

Postgraduate periodontal education. Scope, competences, proficiencies and learning outcomes: Consensus report of the 1st European workshop on periodontal education – position paper 3 and consensus view 3

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Keywords

periodontology; dental education; postgraduate.

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Accepted: 8 January 2010

doi:10.1111/j.1600-0579.2010.00622.x



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Introduction

The purpose or aim of modern dental education is to produce a caring, knowledgeable, competent and skilful dentist who is able, on graduation, to accept professional responsibility for the effective and safe care of patients. Dentists, therefore, should accept a wide variety of responsibilities ranging from promotion and prevention of health, to diagnosis of disease and treatment.

The Association for Dental Education in Europe has produced a series of documents aimed to provide convergence in dental education in Europe by defining a profile and a minimum set of competences, thus assuring a similar degree of dental education throughout Europe and providing the base for professional mobility and reasonable standards of general practice of dentistry (1, 2). Although the assurance of a minimum duration of the studies (5 years) and the fulfilment of these minimum standards may facilitate some degree of homogeneity, it does not ensure that the graduating dentist is competent to treat every oral health problem in every patient. It cannot be expected, therefore, that the undergraduate dental curriculum provides enough knowledge and experience to deal with all pathologies, but simply assures the community that dental graduates are able to take responsibility in the treatment of the most prevalent oral health problems. Amongst these, the management of plaque related infections, such as caries and periodontal diseases, being the most prevalent infections affecting mankind, must be a focus of undergraduate dental education.

Current epidemiological data in Europe clearly show that the majority of the population has mild to moderate forms of periodontal diseases that should be managed by the general dentist (3). To comply with these fundamental aims, education and training in dentistry must make sure that dental students acquire the necessary knowledge and clinical competence to manage these common oral health problems, they must be capable of recognising their limitations and, when faced with situations that surpass their abilities, they must be capable of seeking advice or referring the patient to a *specialist in Periodontology*.

There is, however, a significant and important percentage of the population affected by severe forms of periodontal diseases (4), who will require complex advanced periodontal therapy and who will need a health provider with extended training as a *Periodontologist*. These advanced periodontal treatments are not only required to treat less frequent diseases or conditions which may require extended competences, but also to cope with an increasingly complex dental science and patient demands to which the profession must respond. Consequently, there is a need for advanced postgraduate dental training in key areas of dentistry. The new European Directive (Directive 2005/36/EC) defines in the article XXIV, the need for 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 (5).

Specialist training is particularly relevant in *Periodontology*, because of the significant prevalence of severe periodontal disease. Furthermore, periodontal therapy includes complex

surgical procedures aimed at improving periodontal conditions as well as the quality of life. Expertise in these procedures requires training that cannot be provided at the undergraduate level. An additional aspect of periodontology is implant dentistry. Because of the difficulty of implant therapy and the multitude of procedures in complex cases, specialist training is imperative. For the organisation of oral workforces in Europe and in view of the limited competences acquired by the dental graduates during undergraduate periodontal education specialist training in this field of dentistry is needed, as has been recently reported in an article demanding that the speciality of *Periodontology* is fully recognised at European level (6).

The purpose of this article is to establish the scope, competences, proficiencies and learning outcomes in Postgraduate Periodontal Education aimed for the training of the modern specialist in Periodontology.

Selection criteria

A candidate for a postgraduate programme leading to a specialist in periodontology must be a dentist graduated from an accredited dental programme/school. In addition, the candidate must demonstrate significant experience in general dentistry.

Scope of a postgraduate periodontal programme for the education of specialists in periodontology

A periodontologist is a specialist in a specific discipline in dentistry which encompasses the prevention, diagnosis and treatment of diseases and conditions of the supporting and surrounding tissues of the teeth or their substitutes, including implant site development and their surgical placement, as well as the maintenance of health, function and aesthetics of these structures and tissues.

