

Prosthodontics—Where to Now?

Dental schools are being challenged on many fronts and need measured discussion for planning a different set of priorities in dental education. The 1995 Institute of Medicine report¹ comprehensively addresses these issues and has inspired comment and justification for rapid change.

The basis for the challenges faced by dental schools is threefold, involving changing community oral healthcare needs, the need to introduce appropriate learning methods for students who are more demanding and computer skilled, and finally, a revision of funding priorities in universities. The last factor has left dental schools vulnerable; their high costs and traditional emphasis on face-to-face teaching must be balanced against the expense of quality research. Oral healthcare is becoming more demanding with the "graying" of communities and with the increasing complexity of care required, especially for elderly, intellectually and physically disabled, and medically compromised patients. The unmet need for even primary oral care in the lower socioeconomic groups is a major community concern.

Dental schools are addressing educational resource issues,²⁻⁶ together with the need for: (1) clear accountability to governments and universities as well as the communities they serve; (2) developing alternative funding sources; (3) enhancing research output and competitiveness in gaining research grants; (4) developing strategic educational links with medicine and other health science disciplines^{1,7}; (5) broadening the educational experience of students; and (6) engendering an enthusiasm for lifelong learning through continuing professional education.

These are not impossible challenges. On the contrary, the need for dental schools to rechart educational, organizational, and funding directions and priorities is timely and there is a degree of excitement about the possibilities. Educational change is facilitated by our students, who are impressive in their capabilities and willingness to take on tasks independently as in small-group problem-based learning (PBL).^{2,4,8} Unlike their predecessors they are computer skilled, which is an appropriate foundation for both clinical skills development and self-directed learning.

Prosthodontic Training

Removable prosthodontics has been the cornerstone of dental education in terms of curriculum time devoted to clinical and technical procedures. Technical requirements were often overwhelming and of questionable relevance to dental practice. The need for a change in emphasis from technology to biology⁹ is now recognized. This may be facilitated by vertical integration of basic and biologic sciences with clinical sciences, small-group self-directed learning, and an emphasis on comprehensive oral care. Each is crucial for a contemporary curriculum, and these changes are already occurring in some dental schools.^{2,4,8} The decisions surrounding the revision of prosthodontic education have been difficult,¹⁰ and this issue bears further scrutiny.

Undergraduate Prosthodontics

The undergraduate curriculum in prosthodontics should be based on community needs, which vary significantly within cities, between cities and rural communities, between states, and between countries. Prosthodontic programs need to reflect each country's overall priorities and be sufficiently flexible to meet changing needs.

Undergraduate programs cannot be expected to develop competence in all areas of prosthodontics. Programs should provide background knowledge in key areas and more in-depth knowledge and clinical skills in the areas that are the focus of community need. Whatever the balance, new graduates will be inexperienced and will have limited procedural skills development, although their knowledge base is probably greater than at any other time in their career. Clinicians in practice are often concerned at the apparent lack of skills and clinical experience of their new assistants, but unfortunately fail to remember their own level of expertise at the same stage.

There is a need for ongoing vocational training (VT) for all new graduates. Many European countries have introduced vocational training programs (VTP) to accommodate their own community needs, and such a program has been under consideration in Australia.

A VTP enhances clinical confidence at a time when new graduates are most in need of further skills development. It provides an opportunity to gain experience through a series of rotations in urban and rural general practice, public health clinics, and major public hospitals. These experiences are fundamental for many new graduates in deciding their preferred career path and have the added benefit of enhancing procedural skills before they enter practice.

Prosthodontics would benefit greatly from VTP programs as currently all aspects of this field suffer from insufficient clinical experience in the undergraduate curriculum. The pressures of commercial marketing are another concern that should be addressed¹¹ through VTP programs as many dental graduates lack the knowledge or confidence to question new developments in materials and techniques.

