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Guest Editorial

Periodontology as a recognized dental speciality in Europe

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Abstract

The impetus of the Bologna Process under the auspices of European Union governments has raised enormous expectations. It is the major educational change in Europe within the last 50 years and all the focus from university institutions, learned societies and thematic networks has shifted to this process, with the aim of developing consensus schemes in order to arrive at the expected European Convergence in Higher Education (to be completed by 2010). Dentistry as one of the health professions with clear Educational Standards, as defined by the European Dental Directives, is also reviewing its educational processes within this Bachelor–Master–Doctorate scheme and evaluating how the current and future dental specialities should be accommodated within this framework. Among these specialities, Periodontology is currently considered a formal dental speciality in 11 countries belonging to the EU however it lacks this legal status in the rest of the 14 EU countries. The purpose of this position paper is to provide evidence for the need for a recognized specialty in Periodontology at European level focusing on both the educational and professional perspective, with the hope of providing discussions that may contribute to facilitate its legal establishment as a new dental speciality in Europe.

Key words: dental education; dental speciality; graduate periodontology and periodontal practice; periodontology

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Does undergraduate dental education prepare the general dental practitioner for rendering all periodontal services?

The European Parliament and The European Council has recently approved a common European Directive on the Recognition for Professional Qualifications (DIRECTIVE 2005/36/EC). This Directive includes the educational requirements concerning the mutual recognition of diplomas, certificates and other evidence of the formal qualifications of practitioners in dentistry.

Under this new general directive, freedom of movement and the mutual recognition of the evidence of formal training of medical doctors, nurses responsible for general care, dentists, veterinary surgeons, midwives, pharmacists and architects must be based on the fundamental principle of automatic recognition of the evidence of formal qualifications and on the basis of co-ordinated minimum conditions for training. Therefore, under this provision, holders of the qualification of dental graduate must carry out the professional activity of the dental practitioner as set out in the Directive. This Directive clearly establishes that dental education and training shall comprise a total of at least 5 years of full-time theoretical and clinical study, given in a university or in a higher institute providing training, recognized as being of an equivalent level or under the supervision of a university.

The possibility of a Bachelor degree in dentistry following the model of The Bologna Declaration, with a maximum duration of 3 years (equivalent to 180 European credits), and providing a qualification relevant to the European labour market, poses a problem as it conflicts with this European Directive which states: ''Member States must ensure that the training given to dental practitioners equips them with the skills needed for prevention, diagnosis and treatment relating to anomalies and illnesses of the teeth, mouth, jaws and associated tissues and must fulfil the minimum training recommendations defined in the Directive''. Based on these legal provisions, the Association for Dental Education in Europe (ADEE) has proposed a Dental Curriculum comprised of 5 years of full-time education, equivalent to 300 ECTS credits (Sanz 2003). This suggested Course provides the framework for a model of Education in Dentistry, which will serve as a template for use within various national systems. This framework includes the profile and competences for the graduating dentist, together with all aspects of learning outcomes, content, structure, student exchange and ECTS defined in the Bologna Declaration (The document is accessible on the ADEE website http://adee.dental.tcd.ie/).

The agreed profile and competences for the future European dental practitioner implies that this health professional upon graduation is required to undertake safely the independent practice of dentistry, irrespective of the country or university where he/she graduated. According to this agreed profile, the new graduating European dentist should:

- have had a broad academic and dental education and be able to function in all areas of clinical dentistry;

- be trained sufficiently in dental science;
- be able to work together with other dental and health care professionals in the health care system;
- have good communicative skills;
- be prepared for life-long learning and continuing professional development;
- be able to practice evidence-based comprehensive dentistry based on a problem solving approach, using basic theoretical and practical skills.

Dentists fulfilling this profile must have acquired this ability through the achievement of a set of competences or abilities essential to begin independent, unsupervised dental practice by the time he or she obtains the first professional degree. These competences should be the basic level of attitudes; behaviour, knowledge and skills necessary for a graduate student to respond to the full range of circumstances encountered in general professional practice (Reed et al. 2002). This level of performance requires some degree of speed and accuracy consistent with patient well-being but not performance at the highest level possible. It also requires an awareness of what constitutes acceptable performance under the changing circumstances and a desire for self-improvement. Competences support integration and merging of all disciplines, which should benefit students and also patients who are receiving treatment.

Within this ADEE document there are seven categories of professional activity or domains, which are deemed to be fundamental for the practice of dentistry.

