



Accreditation of postgraduate speciality training programmes in Endodontology. Minimum criteria for training Specialists in Endodontology within Europe

European Society of Endodontology

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Abstract

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This consensus statement from the European Society of Endodontology (ESE) sets out the minimum criteria for training Specialists in Endodontology within Europe. The case is made for recognizing Endodontology as a distinctive dental discipline throughout Europe. Guidelines are presented on the requirements of a specialist

and of a specialist training programme in Endodontology. The aims, objectives and curriculum content of a specialist training pathway are outlined, with guidelines on trainee appraisal, and the expectations of faculty and institutional commitment. In publishing these guidelines, the ESE is responding to a public and professional need for consistently high standards of training and specialist clinical service within Europe.

Keywords: accreditation, Endodontology, Europe, postgraduate, speciality training.

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Justification of Endodontology as a speciality

Endodontology and endodontics have been clearly defined by the ESE (European Society of Endodontology 2006) and form a distinctive branch of Dentistry in a number of European Union (EU) countries (Widström & Eaton 2006), such that there is no significant overlap of knowledge and training with other dental and medical specialties. Endodontics represents a developing clinical discipline embracing scholarly academic activities in microbiology, oral biology, pathology, epidemiology, radiology, biomaterials science, and prevention and management of pulp and periapical disease as well as the emerging fields of tissue engineering and molecular and

genetic investigation. More specifically, the clinical discipline is made distinct by its unique multi-skill dependent nature that relies heavily on tactile skill development. The flourishing need for expertise in both clinical and academic components will need to be met through a coordinated effort in development of basic educational programmes at undergraduate level and more sophisticated, but complementary, programmes at postgraduate levels, as well basic and translational clinical research to develop more effective and efficient methods of management of the diseases involved. These processes should integrate with effective clinical service provision to serve the community.

Primary, secondary and tertiary care service provision

Endodontic conditions and their management constitute a considerable proportion of clinical cases

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encountered in general dental practice (Callis *et al.* 1993, Brennan & Spencer 2003). The provision of endodontic treatment appears to be increasing and the expectations are that this trend will continue (Eriksen 1991, Weiger *et al.* 1997, Schulte *et al.* 1998, Brennan & Spencer 2003, Bjørndal & Reit 2004, Skudutyte-Rysstad & Eriksen 2006). These rising trends may be explained by a combination of factors, including an increase in the dentate population together with higher proportions of sound untreated or treated teeth. The increasing life expectancy of patients results in a greater likelihood of wear and tear problems (tooth surface loss), root caries and periodontal complications. Eventually, this is expected to lead in the future to a rising need for endodontic services of a more complex nature, reflecting the attitude of patients who wish to retain their natural dentition rather than accept prosthetic replacements (Brennan & Spencer 2003). Epidemiological data from Europe and beyond (Eriksen 1991, Dummer *et al.* 1997, Weiger *et al.* 1997, Schulte *et al.* 1998, Brennan & Spencer 2003, Bjørndal & Reit 2004, Hugoson *et al.* 2005, Skudutyte-Rysstad & Eriksen 2006) suggest a high prevalence of apical periodontitis and endodontic treatment provision below the standards iterated in ESE guidelines (European Society of Endodontology 2006). Indeed, poor technical quality of root canal treatment is a risk factor for apical periodontitis (Kirkevang *et al.* 2007). Root canal treatment is available under various financial arrangements in the different European countries, yet the clinical problems faced at the secondary care level are similar.

The consequence of escalating endodontic problems in primary care is their referral to secondary and tertiary care providers. The patients' options are either, further care by a more highly trained dentist with special expertise in endodontics, or tooth extraction; the latter leading only to potentially more expensive prosthetic options (Schulte *et al.* 1998, Brennan & Spencer 2003, Bjørndal & Reit 2004, Skudutyte-Rysstad & Eriksen 2006). This scenario has created a market of patients vying for care by a clinician who is more expert in endodontics. The referral profile varies from one specialist to another and depends upon numerous factors. A mature communication interface between general dental practitioner and specialist can enable better case selection and referral before irreversible iatrogenic damage is incurred, creating a form of preventive practice.

An ideal model of service delivery should take account of the following principal problems:

1. increasing prevalence of primary pulpal/periradicular diseases;
2. ineffective management in primary care because of shortage of skill/knowledge mix;
3. increasing prevalence of periapical disease associated with poorly treated teeth;
4. saturation of secondary and tertiary services to manage complex endodontic problems;
5. lack of coordination between primary, secondary and tertiary services.

A multi-faceted scheme would be needed to address these problems, involving an integrated model of service delivery, consisting of effective general dental practitioners in primary care and specialists in secondary and tertiary care. The effectiveness of such a scheme would be predicated upon the closing of knowledge and skill gaps that currently exist amongst these groups. It should embrace improvements in undergraduate training, opportunities for postgraduate training for continuing professional development, as well as for formal training towards specialization.

