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## Dentistry and Dental Technology

What went wrong with what was once a beautiful relationship? Can that old feeling be restored?

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IN THE PAST 39 YEARS, since I graduated from the University at Buffalo School of Dental Medicine, there have been many changes in dental education, especially in its relationship to dental technology. There have been changes in dental technology as well, including the number of dental technologists and their education and the prosthetic options available to dentists and patients. At the same time, there has been a steady and gradual corporatism of dental education and dental technology that appears to be irreversible. Voids in the existing dental delivery system have become apparent and require action from both the dental and dental technology communities.

During my predoctoral training, students were given broad exposure to the technical aspects of prosthetic dentistry. They were expected to wax, invest and cast gold routinely, and make acrylic veneer bridges under the supervision of dental technicians and dentists, who served on the faculty at UB. Students also set their own denture teeth and processed acrylic resin for the partial and complete dentures provided in the predoctoral clinic. During each step, we interacted with real, live dental technicians.

In the late '60s, graduating students predominately entered the military service. The military maintained a staff of dental technicians who were highly skilled and worked side by side with active dental officers to fabricate simple and complex dental restorations. Retiring military dental technicians opened commercial dental laboratories near military bases and were available to

help with the fabrication of the restorations that were provided to military personnel and their families. Other dental technicians became faculty members in dental schools and dental technology programs throughout the country following their retirement from military service. Today, first-year dentists spend a fifth year of education in general practice residencies instead of going into military service.

### Getting to Know the Technology

As late as the early '70s, as an integral part of the educational process, pre- and postgraduate prosthodontic students were required to develop a basic level of dental laboratory skill, competence and attention to detail, as well as an understanding of how to fabricate restorations. The goal was to help students establish principles and learn to recognize standards of excellence for periodontal, occlusal and marginal adaptation, and substructure engineering considerations before treating clinical patients or fabricating prosthetics. Many faculty had either been laboratory technicians before becoming dentists or had developed a high degree of competence in dental technology.

In my own postgraduate experience, at Tufts University, one of my mentors, Dr. Lloyd Miller, would bring the porcelain-fused-to-metal cases he personally baked to school for us to see. Dental ceramics was in its infancy then. As time went on, postgraduate students were required to visit dental laboratories to meet and

establish communication with the dental technicians who produced the prosthetics the students would be placing in patients.

Dr. Miller made sure all of his students visited Bob Welch and Lou Consoulis, two certified dental technicians at Dental Ceramics, Inc., the laboratory that made a significant portion of the fixed restorations the postdoctoral students delivered to patients treated in the postgraduate program. And Bob and Lou freely shared their experience and knowledge with us. They added to our ability to understand the state-of-the-art of dental technology available at the time and to make sure that new materials met established standards of biocompatibility, materials science and durability. In all, they enhanced our ability to do thoughtful case planning and treatment plans. We also learned the fundamental importance of careful tooth preparation, readable dies and appropriate mounting records, all of which enables technicians to perform to their best standards as well.

### **Human Element is Gone**

If you visit predoctoral programs today, you notice many changes. There has been a gradual virtualization and corporatism of the education experience. Students are given DVDs with all of the essential information they need to prepare for the regional dental examinations they will take at the end of their predoctoral training. Visits to the library have been replaced by a PDA or notebook computer. Mentors are gone, and there is less chance for students to develop independent curiosity and personal judgment. There is information overload, but also a simplification of information and the development of a market-based mentality. Many predoctoral programs require that their students keep track of their production figures in dollars instead of meeting the unit requirements and quality requirements of the past.

Teachers of predoctoral students lament that there has been a shift in the curriculum, resulting in a reduction in the number of clock hours required for dental students in the area of prosthodontics and a virtualization of dental technology. As a result, students have never performed laboratory procedures, are not able to properly evaluate a prosthesis returned from the dental laboratory, have never met a dental technologist and have no sense of the value the dental technologist has in the delivery of dentistry. They are unaware that technologists are being forced to make decisions about product design that were typically a dentist's responsibility.

Adding to the market-based mentality of graduating dental students, many are leaving school with debt between \$250,000 and \$425,000 in education loans. Now, it's no longer enough to make a living. One has to turn a profit. No wonder one of the first things these students do upon graduation is create a Web site to extol their excellence in all phases of dentistry—implants, orthodontics, cosmetic dental services—even though they have little actual training in these procedures. Preoccupied with meeting their loan payments, recent graduates have shifted emphasis from excellence to productivity and profitability.

The situation is not much different in postgraduate educational programs. In the school where I completed my training, I discovered that most if not all of the prosthetics that were delivered to patients were fabricated offshore in Thailand. That effectively reduced or eliminated the two-way communication between students and qualified dental technicians in the area. For many undergraduate and graduate students, interaction with dental technologists has been reduced to a box, a written prescription and a FedEx form. The obvious statement made here by dental school administrators is that the personal nature of a collaboration between dentistry and dental technology is of no value, nor is it good for the bottom line.