(1) Professionalism
(2) Communication and inter-personal skills
(3) Knowledge base, information handling and critical thinking
(4) Clinical information gathering
(5) Diagnosis and treatment planning
(6) Establishment and maintenance of oral health
(7) Health promotion

Periodontology as one of the major oral health sciences has been defined together with the rest of major dental clinical disciplines in terms of competences regarding the acquisition of the knowledge base and critical thinking, the gathering of clinical information and the establishment of a proper diagnosis and treatment planning. However, in terms of the major domain, the establishment and maintenance of oral health, periodontal management, has been subdivided in supportive competences, as follows:

Periodontal management: The new graduate in dentistry must be competent in the management of periodontal diseases in patients of all ages. Specifically, he or she must:

1. be competent at evaluating the periodontium, establishing a diagnosis and prognosis and formulating a treatment plan.
2. be competent at educating patients concerning the aetiology of periodontal disease and encourage them to assume responsibility for their oral health.
3. be competent at instructing patients in appropriate oral hygiene methods compatible with periodontal health.
4. be competent at supragingival and subgingival scaling and root debridement, using both powered and manual instrumentation and in stain removal and prophylaxis.
5. have knowledge of the secondary periodontal aetiological factors.
6. be competent at diagnosing, explaining and discussing the need for advanced periodontal surgical procedures and the proper method of referral for speciality care.
7. be competent at evaluating the results of periodontal treatment and establish and monitor a maintenance programme, including a discussion of risk factors.

The detailed review of this profile and competence document, agreed by all dental schools in Europe, clearly underscores the need for specialized training, since, although the general practitioner is competent at carrying out most periodontal procedures, he or she is not competent at performing the advanced surgical procedures required for the treatment of the severe periodontitis cases.

Current epidemiological data in Europe clearly shows that there is a small, although important, fraction of society affected by severe periodontitis, which will require this advanced periodontal therapy. These patients will therefore need a health provider with extended training as a specialist in Periodontology in order to undertake these complex treatment procedures.

The new European Directive (DIRECTIVE 2005/36/EC) for the first time defines in the article 24 ''specialist dental training''. Under this directive, ''specialist dental training shall comprise theoretical and practical instruction in a university centre or in a health establishment approved for that purpose by the competent authorities or bodies. Full-time specialist dental courses shall be of a minimum of 3 years' duration supervised by the competent authorities or bodies''.

In annex V of this Directive, two dental specialities are recognized, Orthodontics and Oral Surgery. Article 26, however, foresees the inclusion of new specialties when the title is common to at least two fifths of the member state countries. Periodontology is currently recognized at national level in 11 of the 25 EU member countries and therefore, following these provisions, the process for full recognition of Periodontology as a new European dental specialty should start.

Is post-graduate periodontal education in europe organized and able to provide quality training at specialist level?

The European Federation of Periodontology (EFP) was founded in 1990 in Maastricht with the main goal of promoting periodontal health in Europe. This organization embraces all National Periodontal Scientific Societies from all EU countries. Immediately upon its foundation it clearly established that one of its main objectives was to promote standardization of high-quality post-graduate education by defining a formal post-graduate specialty program in Periodontology. With this purpose the EFP established a Post-graduate Education Committee (EFP-PEC) that developed a document entitled ''Quality Standards for Graduate Programs in Periodontology'' formally approved in 30 June 1996.

The purpose of this document was to pursue the formulation of common quality standards for graduate training programs in Periodontology. In this manner, graduating specialists would have a harmonized periodontal training irrespective of which country in Europe they were trained.

In this document, a Periodontology Training Program is defined as an organized, directed, graduate program in periodontal practice. In this document the EFP sets forth the standards and requirements to be used in the evaluation of Periodontology Training Programs applying for registration by the EFP.

In order for a graduate program in Periodontology to gain recognition by the EFP, compliance with the following

quality standards is needed. The standards are grouped into four main categories:

1. Qualifications of the director of the Periodontology Training Program (the trainer);
2. Qualifications of the Periodontology training program;
3. Qualifications of the Periodontology training facility, and;
4. Qualifications of the periodontal service.

This course is organised in three full-time years (6 semesters–40 weeks per year) comprising 180 ECTS. The academic content leading to an Academic Master Degree will be 120 ECTS, including the research presentation. The Speciality Certificate can only be obtained after completing both the Academic Degree and the required clinical time. Both the Academic Degree and the Speciality Certificate are inter-linked in such a matter that one cannot be obtained without the other.

