Present status of musculoskeletal radiology in Europe : international survey by the European Society of Musculoskeletal Radiology

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Present status of Musculoskeletal Radiology in Europe: International Survey by the European Society of Musculoskeletal Radiology (ESSR)

Abstract

No official data exists on the status of Musculoskeletal (MSK) radiology in Europe. The Committee for National Societies conducted an international survey to understand the status of training, subspecialisation, and local practice among the ESSR partner societies. The aim of this paper is to report the results of that survey. An online questionnaire has been distributed to all 26 European National Associations, which act as official partner societies of the ESSR. The 24 questions of the poll were subdivided into six sections: Society structure, Relationship with National Radiological Society, Subspecialisation, Present radiological practice, MSK interventional procedures and MSK ultrasound. The findings of our study show there is a lack of standardised training and/or accreditation method in the field of MSK radiology at a national level. The European Diploma in Musculoskeletal Radiology is directed to partly overcome this problem; however this certification is still under-recognised. By certification methods, a more homogeneous European landscape could be created in the future with a view to subspecialist training. MSK ultrasound and MSK interventional procedures should be performed by a health professional with solid knowledge of the relevant imaging modalities and sufficiently trained in MSK radiology. Recognition of MSK radiology as an official subspecialty would make the field more attractive for younger colleagues as well as attracting the brightest and best; an important key to further development of both clinical and academic radiology.

Key words:

Radiology; Certification; Accreditation; Musculoskeletal system

Key points:

There is a lack of standardised training and/or accreditation method in the field of MSK radiology at a national level.

By certification methods, such as European Diploma in Musculoskeletal Radiology, a more homogeneous European landscape could be created in the future with a view to subspecialist training.

Recognition of MSK radiology as an official subspecialty would make the field more attractive for younger colleagues as well as attracting the brightest and best; an important key to further development of both clinical and academic radiology.

Abbreviations:

EDiMSK - European Diploma in Musculoskeletal Radiology

EFSUMB - European Federation of Societies for Ultrasound in Medicine and Biology

ESSR - European Society of Musculoskeletal Radiology

ESR - European Society of Radiology

EULAR - European League Against Rheumatism

MSK - Musculoskeletal

Introduction

Radiology is one of the most rapidly evolving medical disciplines [1], and thus, it has become too broad for each and every radiologist to master all of it [2]. The European Society of Musculoskeletal Radiology (ESSR) was founded by a small group of visionaries in 1993, who by realizing the increasing complexity of muscle and bone multimodality imaging, created a forum for highly motivated radiologists to exchange their knowledge, experience and research in the field. Today it has grown to become the third largest radiology subspecialty society in Europe and is an official partner of the largest, the European Society of Radiology (ESR). The society is dedicated to promoting excellence in education and research in the field of musculoskeletal (MSK) radiology [3], in addition to providing a supportive platform for networking, clinical and academic collaborations.

High quality education is fundamental to the career of a radiologist and can occur at various stages: during medical school, during residency, during subspecialty training or fellowships and as part of CME/CPD (Continuing Medical Education/Continuing Professional Development) as a practicing professional. Up-to-date MSK radiology curricula are available for medical school, residency and subspecialty programs [4]. The European Training Curriculum for Radiology contains MSK curricula for the undergraduate level (U-curriculum), and for radiology residents (level 1 and level 2) as well as detailing requirements for sub-specialist training (level 3) [5]. Acquired knowledge and skills can be certified through the European Diploma in Radiology (level 1 and 2) and the European Diploma in Musculoskeletal Radiology (level 3) [6,7].

The Educational Committee of the ESSR was founded on the 1st of January 2003 and in the same year, the European Diploma in Musculoskeletal Radiology was announced. Since 2003, the Diploma has been revised twice (in 2015 and again in 2018) in order to fulfill the ESR Criteria for Subspecialty Diploma endorsement. As a result, the European Diploma in Musculoskeletal Radiology has been endorsed by the ESR from 2015 onwards. Successful candidates are awarded the “Diploma of Musculoskeletal Radiology” by the European Society of Musculoskeletal

Radiology and may add the title “EDiMSK – European Diploma in Musculoskeletal Radiology” to their academic title. The title is active and allowed to be used until the certificate’s expiration date [7]. It is a recognized, ESR endorsed European qualification for MSK radiologists and will facilitate standardization of training and expertise across Europe. However, there is a remarkable diversity among European countries in terms of number of radiologists per 100,000 population, health system organization, and local needs for subspecialisation and training recommendations [3].