The general guidelines for undergraduate prosthodontics have been defined^{12,13}; it remains for each dental school to determine the appropriate instruction time to be allocated to didactic, preclinical, and clinical aspects of the areas of prosthodontics most relevant to their community needs. The development of procedural skills requires an interdisciplinary focus that emphasizes total oral healthcare and is based on comprehensive treatment planning. Such an approach will maximize the educational experience and optimize oral health outcomes for each patient. Undergraduate prosthodontics includes three main clinical requirements, which may vary in relative proportion in individual schools and require a change in emphasis from past programs:

1. *Partial denture prosthodontics* remains a simple, inexpensive alternative to implant restoration.

Interdisciplinary planning linking primary oral care, tooth conservation, and periodontics with partial prosthodontics establishes a common goal that benefits patient care. Partial denture prosthodontics should be introduced at the beginning of the clinical prosthodontics program.

2. *Fixed and implant prosthodontics* should be recognized as a core subject for undergraduate prosthodontics. Implant treatment is best introduced as a clinical simulation block in fixed prosthodontics. It is ideally suited for small-group PBL projects. The initial clinical experience may be shared by a group of students who participate in the development of a treatment plan as the first part of a vertical course structure allowing progressive learning and skills development.
3. *Gerodontics* and oral health management of the older adult is an expanding community need. In the process of developing a knowledge base in the anatomic, histologic, and behavioral changes in gerodontics there is a need to integrate restorative and periodontal care with tooth loss. The psychology of tooth loss and the problems of clinical management of complete denture patients¹⁴ logically lead to implant-supported overdenture treatment for edentulism. A clinical overdenture program is best included in the final undergraduate year, when students have more advanced clinical skills.

Skills Development and Dentolegal Responsibility

Fundamental knowledge, with an emphasis on integrated diagnosis and treatment planning, is the essential requirement of the undergraduate program; skills development in the more demanding areas of fixed and implant prosthodontics falls outside the responsibility of the undergraduate program. A 1-year VTP will help to focus the new graduate's attention on many important aspects of clinical practice, but can only be expected to develop clinical skills to a limited extent. Enhancing the more clinically and technically demanding aspects of prosthodontics requires further training, which could be offered as: (1) an optional second year of VT in which two or three clinical options are elected to develop knowledge and clinical skills in areas of special interest (as the second optional year of VT now offered in the United Kingdom); or (2) postgraduate certificate or diploma programs in advanced general practice or specific disciplines, which may be offered as didactic blocks that allow the completion of clinical components in practice.

Registration authorities could be proactive in conjunction with dental schools by requiring additional training and clinical skills to ensure competence before allowing the more complex aspects of prosthodontics—especially fixed and implant prosthodontics—to be offered in practice. It is disturbing to acknowledge that the highest litigation area in dentistry has for some time involved crown-and-bridge prosthodontics and now includes implant prosthodontics (Phillips D, Personal Communication), and it is time to acknowledge that there is a need for further training and skills development as a legal requirement before complex care is offered in practice.

Graduate Prosthodontics

There are now 3-year full-time clinical masters degree programs leading to specialization. Prosthodontic programs are ideally 60% to 70% clinical academic coursework and 30% to 40% research. This combination of coursework and research is a powerful mechanism for developing advanced clinical skills in assessment, treatment planning, prosthodontic care, and critical self-appraisal.

Links between graduate and undergraduate programs are advantageous and may be developed by: (1) graduate students providing clinical supervision in undergraduate clinics; and (2) establishing treatment teams composed of graduate students and senior and junior undergraduates for sharing diagnosis, treatment planning, and different aspects of integrated patient care. A treatment team approach is one strategy to integrate developing student expertise in a collaborative structure, bringing undergraduates into partnership with graduate students. Sharing patient care is an effective mechanism to broaden clinical experience.

In relation to dentolegal responsibility for specialist prosthodontic practice, registering authorities should, as is currently the case, consider the level of clinical skills in prosthodontics on the basis of the training program undertaken by each applicant. In their accreditation of prosthodontic programs, dental councils will in the future consider international benchmarking for ensuring acceptable levels of clinical training. It is envisaged that the sharing of didactic coursework units through the internet will facilitate international collaboration and benchmarking.

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