

OOOO as Required Reading in the Dental School Curriculum: An Opportunity to Both Guide the Curriculum and Reinforce the Relationship Between Biomedical Science Education and Dental Practice?

Paul C. Edwards

As health sciences educators, we're all well aware of three closely related recurring challenges in predoctoral dental education: motivating our students to appreciate the importance of the basic sciences and biomedical curriculum to their future clinical practice; ensuring that this content is of clear relevance to dental practice and making sure that our graduates can translate this knowledge to clinical practice. No doubt, the Commission on Dental Accreditation and high stakes examinations like the (Integrated) National Board Dental Examination provide broad guidelines and potential metrics, but, very appropriately, much is still left to the individual institution as to what is covered and how students are assessed.

Many schools have incorporated methods to try to mitigate these concerns: shifting portions of the basic sciences education to the undergraduate level by increasing the number of prerequisite courses required for admissions, employing a systems-based approach to biomedical sciences, integrating the basic and biomedical science curriculum with the clinical curriculum by extending the basic sciences courses over all four years of the curriculum, or encouraging basic sciences faculty to participate in clinic rounds. These are all valid approaches; some arguably even recommended best practices. Despite this, the challenges of deciding the specific details of which basic and biomedical sciences content to cover, motivating our students to appreciate its relevance and facilitating our students' ability to translate this to routine clinical practice remain. It is not enough to assume that if our students understand that what we were covering is of importance to functioning effectively in their chosen careers, they would better appreciate the relevance of the basic science curriculum.

One obvious approach to deciding what detailed content to cover in the preclinical phase of the DDS curriculum is to confirm that the material passes one of two obvious criteria: 1) does it provide foundational or background knowledge required to understand other required areas in the curriculum, and 2) is it of relevance to the practice of dental medicine? The second criteria, deciding what specific topics are of direct relevance to dental practice, is more challenging, particularly in light of the exponential growth in the biomedical literature in recent years. Certainly, graduating students need to be very familiar with basic medicine and pharmacology; both to prevent and manage potential medical emergencies and to knowledgably and effectively treat their patients. But as dentistry continues to move from a procedure-driven clinical specialty focusing on the teeth and its supporting periodontal structures to a true specialty of medicine attending to the broader diagnosis and management of the craniofacial structures, the ability of our students to apply their biomedical knowledge in the clinical setting becomes even more critical if dentistry is to maximize its contribution to the broader health care landscape. Moreover, it is no longer sufficient to think strictly in terms of what the competent general dentist should know. General dentists routinely practice within specialty areas of dentistry (e.g. endodontics, clinical oral pathology, etc...).

So how can would introducing OOOO, or similar journals, as required reading in the dental school curriculum present "an opportunity to reinforce the relationship between basic sciences

education and dental practice? First, allow me to clarify. I'm absolutely not implying that OOOO is the only journal that would meet these objectives. Other dental journals covering medicine, surgery, pathology, radiology or related areas of dentistry that rely most heavily on the biomedical sciences could similarly serve in this capacity. However, OOOO is somewhat unique in that it covers a wide spectrum of topics from diagnostic to surgical dental medicine based heavily on the foundation of the biomedical and translational sciences. Additionally, for the most part, the content covered in this journal is not esoteric, highly specialized, overly complex material that is only within the realm of the dental specialist.

For example, manuscripts published in the November 2017 through January 2018 issues of this journal cover a wide range of topics supported by the biomedical sciences, including basic experimental design and analysis (e.g. retrospective cohort study; inclusion criteria; primary and secondary outcome variables; statistical analysis), bone biology and histology (e.g. methotrexate and its potential role in osteonecrosis; pathophysiology and pharmacologic management of osteoradionecrosis), physiology of renal regulation of bone metabolism (e.g. maxillofacial manifestations of chronic kidney disease—mineral and bone disorders), molecular genetics, epigenetics and cancer biology (e.g. single homozygous point mutations; gene translocation; cell cycle regulation; methylation in salivary gland mucoepidermoid carcinoma); microbiology (e.g. extrapulmonary tuberculosis; head and neck myiasis), head and neck oncology (e.g. quality of life in advanced cancer of the buccal mucosa; radiation caries; mandibular rhabdomyosarcoma; post-operative swallowing in patients with tongue cancer), clinical pharmacology and anesthesia (e.g. medication prescribing in the geriatric population; anxiety and pain related to mandibular block injection), wound healing (e.g. expression of inflammatory and tissue repair biomarkers in periapical cysts), temporomandibular joint dysfunction (e.g. occlusal splint thickness and the disk–condyle relationship in disk displacement), anatomy (e.g. cone beam computed tomography to assess mandibular third molar impaction), and craniofacial development (e.g. *ROGDI* gene mutation in ectodermal dysplasias). Are these really such arcane topics that should be viewed as completely beyond the expected general knowledge base of today's dental school graduate? Could using these, or similar, collected manuscripts help, in part, to confirm the appropriateness of the content covered in the biomedical curriculum and reinforce the relationship between biomedical science education and dental practice?

Such an approach also has the potential to serve as an additional metric to confirm that what we are teaching in the preclinical biomedical sciences, as well as how we facilitate understanding, is helping our graduates to both apply their knowledge to the clinical setting and understand the dental literature. If our graduates are not leaving with these skills, can we genuinely claim that we are “training the next generation of dental health professionals”?

Respectfully submitted,

Paul C. Edwards
Oral and Maxillofacial Pathology Section Editor
Editor, American Academy of Oral and Maxillofacial Pathology

Professor, Dept. of Oral Pathology, Medicine and Radiology, Indiana University School of Dentistry

Accepted Manuscript