

**Curriculum Proposal for the education and training of
specialists in Prosthodontics**

Suggested Guidelines

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Introduction

This document sets out a curriculum which may be considered the minimum requirements for a specialty course in Prosthodontics in terms of experiential and theoretical needs. Each University will of necessity also separately provide (and according to its rules and regulations) its own comprehensive study guide setting out the organisational structure of the entire programme, the academic programme, the timing of presentation of the courses, requirements of the students, infrastructure available, assessment schedules, etc.

Other accreditation documents are available. For example, documents for the USA may be accessed at <http://www.ada.org/pro.f/ed/accred/index.asp> and for Canada at http://www.cda-adc.ca/english/dentistry_in_canada/cdac/default.asp

Recommended Program Structure

In addition to necessary didactic and clinical facilities, unlimited access to the dental literature via a well-equipped library or internet access facilities may be considered mandatory. A three-year full time program duration would be considered to constitute a minimal program duration for all the aspects included. Extension to a longer period would be at the individual institution's discretion dictated by full or part time considerations, extended periods for complex case completion, research project completion, and inclusion or exclusion of certain aspects depending on regional requirements. An additional one or more years for an additional maxillofacial program (and in some countries an Endodontic program) may be advocated in some regions.

Curriculum Recommendations

Didactic and clinical requirements are often divided in a time ratio of 60%/40%. This will vary between institutions. Didactic requirements may be provided in various formats from formal courses or seminars with prescribed curriculum and outcomes at prescribed levels of knowledge as for example i) in-depth ii) understanding iii) familiarity.

The courses outlined below are guides to content rather than requirements in terms of their course titles. Indeed, where a country may certify specialists with a scope of practice limited to, for example, fixed prosthodontics or maxillo-facial prosthodontics, then these courses would not apply. Similarly when a country has a specialty of endodontics or of "implantology" (we would prefer the term "implant dentistry"), these aspects may be modified.

This document includes all such aspects in order to provide a minimum definition of the wider scope of prosthodontic practice. It is recognised that regional and health policies and priorities will dictate a specific focus for prosthodontic rehabilitation, and those priorities will, of necessity, define the expected scope of practice.

1. Exit level Outcomes / Competencies

1.1 Overall objectives

The objective is to produce knowledgeable and skilled specialists who have developed and formulated their own philosophy through exposure to a wide spectrum of prosthodontic principles, concepts and practices.

It is suggested that learning should be significantly self-directed, and be promoted through provision of resources, discussion and training. Seminar topics should be allocated to individual students to prepare written and oral presentations.

Advanced clinical training will take place with due respect for (1) individual students and with an awareness of the various approaches to clinical decision making. The implication is, however, that students will embark upon their post-graduate studies with an acceptable clinical background and a responsible professional attitude. They are expected to strive for perfection in all that they do; and (2) patient-specific requirements and be provided as patient-specific treatment following informed consent.

1.2 Competencies

- To understand the evolutionary and embryological development of the oral and cranio-facial structures, the stomatognathic system and the natural dentition from a bio-functional perspective.
- To know the biological (including anatomical and physiological), and functional principles to be followed in designing appropriate prostheses for the replacement of the oral and cranio-facial structures.
- To appreciate the changes in the form and function of the mouth and jaws brought about by loss of teeth and/or oral and cranio-facial structures and the social and behavioural consequences of this loss.
- To understand and manage the impact of frailty on the oral health and prosthodontic needs of elderly people.
- To understand and be capable of informed discrimination when evaluating the merits of conflicting philosophies with regard to the biological and physical rationale for the clinical and laboratory procedures employed in the construction of different types of prostheses.
- To be able to critically evaluate the influence of prostheses on the remaining soft tissues and the underlying supporting structures.
- To understand the scope and limitations of different types of prostheses together with the bio-compatibility and physical properties of all materials used in Prosthodontics.
- To be able to evaluate the need for prosthodontic intervention and the long-term consequences of any technologies used, and to demonstrate effective use of technology applicable to a given clinical situation.
- To be able to document and present, for peer review, evidence-based reviews of the prosthodontic literature.