Undergraduate education

The ESE has amongst its objectives the requirement to promote high standards of endodontic practice within the dental profession and to stimulate endodontic postgraduate education (<http://www.e-s-e.eu>). The ESE has developed guidelines for undergraduate education (European Society of Endodontology 2001) and a consensus report on quality guidelines for endodontic treatment to facilitate the setting of minimal acceptable standards in Europe (European Society of Endodontology 2006). The Undergraduate Curriculum Guidelines for Endodontology (European Society of Endodontology 2001) recognize the deficiencies in treatment delivered in general dental practice in Europe and suggest that this is at least in part because of the quality and quantity of education and clinical experience received during undergraduate training (Hayes *et al.* 2001, Jenkins *et al.* 2001). They further recognize that undergraduate training can only achieve a minimum level of competence and experience, and that an ethos of continued learning must be instilled in the graduate to allow complete development. Unfortunately, despite the best efforts of teachers, the graduating dentist is left with a considerable gap in knowledge and practical expertise that are required to meet the endodontic demands of practice (Brookman 1991, Dummer 1991, Qualtrough & Dummer 1997, Qualtrough *et al.* 1999, Stewardson 2002). The extent of this gap varies (Pettiette *et al.*

1999), but of concern is the observation that there appears to be a decrease in the general level of endodontic experience acquired before graduation (Hayes *et al.* 2001, Stewardson 2001a, Stewardson 2001b, Stewardson 2002, Stewardson *et al.* 2003). The new graduate or general dental practitioner with limited experience of endodontics has to acquire this expertise without systematic opportunity for continuing education or postgraduate training (Stewardson 2001 a,b).

Continuing postgraduate development

Further education programmes in Endodontology have been developed to help meet this primary care problem as well as the secondary referral demand, though the arrangements are not formalized and vary considerably from country to country. There exists a range of programmes with different levels of training provision and achievement; from episodic limited day-week courses, through to more formalized university-based courses at Certificate or Diploma levels. In some European countries, Endodontology is a recognized dental speciality with provision of formal taught programmes, whereas in others it is vying to become so. At an EU level, it is therefore important to distinguish between those programmes whose graduates achieve a universally recognized 'specialist status' from those that may be achieving a 'sub-specialist level' that has been termed in some EU countries, 'General dental practitioner with a special interest (in Endodontics)'. See as an example in the UK: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4133751 (accessed 20th May 2010).

It is also important to recognize that 'sub-specialist level' programmes may even have structures and aims and objectives (whose graduates may call themselves 'certified endodontists'), exceeding those provided by episodic, uncoordinated, non-university-based courses delivered by un-recognized authorities with no degree awarding powers.

Postgraduate specialist training

Although it is recognized that it will become the responsibility for each European country to organize their own specialist training and recognition procedures, it is essential that a consensus is developed over the minimum requirement for specialist training in Europe that could be used by national authorities as a framework. There is recognition of the problems of achieving such consensus and its ultimate embedment

in a pan-European legal framework. Nevertheless, where there is need for higher expertise for service delivery, the speciality federations have taken the initiative to develop frameworks; Endodontology clearly falls within this group (Sanz *et al.* 2008). The ESE intends to maintain a list of university-based institutions approved by national authorities for specialist training and of specialists who have certificates of completion of specialist training in Endodontology.

Basic science and translational research

Any population-based disease requiring special management consideration, in addition to requiring coordinated education and service strategies, should also possess coherent research strategies. Consistent with current good practices in Medicine, it follows that these strategies will include basic science research into the endemic problems defining the discipline through to translational clinical research that makes a direct impact on improvements in disease management. The management and coordination of integrated educational, research and clinical service programmes requires high-quality clinical academics working within appropriate university departments. It therefore follows that the development of such a speciality should be driven through universities.

To ensure that Endodontology will be recognized and acknowledged as an independent discipline by universities and the European Department of Health, the ESE must be prepared to present its case in Brussels in a timely fashion, as and when the opportunity arises. The political position in Brussels would be strengthened by having an agreed speciality programme framework, valid for Europe and accepted by the General Assembly of the ESE. In addition, ESE-accredited speciality training programmes could provide the opportunity for graduates to practice anywhere within Europe (subject to cross-nation laws). A framework for approved training programmes would also provide a basis for retrospective differentiation between those members that have achieved the 'Speciality' status versus those that may be designated as 'Certified'.

Requirements of a specialist

Definition of a specialist

It is important to appreciate the lay population's expectations of a specialist. Dictionaries define the term using the following descriptions: someone who devotes

themselves to a *special occupation* or *branch of knowledge*; someone who has *special aptitudes* or *skills*; someone with a mark of *quality* or *excellence*. The inference is a clinician *excelling* in their *deep understanding* of the discipline as well as having *specialist clinical skills* beyond simple competence and even proficiency (Chambers 1994, Chambers & Gerrow 1994). In essence, an individual who has expertise/mastery of the field, including the highest levels of professionalism.

