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Title:

**Twenty years after the launch of Bologna-process – What is the status of harmonization of dental education?**

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**Abstract:**

*Background and Aims:* Higher education in the European Union states has undergone a major reform toward harmonization following the “Bologna Declaration”. The aim of this paper is to evaluate the implementation of the Bologna process in Dental Education following its 20<sup>th</sup> anniversary and identify commonalities and differences in the way dental programs are delivered in the EU.

*Methods:* According to the aim of this study an internet search, based on the EU Manual published in 2015 was undertaken and included representative university/ dental faculty websites from each EU member state. The search was focused on the type of the under- and postgraduate dental programs (cycles), the awarded undergraduate degrees (Bachelor, Master, Doctorate), duration of undergraduate study programs, awarded ECTS credits and the necessity of mandatory postgraduate practical training. Results were collated, and descriptive statistical analysis was undertaken.

*Results:* The search identified 26 EU states out of a total of 28 as providers of dental education. Two of the 26 countries offer a bachelor’s degrees (Bachelor of Dental Surgery); five countries offer a combined bachelor’s and master’s degree; and ten countries still award the doctor’s degree for the undergraduate education. Finally, three countries award diploma for the graduating dentist.

*Conclusions:* Two decades after the launch, noticeable differences in the structure and duration of undergraduate dental programs persist and these may be attributed to curricular structure and university regulations in individual EU countries.

## **Introduction**

The landscape of higher education (HE) in Europe has been influenced by a common goal amongst countries in the European Union (EU) to harmonize HE and this process is by no means complete until today (1). The impetus for change was the celebration of the 800<sup>th</sup> anniversary of the Sorbonne University in Paris on 25<sup>th</sup> May 1998. On this occasion, the education ministers of France, Germany, Italy and the United Kingdom deliberated that the European Union should not only be defined by a common currency, but also by a common policy on higher education. This idea resulted in the so-called "Sorbonne Joint Declaration", a joint statement on harmonization of the European higher education. A need for change in higher education across European countries was identified by the ministers and laid down in the form of the Sorbonne Joint Declaration.(2-5)

On June 19<sup>th</sup>, 1999, one year after the signing of the Sorbonne Joint Declaration, the start of the "Bologna Process" was launched. The Italian conference venue Bolognathus featured in the title of the declaration and the process that was initiated there. The selection of Bologna was deliberate, as it symbolizes the oldest university location in Europe. The Bologna declaration defined six primary objectives: the comparability of academic degrees; introduction of a more cyclic system with corresponding degrees as bachelor, master and doctorate; comprehensive implementation of ECTS credits; endorsement of intra-European mobility; promotion of the internal European quality assurance; and the establishment of a European mindset in higher education. (3-5)

With the signing of the "Bologna Declaration – Joint Declaration of the European Ministers of Education", the decision was made to launch a "European Higher

Education Area" (EHEA) based on voluntary work. No less than 30 European countries, both EU members and non-members, took part in this unique project. At present 48 countries are part of the EHEA, a recognition of European higher education, the promotion of mobility and employability in the European area with mutual recognition of fields of study and academic training, as well as the need for quality assurance in the foreground.(2-4)

In parallel with the developments in higher education following the Bologna declaration, the Association of Dental Education in Europe (ADEE) has been working to develop and promote comparable dental education standards and qualifications throughout Europe. Between 1997 and 2000, a Thematic Network Project (TNP) named "DentEd" was initiated as a platform for collaboration amongst dental institutions and resulted in a document entitled "Development of Professional Competences". These projects gave the impetus for building a network and making an inventory of existing curricula for dental education in Europe. Further works led to the development of "Profile and Competences Document" (PCD) which was sent to all European dental schools for consultation. The final reviewed PCD was unanimously approved by the General Assembly and came to be regarded as the leading document in national and internal debates on the profile and competences of the undergraduate dental curriculum in European dental schools (6-8). PCD was re-evaluated in 2009 and reviewed in 2017 resulting in finally four domains i. Professionalism; ii. Safe and Effective Clinical Practice; iii. Patient-Centred Care; and iv. Dentistry in Society (9-13). Besides these activities, dental schools in European universities have been working to revamp their undergraduate and postgraduate education in the light of the Bologna process (14). As the process of

harmonization of dental education is still ongoing, several differences still exist within the universities based in the EU (15).

