



Improving the Medical Curriculum in Predoctoral Dental Education: Recommendations From the American Association of Oral and Maxillofacial Surgeons Committee on Predoctoral Education and Training

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Dental procedures are often performed on patients who present with some level of medical fragility. In many dental schools, the exercise of taking a medical history is all too often a transcription of information to the dental chart, with little emphasis on the presurgical risk assessment and the development of a treatment plan appropriate to the medical status of the dental patient. Changes in dentistry, driven by an increasingly medically complex population of dental patients, combined with treatment advances rooted in the biomedical sciences necessitate the adaptation of our dental education to include a stronger background in systemic health. Many predoctoral educators in the American Association of Oral and Maxillofacial Surgeons (AAOMS) have expressed concern about the medical preparedness of our dental students; therefore, the AAOMS and its Committee on Predoctoral Education and Training have provided recommendations for improving the medical curriculum in predoctoral dental education, including a strengthening of training in clinical medicine and biomedical sciences, with specific recommendations for improved training of our dental students and dental faculty.

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Among patients and health care professionals alike, there is a general expectation that a medically compromised patient presenting to a physician for a surgical or therapeutic procedure will receive appropriate

consideration of the patient's systemic condition as part of the treatment planning process. However, in many of our dental schools, the exercise of taking a medical history, rather than serving as a vehicle for

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medical risk assessment and appropriate treatment planning, is all too often simply an exercise of checking boxes on a computer, with little thought as to the meaning and dental relevance of the information obtained. Many predoctoral oral and maxillofacial surgery (OMS) faculty members will confirm that this is frequently displayed on the clinic floors of dental schools around the country, and they are often disappointed by the responses of dental students when queried about the most basic of medical issues. Unfortunately, we also see this trend occurring in many dental faculty members. Because more than 50% of older adults have at least 3 chronic conditions¹ demanding a more thorough understanding of the impact of these medical conditions in the dental setting, dental faculty members frequently rely on medical consultations to obtain clearance or simply refer these patients out. Teaching dental students about medical issues requires an in-depth knowledge of the material and its relevance to dental care, which can be challenging for many dental faculty members.

Many predoctoral educators in the American Association of Oral and Maxillofacial Surgeons (AAOMS) have expressed concern about these issues. Therefore, the Committee on Predoctoral Education and Training (CPET) has made recommendations regarding the content of predoctoral medical and surgical education from the OMS point of view and is developing educational resources to assist dental schools accredited by the Commission on Dental Accreditation (CODA) in implementing these recommendations. During our deliberations, many questions surfaced regarding our current efforts in dental education:

1. What is the appropriate quality and quantity of clinical medicine and biomedical basic science material that should be included in the predoctoral dental curriculum?
2. How are we preparing students to acquire skills in medical risk assessment necessitated by an increasing population of medically complex and aging patients who will require dental interventions in the midst of these systemic comorbidities?
3. How are we preparing tomorrow's dentists to use complex rehabilitative therapies rooted in biomedical sciences, such as genetics, immunology, molecular biology, and bioengineering?
4. What is the appropriate balance of the teaching of technical manual skills and the more cerebral critical thinking skills? What is the appropriate balance of "technician" versus "physician" that will be required of dentists in the future?
5. How can we produce a competent and independent clinical practitioner within a 4-year dental

curriculum? Should there be a mandatory year of postgraduate education with increased standards in medicine, pharmacology, and patient assessment?

Biomedical Sciences and Clinical Medicine

It is the conclusion of the CPET that dental practitioners should possess a broad base of knowledge in the biomedical sciences, specifically in clinical medicine.^{2,3} The depth of knowledge in this area is driven by two fundamental factors:

1. Patients requiring complex dental interventions often have complex multiorgan medical diseases that amplify the need for appropriate medical risk assessment.
2. Current and future dental therapies involve complex biomedical sciences, such as immunology, genetics, molecular biology, and bioengineering.

