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Technology and a profession's identity

Lyndon F. Cooper, D.D.S., Ph.D.
ACP Messenger Editor-in-Chief

Dentists love technology. Our professional identity as tooth drillers was evidenced in teeth from 6,500 years ago and over a 1,500 year time period. Notably, it was suggested that early tooth drillers adopted this technology from the development of flint pointed drills to create ornamental beads.¹ Millennia later, we are still at it. Today, we have adopted technology that underscores rapid prototyping via CAD/CAM for the purpose of designing and producing dental prostheses. Will this new technology change our professional identity?

Perhaps current technology trends can help to bring focus to our professional identity and do so for the better. Much of mainstream dental technology, the drills and resins, the impression materials and plaster are derived from an earlier time. Prosthodontists could be viewed as sitting by as the rest of the biomedical complex rushes past, fueled by advances of molecular and cell biology and the knowledge of the post-genomic era. However, in a careful and step-wise manner, we have moved beyond our past. There is mounting evidence that our specialty is fully engaged in modern, cutting edge technologies that underscore the fabrication of biologically integrated prostheses ranging from acrylic dentures, to ceramic crowns, to endosseous implants and more complex orofacial prostheses.

This issue of the Messenger focuses on technology and its adoption by prosthodontists and prosthodontics. Dr. Franzen informs us that the adapting of technology is making the practice of prosthodontics more comfortable and predictable for our patients. This is wonderfully illustrated by Drs. Lin and Morton's demonstration of how digital technology is invading the diagnostic, laboratory and clinical phases of patient care. A behind the scene glimpse of technology in action is provided by Mr. Lee Culp who shows clearly the close cooperation of the dentist/technician team that is enhanced using digital technology.

The message is clear: the technology adopted by prosthodontists makes good patient care better. Our specialty embraces the issues raised by adoption of new technologies and as Dr. Stanford states, we must ask whether such new technologies are safe, efficacious, economical, and socially and ethically valuable and valid. These insights reflect a highly educated profession and one of our youngest prosthodontic stars, Dr. Thalji, highlights

“The message is clear: the technology adopted by prosthodontists makes good patient care better.”

the value of an in-depth dual degree education and the role of being an educator. Her message is a special one and as another graduate program director, I can attest to the role that technology adoption has in our ability to transform patients' lives. We must leverage this technology in creating the world's leading prosthodontic educational centers. Read from Dr. Campbell a chairman's perspective on how we share our specialists' knowledge and transmit our enthusiasm to the broader discipline of restorative dentistry.

Evolving prosthodontics represents technology leadership. We are efficient adopters of technology and are proudly part of emerging biotechnology in a rapidly changing biomedical world. ■

1. Coppa, A.; et al. (2006-04-06). "Early Neolithic tradition of dentistry: Flint tips were surprisingly effective for drilling tooth enamel in a prehistoric population". *Nature*; 2006440 (7085): 755–756.