Scope of a specialist's duties

A specialist would be expected to liaise with the referring practitioner (usually the coordinator of the patient's overall oral care) to provide a seamless, ethical, high-quality service. This infers a familiarity with the remit of the referrer and therefore a previous first-hand knowledge and experience of providing such general dental care. The specialist should be able to decipher the patient's problem and prescribe the appropriate management as well as execute it with the highest level of skill. Doubts about the origin of the problem or choice of treatment should be promptly identified and appropriately handled through the referrer.

Requirements of a specialist training programme in Endodontology

Specialist endodontic training within the framework of a graduate programme

The emergence of Endodontology as a discipline in Europe has occurred because of the following:

1. The recognition that endodontic conditions are a substantial clinical problem with prevalence that is comparable to other major dental diseases;
2. The need to develop a scientifically supported knowledge base for improved understanding of the diagnosis and management of endodontic diseases and related disorders;
3. The need for both clinicians and faculty with sufficient training and experience in Endodontology to provide quality patient care, education, training and research in the field;
4. The lack of substantial overlap of knowledge and training with other dental and medical specialties.

To meet the continuing needs of development of this discipline, it is important that specialist training is provided within the framework of a university-based, clinical, taught graduate programme.

Aims of a specialist training programme in Endodontology

General aims

1. To help meet the national and international demand for highly knowledgeable and specialist endodontists in Europe;
2. To provide comprehensive, structured and balanced specialist training, enabling satisfactory completion of training and development by the trainee to undertake high-quality, independent practice, as well as to contribute to and lead high-quality teaching and research in the discipline.

Specific aims

1. To provide a suitable foundation of basic science knowledge relevant to the understanding of all aspects of Endodontology;
2. To provide a suitable forum in which to stimulate deep learning by objective evaluation and discussion of the aetiology, pathogenesis, epidemiology and treatment of endodontic conditions;
3. To emphasize the importance and implications of the inter-relationship between endodontics and other clinical disciplines;
4. To facilitate and encourage development and refinement of specialist-level practical and clinical skills in endodontics as well as to become proficient in the overall management of patients;
5. To instil the independent ability to appraise critically and modify clinical practice in the light of advances in knowledge and technology;
6. To be familiar with the principles and practice of clinical governance and its value in improving clinical service;
7. To provide a direct insight into quality research and publication, and enable the trainee to perform and publish quality research (under supervision);
8. To provide a direct insight into teaching, learning and assessment;
9. To prepare for professional examinations and competence tests.

Objectives of a specialist training programme in Endodontology

General objectives

To train clinicians with a broad educational base and diverse skills, who are able to:

1. Provide specialist-level high-quality care for patients with endodontic and related conditions; and

2. Continue their development to act as teaching and research faculty in dental schools and/or other health science centres, universities and hospitals.

Specific objectives

Upon successful completion of the programme, the graduate trainees should have acquired:

1. A broad foundation of knowledge and deep understanding of the basic sciences and principles underpinning endodontics;
2. A deep understanding of the evidence-base for endodontics, including the areas of knowledge, deficiency and probable avenues of future development;
3. An ability to collect relevant clinical information (biological, technical, psychological, social) from a patients' history, examination and special tests and to integrate and analyse it to identify the nature of their condition, where necessary using differential and provisional lists, with further investigation and analysis to make a definitive diagnosis of the problem(s);
4. A sufficient familiarity with available treatment options to discuss them with patients and make an appropriate choice (if necessary in conjunction with other specialists) and to formulate an overall integrated plan of management for each patient;
5. An ability to plan systematically the management of an endodontic problem and the clinical and surgical skills to execute it with a high degree of specialist expertise (proficiency);
6. An ability to communicate effectively and professionally with referring clinicians, to coordinate effective delivery of care;
7. Sufficient understanding of research to critically assess classical or new research work and to design and execute their own research projects in the discipline of Endodontology;
8. An ability and motivation to maintain themselves abreast of theoretical and practical developments and modify practice as appropriate, using a life-long learning philosophy;
9. Full knowledge and practice of clinic governance issues;
10. An appropriate attitude and understanding of ethical and societal issues, and the place of endodontics in the overall healthcare spectrum;
11. An ability to convey and disseminate academic and clinical knowledge in properly designed taught courses (with appropriate aims, objectives and assessment), set in appropriate facilities for the benefit of general dental practitioners and/or undergraduates.

Curriculum for specialist training in Endodontology

Advanced education

Advanced educational programmes should be organized as graduate programmes. Graduate programmes are academic programmes of study under the aegis of a university. They should be integrated with advanced clinical training in a planned sequence of study units or modules and should provide the student with substantive research training in specific areas of science. A quality controlled and peer-reviewed, defensible thesis at Masters (M) level based on original research should be required to complete the graduate programme. An academic Masters Degree, such as Master of Science or Master of Clinical Dentistry may be an appropriate level of study under present regulations [the level may be subject to re-labelling after the Bologna agreement is implemented (<http://www.hefce.ac.uk/Partners/world/bol/>; <http://www.bologna-berlin2003.de/index.htm>)]. A postgraduate research Doctorate would not normally be included in the specialist training period. On completion of a graduate programme related to Endodontology, graduates should be prepared for careers in patient care, education and/or research. Every endeavour should be made to encourage graduates to seek further advanced training to meet the international need for clinical academics in endodontics.