CODA Standards and Biomedical Science Training

There are multiple CODA⁴ standards specific to training in the biomedical sciences, which are best summarized by Standard 2-14: *Graduates must be competent in the application of biomedical science knowledge in the delivery of patient care.* The intent for this standard is, "Biological science knowledge should be of sufficient depth and scope for graduates to apply advances in modern biology to clinical practice and to integrate new medical knowledge and therapies relevant to oral health care." Although dental schools consistently meet the standards as determined by our accrediting bodies, we are still faced with questions about the skills of our new graduates: Can an entry-level graduate appropriately and safely manage a patient who presents with a complex medical history?

Dental licensure allows independent decision making, independent prescription and administration of drugs and anesthetics, and independent performance of irreversible and often complex surgeries of the human body often in patients who present with some level of medical fragility. Dental procedures and interventions can exhibit complexity and invasiveness rivaling many surgeries performed by physicians. In many states, dental licensure is virtually that of a physician with anatomic restriction to the maxillofacial region. Therefore, the CPET believes that practicing dentists should possess the skillset of a physician-surgeon. The focus should not be to gain competence in the medical treatment of diseases that are outside the scope of dentistry, but instead to

gain a level of familiarity with systemic disease that would allow independent determination of medical risk posed by the delivery of dental care. There should be an understanding of the interrelation of the dental intervention to the systemic disease process, with assessment skills similar to those possessed by a medical specialty surgeon, such as an ophthalmologist, a dermatologist, or an otolaryngologist.

Biomedical Education—Strength and Relevance

The CPET recommends that biomedical education and exposure to clinical medicine be strengthened and not weakened or diluted in our dental schools. The CPET believes that the trend to “water down” biomedical content has been a real phenomenon in recent decades, fueled largely by curricular crowding and the difficulty in maintaining high standards of scholarship while trying simultaneously to train students in technical skills. This problem is less evident in our medical schools, because technical training occurs largely in required residency programs.

Those in dental education who have participated in curriculum committee work will be quick to point out that there is no time in most curricula for “additional courses.”⁵ The CPET is certainly sensitive to this issue, and curricular crowding is a common problem at most schools. However, dentistry will continue to progress in its complexity and our patients will continue to survive with ever increasingly complex medical management strategies for their systemic diseases. Technology and our patients will not sit still while we try to adjust our educational system. Even a cursory look at the education of nearly every medical specialty will show that length of training has been extended into the residency years to accommodate the new knowledge and technology. The CPET believes that this could be addressed by the adoption of a requirement that dental graduates complete one year of postgraduate training (PGY-1) prior to licensure examination.⁶ This would allow some decompression of the curriculum and allow more time for medical education and technical psychomotor skill development. This would require increases in infrastructure to accommodate all our graduates but it also might be instrumental in addressing community access issues by increasing the number of general practice residencies and advanced education in general dentistry programs.

Clinical medicine education for dentists must be relevant. While studying the biomedical sciences, students must see themselves at the chairside encountering a patient with a biomedical issue they are currently studying. The best way to accomplish this is to present basic biomedical science in the context of patient care situations⁷ beginning at the earliest

possible time in the curriculum and continuing throughout the clinical years. Early exposure to the clinic in the first year of dental school, whether performing simple procedures or assisting in more complex procedures, should be encouraged, because it will enhance the students’ ability to see the clinical relevance of the basic sciences if they can relate to an actual patient they might have seen. The CPET believes that schools should optimize opportunities for case-based instruction to provide context and dental relevance and should emphasize collaboration between basic biomedical scientists and clinicians who will work together to facilitate the case discussions. This would expose nonclinicians to clinical problem solving and remind the clinicians of the basic science aspects of the clinical problem, providing an excellent opportunity to improve the elusive relationship between basic scientists and clinicians. The current situation, in which nonclinicians are teaching basic science to dental students without an appreciation of the clinical relevance and dental students are acquiring knowledge simply to pass an examination without a deeper understanding of the clinical problem, results in little more than a short-term memory exercise that is quickly forgotten.

Clinical medicine should be emphasized in all clinical experiences provided for dental students, not just when they rotate on the OMS service. Students should be held accountable for understanding in depth their patients’ medical problems and medications and be prepared at all times and in all clinics to discuss this information with faculty. Retraining and calibrating faculty schoolwide will be an ongoing and challenging process but should be considered part of the continuous “life-long learning” that we profess to teach our own students.

