\pm$ 10.1	13.0 $\pm$ 9.3
MSUS training (%)	70	71
MSUS practitioners after residency (%)	48	74 <sup>a</sup>
Start of MSUS training during residency (%)	62	93 <sup>b</sup>
Training modalities (%)		
Direct learning (e.g., during internships)	63	55
Courses/Workshops	63	31
Both	-	14
Locations of MSUS training		
In Portugal, in a rheumatology department	43	67
In Portugal, in a radiology department	8	5
In Portugal, in another place (e.g., ESPER/SPR courses)	-	36
In a foreign country, in a rheumatology department	37	33
In a foreign country, in a radiology department	3	0
In a foreign country, in another place (e.g., EULAR courses)	-	45
Practice of MSUS in public hospital (%)	44	88 <sup>b</sup>
Practice of MSUS in private clinics/hospital (%)	24	45 <sup>b</sup>
Duration of MSUS practice, years (mean $\pm$ SD)	4.4 $\pm$ 5.1	7.1 $\pm$ 5.6 <sup>c</sup>
Time spent performing MSUS, hours per week (mean $\pm$ SD)	5.6 $\pm$ 4.2	6.3 $\pm$ 4.4 <sup>c</sup>
Number of MSUS performed (mean $\pm$ SD)	441.0 $\pm$ 458.8/ year	53.3 $\pm$ 56.8/ week <sup>c</sup>
Production of MSUS reports (%)	51	86 <sup>c</sup>
Activity registry (%)	57	89 <sup>c</sup>

ESPER: Ultrasound School of Portuguese Society of Rheumatology; EULAR: European League Against Rheumatism; MSUS: musculoskeletal ultrasound; SD: standard deviation; SPR: Portuguese Society of Rheumatology.

<sup>a</sup>Among the 57 respondents who received MSUS training.

<sup>b</sup>Among the 42 MSUS practitioners.

<sup>c</sup>Data available on 36 respondents (out of 42 practitioners).

peutic failure or dissociation of clinical and laboratory findings. Concerning spondylarthritis (SpA), 54% of 63 respondents consider that MSUS has an added value in the detection of enthesitis over clinical examination. In SpA, the most useful indications for requesting an MSUS examination are suspicious or risk of disease, or therapeutic failure.

Overall, 92% of 70 respondents classify the practice of MSUS as important or very important in the clinical activity of a rheumatologist. Among 62 respon-

dents, 81% assign the same degree of importance to a future Competence Certification in MSUS. Additionally, 90% consider important or very important to continue performing MSUS more frequently. Interestingly, non-practitioners addressed it more than practitioners. According to the respondents' experience, the waiting time for an MSUS examination is 5.1  $\pm$  4.7 weeks. The main obstacles to more frequent use of MSUS are the limited access to the equipment, followed by the insufficient number of machines and lack

of time for the examination.

Comparing the results obtained in the current survey with those of 2015, there is a notable increase in the number of rheumatologists performing MSUS (48% vs 74%), either in public hospitals (44% vs 88%) or private practice (24% vs 45%); and there is a rising percentage of practitioners who received training in Portuguese rheumatology departments (43% vs 67%) or who started learning it during the residency (62% vs 93%). Moreover, compared to 2015, more practitioners are registering their activity (57% vs 89%) or producing reports (51% vs 86%), which are hallmarks of a high standard of practice, emphasizing the improvement of MSUS quality indicators. The exponential development in this field is probably driven by the wide variety of educational offers by SPR and the inclusion of MSUS in the rheumatology training curriculum. Nonetheless, further financial support and availability of MSUS equipment, as well as the promotion of continuous high-quality MSUS education should be encouraged.

Despite a good overall response rate, we recognize some limitations on this study, such as the possibility of sampling bias that may have led to an overestimate of the results, the missing data due to item nonresponse, and the comparison of two different questionnaires, though they both contained similar items.

Overall, this survey showed that there is a growing use of MSUS by Portuguese rheumatologists, similarly to what has been reported in other countries. Structured training and competency in MSUS are crucial to provide high quality examinations and support clinical care.

#### CORRESPONDENCE TO

Agna Neto  
Serviço de Reumatologia, Hospital de Egas Moniz  
Centro Hospitalar de Lisboa Ocidental, Lisboa  
E-mail: agnaneto@gmail.com

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