Award of degrees and certificates of completion of training

An institution offering advanced training in Endodontology may award a Masters Degree and/or an equivalent certificate indicating completion of a recognized programme of study and specialist clinical training. Special licensing and titular privileges are awarded by the licensing body of the country in which the training took place. In view of the international need for clinical academics in endodontics, opportunities should be available for participants to complete a thesis and/or to undertake a further research degree such as a PhD (3–5 years), as part of further advanced training in Endodontology. This may be developed through a clinical graduate programme or independently or in association with existing science graduate programmes in oral biology, oral sciences or other related health science fields.

Overview and general conditions

The graduate programme must be designed to provide specialist knowledge and skills beyond the dental undergraduate level (European Society of Endodontology 2001) and must be oriented to the accepted

standards of speciality practice as set forth in specific requirements contained in this document. All advanced education courses in Endodontology must have a sound scientific basis, and core material should be underpinned by classical and current best evidence from publications in appropriate refereed journals. In addition, clinical programmes should be multidisciplinary, when appropriate, with an emphasis on whole patient care and the importance of Endodontology in the overall welfare of the patient. The education shall take place within universities under the responsibility of appointed academic teachers in Endodontology with participation by specialists in practice, including specialist practice orientation. It is envisaged that faculty specialists will acquire experience in education and training to enable them to become more competent, confident and reflective teachers, capable of critically evaluating and developing their own teaching and learning approach to facilitate high-quality student learning.

1. The duration of the graduate speciality programme must be a minimum of 3 years full-time formal training (4500 h). Trainees may be enrolled on a half-time (a minimum of five sessions per week, each session lasting 3 h) basis providing that the educational experiences, including clinical experience and responsibilities, are the same as those acquired by full-time students and there are an equivalent number of hours spent in the programme. Trainees enrolled on a half-time basis (or greater fraction) must be continuously enrolled and must complete the total curriculum in a period not to exceed twice the duration of the programme for full-time trainees. Trainees should ideally start and complete the programme within a single institution, but where necessary, transfer should only occur between accredited programmes and on the proviso that continuity can be assured. Flexible training for trainees with health or social issues (e.g. pregnant women) would be considered but in any case must not result in suspension of training leading to elongation of the overall programme beyond twice the full-time equivalent;

2. The distribution of time spent during training should be approximately 60% clinical activity, 25% academic activity and 15% research activity;

3. The clinical activity may include preliminary laboratory simulation exercises to develop technical skills. The trainees should be exposed to a variety of endodontic techniques. The programme must include a system for follow-up evaluation of patients. The trainees must maintain an accurate and sufficiently detailed

log of their clinical training activities to enable appropriate assessment by internal and external bodies. It is important that a log summary sensitive enough to accurately reflect the trainees experience is created and used for assessment. This should be comprehensive and reflect laboratory technical training, clinical treatment (discipline-specific case-mix as well as multi-disciplinary case-mix), case conference activity and diagnostic, treatment planning and review clinics. It is suggested that a minimum of 180 patients are treated over the training period, with a minimum distribution of 60 patients per year. These indicative figures should not be taken as a prescriptive benchmark, rather they serve as an indicator of the minimum average numbers of cases required to achieve the specialist skills and experience levels required of a putative specialist on graduation. In training terms, therefore, the trainee should demonstrate progression and achievement of consistently high quality in an increasingly complex case-mix through the programme. It is anticipated that these qualities will be further consolidated during the working life of the specialist. The case-mix during training should reflect the needs of secondary/tertiary care in the population to be served in the country of origin of the programme. If the trainee subsequently wishes to practice in another country within the EU, the local governing bodies may wish to review the training case-mix and therefore there is merit in some degree of standardization throughout the EU;

4. The academic activity must include basic, applied and clinical science relevant to Endodontology. This course of biomedical science instruction should be accomplished through formal interactive teaching/learning episodes including tutorials, seminars, conferences, laboratory assignments and should be preceded by self-study. Supplementary topics may be added to meet the specific goals of each candidate and fit within the framework of the Endodontology programme. The goals of the clinical and didactic components of the programme must be clearly identified and documented. Documentation of all programme activities and assessments must be maintained by the programme director and available for review. There should be evidence of integration of academic and clinical activity, so that they do not stand as separate strands of learning and teaching; case conferences may act as a formal forum for testing such integration;

5. Trainees must be academically and practically exposed to research methodology. Trainees should participate in a research project (clinical, experimental

or literature research) and report their findings and conclusions in a formal thesis or equivalent written report, which should be assessed summatively as part of the overall assessment strategy;

6. The majority of the time will be allocated to the core programme but may be supplemented by additional activities (electives, special assignments), which will vary according to the individual institution and the needs of the students. Such activities include: extension of the obligatory course work, special courses, additional clinical experience, more teaching engagements, as well as attending guest lectures and scientific meetings;

7. Clinical teaching of undergraduate dental students or general dental practitioners may form a part of the programme, provided it is delivered within a proper educational framework and is limited to no more than 10% of the total clinical activity. Likewise, academic teaching may form part of the programme under similar limitations. Such teaching activity should be accompanied by evidence of peer monitoring and quality control;

8. Summative and formative assessment must be included for all academic and clinical courses to appraise understanding, knowledge and clinical progression;

9. At the end of the programme, there must be a final evaluation by a board of examiners, which must include one suitably qualified external examiner (not affiliated with the programme or Institute).