The Committee for National Societies is one of the ESSR subcommittees and includes 26 European National Associations dedicated to MSK radiology. The committee is committed to supporting the National Societies for MSK radiology, endorsing the concept of subspecialisation, and representing a strong European-wide alliance of National Societies devoted to MSK radiology. Since no official data on the status of MSK radiology in Europe exists, the Committee for National Societies conducted a survey to understand the status of training, subspecialisation, and local practice among the ESSR partner societies. The aim of this paper is to report the results of that survey.

Materials and Methods

Study design

Institutional Review Board approval was not required for the present paper, as it does not directly involve patient data. The survey was approved for distribution by the ESSR Executive Committee in June 2018.

This report is concerned with the administration of an online questionnaire to all 26 European National Associations, which act as official partner societies of the ESSR as per April 2019 regarding the status of MSK radiology in the European Countries. The list of the National Associations and their corresponding approximate number of members (where available) is reported in Figure 1.

To collect data, an online poll was created using the online tool Google Forms (Mountain View, CA) [8]. The 24 questions of the poll subdivided into six sections, with their possible answers are reported in Table 1.

In October 2018 an email was sent out to all National Societies Committee members, inviting them to participate in this poll. They were sent the questions in advance to have data available when responding to the questionnaire. They were advised that completion of the questionnaire would not require more than ten minutes.

Reminder email was sent to the same recipients after ten days, further inviting those who had not responded yet and the poll was then closed after two months from the initial invite.

Data analysis

Data were then tabulated, and the response rates were expressed in percentages.

Results

A total of 19/26 answers were received (73% response rate). Seventeen participants out of 19 (89%) answered to all proposed questions (two did not define the number of members, one answer was not given for questions #7 and #23, two answers for question #22). Full data is reported in Table 1.

Society structure and relationship with National Radiological Society

68% of MSK radiology associations are a subgroup of the respective national radiological society, while less than one third are independent societies. In almost all cases (95%), the MSK association has formalised cooperation agreements with their respective national society, mostly regarding education and scientific research.

Subspecialisation

The most relevant question for result stratification was number #6 *("Does MSK radiology represent an official radiological subspecialty in your country?")*. Only in 3/19 countries (16%; United Kingdom, The Netherlands, Portugal), MSK radiology is recognised as an official subspecialisation, while in two of the respondent 15 countries (13%; Slovenia, Russia) it is not, but is planned to be in the future. Still, the European Diploma in Musculoskeletal Radiology is accepted as an official qualification in almost half of the countries (9/19, 47%). It is important to note, that, despite the current practice in many European countries, the majority of respondents (81 %) regarded official subspecialisation in MSK radiology as beneficial to the field of radiology and its future.

Present radiological practice

In European countries MSK radiology is practiced by different categories of radiologists such as general, MSK, interventional, thoracic and abdominal radiologists, as well as other physicians. In some countries (7/19), MSK procedures are performed by other physicians including rheumatologists, orthopaedic surgeons, physiotherapists and /or radiographers (1/19) and

sonographers (1/19). It is also worth noting that European countries included in the survey have variable allocations of specific clinical (12/19, 63%) and academic positions (9/19, 47%) for MSK radiologists.

MSK interventional procedures

In the majority of cases (65%), MSK interventional procedures are carried out by MSK radiologists, general radiologists, or interventional radiologists. In addition, radiologists who perform interventional procedures are allowed to prescribe drugs and request laboratory tests related to the procedure (63%), while only in a minority of practices, radiologists are authorised to have direct patient referrals (42%).

MSK ultrasound

MSK ultrasound (US) is included in the core curriculum of radiology training in 74% of countries. In most countries (79%), non-radiologists do not need any additional professional qualification/certification to perform MSK US and in most cases (in at least 58%) do not provide patients with a written report.

Discussion

Our survey showed that the structure, certification, and accreditation of MSK radiology as a subspecialty is not uniform among the European countries represented in the National Societies Committee of the ESSR. Although there is an increasing interest in MSK radiology, there is a lack of standardised training and accreditation arrangements on a European level.

Subspecialty societies have close cooperation with the ESR [3,5]. The survey results depict similar objectives of the ESSR partner Associations. Most of the respondent ESSR partner Associations act as a subgroup of the National Radiological Society in their country. Despite a quarter of societies having no affiliation to the National Radiological Society in their country,

almost all ESSR partner associations are engaged with the National Radiological Societies in various fields of cooperation, mainly in education and science.