- To acquire and assimilate scientific knowledge and associated clinical experience appropriate to the discipline to be applied in patient assessment.
- To demonstrate professional clinical reasoning and judgement, and the technical skills required to competently diagnose relevant systemic, oral and dental diseases including oral and cranio-facial defects and anomalies pertaining to the specialty.
- To acquire an ability to render an evidence-based best practice comprehensive service to patients who require complex prosthodontic treatment, by managing a multidisciplinary health team involving other disciplines, and to produce carefully documented case reports supported by photographic evidence.
- To gain an understanding of basic research methodology, and to be able to conceive, develop, and carry out independent research, as evidenced by the production of a research report which, in abridged form, would be acceptable for publication in an international journal.
- To have an understanding of the socio-economic consequences of the provision of a comprehensive prosthodontic service for all types of communities, and of the socio-political role of the speciality in relation to national oral health policy and other relevant national legislation.
- To be able to evaluate the alternative procedures available for the provision of a prosthodontic service based on appropriate technology for communities with different socio-economic resources.
- To know and apply learning techniques and strategies, including assessment and examination techniques.
- To know how to engage in lifelong learning through well-developed self-directed learning skills to maintain continued professional development and competence and show a continuous interest in new developments in the specialist field.
- To demonstrate professional and ethical behaviour.

2. Primary Courses

Note: these topics may be presented as part of integrated courses, but are set out here separately in order to ensure that the individual topics are covered.

2.1 Anatomy

An Anatomy course would include the following topics: anatomy of the head and neck including the cranial nerves; the principles of human genetics; the histology of the primary tissues and of oral structures; and oro-facial embryology.

2.2 Physiology

A Physiology course would aim to provide an overview of the clinical physiology relevant to the practice of dentistry, and include: basic neurophysiology; autonomic nervous system; respiration; cardio-vascular system; immunology and wound healing; vitamins and minerals; saliva; muscle physiology; mastication; deglutition; and oral sensation.

3. Major Courses

3.1 Techniques (pre-clinical) Courses

3.1.1 Fixed Prosthodontics

Where resources are available it is suggested that the following be the minimum requirements:

Restorations:

The construction of at least the following restorations from preparation to delivery including all laboratory work:

- A cast gold restoration
- An all-ceramic crown
- A ceramo-metal crown with shoulder porcelain
- An implant-supported crown
- A CAD/CAM restoration

Provisionals:

The construction of provisional crowns and bridges by direct and indirect methods

Cores:

The construction of a direct and indirect dowel and core.

Occlusion:

The programming of a variety of articulators.

Occlusal analysis exercise on casts mounted on a semi-adjustable articulator, and methods for occlusal equilibration.

Occlusal waxing exercises building up stable, static and dynamic occlusal relationships.

3.1.2 Removable Prosthodontics

Complete dentures:

To carry out all the laboratory work for at least one case of complete dentures.

To provide characterisation of gingiva, flange and teeth.

Partial dentures:

The production of a minimum of 10 design drawings for each of acrylic- and metal-based dentures

The laboratory procedures for the processing of at least one acrylic-based denture incorporating pre-formed wire components

The observation of all stages in the construction of a cast metal base.

Maxillo-facial prosthodontics:

The creation of wax replicas for an auricular, nasal, orbital and/or facial prosthesis.

3.1.3 Implant Dentistry

The laboratory procedures for one case of a bar and clip retained implant supported overdenture.

3.2 Clinical Courses**3.2.1 Complete Removable Dental Prostheses (RDP)**

Note: numbers are only a guide and will vary widely from region to region; the numbers indicated here would for example be for a developing country with high levels of complete and partial edentulousness.

At least 5 sets of complete dentures, with a difficulty factor (for example: extreme residual ridge resorption, neuromuscular disorders, following trauma or cancer, children, immediate dentures, etc.).

Competence must be demonstrated in different ways of achieving jaw registration positions using extra-oral and intra-oral registration methods.

Use of different occlusal schemes, in particular cusped articulation and lingualised occlusion, for different skeletal jaw relations and according to clinical indications.

Different techniques (for example for taking impressions) must be demonstrated.

In addition, 3 single maxillary dentures opposing natural teeth must be made, as well as the use of a duplication technique for 2 cases.

3.2.2 Partial RDP

At least 5 conventional metal-frame partial dentures, using different techniques such as altered cast, dual path of insertion, etc.

At least one precision attachment denture.

Overdentures of different designs.

Acrylic-based dentures with preformed components.