### **Gone Forever?**

The dentist/dental technician interaction within pre- and postdoctoral programs is not likely to be reinstated in the immediate future without a nationally mandated change in the predoctoral curriculum, according to dentists active in dental prosthetic education. Perhaps an educational module explaining dentists' responsibilities upon graduation and the standards that have to be met must become part of predoctoral educational curriculum.

There are similar problems in dental technology. The gradual Taylorization of the commercial dental technology business, the same philosophy used by Henry Ford to develop his automobile assembly line, has eroded the culture of artistic professionalism that used to characterize dental technology, turning it into an industry based upon productivity relying upon an assembly line model developed to create a profit. The supply of retiring military-trained dental technologists has declined dramatically. And the number of accredited programs in dental technology has steadily dropped since 1990 from 60 to 20. The Department of Labor, Bureau of Labor Statistics, predicts that 11,000 out of the current 48,000 dental technicians will leave the profession by 2014. In that time, the accredited educational system will replenish that number by only 1,400.

Outsourcing the fabrication of dental prosthetics to offshore laboratories will not solve this problem and may diminish our capacity to correct the manpower shortage by limiting our ability to recruit and sustain a workforce of educated dental technicians with a comprehensive knowledge of dental technology. It has also become a fact of life that dentists are less able to talk directly with the dental technologists who are fabricating restorations for dentists' patients.

Reducing the dental technician to a prescription and a case pan, eliminating the technician from the predoctoral dental educational experience has created a statement that could not be clearer. Public recognition of the essential collaboration that occurs between dentists and dental technicians is not occurring and should be addressed. The number of certified dental technicians (CDTs) has been steadily decreasing due to retirement, and these technicians are not being replaced adequately to meet present and future needs of their industry and those of dentistry. It is necessary

to acknowledge the professionalism of CDTs who have demonstrated a verifiable level of competence, established through the standardized testing and practical examination conducted by a national certification board.

The American Dental Association has firmly established that dentists have the ultimate responsibility for deciding what is acceptable to be placed in the mouths of their patients and for safeguarding their patients' health. In practice, however, dentists are relying more than ever on dental technologists to make decisions about the materials that will be placed in patients' mouths. Often, these decisions are made without consultation with the dentist. Absent any state or federal mandate, there is no assurance or effective safeguard that the materials chosen for use in restorations fabricated by dental laboratories meet FDA standards, and the ability to track materials is severely limited.

### **Bolstering the Image of Dentistry**

The changes in the de facto responsibilities of dentistry and dental technology deserve consideration by individual dentists, educational programs, state governments and the ADA. Currently, dental laboratories are not licensed or regulated in New York State. There are no minimum standards or training required, no required demonstration of a verified level of competence, no license or regulation required for an individual to operate a dental laboratory in

New York State. There is no minimum or required amount of continuing education for dental technologists who are not certified dental technicians.

CDT's who have demonstrated a verifiable level of competence must be recognized for their accomplishments and professional commitment. They should be drawn upon to insure that acceptable standards are met and adhered to. Dentists should document specific materials contained in a manufactured prosthesis, as well as the country of its origin. Currently, more is known about the E. coli in the hamburger and spinach sold in a supermarket than about the materials contained in a dental prosthesis. There is no difference between contaminated medicines or food and a material used in a dental restoration that is potentially damaging to a patient's health. Each should meet FDA standards and approval and be specified in the patient's record for tracking purposes.

In time, the memory of the basis upon which the credibility of dentists has rested, the collaborative efforts with dental technicians, the dedication to the best care possible for the patient's health and welfare will fade and so will the prestige and trust that has served dentistry so well. There already has been a decline in professionalism in both dentistry and dental technology, replaced by a more market-based mentality that is coupled with a reduction in the quality-of-life experience in both areas.

When dentistry becomes tangled in the bottom line, delivery of mediocre service will accurately define the image of the dentist. Despite what you may have read in advertisements, not everyone needs or can afford porcelain laminates or dental implants. But the need for conventional dentistry remains at an all-time high. Without highly dedicated and skilled dental technologists available nearby to discuss prosthetic design and delivery with dentists, the collaborative efforts of educated, knowledgeable and well-trained dentist/dental technologist teams will disappear, and this will have an impact on the quality of the oral health service provided.

We must be the custodians of our profession and act positively on these issues. To begin addressing these changes in dentistry, modifications in the curriculum for predoctoral dental students need to be made to provide a clear description of the dentist's responsibilities and the standards to be met when evaluating prosthetics to be placed in patients' mouths. Also, recognition must be made of CDTs and their continuing education needs, as well as on-the-job training as a group and as responsible individuals who have demonstrated a verifiable level of competence and are essential collaborators in the dental practice. Licensure and regulation of dental laboratories statewide is a further step in the right direction deserving consideration. ■

*Dr. Croll, a New York City prosthodontist, is executive director of the Dental Laboratory Summit, a group comprising representatives of the dental technology industry, dental and dental technology formal education programs, manufacturers and suppliers to dentistry and dental technology, the ADA, National Association of Dental Technology and publishing industry that is concerned with issues confronting dentistry and dental technology nationally and internationally.*

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