The aim of this paper is to evaluate the implementation of the Bologna process in Dental Education following its 20<sup>th</sup> anniversary and identify commonalities and differences in the way dental programs are delivered in the EU.

**Methods:**

This study utilized an internet search based on the EU Manual published in 2015 (16). The websites of up to three representative university/ dental faculty websites from each EU member state were identified depending on the accessibility, and availability of information (16-60). Further sources such as the German document of approbation regulation were also included (18, 19, 30). The search was focused on the type of the under- and postgraduate dental programs (cycles), the awarded undergraduate degrees (Bachelor, Master, Doctor), duration of undergraduate study programs. In addition, European Credits Transfer and Accumulation System (ECTS) awarded and the need for any mandatory training after graduation were also collected. Results were collated, and descriptive statistical analysis was undertaken using Microsoft® Office Excel software program (Microsoft Corporation, Redmond, USA). The search analysis did not include type of the curriculum (traditional vs problem-based) learning strategies or postgraduate clinical training programs (61).

**Results:**

The search identified 26 EU states out of a total of 28 as providers of dental education. These 26 countries offer one or two-cycled undergraduate dental education programs leading to the award of a Diploma or Degrees at bachelor, master, and doctor levels. Figure 1 shows that two of the 26 countries are solely offering a bachelor's degrees (Bachelor of Dental Surgery); five countries are offering a combined bachelor's and master 's degree. The remaining ten countries award the doctor's degree for the undergraduate education. Finally, three countries award diploma for the graduating dentist with the option of a doctorate degree after practical work and writing a thesis (61).

A greater uniformity was observed in the ECTS for undergraduate dental programs. ECTS record was available for 21 out of the 26 investigated countries. Universities in the majority of the countries (N=15) offer at least 300 ECTS credits, while in six countries at least 350 ECTS are offered. For five countries no information was available (61).

The duration of program of study is 5 years in 17 countries and 5.5 years in one country, while in eight member states the programs are of 6-year duration. The results show that additional practical education under supervision after graduation is mandatory in only three countries (61).

The structure of postgraduate programs is even more diverse, and the investigation was difficult, because a lack of structured information. Some countries, including Belgium, Denmark, Italy and the Netherlands seem to have implemented the 3-cycle



system (bachelor – master - doctorate) as suggested by the EU. (42-46). Other countries appear to have variable regulations regarding requirements for under-and postgraduate education (61).

## **Discussion:**

This investigation revealed a clear change in the landscape of higher dental education compared to former publications (16). Based on the EU directive and the recommendations of the Bologna declaration, several steps have been taken to promote harmonization in the structure of undergraduate dental education (4, 14, 16, 62). However, there appear to be some variations which may potentially restrict the comparability of higher dental education within the EU. This in turn may impede free movement of the students and graduates (15, 61).

At present only a few countries (Belgium, Denmark, Estland, Italy and the Netherlands) seem to have successfully implemented a dental education framework based on three-cycles with separated bachelor, master and postgraduate doctoral degrees. (42-46) Besides this, Switzerland, a non-member state of the EU, implemented it in a similar manner (57). Although several EU states show a clear trend toward an undergraduate dental master's degree, countries like Austria, Croatia, the Czechia, Hungary, France, Greece, Latvia, Lithuania, Slovakia, Slovenia and Spain are awarding their traditional doctoral degrees. In contrast, the United Kingdom and Ireland award a bachelor's degree, although this is considered to be equivalent to master's degree compared to other undergraduate programs. In addition, there is a growing trend of awarding an intercalated master's degree for students undertaking additional research (52, 61).