In full accordance with the European Directives, the specialist postgraduate programme in Periodontology must comprise a 3-year full-time course or its equivalent part-time of 4 years, enabling the successful postgraduate student to practise Periodontics and Oral Implant Therapy at a specialist level. This course must consist of a didactic, a clinical and a research component. The didactic component may be delivered using different learning methods, but must include an extensive overview of the periodontal literature, both current and historical. The clinical component must include the treatment of all patients referred for periodontal therapy and the fulfilment of a set of competencies and proficiencies defined below. The research component should include a literature review and the undertaking of a research project (or dissertation) by the graduating students, whose results should be presented in the form of a written report or publication.

Upon completion of the postgraduate programme, the graduate will receive a certificate from the university and is eligible to apply for recognition as a specialist. Graduates from programmes accredited by the European Federation of Periodontology (EFP) can apply for a certificate from the EFP. The postgraduate programme may be extended so that a PhD degree can be obtained; however, this would involve significant extra study and requirement.

Competences and proficiencies in periodontal education at the postgraduate level

Definitions of terms (ADEE document)

In a competence-based postgraduate training programme leading to a specialist in periodontology, competency statements should describe the knowledge, skills, attitudes and values that a graduate must have and they are usually expressed in four levels:

- **Be familiar with:** graduates should have a basic understanding of the subject, but need not have direct clinical experience or be expected to carry out procedures independently.
- **Have knowledge of:** graduates should have a sound theoretical knowledge of the subject, but need have only a limited clinical/practical experience.
- **Be competent at:** graduates should have a sound theoretical knowledge and understanding of the subject together with an adequate clinical experience *to be able to* resolve clinical problems encountered, independently, or without assistance.
- **Be proficient in:** is defined as responsible for carrying out the procedure, requiring no advice to complete the task in a timely manner. He/she should be able to undertake competently a small number of procedures that are beyond core. He/she should be able to demonstrate an understanding of the indications, process and outcome of the procedure to peers. He/she should be able to provide a logical, sequenced, integrated advanced treatment plan that takes due regard of the patient's needs, wishes and level of co-operation (7, 8).

Competences in periodontal education at the postgraduate specialist level

Following the same curricular structure in a competence-based curriculum according to the ADEE (8), the postgraduate curriculum is organised in domains with major and supporting competences.

Domain I. Professionalism

Major competence

Professional behaviour: A specialist **must** be proficient in a wide range of skills, including investigative, analytical, problem solving, planning, communication, presentation, team building and leadership skills and has to demonstrate a contemporary knowledge and understanding of the broader issues of dental practice. The specialist should fully understand and implement these issues in clinical practice.

Supporting competences

A specialist in periodontology **must**:

- Be proficient at displaying appropriate professional behaviour and communication towards all members of the periodontal team and the referring dental practitioner, as part of the periodontal services may be delegated to other members of the dental team, mainly dental/oral hygienist/

therapist/GDP. This delegation, however, must be undertaken under the leadership of the periodontologist who is responsible for the diagnosis, treatment planning and overall periodontal care of the patient.

- Be competent at critically evaluating the scientific literature, updating their knowledge base and evaluating scientific and technological developments as they arise. The specialist should demonstrate commitment to the maintenance of high levels of professionalism and continuous training of the periodontal team.
- Be competent at managing and maintaining a safe working environment and working with other members of the periodontal team with regard to health and safety and clinical risk management, as cross-infection control is of great concern due to invasiveness of most periodontal procedures.

Major competence

Ethics and Jurisprudence: A specialist must demonstrate knowledge of the content and have a thorough understanding of the moral and ethical responsibilities involved in the provision of care to individual patients, to populations and communities. The specialist must display knowledge of contemporary laws applicable to the practice of dentistry.

Supporting competences

The specialist in periodontology **must**:

- Be proficient at selecting and prioritising treatment options that are sensitive to each patient's individual needs, goals and values, compatible with contemporary methods of treatment, and congruent with an appropriate periodontal, oral and general health care philosophy, acknowledging that the patient is the centre of care and that all interactions, including diagnosis, treatment planning and treatment, must focus on the patient's best interests. The main goal of periodontal care is the reinstatement of periodontal health to ensure the longevity of the natural dentition.
- Be critical towards their own achievements in the light of the complexity of some periodontal conditions.
- Be competent in the application of the principles of regulatory law and ethical reasoning and professional responsibility as they pertain to the practice of periodontics.