In general terms the training program is a full-time training program of 3 years duration and includes theoretical, clinical and research training. Graduation is achieved upon passing a final examination consisting of the defence of full-treated periodontal and implant cases and the presentation of a thesis consisting of a literature review and a research report. The examination panel of judges must include an external examiner approved by the EFP Educational Committee.

Universities applying for accreditation of their periodontal graduate program must present a formal application to the EFP Education Committee. This committee will evaluate the document, verifying that the program fulfils the pre-requisites of content, duration, facilities and staff. Once the committee approves the document a formal program visitation is organized.

The visiting committee is composed of experts from both the soliciting country and external. During this visit they will review with the Director of the Program the completed application document and will assess the facilities, the educational methodologies, patient care and research output. They will interview with teaching staff and with the students. On the basis of this evaluation, the EFP- visiting committee will write a report for the board of the EFP-Education Committee who will make the final decision. The approval by the EFP for accreditation of a graduate program is recognized for a period of 8 years, provided the director of the program stays in charge.

An *EFP certificate* will be granted to every graduate student who successfully passes the final examination on an EFP approved graduate program. After the examinations have been completed the EFP approved external examiner will write a report to the Chairman of the EFP Education Committee who will sign the certificates together with the Director of the Program.

The following is the list of currently approved EFP Graduate Programs in Periodontology, including the name of the Director.

1. Academic Centre for Dentistry Amsterdam, U. van der Velden, the Netherlands
2. University of Bern, N.P. Lang, Switzerland
3. University of Nijmegen, A. Sculean, the Netherlands
4. University of Göteborg, L. Heijl, Sweden
5. Jönköping Institute for Post-graduate Dental Education H. Thorstensson, Sweden
6. Eastman Dental Institute London, N. Donos, UK
7. Catholic Univerity of Leuven, D. van Steenberghe, Belgium.
8. University Complutense Madrid, M. Sanz and A. Bascones, Spain
9. Hadassah Faculty of Dental Medicine Jerusalem, W.A. Soskolne, Israel
10. Yeditepe University of Istanbul, S. Yilmaz, Turkey

At present there are three pending applications of graduate programs for EFP approval but is anticipated that in the near future a number of existing graduate programs in Periodontology will apply for EFP approval in order to participate in the well-established European forum of graduate training in Periodontology.

Periodontal practice. What is the current situation and future perspectives?

The variations in oral health care observed throughout member states of the EU from both a professional and health services viewpoint are of paramount importance in any workforce analysis. In particular the study of the need for high quality accredited post-graduate programs producing specialists and the definition of the clinical activities and competences of such workforce.

Periodontology in particular, because of recent breakthroughs in diagnostics and therapeutic approaches within a trend towards ageing populations, has acquired a distinctive importance in this context. Depending on the country one or more specialties are officially defined. This is especially relevant for the public who has no other way to be informed of the background of the relevant oral health providers. Eleven countries belonging to the EU currently recognize Periodontology as a Dental Speciality, together with other European countries, that although not belonging to the EU, have a clear influence on a wider European scene, such as Switzerland, Norway and Israel.

Clinical Periodontology involves the diagnosis, prevention and therapy of the diseases affecting the periodontium or peri-implant tissues. From these diseases the largest amount of services and workload are rendered to the so-called *plaque-related diseases,* which will therefore get most attention in the present position paper. There are, however, a large number of conditions, not related to dental plaque, which may affect the periodontal tissues. These *non-plaque related diseases,* which range from fungal infections to auto-immune diseases of the soft tissues of the periodontium and from periodontal ligament cysts to necrotizing gingivitis are less frequent or imply less workload (Armitage 1999). Their complexity and need for differential diagnosis make them, however, very relevant at the individual level. To allow a clinician to familiarize him/herself with such rare diseases, it is wise to have them concentrated in second line/specialist health care level. During the last two decades our knowledge of these pathologies has impressively expanded and their study is now an integral part of both the under- and post-graduate curricula in Periodontology. Standard textbooks (e.g. Lindhe et al. 2003) and specialized books (e.g. Newman et al. 1994) contain several chapters on these conditions, which focus on these pathologies and their systemic and genetic backgrounds, which cannot be fully covered during a basic dental training.

Thus, a second line of specialists must be identifiable by both the profession and the public at large to deal with diseases of the periodontium that can be rare but very relevant for the patient's general health.