The increasing complexity and rapid technological advances in the radiology field, render maintaining expert level, up to date knowledge across the specialty almost an impossible task [9]. Chalian et al. uncovered evidence in favour of subspecialisation in MSK radiology in tertiary centres [10]. He showed a quarter of discrepant interpretations in MSK imaging examinations between subspecialists and non-subspecialists, with latter often requesting second opinion consultations from subspecialists [10]. The ESR recognised several strong arguments and listed a number of reasons in favour of subspecialisation [2]. These reasons are: information overload, rapid development, clinicians in secondary and tertiary centres are all specialised, technological developments, the need for the most accurate diagnosis and increased appreciation for translational research and evidence value- based healthcare [2]. Our survey found that less than 20% of the respondent ESSR partner Associations recognise MSK radiology as an official subspecialty. In those countries where MSK radiology is accepted as an official subspecialty, certification is obtained after completion of up to two-year long fellowships and/or up to three years of practice in MSK radiology. Most respondent ESSR partner Associations indicated that an official subspecialisation in MSK radiology would be beneficial to promote higher quality practices, improved patient care and more robust training of faculty members. Furthermore, the vast majority was also convinced that the recognition of MSK radiology as an official subspecialty would make the field more attractive to upcoming radiologists. Radiologists in training across Europe listed working conditions and career development possibilities as the two main criteria for choosing a job position [11]. Fundamentally, this is of utmost importance as several countries face the challenge of attracting young, bright academics to radiology. Moreover, skilled radiologists often leave their home country to work in another country, where they could secure a position as a subspecialised radiologist [11].

Only 13% of the respondent ESSR partner associations state that in their countries, the

adoption of MSK radiology as an official subspecialty is planned in the future. A possible explanation is that only 63% of these countries offer radiologists the potential of a full-time MSK radiology practice, with most positions available at university hospitals and a minority in larger community hospitals or dedicated orthopaedic hospitals. Of note, in some European countries, radiology training is modality-based rather than organ-specific, thereby reducing the inclination towards subspecialisation [12]. However, it is most likely that the main reasons are barriers and turf battles within the field of radiology. The advocates of general radiology usually state that too much subspecialisation would weaken radiology as a whole with arguments in favour of keeping the concept of general radiology such as shortage of radiologists, the need for broader knowledge to cover emergency radiology and lack of structured formal subspecialty training. The ESSR believes that subspecialisation would strengthen radiology and that formalisation of subspecialty trainings is needed. In the future, both general and subspecialised radiologists will be needed. The education in different fields of radiology (for both general radiologists and future subspecialists) will benefit from the presence of officially subspecialised radiologists. A contributing factor in this process may be the development of teleradiology which can help raise the quality of patient care by enabling instant access to a subspecialist [2].

It needs to be recognised that the vitality of a certain field depends on continuing discovery and innovation, but there are several challenges academic radiology has to face nowadays, such as limited resources, lack of allocated time for research, insufficient research training, salary discrepancy between private practice and academic hospitals, etc. [13]. Academic MSK radiology and research-oriented radiologists in this field are the key factors in ongoing improvement and advancements of MSK subspecialisation [13]. Due to constant development, there are continuous modifications in radiologists' workflow [9,14-18]. The landscape of the MSK radiologists' workflow may change even further in the near future with implementation of artificial intelligence [19]. The future challenge for the MSK radiologists will be to define the appropriate use of the new competing technologies to maximise the benefit of available imaging resources and optimise

clinical work with a high level of patho-anatomic knowledge [14]. In these steps certain qualification and certification methods will be needed to recognise utility and proficiency.

Like the ESSR, other radiological subspecialty societies also offer certification methods, of which details are portrayed on their official websites. According to the results of the survey, the European Diploma in Musculoskeletal Radiology is recognised by 47% of the respondent ESSR partner associations. Currently, it is also incorporated into some national certification programs [20]. The respondent ESSR partner associations indicated other ways to document personal qualification in the field of MSK radiology, such as courses organised by National Societies etc. It is the aim of the ESSR to support the National Societies on their way to subspecialisation. By offering support, a more homogeneous European landscape could be created in the future with a view to subspecialist training.