Domain II. Communication and interpersonal skills

Major competence

A specialist must be proficient to communicate effectively, interactively and reflectively with patients, their families, relatives and carers, and with other health professionals involved in their care.

Supporting competences

The specialist in periodontology **must**:

- Be proficient at establishing a patient–dentist relationship that allows the effective delivery of periodontal treatment, as long-term treatment outcomes depend on patient com-

pliance, both with self-performed preventive measures and with appropriate supportive therapy.

- Be proficient in identifying patients' expectations (needs and demands) and goals for periodontal care, as the patient should participate in the therapeutic decision, once he/she is provided with all the relevant information.
- Be proficient in sharing information and professional knowledge with both the patient and other professionals and specialists in other dental and medical disciplines, verbally and in writing.
- Be proficient at working with other members of the periodontal team, as the communication with the hygienists and dental assistants is particularly relevant for successful therapeutic outcomes.
- Have comprehensive knowledge of behavioural risk factors for periodontal diseases and methods for their modification (including tobacco, alcohol and diet).

Domain III. Knowledge base, information, information literacy, clinical sciences and clinical skills

Major competence

Basic knowledge and critical thinking.

A specialist in periodontology must have comprehensive knowledge of the basic sciences relevant to dentistry in general and to periodontology in particular. Moreover, he/she must be proficient in all areas of clinical periodontology.

Supporting competences

The specialist in periodontology **must**:

- Have comprehensive knowledge of the biomedical sciences relevant to dentistry in general and to periodontology in particular.
- Have knowledge to be able to integrate all aspects of clinical and public health dentistry into the practice of periodontics.
- Have comprehensive knowledge of those aspects of medicine relevant to periodontics and should be competent to interact with the respective health care providers. He/she should have comprehensive knowledge of all possible interactions between oral and systemic diseases and be competent to manage the periodontal problems of the medically compromised patient.
- Be competent in the application of the principles of regulatory law and ethical reasoning and professional responsibility as they pertain to the practice of periodontics.
- Have comprehensive knowledge of the historical development of periodontics.
- Be competent at critically evaluating the scientific literature, updating their knowledge base and evaluating scientific and technological developments as they arise.
- Be competent in posing pertinent research questions and hypothesis
- Be competent in designing scientific experiments
- Be competent in the statistical analysis of research data

- Be competent in writing a literature review
- Be competent in writing a research paper

Major competence

Diagnosis, treatment planning and patient management

A specialist in periodontology must be able to evaluate the relevant clinical conditions in such a way that a comprehensive treatment plan can be designed and appropriate treatment, taking into consideration the individual patient needs and expectations, can be provided.

Supporting competences

The specialist in periodontology **must** have:

- Comprehensive knowledge of the anatomy, histology and physiology of the tissues of the oral cavity and related structures.
- Comprehensive knowledge of oral microbiology with emphasis on the following: the nature, composition and physiology of plaque biofilm and its relationship to inflammatory periodontal diseases; techniques to identify microorganisms, their application and utility in periodontal practice; calculus formation.
- Comprehensive knowledge of infectious, inflammatory and immunological processes in oral diseases with emphasis on the pathogenesis of periodontal diseases.
- Comprehensive knowledge of the principles of wound healing and regeneration.
- Comprehensive knowledge of the classification and epidemiology of the periodontal diseases.
- Comprehensive knowledge of imaging techniques and their interpretation as they are related to the diagnosis of periodontal diseases and for implant therapy.
- Knowledge of behavioural/life style risk factors for periodontal diseases and methods for their modification (including tobacco use, alcohol consumption, and diet).
- Proficiency in diagnosing abnormalities in the anatomy and morphology of periodontal and oral mucosal tissues that may compromise periodontal health, function or aesthetics and identifying the conditions, which may require management.
- Proficiency in determining a patient's aesthetic requirements and determining the degree to which those requirements/ desires can be met. This is particularly relevant when recommending periodontal plastic surgery procedures.
- Proficiency in the collection and interpretation of all data necessary to establish the diagnoses, including all diseases and conditions affecting the periodontium, peri-implant tissues and neighbouring structures.
- Proficiency in determining prognosis and developing a comprehensive periodontal treatment plan, including implant therapy and to communicate effectively to patients the nature of their periodontal health status and treatment needs.
- Proficiency in the selection and prescription of medications for the management of preoperative, operative and postoperative pain and anxiety and familiarity with the appropri-

ate sedation techniques that can be useful in the most complex periodontal surgical procedures.