Levels of achievement

The level of academic achievement and clinical skill development is defined by the adoption of terms described below. It is anticipated that the completing trainee's achievements will be bracketed at the lower end of the extreme by the minimum level of knowledge and competence compatible with care provided by a general dental practitioner (for general dental care issues) and at the higher end of the extreme by a deep understanding of the core subject, underpinned by scientific principles and the highest clinical expertise (proficiency/mastery). The precise methods for achieving the final goals may vary between programmes.

The following terms indicate the relative weight attached to each statement:

Levels of imperative:

1. Must: indicates an imperative need and an essential or indispensable item, i.e. mandatory;

2. Should: indicates the recommended manner for obtaining the standard, i.e. highly desirable;

3. May or Could: indicates freedom or liberty to follow a suggested alternative.

Levels of knowledge:

1. In-depth: a thorough and deep knowledge of concepts and theories for the purpose of critical analysis and synthesis of a more complete understanding;

2. Understanding: adequate knowledge with the ability to apply;

3. Familiarity: basic knowledge for the purposes of orientation and recognition of general principles.

Levels of Skill:

1. Specialist: Highest level of skill consistent with being a specialist and beyond the proficiency level; indicating expertise or mastery;

2. Proficient: Level of skill beyond competency. It implies a high level of skill attained through advanced training and habituation to a particular activity; its signature characteristics include consistency of high standard as well as efficiency;

3. Competent: Level of skill displaying special ability or knowledge derived from training and experience;

4. Exposed (Beginner/Novice): Level of skill attained merely by observation or participation in a particular activity.

Syllabus topics

Upon completion of the programme, the trainee should have special knowledge and skills at a considerably more advanced level than those required for a licence to practice dentistry.

Trainees must have an understanding of the relevant aspects of the following basic and applied sciences in relation to Endodontology:

- 1.** Head and neck anatomy;
- 2.** Dental embryology and physiology;
- 3.** Clinical pharmacology and therapeutics;
- 4.** Oral microbiology and immunology;
- 5.** Oral pathology and medicine;
- 6.** Oral and maxillofacial radiology;
- 7.** Oral cell biology and histology;
- 8.** Biostatistics;
- 9.** Research methodology and science education;
- 10.** Epidemiology;
- 11.** Scientific writing;
- 12.** Cariology;
- 13.** Pulp biology;
- 14.** Periodontology.

Trainees must have an in-depth knowledge of the following endodontic topics, as well as clinical skills in:

Differential and definitive diagnosis of common pains and diseases of the oro-facial region, especially those arising from injury to the pulp and periradicular tissues in both the primary and permanent dentition;

1. Pain management, including prevention and control;
2. Non-surgical endodontic procedures;
3. Surgical endodontic procedures;
4. Emergency management of dental conditions;
5. Evaluation of endodontic treatment;
6. Causes and management of persistent problems;
7. Concepts for dental treatment planning, as well as principles and practice of endodontic and restorative treatment planning;
8. Communication of nature of problems and management to the patient and referring dentist;
9. Use of contemporary techniques such as the operation microscope.

The clinical proficiency required of the trainee is further defined by the following specific skills above those required by the general dental practitioner as described in the Undergraduate Curriculum Guidelines for Endodontology (European Society of Endodontology 2001):

Endodontic management

1. The trainee must develop excellent clinical management skills in endodontics;
2. (S)he must develop excellent diagnostic skills including the ability to obtain relevant clinical information (biological, technical, psychological, social) from patients' history, examination and special tests and to analyse and integrate it to identify the nature of their problem;
3. (S)he must develop the ability to enumerate treatment options and be adept at decision-making approaches to select the correct choice for the patient through a risk assessed and informed consent process;
4. (S)he must develop excellent communication skills to relay the relevant information to the patient and referrer, as well as to facilitate an appropriate management of their clinical learning environment;
5. (S)he must develop excellent management of their operatory and clinical environment;
6. (S)he must develop a high level of technical excellence, demonstrating consistently high standards in treating all varieties of endodontic cases;

7. (S)he must be able to manage involved pulps through appropriate evidence-based pulp therapy techniques to maintain and protect pulps and teeth;

8. (S)he must have a range of highly developed technical and clinical skills to perform root canal treatment or root canal re-treatment, where necessary, using contemporary evidence-based approaches, whilst showing awareness of the need for protection of remaining tooth structure and its long-term retention;

9. (S)he must be able to avoid, identify, appreciate the consequences of and correct procedural errors during treatment;

10. (S)he must be able to identify the need for and be able to perform endodontic surgical procedures, using contemporary evidence-based procedures, techniques and materials;

11. (S)he must have well-developed skills in providing appropriate levels of after-care after any endodontic procedure, over short, medium and long terms;

12. (S)he must obtain sufficient experience from reviewing long-term outcomes of a large enough pool of patients to enable development of prognostic skills. This level of exposure may require specific review clinics of patients treated within the unit.