The Medical Curriculum in Dental Education

Therefore, the CPET recommends that schools consider adopting a systems-based approach to the teaching of clinical medicine for dental students that is introduced at times appropriate to the clinical experiences planned for students. For example, the neurologic system could be introduced early in the curriculum to facilitate the teaching of local anesthesia and the subsequent clinical experiences related to pain control. Such topics as nerve function, pain pathways, and analgesia could be discussed within the context of a case-based problem such as a patient with a seizure disorder requiring simple dentistry. Not only would it be important for students to learn about seizures, but also foundational basic science subjects related to this condition (neurophysiology

and neuroanatomy) could be incorporated as objectives or supported with lectures.

Integrating basic biomedical sciences vertically into the dental curriculum also would de-emphasize the schism that exists in many schools between basic sciences (taught largely by non-dentists during the first two years and lacking clinical correlation) and clinical sciences (taught by clinical dentists during the last two years and lacking basic science correlation).⁷ It also would align the students' experiences with the unified national board examination that will be given later in the curriculum and that assumes a continuous basic science content.

Interdisciplinary exposure should be emphasized, with opportunities for dental students to rotate on medicine services, seeing patients who have the diseases they are studying in their didactic courses, and modeling the behaviors of the medical faculty as they process a patient's history and physical findings to determine diagnoses and treatment options.

The CPET also believes that schools must be serious about emphasizing the importance of understanding the medical status of the dental patient, not only for educational purposes but also to promote patient safety. Often, when students work with their non-OMS clinical faculty members, many of whom are recognized as outstanding and well-respected clinicians, the focus is solely on the dental procedure at hand. Avoiding discussion of the patient's medical issues, and sometimes even actively dismissing the importance of the medical status, they often conclude that it is acceptable to proceed with treatment and that all the fuss about medical history is important only in the oral surgery clinic. The CPET acknowledges there are many pressures on the restorative dental clinic, such as time and coverage, that make taking time to go over the medical history a challenge, but students will model the behaviors they observe in their faculty and it is essential that all faculty members participate in this necessary part of pretreatment patient care. Deans and department chairs college-wide must embrace this philosophy and work to provide continuing training opportunities for their faculty.

Expectations of Dental Graduates

The CPET believes that entry-level graduate dentists should be able to safely treat patients with common medical problems, and that they should understand these problems with enough depth to make independent decisions regarding the dental treatment, delivery of anesthesia, and prescribing medication for such patients. For patients presenting for routine dentistry, the student is expected to:

1. Identify existing systemic disease processes and understand and be able to explain the basic pathophysiology of the disease(s)
2. Identify and understand the related medications
3. Determine whether the patient is stable or unstable (optimum medical management), stratify risk of procedural intervention in light of existing comorbidities and historical exercise tolerance and activity level, and use appropriate medical consultation when indicated
4. Identify modifications in the proposed dental treatment necessitated by the medical condition
5. Predict and prepare for medical emergencies that are more likely to occur
6. Form a general impression of how well the patient will tolerate a surgical or anesthetic intervention

Assessment

For dentistry to improve its performance in the area of clinical medicine, it must adopt assessments that reflect the importance of these topics. Defining competency must include the satisfactory execution of a defined dental intervention within specified criteria, and it must include the critical thinking skills of how to integrate this care in the dental patient with common medical problems, such as atrial fibrillation.

The CPET supports a unification of basic sciences with clinical sciences in the national board examinations and recommends that state or regional examining boards⁸ incorporate a more robust evaluation of critical thinking in their examinations. If critical thinking is an expectation in our testing, it will become an integral part of our teaching.

Summary

As dental education proceeds into the 21st century, the CPET believes dentistry will have to assume a path that is more convergent with than divergent from medicine.⁸ Dental patient needs and potential therapies of the future will require more knowledge and skills in clinical medicine and biomedical sciences, not less. Our dental graduates will be expected to be not only excellent technicians but also thoughtful, independently practicing health care professionals who are providing oral health within the context of systemic health. The AAOMS and its educational committees would like to be available to the dental profession to assist and provide resources to educators and regional and national board examiners as we improve teaching standards and adapt to the changes that await our profession in the future.

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