Major competence

Establishment and maintaining periodontal/oral health

- Be proficient in the full scope of non-surgical and surgical periodontal and implant therapy.
- Be proficient in providing each patient with an appropriate, tailor made maintenance programme.

Supporting competences

The specialist in periodontology **must**:

- Be proficient in all methodologies for plaque biofilm control.
- Be proficient in educating patients about the aetiology and prevention of periodontal and mucosal diseases and motivating them to assume responsibility for their periodontal health.
- Be proficient in all aspects of non-surgical therapy.
- Be proficient in the mechanisms, application, effects and interactions of medications used for the prevention and therapy of periodontal diseases.
- Have comprehensive knowledge of the mechanisms, effects and interactions of medications used for the management of systemic diseases that may affect periodontal tissues and surrounding structures.
- Have comprehensive knowledge of the periodontal–systemic relationships.
- Have comprehensive knowledge of the influence of forces (trauma, parafunction, orthodontic forces, etc.) on the periodontium and related structures and their management.
- Be proficient in all surgical techniques used in periodontics, their indications and contraindications, advantages and disadvantages.
- Have comprehensive knowledge of the inter-relationship of periodontitis to pulpal disease and the various approaches to treatment.
- Have comprehensive knowledge of the inter-relationships of orthodontic, restorative therapies and periodontal treatment.
- Have comprehensive knowledge of maintenance therapy.
- Be proficient in surgical implant therapy, including site development, surgical placement and maintenance.
- Be proficient in evaluating the results of periodontal treatment and establishing and monitoring a maintenance programme, in co-operation with other members of the dental team, including the evaluation of likely risk factors.
- Be proficient in methods for soft and hard tissue reconstruction.
- Be proficient in the treatment of all diseases of the peri-implant tissues.

Learning outcomes in periodontal education at the postgraduate specialist level

Formal instruction must be provided for the student to achieve the following learning outcomes:

1. Comprehensive knowledge of the anatomy, histology and physiology of the tissues of the oral cavity and related structures.
2. Comprehensive knowledge of oral microbiology with emphasis on the following: the nature, composition and physiology of plaque biofilm and its relationship to inflammatory periodontal diseases; techniques to identify microorganisms, their application and utility in periodontal practice; calculus formation.
3. Comprehensive knowledge of infectious, inflammatory and immunological processes in oral diseases with emphasis on the pathogenesis of periodontal diseases.
4. Comprehensive knowledge of the principles of wound healing as well as soft and hard tissue regeneration and repair.
5. Comprehensive knowledge of the process of osseointegration as well as the biology of the peri-implant tissues.
6. Comprehensive knowledge of the classification and epidemiology of the periodontal diseases.
7. Comprehensive knowledge of imaging techniques and their interpretation as they related to the diagnosis of periodontal diseases and for implant therapy.
8. Knowledge of behavioural risk factors for periodontal diseases and methods for their modification (including tobacco, alcohol and diet).
9. Comprehensive knowledge of all aspects of non-surgical therapy.
10. Comprehensive knowledge of the mechanisms, effects and interactions of medications used for the prevention and therapy of periodontal diseases.
11. Comprehensive knowledge of the mechanisms, effects and interactions of medications used for the management of systemic diseases that may affect periodontal tissues and surrounding structures.
12. Comprehensive knowledge of the periodontal–systemic relationships.
13. Comprehensive knowledge of the influence of forces (trauma, parafunction, orthodontic forces, etc.) on the periodontium and related structures and their management.
14. Comprehensive knowledge of the historical development of periodontics.
15. Comprehensive knowledge of all surgical techniques used in periodontics, their indications and contraindications, advantages and disadvantages.
16. Comprehensive knowledge of the inter-relationship of periodontitis to pulpal disease and the various approaches to treatment.
17. Comprehensive knowledge of the inter-relationships of orthodontic, restorative therapies and periodontal treatment (including implant therapy).
18. Comprehensive knowledge of supportive periodontal therapy.
19. Comprehensive knowledge of the historical background to the development of oral implants and the various types of implant material/surgical techniques, in use.
20. Proficiency in the indications and contraindications when considering placement of different implant materials and their advantages and disadvantages, as well as alternatives.