Adjunctive and multi-disciplinary approach to management

1. The trainee should be aware of the broader aspects of Endodontology and learn to practice preventive endodontics (advice to avoid or prevent those practices, treatments or procedures that may jeopardize the survival of the pulp, such as heavily reduced crown preparations, conventional bridges, where alternatives may be available, etc.);
2. In cases in which sub-gingival fracture, perforation, resorption or caries are present, the trainee should have an understanding of and be able to make assessments of tooth restorability and viability as an abutment, as well as to stabilize and protect such teeth from future fracture;
3. Where necessary and appropriate, the trainee should be able to perform, or arrange appropriate access to periodontal surgical or orthodontic procedures which would permit restorable teeth to be sufficiently exposed for rubber dam placement and restoration;
4. The trainee must have an understanding of the indication and availability of the following procedures and must also be able to perform these, where required:
 - Hemisection;
 - Root resection/amputation;

- Apexification;
 - Extraction with replantation (intentional replantation).
5. The trainee should be aware of the shifting dynamic in treatment planning brought about by the growth and potential of replacement of compromised teeth by implant-retained prostheses. They should have a working knowledge and some experience of the principles and practice of this as well as other tooth replacement modalities, whether this is achieved through multi-disciplinary cases or personal experience. This should include a good insight into the cost:benefit analysis of various options.

It is understood that local service needs and case-mix flow may influence the ability of Trainees to achieve speciality-level skills in the aspects listed below. Under such circumstances, it may be appropriate that they develop an in-depth knowledge of the following endodontic topics, as well as competence in the associated clinical skills:

1. Dental traumatology and management of traumatic dental injuries;
2. Restoration of the root-filled tooth;
3. Management of the discoloured tooth;
4. Inter-disciplinary management of problems, such as interfaces between endodontics with periodontics, prosthodontics, orthodontics, paedodontics, oral medicine, special needs and oral surgery;
5. Total dental care for patients;
6. Clinical photography;
7. Clinically relevant IT skills.

It is understood that local service needs and case-mix flow may influence the ability of Trainees to achieve competence in the topics below. Under such circumstances, it may be appropriate that they develop an understanding of the following endodontic topics, as well as be exposed to the associated clinical skills:

1. Extraction with replantation;
2. Management of medically compromised patients;
3. Behavioural sciences as applied to endodontics;
4. Differential diagnosis of lesions of the periodontal tissues;
5. Diagnosis and treatment of periodontal disease;
6. Diagnosis, prevention and treatment of tooth surface loss;
7. Principles and practice of fixed and removable prosthodontics and implant dentistry;
8. Cranio-mandibular function;
9. Practice management.

Trainees must have familiarity with the following endodontic topics, as well as be exposed to the associated clinical skills:

1. Medical emergencies (with annual updates on procedures);
2. The history of endodontics;
3. Teaching methodology;
4. Sedation techniques.

Trainee appraisal

There must be documentation of ongoing evaluation and progress of students. The system should ensure that, through the director and faculty, each programme performs the following:

1. Continuous and on-going evaluation of the knowledge, skills and professional growth of its trainees using appropriate criteria and procedures, including formative and summative assessment;
2. Ideally, systematic, continuous and/or quarterly appraisal of trainees' performance to allow them to reflect on their progress and to equilibrate it with the individual and collective views of the faculty. Based upon these assessments, trainees who do not fulfil the requirements must be counselled regarding motivation or other learning problem(s) and reassessed after an appropriate probationary period. If necessary, formal warnings should be issued regarding the eligibility for progress or retention in the programme;
3. Progression of trainees to more complex procedures, cases, positions of greater responsibility and independence only on the basis of evaluated evidence of their readiness for such advancement;
4. Maintenance of a personal record of evaluation for each trainee which is accessible to the trainee and available for review;
5. Implementation of an institutional policy that provides for due process for all individuals who may be potentially involved when actions are contemplated or initiated which could result in the dismissal of a trainee. When there are grievances against a programme or institution, it is imperative that review of these grievances be initiated at the programme level prior to involvement of other offices. Records of all courses, conferences, seminars and clinical experience must be maintained for each trainee.

Faculty

A well-qualified faculty is the primary requirement for an acceptable advanced education training programme in Endodontology. Faculty who have had advanced training in Endodontology, or through their own efforts have achieved advanced knowledge and skills in the

discipline, should supervise a major portion of the training. Where appropriate, the faculty members should be on the national Specialist List in Endodontics (and in due course on the ESE specialist list). Speciality training in another dental field is inappropriate. The supervision of Masters Theses and PhD dissertations should only be carried out by faculty with experience as independent investigators and who are members of the faculty of the university that confers the award.