About the author



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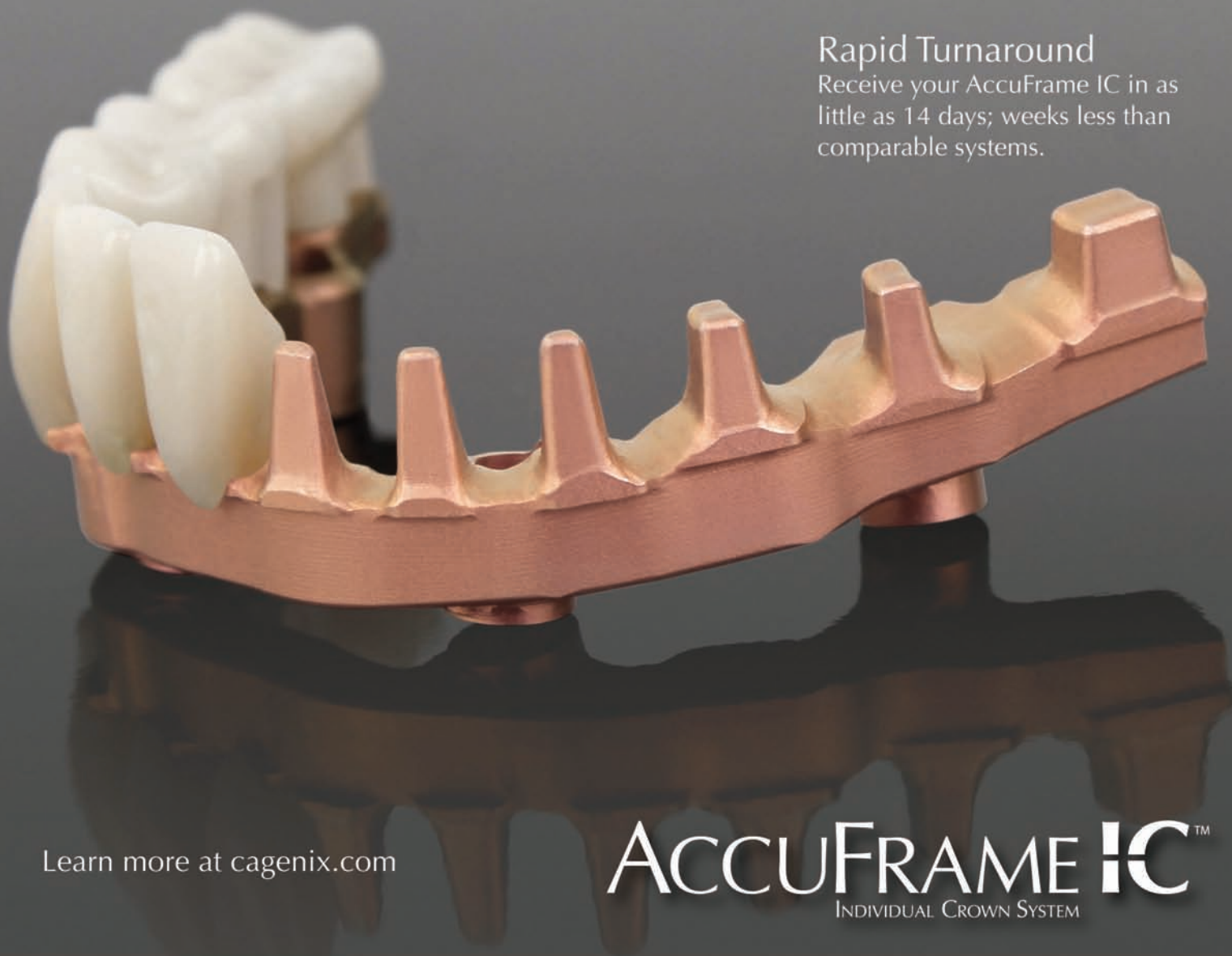
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The harmony of prosthodontic function and esthetics with digital technology

Lee Culp, C.D.T.

The attainment of perfection in the duplication of natural dentition is the ultimate achievement in contemporary esthetic dentistry. Understanding the complex relationship between tooth form and function, and how they relate and combine to create the esthetics of natural dentition, is the basis of study for achieving predictable success in oral reconstruction. Throughout the years, restorative trends and techniques have come and gone and some of these developments have transformed the face of restorative dentistry, while other initial concepts have phased out and died.

The concept of digital dentistry started out small and has progressively increased in momentum until its boundaries appear to have become endless. New technologies in dentistry will only be successful if they are combined with a complete understanding of comprehensive dentistry. While new technology and computerization can make procedures more efficient, less labor-intensive and more consistent, it will not replace education, practical experience and clinical/technical judgment.

The most exciting factor surrounding these technologies is not, however, only in the potential applications of the technology that are being hypothesized by dental professionals. The excitement truly lies in the fact that these “hypothetical” applications are currently being developed today, and some are even in the final stages. In a relatively short time period, digital technology will revolutionize the quality of dental care that is being delivered in modern practice. CAD/CAM (Computer Aided Design/Computer Aided Manufacturing) is based on technology adopted from aerospace/automotive and even the watch-making industry. This technology is being adopted due to its advantage of increased speed, accuracy and efficiency. Today’s CAD/CAM systems are being used to design and manufacture implant abutments/bars, metal

and zirconia frameworks, as well as all ceramic full contour crowns, inlays, and veneers that may be stronger, fit better, and are more esthetic than restorations fabricated using traditional methods.

“Imagine that the laboratory is not a physical place, but exists only in the talents of those performing the restorative process: the dentist, and the technician.”