The Bologna process recommends a bachelor's degree in dentistry would consist of 3-4 years of education with 180-240 ECTS credits. However, this apparently conflicts with the requirements of a dental practitioner defined in the EU Parliament's

Directive in 2005 (4,7,14,16,62-64). Some inconsistencies were also noted in the award of ECTS credits and they ranged between 300 to around 360 credits. However, the differences in ECTS do not seem to be related to additional training after graduation (usually or one year), as it seems to be mandatory in only three countries (61).

ADEE is the representative dental academic association in Europe and has provided an effective platform for promoting excellence in dental education. ADEE has led the development several documents to define the profile and competences of European Dentists (9-13,63). Although it is not within the remit of ADEE to regulate dental education in Europe, it is in an ideal position to work with the regulators in individual EU countries to facilitate further convergence of the structure of undergraduate curricula across the board (65). Apparently, the dental programs in EU member states are largely consistent with regards to the duration of undergraduate programs. At present majority of the countries have 5-year undergraduate programs and only one third have programs longer than 5 years (61).

It is suggested that a 5-year program on full-time study (300 ECTS) with the award of a master's degree may provide a way forward and there is precedent of the same in many EU member states (7). Similar ideas have been also discussed in medical education by several authors. Although the ECTS is the most recognised and commonly used mechanism to enable credit transfer between universities across the EU. However, data from EU universities shows that the alignment of ECTS grades shows clear variations. Given the growing trends in student mobility, there is a need for re-alignment of ECTS to enhance uniformity and transparency with the EU. This

is crucial to achieve the objectives of the Bologna process (66, 68). Two different models of a bachelor's and master's session adaptable for a dental setting have also been reported (68, 69) and have already been implemented in a few countries (57, 64). Secondly it is suggested that a modular curriculum may be helpful to harmonize the undergraduate curricula with regards to the Title of award; ECTS value; learning outcomes; curriculum content; methods of teaching and learning; and assessments. (7, 63) Development of consensus on the core curriculum and elective units in undergraduate dental education may be a major step in this direction (63). Finally, greater consistency is required in the requirements for internship after graduation before working as an independent practitioner especially within a state-funded healthcare system. These steps may go a long way in the harmonization of the undergraduate curricula in EU member states and promote freedom of movement in a more effective manner.

Several limitations of this study are acknowledged. Although the internet seemed to be an appropriate source of information, there is an inherent risk of bias in web-based search. With nearly 200 dental schools in EU member states (70), it was not possible to screen all dental programs in the EU as some schools do not have websites with details about their programs. Therefore, representative schools in each country were identified based on the availability of information during web-search. Moreover, this study only investigated EU member states rather than all countries included in the European Economic Area (EEA). This approach was adopted because the EU directive (36/2005) only affects EU member states and may not be directly applicable to countries such as Switzerland or Norway (4, 14, 16, 62). It is also recognized that variations may exist amongst dental programs in individual

countries, which are not always based on educational interests alone. Although it is expected that the information of websites of universities is kept up to date, it may not be true and complete. Also, language bias must be considered. There is merit in considering a structured approach to investigate and monitor the implantation of the Bologna process through direct engagement with all dental schools in Europe. Given the challenges of collating this massive piece of information, it may be appropriate ADEE provides the resources and expertise to form a task force for this purpose. Nevertheless, the data provides an overview of the current structure and delivery of undergraduate dental programs as well as demonstrate the still existing diversity.(61)

**Conclusion:**

Two decades after the launch of the EHEA, noticeable differences in the structure and duration of undergraduate dental programs persist along with and these may be attributed to curricular structure and university regulations in individual EU countries. It is recognized that this is an ongoing process and it may be appropriate to undertake a comprehensive consultation to further harmonize the curricula of undergraduate dental programs across Europe. Given the challenges of collating data from dental schools across Europe, the establishment of a central office under the patronage of an appropriate body such as ADEE may be helpful.

*Disclosure*

The data in the manuscript was collected as part of the first author's doctoral thesis "Teaching- and learning quality of the oral-surgical education in the undergraduate dental curriculum at the Medical University Graz", which was approved by the Medical University of Graz in January 2019.