All programmes must be directed by a single responsible individual (Programme Director) who meets the requirements described earlier. The director must have sufficient authority, resource and time to fulfil administrative, teaching, clinical and research responsibilities to achieve the educational goals of the programme. It would be preferable if the appointment was full-time but the multiple and various demands on an academic are well recognized. The director should have demonstrable personal authority in the scholarship, teaching, research and patient care aspects of the discipline. The director should appoint and organize the faculty into a balanced team meeting the needs of the programme. Whilst the director takes the responsibility of all decisions and should remain the final arbiter, the programme would be significantly strengthened by a structure of management that allows the entire faculty to participate in the decision-making process and gives the team part ownership as well as the motivation to strive for higher standards. To this end, management by a programme committee (consisting of entire faculty and other relevant partners such as representatives of support staff, laboratories etc. in delivering the educational experience), chaired by the director and assisted by junior and senior programme coordinators has much to credit it.

It is the University's responsibility, through the programme director and relevant programme committee, to assure that the trainees completing the programme have achieved the academic and clinical standards of performance established for the programme and for practice in the speciality. The Programme Director must discharge the following responsibilities with the aid of the programme committee:

1. Student selection;
2. Development and implementation of the curriculum;
3. Ongoing evaluation of programme goals and content, faculty teaching, and student performance;
4. Programme administration;
5. Planning and operation of facilities used in the educational programme;

6. Maintenance of records related to the educational programme;

7. Overall continuity and quality of patient care.

The size and time commitment of a critical mass of core programme faculty must be sufficient to ensure the following:

1. Continuity of instruction;
2. Exposure of trainee to a broad range of diagnostic and treatment modalities;
3. Faculty involvement in all teaching activities, including clinical teaching, case conferences, self-study activities and seminars;
4. Faculty review of patient evaluation, treatment planning, management, complications and outcomes of all cases with trainees;
5. Adequate supervision of all clinical activity;
6. Adequate liaison with consultants, collaborators and affiliated institutions;
7. Faculty participation in basic or clinical research;
8. Faculty participation in research training.

A member of the programme faculty must be present for teaching and direct supervision of all patient care. They should have specific and regular assignments to ensure their immediate availability for direct supervision of trainees in the clinic.

The suggested optimal ratios for trainer to trainee are:

- Clinical training 1 : 4
- Academic training 1 : 8
- Research training 1 : 5

Faculty members should be appraised formally at least annually to determine the quality of their performance. Whilst the programme director must be responsible for faculty evaluation, it is essential that trainees also have an input in this process. The programme director, as well as the faculty, should have a demonstrated interest in teaching, research and patient care in Endodontology. They should allow enough time to be able to devote their full efforts to their teaching remits. Furthermore, they should set an example for the students by engaging in scholarly activity such as: participation in their own continuing education; participation in regional and national professional or scientific organizations; presentation of papers and publications in refereed journals; demonstration of a personal and active interest in research.

Institutional commitment

Advanced endodontic education must be provided by university-based dental schools with patient care clinics

demonstrating adequate staffing and facility resources suitable for a speciality programme. There should be a commitment on the part of the institution that the educational programme provides training and health services of high quality.

This responsibility includes, but is not limited to, assuring an administrative system that is dedicated to education and provides for the involvement of teaching faculty in:

1. Selection of candidates;
2. Programme planning;
3. Programme review and
4. Trainee evaluation, on a regular basis.

The programme should be a recognized entity within the institution's administrative structure. The position of the programme in the administrative structure should be consistent with other parallel programmes, and the administrator should have authority, responsibility and privileges equal to those of other programme administrators.

The educational mission of the programme must not be compromised by a reliance on trainees to fulfil institutional service, teaching or extraneous research obligations. For proper achievement of educational objectives, adequate resources and time must be provided. Institutions sponsoring advanced education programmes must provide adequate financial support to assure fulfilment of programme objectives on a continuing basis. Appropriations should provide for innovation and changes to reflect current concepts of higher education and the practice of the speciality.

Institutional facilities and resources

Institutional facilities and resources must provide the educational experiences and opportunities to fulfil the needs of the training graduate programme and to develop and sustain it on a continuing basis. All facilities and resources must be available to permit trainees to carry out their educational, research and patient care responsibilities on a full-time basis. The programme should therefore have the resources to employ an adequate number of full-time faculty, purchase and maintain equipment, procure supplies, reference material and teaching aids as reflected in annual budget appropriations. Financial resources should allow the programme to recruit competitively and retain qualified faculty. The resources should include, but are not limited to:

- dedicated (specifically identified and designed) contemporary clinical facilities supported by dedicated support staff to carry out endodontic practice to a high

level, including opportunities for four-handed dentistry; operation microscope and radiographic imaging facilities should be readily available;

- access to properly equipped technical skills laboratory where simulated treatment exercises may be performed at all stages of the programme;
- an adequate library (or Information Centre) providing direct and electronic access to standard reference texts and appropriate current journals;
- sufficient classroom space for seminars, tutorials, lectures and other modes of academic instruction with appropriate audio-visual aids;
- access to properly equipped science laboratories for basic or applied research; and
- administrative offices and personnel.