Plaque-related diseases are a variety of entities where bacterial accumulations (biofilm) on teeth or oral implants trigger a chronic inflammatory subject host response leading to different pathological conditions. These complex bacterial–host interactions are modulated by both genetic and behavioural factors responsible for the heterogeneity of the expression of these diseases, ranging from localized inflammation of the gingival margin (gingivitis) to wide-spread generalized destruction of the periodontal and peri-implant (periodontitis or peri-implantitis) tissues. These diseases, different to other chronic infectious conditions are not related to a single bacterial pathogen, but to a mixed infection composed of many true pathogens and opportunistic commensals residing in the oral cavity. Primary or secondary prevention against these diseases requires regular oral hygiene procedures to control the daily accumulation of dental plaque, together with professional removal of these bacterial accumulations and retentive factors at regular intervals.

Although many classifications have been proposed, there is consensus that the most common forms of destructive periodontal diseases are associated with local and behavioural factors, such as lack of oral hygiene and tobacco use, together with increased age, while other less frequent manifestations occur in younger individuals and have a more aggressive progression (Armitage 1999; Van der Velden 2005).

Chronic adult periodontitis

For chronic adult periodontitis, which is by far the most frequent of these plaque-related diseases, the incidence is well documented in several Europeans countries, with significant differences. Most of the epidemiological studies carried out in Europe have used the *CPTIN* Index to evaluate the prevalence and severity of periodontal diseases. Although questionable as an accurate appraisal of disease severity, this index offers the advantage to assess the severity of the disease in the perspective of the workload it requires. In the 1980s the percentage of adults 35–44 years old with an index 4, which means severe periodontitis likely requiring periodontal surgery, was on average 10% for Western Europe (Sheiham & Netuveli 2002). Although there is tendency for a lower incidence of chronic adult periodontitis associated with a better global oral hygiene (Hugoson et al. 1998), this has only been observed in countries with a well-established tradition of oral health prevention and periodontal therapy. On the other hand over the age of 70, the incidence of periodontal breakdown and tooth loss remains high. Typical for gingivitis and early to moderate periodontitis is that they rarely lead to any subjective symptom. Dental caries often goes unnoticed, especially since pain hardly ever occurs and therefore unless patients go regularly to the dentist, diagnosis more often happens in the more severe forms of the disease.

Because of their high prevalence, the workload implications are important. When the disease is diagnosed early and the periodontal destruction has not occurred (gingivitis) or is moderate (early and moderate periodontitis), its therapy is usually rendered by the general dentist in collaboration with the rest of the dental team, mostly dental hygienists. Although non-surgical periodontal therapy implies less elaborate skills, the need for an integral clinical approach remains essential. It can therefore be delegated to other members of the dental team, although the responsibility for the establishment of a treatment plan and its supervision remains with the dentist.

However, when the disease is diagnosed in the most advanced stages (severe periodontitis), its therapy often needs more elaborate curative treatments such as periodontal surgery in order to eliminate the affected inflammatory tissues and create an environment which can be maintained free of significant inflammation by the patient. Moreover, the establishment of a comprehensive treatment plan in cooperation with a restorative dentist, orthodontist or oral surgeon, often requires involvement of a well-trained periodontal specialist. These differences in treatment levels, preventive versus curative, with the eventual need for advanced surgical treatment has important consequences on the workforce and costs of therapy. Indeed, surgery, where gums have to be reflected and the jaw bone is denuded, requires proper aseptic conditions and surgical skills. The risk of improper treatment may lead to disease recurrence and the need for re-intervention. In some instances regenerative procedures are definitely indicated such as around strategically important natural abutment teeth. The use of barrier membranes or bone grafts is very technique sensitive (for review see McGuire et al. 1996). Thus this kind of advanced treatment should be, preferably, in the hands of a clinician specialized in Periodontology with adequate training in surgical skills and biological understanding. It is therefore, for the benefit of the patient population requiring this advanced periodontal therapy, that the competence of the clinician can be recognized by a well-defined professional title.

Aggressive forms of periodontitis

For the early onset and aggressive forms of periodontitis most epidemiological data confirm a low incidence ($<5\%$) with limited clinical evidence of attachment loss/marginal bone loss in the deciduous dentition (Sjodin & Matsson 1994). For the permanent dentition it is difficult to give an average considering the different age groups examined, ranging from 15 to 19 years and the different thresholds used. Globally one can say from radiographic surveys using bitewings that after the 1990s a loss of bone of >2 mm occurred in 1–6.5% of the subjects (Jenkins & Papapanou 2001) and this incidence increases with age (Aass et al. 1994).