More and more clinicians are beginning to adopt imaging modalities into their clinical practise [3]. The results of this survey are in line with this statement, showing large heterogeneity of health professionals practicing MSK radiology. MSK US and MSK interventions are performed by MSK radiologists, general radiologists, rheumatologists, orthopaedic surgeons, physical rehabilitation specialists, physiotherapists, physician assistants and general practitioners. The subspecialist curriculum contains diagnostic and interventional MSK radiology [5]. A future goal should be that MSK interventions are to be performed by MSK radiologists as they are most proficient with target imaging, access and appropriate choice of modality for image guidance. Non-radiologists use MSK US partly as an extension of their clinical examination and to guide interventions [21]. In up to 58% of cases in the respondent countries a written report is not provided when MSK ultrasound is performed by a non-radiologist, contradictory to the joint recommendation by the ESR and European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB) on archiving and reporting ultrasound examinations [22]. However, MSK US examinations performed by a radiologist are in line with recommendations as it is always concluded with a written report [23].

The survey revealed that the financial remuneration for MSK US for radiologists and non-radiologists is different in 53% of the respondent countries, with radiologists being reimbursed for the examination and non-radiologists not. Breaking away imaging services from radiology could lead to frequent self-referral, questioning the ethics and financial aspects in these circumstances. Preserving the integrity of imaging under the umbrella of radiology as a separate specialty offers many advantages such as skills in image interpretation, appropriate patient referral, broad clinical perspective and expertise in imaging technology [3]. It should be noted that a radiologist appreciates the value of high image quality and high-resolution US examination, both much needed features in MSK US examinations. The more affordable portable US devices are effective but cannot replace a high-resolution US examination [24].

The question of education and training options in the field of MSK US for radiologists and non-radiologists should also be addressed. MSK US training is not incorporated into the radiology core-curriculum in all respondent countries. The main reasons might be the lack of time and radiologists to provide such training [25]. Berko et al. reported that radiology residents in the United States of America received less training in the field of MSK US than residents from rheumatology, physical medicine and rehabilitation and sports medicine [25]. In Europe the Radiology Societies, Ultrasound Societies, Rheumatology Societies, Orthopaedic Surgery Societies, Physical Medicine Societies, Sport Medicine Societies offer structured training programs [26]. However, training does not assure competency in MSK US [22]. European Societies such as ESSR, EULAR (European League Against Rheumatism) and EFSUMB (European Federation of Societies for Ultrasound in Medicine and Biology) strive for standardised qualification in MSK US [26]. ESSR is moving in this direction by offering MSK US guidelines, up to date MSK US publications and is involved in constant US education through the organisation of various MSK US courses [27-30]. The EFSUMB proposed the minimum training requirements for rheumatologists practicing MSKUS in Europe with a 3-level competency assessment [31]. However, official qualifications for non-radiologists to perform MSK US are necessary in only 21% of the respondent countries.

The main limitation of this work is that we did not obtain responses from all ESSR partner associations and only representatives of the ESSR partner associations answered. Both could introduce bias to the results. Also, the limited number of questions and the impossibility of providing free comments may also have led to a loss of information.

In conclusion, there is a lack of standardised training and/or accreditation method in the field of MSK radiology at a national level. The European Diploma in Musculoskeletal Radiology is directed to partly overcome this problem; however this certification is still under-recognised. By certification methods, a more homogeneous European landscape could be created in the future with a view to subspecialist training. MSK US and MSK interventional procedures should be performed by a health professional with solid knowledge of the relevant imaging modalities and sufficiently trained in MSK radiology. Recognition of MSK radiology as an official subspecialty would make the field more attractive for younger colleagues as well as attracting the brightest and best; an important key to further development of both clinical and academic radiology.

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Figure 1. Graph depicting number of members in the respondent European Society of Musculoskeletal Radiology (ESSR) partner associations.

Table 1. Survey structure and answers.