Proficiency in all aspects of implant site development, placement and maintenance.

21. Comprehensive knowledge of the (cellular) immunological mechanisms involved in the inflammatory response in the peri-implant soft tissues.
22. Comprehensive knowledge of the various (cellular) mechanisms leading to bone loss around oral implants.
23. Proficiency in the mechanical, surgical, and/or antimicrobial treatment of peri-implant pathologies.
24. Comprehensive knowledge of the diagnosis, aetiology and treatment of halitosis.
25. Comprehensive knowledge of the diagnosis, aetiology and treatment of dentinal sensitivity.
26. Knowledge of the diagnosis, aetiology and treatment of mucosal lesions.

At the completion of the specialist programme the graduate is expected to have accomplished the following in the **clinical component** of the programme:

- Be able to recognise the various forms of periodontal diseases in order to make a diagnosis and prepare a treatment plan (including alternatives).
- To fully document each phases of treatment in order to subsequently present these cases for evaluation.
- To attend clinics in which patients are referred by general dental practitioners and are treated by specialists in a specialist setting.
- Be able to diagnose and develop a treatment plan for advanced multi-disciplinary cases (combined problems of periodontal disease plus systemic and restorative considerations) and be able to carry out the periodontal component of such treatments.
- Be able to document and carry out (in a timely manner) a wide range of surgical procedures, including:
 - Gingivectomy/local excision,
 - Periodontal flap surgery including access flaps and apically positioned flaps, with or without concomitant osseous surgery,
 - Root resection/hemisection procedures,
 - Mucogingival and plastic periodontal surgery procedures,
 - Reconstructive periodontal surgery procedures,
 - Surgical implant therapy, including surgical placement of oral implants in all areas of the dentition in both fully and partially edentulous patients, bone augmentation procedures including grafting, guided bone regenerative techniques, sinus floor elevation and soft tissue surgical procedures in conjunction with oral implants.
- Be able to evaluate the results of the treatment and to carry out any further procedures required to maintain (supportive periodontal therapy) or improve the obtained treatment outcome.
- Be able to diagnose and treat any biological complication that may occur around oral implants.

Research

At the completion of the specialist programme, the graduate must have accomplished the following learning outcomes:

- Design and carry out a research project, including a thorough literature review with the necessary background to

define the hypothesis and objectives of the proposed research. In addition, the project should include the appropriate statistical analysis of the obtained research data.

- The results must be presented in the form of a written report acceptable for publication in an English language international refereed scientific journal. The literature review in conjunction with the research report may constitute the thesis (or dissertation) of the postgraduate programme.

Methods of learning and teaching

Although each University and Dental School may have different approaches to education and training influenced by structures, cultures and resources, the curricular structure of the Postgraduate Programme in Periodontology should be organised in modules according to the European Credit Transfer System (ECTS). Within this context of a competence-based curriculum, there should be a strong emphasis on learning. With this aim, different learning methods may be used, but preferably those that are student centred, such as problem-, project- or case-based learning. The postgraduate student should take full responsibility for his/her learning and acquire learning characteristics such as critical thinking, decision-making, active learning and autonomous learning and problem solving.

Assessment of learning outcomes

Assessment should be valid, and therefore should be developed in alignment with the curriculum content and the learning outcomes. Assessments should also be reliable, reproducible and feasible.