Equipment and supplies for managing medical emergencies in the clinic must be readily accessible and functional. All trainees, faculty and support staff involved in the direct provision of patient care must be continuously recognized/certified in basic life support procedures. In addition to policies minimizing the use of ionizing radiation, attention must be directed to the judicious use and monitoring of nitrous oxide, mercury, drugs and other substances and techniques that might be hazardous to patients or personnel. Each institution must establish a mechanism to assure adequate infection and hazard control during the delivery of patient care. A written infection and hazard control clinic protocol must be developed and made available to all students, faculty and appropriate support staff. Mechanisms must be established for monitoring compliance with this protocol within the institution and affiliated programs. Health and safety regulations must also be followed for each teaching or research laboratory, and institutes should be able to demonstrate working protocols in place. Periodic and unannounced review of the clinical and laboratory facilities should be undertaken to ensure proper monitoring. Graduate programmes in Endodontology must use institutional facilities and resources to carry out the major components of the programme. Trainees may be permitted to use private dental operator facilities to provide specialist practice orientation for a proportion of the final year of training, when close clinical supervision is being tapered down to allow more independent decision-making. Such arrangements should, however, involve appropriate practice and supervisor approval, as well as careful case-log and case-mix monitoring. These aspects should be well documented. Visits to specialist practices for observation may also be encouraged.

Quality control of programme

The institute and programme must have mechanisms in place for annual and periodic (approximately 5 years) review of the programme against its stated aims and objectives. It is beneficial to perform a broad review encompassing the trainee's experiences on the campus as well as the programme but particularly focus on its main remit; the involvement of an external evaluator with experience in teaching at this level may enable sensitive deficiencies to be revealed and corrected. The review may be stratified by programme elements down to the individual taught activities, as well as to the performance of the faculty. The findings should be presented in a formal report and be available as a record and for external review.

In addition to this, the programme committee should review the performance of the trainees as well as the training programme on a quarterly basis to identify and correct problems early. These deliberations should be minuted.

The external examiner should formally report to the university as well as the programme director following the annual trainee examinations to comment on the performance of the trainees in the context of national and international university standards as well as the process of assessment and the performance of the programme. These should be maintained for internal records and external review.

Selection of trainees and their responsibilities*Prerequisites*

The applicant for advanced training in Endodontology must be:

1. A graduate of a EU accredited dental school; or
2. A graduate of a non-EU dental school who possesses equivalent educational background and standing to (a);
3. A possessor of a qualification acceptable to the licensing authority of the country hosting the dental school and also to the country hosting the specialist training;
4. Sufficiently experienced in the general practice of dentistry to have acquired a good level of generic dental and patient management skills over a *minimum* of 2 years following graduation (In some EU countries, there is no legal requirement for an applicant to demonstrate experience in general dental practice prior to being accepted on a specialist programme. In these circumstances, this prerequisite cannot be enforced;

however, the ESE is strongly in favour of enrolling on specialist programmes only those applicants who have undertaken a minimum 2-year period of general professional training);

5. Able to demonstrate continuous learning and clinical progression, post-qualification, by attendance at approved continuous professional development courses and active adoption of new knowledge, techniques and skills in their dental practice (In view of (d) above this prerequisite cannot be enforced in some EU countries. However, the ESE is strongly in favour of enrolling on specialist programmes only those applicants who have undertaken a period of general professional training during which they can demonstrate continuous professional development);

6. Recruited after stringent selection procedures within a competitive framework that assesses both academic and clinical potential.

7. These criteria should be followed to ensure the best quality of recruits to specialist training.

Student rights and responsibilities

Candidates for acceptance should be appraised, in general, of the educational experience to be provided, including the philosophy, aims and objectives of the programme, the nature of the curriculum and delivery of teaching, the facilities and the faculty, nature of assignments to other departments or institutions, and teaching commitments.

In particular, the trainee should be made aware of their responsibility to actively engage and participate in the learning and development process; acceptance onto a programme does not simply mean attendance. At the end of the training, the trainee should be capable of independent practice of endodontics at a high level; this implies the requirements of high motivation, drive and personal organization to achieve their individual and programme goals. These aspects should be reinforced in the form of a course manual issued to the trainee at the commencement of the programme. This will include their obligations and responsibilities to the institution, the programme of study and programme faculty. The statement should include, but not necessarily be limited to, information about:

1. Tuition, stipend or other compensation;
2. Vacation, sick leave and maternity/paternity entitlements;
3. Practice privileges and other activities outside the educational programme;
4. Professional liability coverage; and
5. Due process policy.

The Executive Board of the ESE, through its Accreditation Committee, are developing procedures for the assessment and accreditation of specialist training programmes in Endodontology within Europe. The ESE is also developing criteria for entry to a Specialist List for approved individuals who can demonstrate they have achieved the status of a Specialist in Endodontology within Europe.

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