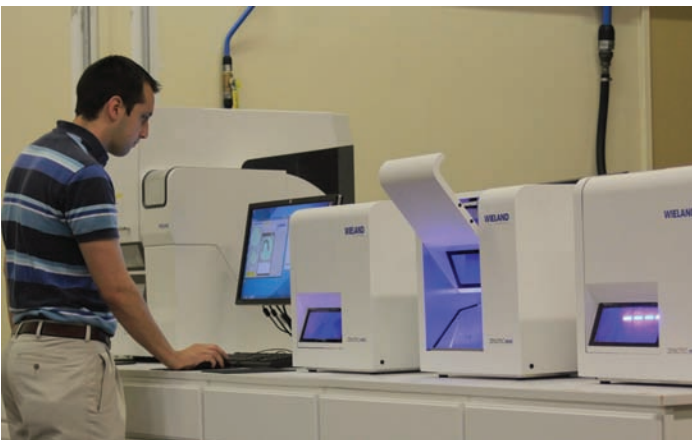
As dentistry evolves into the digital world, the successful incorporation of computerization and new technology will continue to provide more efficient methods of communication and fabrication while at the same time retaining the individual creativity and artistry of the skilled dentist and dental technician. The utilization of new technology will be enhanced by a close cooperation and working relationship of the dentist/technician team. The evolution from hand waxing to “digital waxing” using the diagnostic wax-up and provisional restorations, and their digital replicas to guide us in the creation of CAD/CAM restorations will become dentistry’s “standard operating procedure”. The utilization of these new technologies, along with the evolution from “hand” design to “digital” design, with the addition of the latest developments in intra-oral laser scanning, materials and computer milling/printing technology will only enhance the close cooperation and working relationship of the Dentist / Dental Laboratory team.

The Digital Dental Laboratory

The dental laboratory’s primary role in restorative dentistry is to perfectly copy all of the functional and esthetic parameters that have been defined by the dentist into a restorative solution. Throughout the restorative process, from the initial patient consultation, diagnosis- treatment



Digital scan and design technicians.



Creating restorations with milling technology.

planning, to final restoration placement, the communication routes between the dentist and the laboratory technician require a complete transfer of information. Functional components, occlusal parameters, phonetics, and esthetic requirements are just some of the essential types of information that are necessary for the technician to complete the fabrication of successful, functional, and esthetic restorations. Today, as in the past, the communication tools between the dentist and the technician are photography, written documentation, and impressions of the patient's existing dentition. The clinical models from these impressions are created and mounted on an articulator, which simulates the jaw movements of the mandible.

As restorative dentistry evolves into the digital world of image capture, computer design, and the creation of dental restorations through robotics, the dental laboratory must evolve as well. However, just as the Internet has forever changed the landscape of communication through related computer technology, the possibility to use CAD/CAM

restoration files electronically has provided the catalyst for a significant change in the way we view and structure the dentist-laboratory relationship.

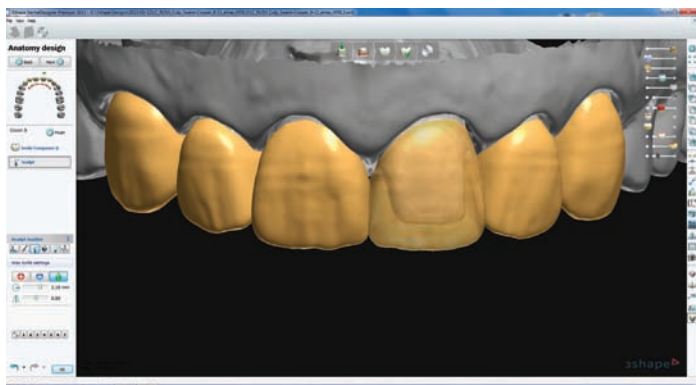
Imagine that the laboratory is not a physical place, but exists only in the talents of those performing the restorative process: the dentist and the technician. The equipment used to create the restoration may be located centrally, remotely, or both. The laboratory is essentially a workflow, which is as flexible as the abilities of the dentist, the technician and the equipment will allow. The primary decision becomes where the hand-off from one partner to another should occur. The dentist has enhanced freedom as to where the hand-off to the technician should occur. As a result the laboratory is no longer a place. It is instead, to a large degree, virtual.