Requirements for such assessments procedures and performance criteria:

1. Clearly defined criteria for the learning outcomes, which should be communicated to the students.
2. Multiple methods of assessments should be used and multiple samples of performance should be taken.
3. Both formative and summative assessment should be employed.
4. The alignment of the learning content, the method of teaching and learning as well as the assessment should be clear as well as demonstrable.

Postgraduate programme of periodontology accredited by the European Federation of Periodontology (<http://www.efp.net/education/graduate/>)

The European Federation of Periodontology (EFP) has formulated guidelines and common quality standards for postgraduate training programmes in periodontology, establishing standards and requirements to be used in the evaluation of postgraduate programmes in periodontology, which seek formal accreditation by the EFP Education Committee.

The standards are minimum requirements that the University Programme should have and are grouped into four main categories:

1. *Qualifications of the director of the postgraduate periodontology training programme (the trainer)*. Individuals who hold a

high professional profile in Periodontology, including a distinguished record both in academia and in practice, and who have the desire and aptitude to teach must direct the postgraduate programmes in Periodontology.

2. *Qualifications of the postgraduate training programme.* The periodontology training programme shall be organised in accordance with sound educational principles and shall be predicated on the competences and proficiencies required in contemporary periodontal practice at specialist level. The programme should ensure that the student's clinical experience needed is provided in terms of both facilities and patient load.
3. *Qualifications of the periodontology training facility.* The periodontal clinic shall serve as the principle teaching facility for the student(s) and shall be adequate to make possible the attainment of the objectives as set forth in the programme description/requirements as approved by the EFP.
4. *Qualifications of the periodontal service.* The principal goal of the periodontal services rendered in the Periodontal Clinic should be to ensure the safe, appropriate and cost-effective treatment of all patients.

The course should be organised in 3 years (full-time) or its equivalent part-time (6 semesters—40 weeks/year) comprising 180 European Credits (ECTS – 1 ECT accounts for 25 h of workload). Parts of the programme may be exchangeable between the 3 years of education as long as the general structure is maintained. The specialty certificate can only be obtained after successful completion of the didactic, research and clinical components.

General Distribution of ECTS Credits by Year

Year	Didactic learning	Self-study and directed work	Evaluation	Research up to	Clinical practice at least	ECTS
1	8	16	2	12	22	60
2	8	16	2	12	22	60
3	8	16	2	18	16	60
Total	24	48	6	42	60	180

The didactic component of the programme is designed to provide structured content. This will be accomplished through seminars, tutorials and especially through discussion of the literature related to the various topics. The student will be expected to fulfil the described learning outcomes mainly through self-study and directed work and by passing assessment exercises throughout the programme.

In the research component, the students must take part in the research programme of the department of periodontology or a relevant collaborating department, accomplishing competence in biostatistics and research methodology. This academic part may be waived on the basis of documented proficiency in these topics. Once these academic requirements are completed, the proposed research work will be presented to an examining committee for evaluation, discussion and subsequent approval. An academic full-time member from these departments should

be responsible for tutoring the approved research project and for mentoring the student during its accomplishment. The student is required to finish the proposed research work and to present its results in the format of a scientific publication for a recognised peer-review scientific publication.

The clinical part of the programme is designed to enable the student to obtain the required clinical competences and proficiencies. This part should take at least one-third of the total duration of the programme and at its completion, the students must demonstrate their proficiency in clinical treatment of cases involving both periodontics and the surgical component of oral implant therapy.

Once these three components are fulfilled, the students should take a final examination in front of a Board of Examiners, which at a minimum should include an external examiner appointed by the EFP. In this final examination, the students must be able to present five fully documented cases encompassing the whole field of Periodontology and Implant Dentistry. Students must be able to participate in a discussion of the diagnostic elements and treatment plans of at least one of the documented cases. Furthermore, the students must be prepared to answer questions related to the general subject of Periodontology and implant dentistry. In addition, students are required to present a scientific report to the Board of Examiners. This document must consist of at least two parts – a literature review and a report of the research project carried out by the student, presented in a format demonstrating the potential to be published in a peer-reviewed specialist science journal.

Once the board of examiners certificate the passing of this examination, the graduating students will be granted with the Certificate of Specialist in Periodontology issued by the EFP.

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