3.2.3 Fixed Prosthodontics

The use of face-bow recordings and appropriate inter-occlusal recording materials and methods to mount models on a semi-adjustable articulator, to appropriately adjust the articulator, and to use custom incisal guide tables and diagnostic wax-up procedures.

The use of a suitable scheme to analyse a natural dentition and carry out a systematic adjustment of the natural occlusion to produce an optimum and harmonious occlusal scheme within the patient's stomatognathic system.

Make appropriate recordings, construct, fit, and adjust a Michigan type occlusal splint.

At least 5 completed cases demonstrating total patient care and interdisciplinary management incorporating the following aspects:

- The rehabilitation of posterior occlusal surfaces using cast restorations
- The restoration of missing teeth by means of resin-bonded retained prostheses, both metal and porcelain based, as well as with the use of polymer impregnated fibres.
- Rehabilitation of the complete dentition with combinations of individual crowns and fixed partial prostheses (bridges).
- Rehabilitation of the dentition for a periodontally compromised patient
- Restoration of function for severe attrition
- Restoration of function for severe bone loss
- Cases including the use of implants

3.2.4 Implant Dentistry

Interdisciplinary planning for the placement of implants, including the use of special investigations such as imaging, rapid prototyping, templates, interim prostheses, etc.

Participation in the surgical procedures for the placement of implants both intra- and extra-orally.

The design and placement of implant retained prostheses for complete and partial tooth loss.

The use of removable prostheses over implants, both with individual retainers, bar and clip retainers, ball and precision-attachment retainers, etc.

The restoration of missing teeth with single and multiple implants.

The fixed restoration of the severely resorbed maxilla and mandible.

Exposure to different technologies for the construction of implant supported prostheses such as CAD/CAM, milling, casting, etc.

The management of complications by treating patients in an implant maintenance clinic.

3.2.5 Dental Geriatrics

Dental geriatrics is concerned with the management of oral health and related issues in people who are old and frail. Proficiency in dental geriatrics includes:

Knowledge of the physiology of aging and the influence of medications and disease on oral healthcare for a geriatric population;

Understanding of the delivery of oral healthcare to frail elders;

Management of oral healthcare in geriatric clinics, long-term care facilities, palliative care, and other supportive environments for in-patients and out-patients;

Delivery of oral healthcare to a range of abled and frail elders;

Collaborative practice on inter-professional teams with other healthcare providers in the medical and social services associated with the needs of frail elders.

Clinical competence includes:

The modification, adaptation and use of appropriate techniques in the treatment of the elderly patient with a partial or transitional dentition, as well as in the provision of complete dentures for the elderly patient

3.2.6 Cranio-mandibular disorders and orofacial pain

The completion of at least 5 cases of interdisciplinary care, managed and documented.

3.2.7 Maxillo-facial prosthodontics

Participation in the planning of cases with different surgical and allied disciplines including the use of special investigations such as imaging, rapid prototyping, templates, interim prostheses, etc.

Colour matching of prostheses to skin tones.

Impressions for the following:

- facial moulage
- undercut lesions (2 or more parts)
- palatal defects
- velo-pharyngeal defects
- optic and orbital defects
- auricular defects

The use of a variety of different speech prostheses.

Restoration of a variety of congenital or surgically created defects such as facial features, maxillectomies, partial and complete mandibulectomies, palatal defects, etc.

The use of a variety of retention devices for prosthesis, both intra- and extra-oral, including the use of implants.

Participation in clinics providing neo-natal care such as for cleft palate patients.

Participation in clinics providing radiation oncology.

The management of radiologically and immunologically compromised patients.

3.3 Research Report/Mini thesis/Minor dissertation

Throughout all years of the course the student will be exposed to aspects of research methodology including the critical appraisal of research papers, an understanding of systematic reviews and how to undertake them, the role of evidence-based dentistry, and the use of statistical analyses. A research methodology course is considered to be a part of this component.

A research report must be produced which shows evidence that the student has gained an understanding of basic research methodology, and was able to conceive, develop, and carry out independent research.

This requires the development of a suitable protocol, which must conform to the University's guidelines, and which must be submitted at the appropriate time for approval, prior to conducting the research. The report, in appropriate form, must be acceptable to external examiners according to the rules of the University. It does not receive a mark, but must have been declared acceptable before the final clinical assessment is taken and before the degree can be awarded.

4. Additional / Subsidiary Courses

Note: these topics may be presented as part of integrated courses, but are set out here separately in order to ensure that the individual topics are covered. The titles of the courses may be changed. It is recommended that they be assessed.

