

# The Current State of Orthopaedic Residency in Europe

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The aim of this study was to compare orthopaedic and trauma training programs across Europe. A questionnaire was sent to the FORTE (Federation of Orthopaedic Trainees in Europe) representatives of 25 European countries, of which 18 responded. The number of trainees per specialist varied between countries from a ratio of 1:2 to 1:7. The residency program was generally 5-6 years in all the countries. In more than half of the countries selection was based on an interview. Nearly all countries utilized a logbook but only a few utilized a web-based logbook. About 80% of the countries had a final exam at completion of training. When assessing the components of training it was found that only one country had mandatory minimum requirements for 1) courses, 2) surgical procedures, 3) research and 4) leadership. Nearly 40% of the participating countries had only 1 or none of these four training components as a mandatory part of training requirements. While there are many similarities across orthopaedic and trauma training programs, some important differences remain in overall requirements and final qualification. FORTE will continue to serve as a forum for sharing best practices with the ultimate goal of improving and harmonizing the level of orthopaedic training across Europe.

## Introduction

The evolving paradigm of orthopaedic and trauma training is an area that remains frequently discussed among institutions responsible for orthopedic education. The European Union of Medical Specialists (UEMS) was founded in Brussels in 1958 by the rep-

resentative delegates of the professional organizations of medical specialists of the six member countries of the European Economic Community (EEC) (1). The main objectives of UEMS were to establish a high quality and comparable level of medical specialist training in the EU.

As in other sections of UEMS, a European Board

of Orthopaedics and Traumatology (EBOT) was established in 1994, and the first undertaking was to organize a board examination. The EBOT fellowship examination has been designed to standardize and improve the standard of orthopedic training in Europe (2). Although the high quality of the diploma of the EBOT examination has been achieved by a very broad base of support and cooperation of all orthopaedic associations of the UEMS countries, it is still not a mandatory requirement in Europe. Nevertheless, within the EU, the specialist qualification of orthopaedic surgery is automatically recognized (Directive 2005/36/EC on recognition of professional qualifications) in several countries. Furthermore, even if the qualification does not meet the automatic criteria for recognition, it may still be recognised in another EU country, under the general system for recognition of qualifications (3). Nonetheless, little is known about the similarities and differences in orthopaedic and trauma training programs in European countries, as this information is, in general, not readily available.

Since its inception, The Federation of Orthopaedic Trainees in Europe (FORTE) has aimed to promote and improve the standards of orthopaedic and trauma training in Europe. FORTE also attempts to harmonize orthopaedic training among European countries. This objective is becoming increasingly important with recent developments in medical profession that introduced a great amount of movement of medical graduates across Europe (4). The aim of this study was to compare current orthopaedic and trauma training programs across Europe and to understand the main similarities and possible differences.

## *Materials and methods*

A questionnaire was sent by email to the FORTE representatives of national trainee societies of 25 European countries in September 2015. The questionnaire included demographic information regarding the number and gender distribution of trainees and specialists in 2014. The survey also inquired if there was a national association for trainees and, if so, was it dependent on the national orthopaedic association. The remainder of the questionnaire was related to the structure of the respective orthopaedic training programs and included the following information with emphasis on mandatory requirements: selection process, duration, course training, number of surgical procedures, research, leadership training, examina-

tions, fellowship, and use of a training logbook. The information obtained from the different countries was then compared.

## *Results*

Representatives from 18 countries (Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Kosovo, Malta, Norway, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, and the United Kingdom) answered the questionnaire. The demographic data from the different countries is presented in Table 1. Orthopedic surgeon densities (number of surgeons per 100 000 of the population) varied substantially among the participating countries. The highest densities were in the Nordic countries with nearly 20 orthopaedic surgeons per 100 000 of the population. More than half of the participating countries only had densities of only 2-6 orthopaedic specialists for 100 000 of the population. The number of trainees per orthopaedic surgeon was calculated in order to understand differences in surgeon replacement rates. This ratio varied between countries from a ratio of 1:2 to 1:7, with no clear geographic patterns within Europe. The highest replacement rates were in Finland, Switzerland, Spain and Ireland and the lowest in France, Sweden, and Denmark. The proportion of female trainees was higher (mean 20%) than the proportion of female orthopaedic specialists (mean 9%) in nearly all the countries (Table 1).