From a healthcare point of view, these children and young adults with aggressive periodontitis need early diagnosis and a specialized treatment. It cannot be expected of a general practitioner to have enough knowledge and experience to deal with complex immune-genetic interactions.

In summary, epidemiological trends indicate that most periodontal diseases require non-surgical periodontal in order to arrest the disease and supportive therapy aimed to prevent its recurrence. These treatments will increase because of an ageing population with more means and more demands for quality of life and therefore most of the bulk of periodontal treatment will and should remain under the responsibility of the general dentist. This however, should not underscore the need for a specialized professional profile appropriately trained for the treatment of the more aggressive and severe forms of periodontitis. Patients have the right to receive up-to-date optimal care within the limits of their financial capacities. Therefore, a proper identification of the professional profile of the clinician is mandatory. All countries/communities have a limited amount of money to spend for health care and oral health in particular. The investment, either from

government or insurance companies or out of the pocket money, must be well spent. The availability of specialists can assure that complex treatment can be delivered to the best of one's capacities. Beyond treatment needs, clinical practice in Periodontology has changed dramatically in recent years. Periodontal diagnosis has improved with the use of standardized clinical parameters as well as microbial testing. Today, the approach to periodontal care is patient-centred, focusing not only on the severity of the disease but on the patient's needs and demands. Issues such as tobacco counselling or aesthetically driven periodontal surgery have become an integral part of periodontal therapy.

Periodontology as an independent field of Dentistry has demonstrated in the last three decades major developments both in education and research. Periodontal research has been very active and productive. For example, at the last international congress in dental research (IADR/AADR) in 2005, almost 20% of the presented abstracts were related to the periodontal field. Over the past decades, major breakthroughs have been made in different areas. The microbial aetiology of periodontal diseases was demonstrated in animal models as well as in humans. Several key-pathogens associated with periodontitis were identified and their genome sequenced. The role of the inflammatory-immune response and the mechanisms involved in tissue destruction were unveiled. More recently, advances were made in tissue engineering and bone regeneration. Clinical research allowed the identification of several risk factors for periodontal diseases such as tobacco use, stress, diabetes and other systemic conditions. Research also showed the connection between periodontitis and systemic conditions. Epidemiological surveys provided important data on the prevalence of periodontitis among populations.

For two decades the availability of osseointegrated implants with excellent long-term survival (95% after 5 years in most clinical indications) (Berglundh et al. 2002) has resulted in a clear treatment option to restore the natural dentition in fully and partially edentulous patients, as well as in those of very severe destructive periodontitis in need of functional rehabilitation. It is therefore essential, to integrate the global knowledge on Periodontology with the goal of maintaining the remaining dentition, with increased knowledge on the bases and surgical skills to enforce implant-based treatment when indicated (Quirynen et al. 2002). The periodontal specialist is also used to cooperating with the restorative dentist for prosthetic aspects of the natural dentition.

The surgical skills and comprehensive understanding of the biology of surgical wound healing, together with the pathogenesis, diagnosis and therapy of peri-implant tissue infections fall well within the scope of the specialist in Periodontology. This specialty has played a key role in the expansion of the use of oral implants both from a research and a clinical point of view, as can be appreciated when reviewing the major authors in the field and the composition of the editorial boards of the most prestigious scientific implant journals. Another area of recent development in Periodontology derives from current information developed from mostly epidemiological population studies demonstrating that Periodontitis may confer independent risks for different systemic conditions (mortality, osteoporosis, diabetes mellitus, pulmonary infections, pre-term low weight births, cardiovascular diseases, and infections in other body sites). Although the casual relationship between periodontitis and these systemic conditions have not yet been proven in well designed intervention trials, periodontitis has been clearly associated with atherosclerosis, acute myocardial heart infarction, stroke and pre-mature birth (Madianos et al. 2002). These associations may pose an enormous challenge to public health, with increasing need for providing an important workforce to deal with the cure of present periodontal disease prevalence, at its different severity levels, in an increased ageing population.

In summary, this position paper provides evidence for the need for a recognized specialty in Periodontology at European level. This evidence comes from reviewing educational needs at both undergraduate and post-graduate levels, together with the study of the prevalence of periodontal diseases and the different workforces needed for their prevention and treatment. It is hoped that the discussions arising from this document may contribute to facilitate the legal establishment of the speciality of Periodontology in Europe

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