4.1 Oral Biology/Physiology

This course includes topics such as the evolutionary and embryological development of the oral and cranio-facial structures, stomatognathic system and the natural dentition; form and function in the stomatognathic system; mastication; oro-facial feedback and defence mechanisms; tissue responses in the oro-facial region; bone growth; orthognathics; etc.

4.2 Oral Pathology

This includes topics such as oral mucosal diseases; salivary gland disorders; pathology of dental tissue; pathology of bone and synovium; age changes in the oral tissues; histological diagnostic criteria for hard and soft tissue diseases; radiological signs for differential diagnoses; treatment of the medically compromised patient; etc.

4.3 Oral Medicine and Periodontology

Topics include the clinical appearance of oral mucosal diseases; surgical and non-surgical treatment of routine and periodontally-involved cases; use of surgical techniques for crown lengthening and hemi-section; the relationship between periodontal health and prosthodontic treatment; peri-implant tissue management; etc.

4.4 Oral Microbiology

This course includes: bacteriology; virology; bacterial pathogenic mechanisms; microbial techniques; sterilisation and disinfection; immunology, etc.

5. Attendance Courses

Note: these topics may be presented as part of integrated courses, but are set out here separately in order to ensure that the individual topics are covered. It is recommended that these be attendance courses as it is not considered necessary to formally assess them.

5.1 Research Methodology

Introduction to research methods; Elementary statistics; computers in research; laboratory animal science; experimental design; research protocols; critical appraisal of research papers; research reports, dissertations and theses for different levels of degree; grant writing; presentation of papers at congresses; ethics and honesty in research.

5.2 Radiographic Diagnosis

The normal anatomy of the maxillofacial region including the anatomy of the temporomandibular joint as seen on computerised tomography and magnetic resonance imaging.

The concepts of the panoramic image, cephalometric and implant radiography, digital imaging and cone-beam volumetric tomography.

The application of diagnostic imaging in the interpretation of lesions of the maxillofacial region.

Recognition of the more common abnormalities affecting the maxillofacial region as well as the signs and symptoms of important malignant lesions to inform an acceptable differential diagnosis.

5.3 Speech Therapy

This course covers the basic aspects of speech, the articulators of speech as they apply to prostheses and in particular the effect on speech of defects in the cranio-facial region and the rehabilitation of speech along with the rehabilitation of the area with prostheses.

5.4 Maxillo-Facial and Oral Surgery

This course is provided to give the student in Prosthodontics an understanding of the surgical procedures involved in such aspects as orthognathic surgery, trauma, oncology, implantology, augmentation, etc.

5.5 Orthodontics

The interdisciplinary aspects of appropriate treatment planning and management with respect to the need for orthodontic repositioning as adjunctive therapy together with Prosthodontic rehabilitation is taken together with students in Orthodontics to gain an understanding of the procedures that will assist both disciplines in effecting an appropriate outcome for the patient.

6. Adjunct / Integrated Topics

It is recommended that these topics be integrated into the major courses where and when appropriate: they are listed here for completeness, and individual study guides will provide more detailed information.

- Behavioural science
- Geriatrics
- Dental materials
- Educational methodologies
- Public health

7. Ancillary Courses

Although not compulsory, students are strongly encouraged to undertake additional courses which will contribute to their overall professional development, and enable them to acquire additional skills and experiences. The recommended courses, which the students are expected to arrange for themselves and in their own time, are as follows:

7.1 Life skills

A life-skills training course such as that run by help-line type organisations is recommended to provide an opportunity for students to be more aware of the infallibility of themselves and others so that they may better understand, sympathise, empathise and communicate with their patients,

as in Prosthodontics in particular it is acknowledged that the cranio-facial region plays a large psychogenic role in signs, symptoms, treatment and rehabilitation.

7.2 Drawing and sculpture

A life drawing and sculpture course is recommended to assist students to develop their psychomotor skills and in particular to learn to observe and see through greater use of the more creative part of their cognition (what used to be called the right side of the brain), as it is known that this will assist them in developing a more refined recognition of their aesthetic observations and their patients' aesthetic needs and demands.

8. Final Assessment

It is not the purpose of this curriculum document to dictate the methods of assessment of all courses, other than to expect that sound pedagogy will underlie all assessment practises.