The selection process for entering a residency program varied widely. In more than half of the participating countries selection was based on an interview or a combination of merit and interview. In the remainder, selection was based on the results of a national exam or a simple application process (Fig. 1). The residency program was generally 5-6 years in all the countries. Nearly all countries utilized a mandatory logbook throughout residency but only a few countries utilized a web-based logbook. There were still a small number of countries that did not require a logbook for keeping track of residents' achievements (Fig. 1).

Nearly 80% of the participating countries had a final examination at completion of residency but the remainder only had some form of interim exams without a mandatory final examination (Fig. 2). Most of the participating countries did not have a mandatory fellowship requirement. When assessing the components of training it was found that only one country

Table 1. Demographic data on the number of orthopaedic surgeons and trainees in 18 European countries in 2014

Country	Number of Orthopaedic Surgeons (% female)	Number of Orthopaedic Surgeons/100 000 of population	Number of Orthopaedic Trainees and (% female)	Number of Orthopaedic Trainees/100 000 of population
Croatia	218 (6.8%)	5.0	55 (11%)	1.3
Denmark	1057 (16%)	18.9	164 (29%)	2.9
Finland	488 (14%)	9.0	248 (13%)	4.6
France	3157 (5%)	5.0	450 (15%)	0.8
Germany	NA	NA	500* (NA)	NA
Greece	1819 (9%)	14.2	562 (15%)	4.4
Ireland	84 (0.9%)	1.8	39 (13%)	0.9
Kosovo	75 (1.3%)	3.8	19 (11%)	0.9
Malta	19 (6%)	3.2	7 (14%)	1.4
Norway	975 (17%)	18.5	375 (NA)	7.5
Portugal	1005 (10%)	9.0	262 (27%)	2.5
Slovakia	550 (NA)	10.0	97 (NA)	1.7
Slovenia	90 (3%)	4.5	22 (13%)	1.1
Spain	2350 (29%)	15.0	1125 (41%)	2.4
Sweden	1874	19.5	286 (33%)**	2.9
Switzerland	889 (7%)	11.0	442 (NA)	5.5
Turkey	3117 (NA)	4.0	976 (NA)	1.2
United Kingdom	5071 (4.2%)	8.0	976 (19%)	1.6

\*Approximate number

\*\*Number of orthopedic trainees who are members of the national organization. Membership is not mandatory.

NA Data not available

Fig. 1. Duration, selection process and log book requirement for residency programs in the different European countries.

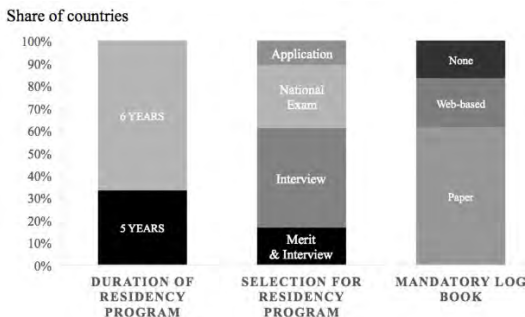


Fig. 2. Mandatory examinations, fellowship, and training requirements (courses, surgical procedures, research, and leadership) for residency programs in the different European countries.

