©Operative Dentistry, 2007, **32-3,** 205-206

Editorial

Art and Science

Our profession has long been recognized as being a blend of art and science, particularly in the clinical restorative areas. It is understood that science must be the foundation for all health care, and the need for evidence-based information has become paramount in our research literature. To support these concepts, schools of dentistry have been increasing the hours allocated to basic science courses, and many are centering their educational outcomes on problem-based learning to encourage developing practitioners to continually question, examine viable options and apply the scientific method of evaluation to all they do. Unfortunately, available curricular time has not changed from the generally accepted four years and, with the expanding emphasis on science, training in the art of dentistry is being slowly but steadily eroded.

In restorative disciplines, the ability to recreate the anatomy and function of the human dentition is an art form requiring the sculpting of various materials into near perfect replicas of tooth structure lost through decay or trauma. With the increasing emphasis on "cosmetic" dental procedures, we also need to understand and be able to reproduce the subtle shadings, surface irregularities, translucencies and reflective qualities of natural teeth. While replication of these parameters requires an intimate knowledge of the science of color, light, anatomy and biomaterials, knowing is not sufficient…doing by precisely coordinating this knowledge with visual and manual skills is equally, if not more, critical to the restorative process.

The importance of the art of our profession is reflected in patients' comments about their care…"my dentist does beautiful work" not "my dentist is well versed in the basic sciences." Colleagues discuss the clinical skills of their peers with statements about "what great hands they have" not "what a tremendous depth of anatomical knowledge they possess." We take copious notes at professional symposia and continuing education courses on advances in materials science, the newest developments in CAD/CAM and the latest in implant technology…but we "oooh!" and "aaah!" at photos of restorative treatment that is indistinguishable from natural tooth structure, and we applaud the visual results produced by the presenter's technical skills.

Superior manual dexterity, excellent hand-eye coordination and the ability to visualize in three dimensions are mandatory in operative dentistry, because it is essentially microsurgery performed in a constrictive, polluted environment. If training in these skills is reduced, not only will our students be unprepared to deliver quality restorative care, but eventually we will no longer have teachers capable of providing this type of expertise. Already, newly graduated dentists must count on dental laboratories to provide all the "art" support for indirect restorations, since they are no longer trained to wax, invest and cast gold or to fire porcelain. Having never done these procedures, it is often difficult for them to understand what the technician needs from them (preparation design, amount of tooth reduction, quality of impression, etc) or even what to provide as instructions (color variations, characterization, translucency) so that they will receive the best product possible. We preach conservatism, but veneers are sometimes done in cases where direct resin bonding would offer similar results with less aggressive preparation, and the use of full-coverage rather than inlay and onlay restorations is becoming much more prevalent. Is this a subtle reflection of a lack of confidence in our own technical abilities to manipulate direct restoratives or to execute more detailed and demanding preparations?

Medicine recognized years ago that, with the explosive expansion of its knowledge base, four years of education was totally inadequate to produce qualified practitioners in all phases of the diagnostic, clinical and surgical specialties. It elected to focus the four years of medical school on basic science education to prepare its students for intensive clinical training during their subsequent internships, residencies and specialty programs. Wisely, the field of medicine has made the internship and residency required readily available and funded. I know that, if I need my heart repaired, not only will my cardiac surgeon have a thorough grounding in anatomy and physiology, but he or she will also possess the technical ability and manual dexterity to perform the necessary surgery.

Dentistry is trapped in a four-year curriculum and keeps trying to shoehorn more and more information into this finite model. No one can argue that it would be good for our students to have more education in anesthesiology, pathology, hospital dentistry, pharmacology, biomaterials, implantology and oral facial development. Students desire additional exposure in endodontics, periodontics, oral and maxillofacial surgery and orthodontics so that they can incorporate these disciplines into a general practice without the expense of specialty programs. Sadly, in my opinion, these irresistible forces are proving that training in the technical skills necessary for restorative dentistry is not an immovable object. In fact, it seems to be moving steadily out of the dental curriculum.

Are there ready solutions? We certainly cannot ignore science for technique. That would undermine the very foundation of health care. Can we follow the current trend of teaching less and less about more and more? That appears to me to be an extremely frustrating and self-defeating proposition. Should we, as a profession, develop a consensus that we recognize this problem for what it is and begin to formulate and vigorously explore viable alternatives? Absolutely! Required general practice residencies following dental school (where do we find facilities and funding), increased mandatory continuing education (needs a valid accreditation process), development of different curricular tracks in dentistry (diagnosticians and treatment delivery specialists working hand-in-hand)…ideas are readily available, finding a workable one and getting the profession on board is the problem.

I have heard colleagues say that, without science, a dentist would be nothing but a technician…not a real doctor. Others argue that, without the technical skills necessary to manipulate our restorative materials, we can diagnose but not treat. Both camps are correct within the limits of their observations, Our ultimate goal should be to not only understand the validity of each perspective, but to realize that, without combining them equally in our educational system, we are destined to produce a cadre of incomplete dental professionals. The art and science components of dentistry should never be at odds. Both are vital to our mission of providing long-lasting, functional, esthetic, biocompatible restorations to our patients, and they must be fundamental and equal components of the dental curriculum. I do not pretend to have a perfect answer to this age-old educational conundrum…but I do know that if we do not address it soon, the teaching of the art of dentistry will eventually become a lost art.

Michael A Cochran, Editor