The Digital Process

The new millennium has brought with it a change in digital dentistry, as more than 20 different CAD/CAM systems have now been introduced as solutions for restorative dentistry. The introduction of digital laboratory laser scanning technology along with its accompanying software allows the dental laboratory to create a digital dental environment to accurately present a real 3-D virtual model that automatically takes into consideration the occlusal affect of the opposing and adjacent dentition, and possesses the ability to design 16 individual full contour anatomically correct teeth at the same time. It essentially takes a complex occlusal scheme and its parameters and condenses the information, displays it in an intuitive format that allows dental professionals with basic knowledge of dental anatomy and occlusion to make modifications to the design, and then sends it through to the automated milling/printing unit. For the dental lab profession, the introduction of digital technology effectively automates and even eliminates some of the more mechanical and labor-intensive procedures (waxing, investing, burnout, casting, and/pressing) involved in the conventional fabrication of a dental restoration.

Digital Diagnostic and Treatment Planning

The basis for all long-term success in restorative dentistry is a comprehensive diagnosis and treatment plan. The ability to preview a case from start to finish, communicate and co-diagnose with other specialists about dental patients via the virtual world is the true power and capability of Digital Dentistry.



Digital restorative design.

methods, and further enable the dental professional to replicate natural aesthetics while focusing on proper function and occlusal harmony using CAD/CAM technology.

Digital Dentistry and the Digital Dental Team represent a totally new way to diagnose, treatment plan and create functional esthetic restorations for our patients in a more productive and efficient manner. CAD/CAM dentistry will only further enhance the dentist/assistant/technician relationship as we move together into this new era of patient care.



Milled Lithium disilicate restorations in the “blue” stage.



“Crystalized” Lithium Disilicate restorations

Dental design software is currently available that will allow dentists and technicians and even patients, the ability to communicate and create numerous anterior tooth arrangements based on functional-esthetic parameters, as well as patient desires. This would encompass both software and output devices to simulate and fabricate intraoral devices for tooth movement, tooth restoration and tooth replacement.

Technological advancements often consist of an initial design that is improved through several iterations. In the past, traditional communication methods resulted in insufficient data transfer and increased patient dissatisfaction caused by the need to remake an ill-fitting or undesirable restoration. While CAD/CAM technologies evolved, dental professionals continued to use tried and true methods for data transfer, incorporating digital dentistry to fill in some of the blanks that were caused by familiar methods. As the field of digital dentistry further expands, CAD/CAM systems will be increasingly applied for treatment planning procedures, implemented from the very beginning of treatment throughout the entire restorative process. By incorporating advanced systems in the diagnostic phase, dental professionals will continue to reduce the margin for error available using traditional



Final all ceramic restorations

There will come a day in the near future when all frameworks and full anatomical crowns will be designed on computer. Only then will we truly realize the wonder and awe of dental CAD/CAM technology. ■

About the author

Lee Culp, C.D.T. is the Chief Technology Officer for Microdental Laboratories, where he guides the development of the digital technologies program, and their applied applications to diagnostic and restorative dentistry.

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Barry R. Franzen, D.D.S., M.S.

Some things never change. Like the fact that I still hit my snooze alarm three times before I get out of bed and the fact that after 31 years of marriage this act still annoys my bride. But in the nearly thirty years of my prosthodontic practice, the way we deliver quality care to our patients each and every day is changing at a dramatic pace. The technological advances in everything from diagnostics, to impression taking, to computer assisted restoration design and fabrication only help to make dentistry more comfortable and predictable for our patients.

While our practice does not encompass every advance technology offers in dentistry today, there are many facets we have adapted that help us deliver specialty care on a daily basis. These adaptations of technology insure consistent results for our patients, from diagnosis and design to delivery of the new smile and dental health every patient deserves.

Technology in prosthodontics can start with very simple advances in office software. As many people have access to email and/or smart phones, our office management software is programmed to send email or text messages to patients for reminders of their appointment times. Even our

older patients who would not be classified as technologically savvy enjoy the convenience of this option.