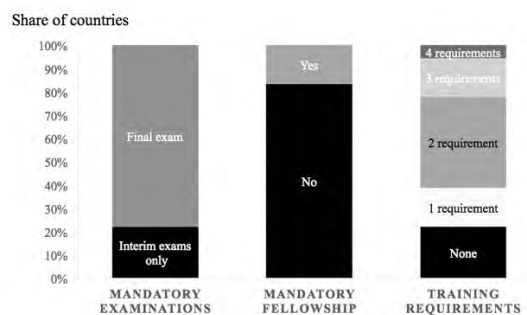
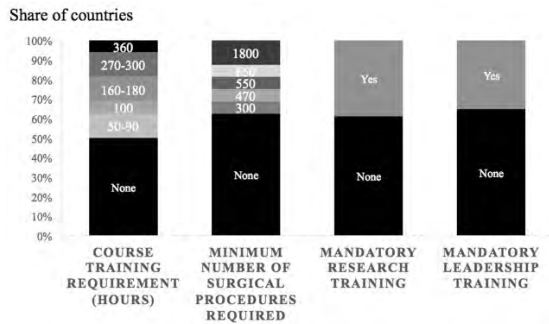


Fig. 3. Minimum requirements for four main areas of training (courses, surgical procedures, research, and leadership) for residency programs in the different European countries.



had mandatory minimum requirements for 1) courses, 2) surgical procedures, 3) research and 4) leadership. Surprisingly, nearly 40% of the participating countries had only 1 or none of these four training components as a mandatory part of residency requirements (Fig. 2). For the countries that had minimum requirements for course training and surgical procedures, these requirements varied from 50-360 hours and 300-1800 procedures, respectively. Research and leadership training were only a mandatory part of orthopaedic training programs in 40% of the countries (Fig. 3). Finally, nearly 70% of the countries had an association for orthopaedic residents. Most of these associations were dependent on the national orthopaedic association.

## Discussion

The aim of this study was to collect demographic and structural data regarding current orthopaedic and trauma training programs across Europe and make comparisons between them. We found that while there are many similarities across residency programs, some important differences still remain in overall requirements and final qualification.

There were clear differences in both orthopaedic surgeon densities and replacement rates across Europe, reflecting possible inherent disparities in both the structure of the healthcare systems as well as in the future need for orthopaedic specialists. The larger proportion of female trainees compared to specialists would indicate a shift in gender parity in the near future. This may be particularly important as Orthopaedic Surgery has among the lowest percentages of

women in residency programs of any surgical specialty (5). The selection process to enter a training program was based on an interview in most countries. In a few countries selection was based on performance in a national examination. One could argue that some form of summative assessment might be beneficial in selecting appropriate candidates for residency. The training program duration in all the countries ranged from 5-6 years meeting the minimum EU requirements for orthopaedic specialist training. Nearly all countries utilized a logbook for tracking the performance of residents and there was a tendency for the logbook to be moving from a paper version towards a web-based form. Some countries still did not have a mandatory logbook and we believe this is an important issue that can be easily addressed.

Most countries had a final exam but there were still a few that had no form of final examination. In such countries the EBOT exam could serve as a potential final assessment of competency. For the purposes of the current study, we divided the key mandatory components of training into 4 categories: course training, surgical procedures, research, and leadership. Most would agree that the first two are essential components of training, whereas the latter two could be considered more elective in nature. Only one country had all four of the aforementioned components of training as mandatory. Nearly half of the countries did not have a minimum number of mandatory surgical procedures or course training requirements. For the remainder that did, there was a substantial variation in the minimum requirements. We believe there is definitely room for improvement in both of these aspects.

The current study had some limitations. We were only able to get data from 18 of 25 countries and some of the provided data from the 18 countries was unfortunately lacking. Another limitation is that we did not include more granular information regarding the detailed structure of the residency programs such as the required rotations through subspecialties as this was outside the scope of the present study. To our knowledge this is the first study that has collected essential information regarding differences in orthopaedic training programs across Europe. Future studies should aim at including information from more countries.

In addition to the European curriculum, FORTE has been actively involved in multiple endeavors aimed at improving and harmonizing the level of orthopaedic training across Europe. Some of these projects include a book series for trainees and an ortho-

paedic summer school, to name a few. FORTE will continue to serve as a forum for sharing best practices with the ultimate goal of building competencies essential for the twenty-first-century orthopedic surgeon in Europe.

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