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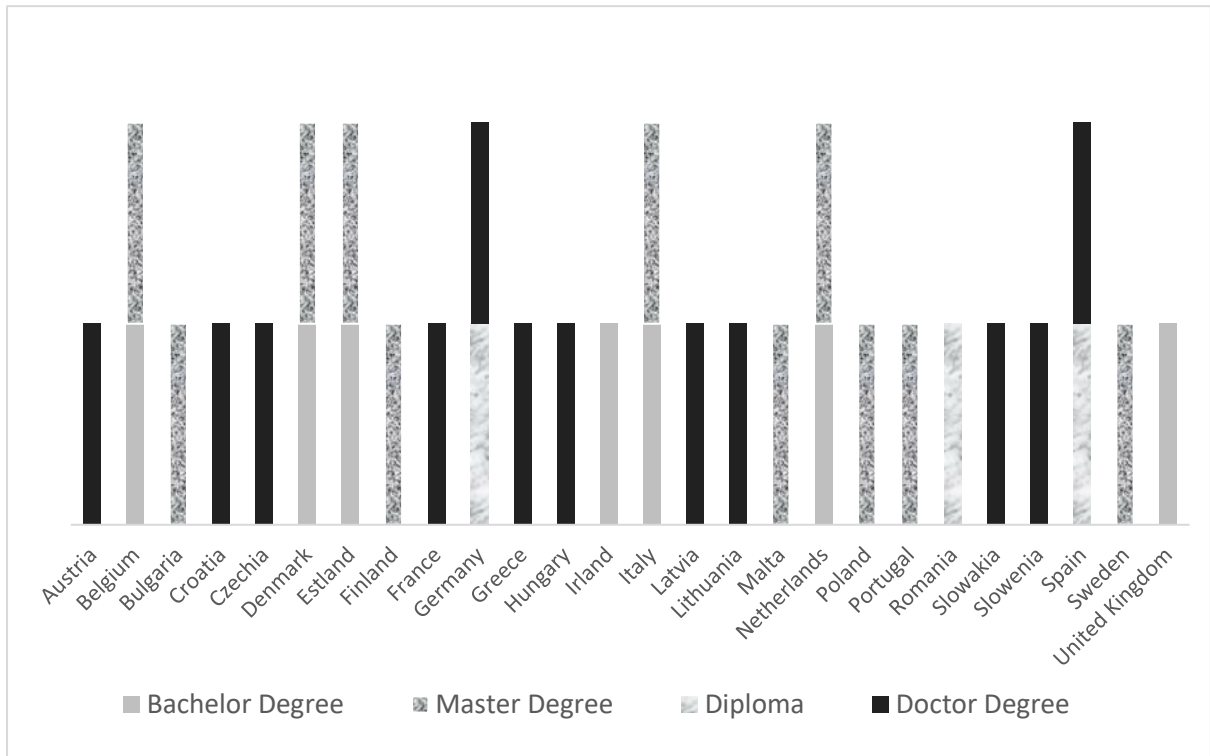


Figure 1: Undergraduate Degrees in Dentistry separated in 26 EU countries

Country	Duration†	ECTS	Bachelor Degree	Master Degree	Diploma	DoctorDegree
Austria	6	360				X
Belgium	5	300	X	X		
Bulgaria	6	300		X		
Croatia	6	342				X
Czechia	5	n.i.‡				X
Denmark	5	300	X	X		
Estland	5	300	X	X		
Finland	5,5	330		X		
France	5	300				X
Germany	5	n.i.			X	X
Greece	5	373				X
Hungary	5	300				X
Ireland	5	300	X			
Italy	6	360	X	X		
Latvia	5	300				X
Lithuania	5	300				X
Malta	5	300		X		
Netherlands	6	360	X	X		
Poland	5	n.i.		X		
Portugal	5	300		X		
Romania	6	n.i.			X	
Slowakia	6	n.i.				X
Slowenia	6	360				X
Spain	5	300			X	X
Sweden	5	300		X		
United Kingdom	5	300	X			

Table 1: Results for undergraduate study duration (†), ECTS and undergraduate degrees. (‡: no information)