	Question	Type of answer	Answer
Society structure	1. Your association is a:	Closed	Subgroup of the National Radiological Society: 13/19 (68%)
			Society separated from National Radiological Society: 6/19 (32%)
			Non-official group: 0/19 (0%)
	2. Does your association have its own status?	Yes/No	Yes: 13/19 (68%)
			No: 6/19 (32%)
Relationship with the National Radiological Society	3. Your association acts as a:	Closed	Subgroup of the National Radiological Society: 12/19 (63%)
			Separate society with affiliation to the National Radiological Society: 2/19 (11%)
			Separate society without affiliation to the National Radiological Society: 5/19 (26%)
	4. Is there a cooperation with the national radiologic society?	Yes/No	Yes:18/19 (95%)
			No: 1/19 (5%)
	5. If yes, which fields does this cooperation include?	Closed	Education, science, others: 6/18 (33%)
			Education, science: 5/18 (28%)
			Education: 5/18 (28%)
			Education, others: 1/18 (5.5%)
			Others: 1/18 (5.5%)
Subspecialization	6. Does MSK radiology represent an official radiological subspecialty in your country?	Yes/No	Yes: 3/19 (16%)
			No: 16/19 (84%)
	7. Is an official subspecialisation in MSK radiology planned in your country?	Yes/No	Yes: 2/15 (13%)
			No: 13/15 (87%)
	8. Would you consider an official	Yes/No	Yes: 13/16 (81%)

	subspecialisation in MSK radiology beneficial for radiology in your country?		No: 3/16 (19%)
	9. If MSK radiology is not an official subspecialty in your country, are there other ways to document personal qualification in this field (e.g. training programs, special courses)?	Yes/No	Yes: 12/16 (75%)
			No: 4/16 (25%)
	10. Is the ESSR diploma accepted as an official document of qualification in your country?	Yes/No	Yes.: 9/19 (47%)
			No: 10/19 (53%)
	11. Do you think that an official subspecialisation in MSK radiology would make our field more attractive to young radiologists in your country?	Yes/No	Yes.: 13/16 (81%)
			No: 3/16 (19%)
Present radiological practice	12. By whom is MSK radiology done in your country?	Closed	General radiologists, MSK radiologists: 9/19 (47%)
			General radiologists, MSK radiologists, others: 5/19 (26%)
			General radiologists: 3/19 (16%)
			General radiologists, others: 1/19 (5.5%)
			MSK radiologists: 1/19 (5.5%)
	13. Are there any specific positions for MSK radiologists (full time, 100%) at your hospitals?	Yes/No	Yes: 12/19 (63%)
			No: 7/19 (37%)
	14. If yes, please specify the type of hospitals:	Closed	University hospitals: 12/22 (55%)
			Larger community hospitals: 4/22 (18%)
			Orthopedic hospitals: 4/22 (18%)
			Others: 2/22 (9%)
	15. Are there any positions for MSK radiologists with preferential MSK activities (part-time) at your hospitals?	Yes/No	Yes: 8/19 (42%)
			No: 11/19 (58%)

	16. Are there any academic positions for MSK radiologists at your university hospitals?	Yes/No	Yes: 9/19 (47%)
			No: 10/19 (53%)
MSK interventional procedures	17. By whom are MSK interventions done in your country?	Closed	MSK radiologists: 17/74 (23%)
			Interventional radiologists: 17/74 (23%)
			Orthopaedic surgeons: 16/74 (22%)
			General radiologists: 14/74 (19%)
			Rheumatologists: 11/74 (15%)
			Others: 3/74 (4%)
	18. Are radiologists who perform MSK interventions authorized to prescribe drugs and laboratory tests (related to the procedure) in your country?	Yes/No	Yes: 12/19 (63%)
			No: 7/19 (37%)
	19. Are MSK radiologists in your hospitals authorized to have primary referrals (e.g. patient directly referred to MSK radiologist for consultation NOT via a referring physician)?	Yes/No	Yes: 8/19 (42%)
			No: 11/19 (58%)
MSK ultrasound	20. Is MSK ultrasound included in the core curriculum of radiology training in your country?	Yes/No	Yes: 14/19 (74%)
			No: 5/19 (26%)
	21. Do non-radiologists require an official qualification to perform MSK ultrasound in your country?	Yes/No	Yes: 4/19 (21%)
			No: 15/19 (79%)
	22. Is financial refunding for MSK ultrasound equal for radiologists and non-radiologists in your country?	Yes/No	Yes: 8/17 (47%)
			No: 9/17 (53%)
	23. Do radiologists who perform MSK ultrasound provide a written report in your country?	Yes/No	Yes: 18/18 (100%)
			No: 0/18 (0%)
		Yes/No	Yes: 8/19 (42%)

	24. Do non-radiologists who perform MSK ultrasound provide a written report in your country?		No: 11/19 (58%)

ESSR - European Society of Musculoskeletal Radiology, MSK - Musculoskeletal