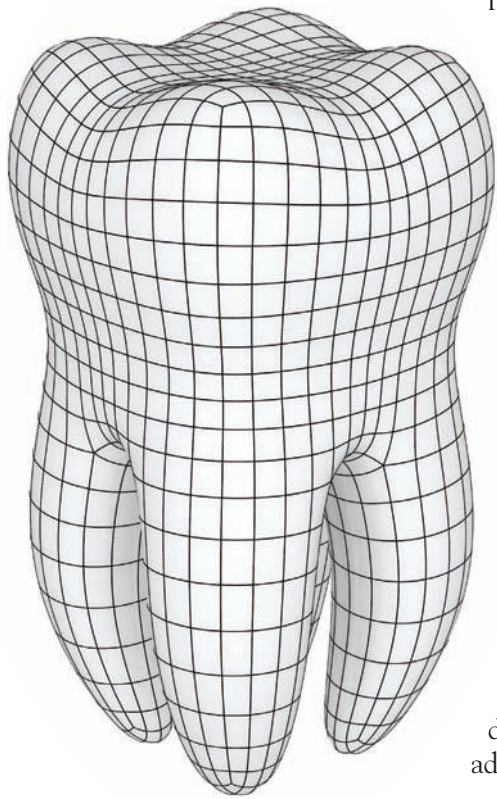
Diagnostics with digital x-rays offer many advantages to our patients. Of greatest importance to our patients is the dramatic decrease in radiation exposure versus conventional film radiographs. An 80-90% less exposure is standard when compared to an

“These adaptations of technology insure consistent results for our patients, from diagnosis and design to delivery of the new smile and dental health every patient deserves.”

already low dose film x-ray. In-house digital panoramic and cone beam surveys allow today's prosthodontic practice to make diagnostic evaluations immediately. The planning of implants is now done in three dimensions making the placement of implants safe and predictable. Furthermore, as those images are digital data, they can be sent across town to the surgeon's office for an immediate second opinion saving the patient the time of a second office visit. These transfers are made via a HIPPA compliant secure email service insuring patient security and

confidentiality. The data can also be inserted into implant planning software that allows the prosthodontist to plan the precise placement of the implants on the computer and then develop a surgical guide used at the time of surgery to place the implants exactly where they were planned. Gone are the days of compromise of the final restoration due to a slightly misaligned implant.

Digital imaging or impressions are another facet making the patient's experience more comfortable and less stressful. Instead of the 5 minute mouthful of runny impression material, today's prosthodontist can capture images of the prepared tooth digitally in much less time. This data can be then transferred to our laboratory teams for the creation of milled restorations that are accurate, durable and extremely esthetic. Our digital lab scanner allows us to scan conventional stone models and create beautiful restorations and implant



frameworks right at the desk top. The data is sent via email to milling centers and can be back in our office in less than 48 hours.

This dramatically decreases treatment time for our patients and insures quality esthetic restorations. Again as all this data is digital, the prosthodontist can communicate with the laboratory team as to any design changes necessary prior to fabrication.

While the habit of hitting the snooze alarm every morning has not changed, the technological changes in my office have been dramatic. And the technological advances yet to come in the delivery

of prosthodontics are going to be exponential. All these advances serve to insure quality and esthetic results for our patients from design to delivery.

These adaptations of technology insure consistent results for our patients, from diagnosis and design to delivery of the new smile and dental health every patient deserves. ■

About the author

Dr. Franzen is a 1982 graduate of Marquette University School of Dentistry. He completed a three year residency in prosthodontics and maxillofacial at UMKC School of Dentistry and Truman Medical Center. He has been in private practice limited to prosthodontics in Milwaukee since 1985, with an emphasis on dental implants.



Noteworthy ACP Events 2013–2014

Organization Name	Event/Course Name	Location	Date	Web site
American College of Prosthodontists	Prosthodontic Review Course	Chicago	November 15-16, 2013	GoToAPro.org
	Staffelano Head and Neck Cancer Dental Symposium	Chicago	January 17, 2014	
	National Prosthodontics Awareness Week	Nationwide	April 6-12, 2014	GoToAPro.org/NPAW
American College of Prosthodontists	44th Annual Session	New Orleans	November 5-8, 2014	GoToAPro.org

Single tooth replacement using contemporary impression and fabrication methods

Wei-Shao Lin, D.D.S., and Dean Morton, B.D.S., M.S.

Implant based treatment for completely and partially edentulous indications is a routine option for patients. For many years the prosthodontic phase of therapy has been predicated on use of proven protocols. These included rigid procedures for treatment planning, implant positioning, impression making, provisional restoration and fabrication of abutments and definitive prostheses.

More recently digital options have become available for each phase of care. Treatment planning for both implant positioning and restoration can be accomplished with computer software. The prosthodontically driven optimal position for implants can be transferred to the clinician placing implants through printed surgical templates, so enabling guided surgical placement. Digital impressions can be utilized in conjunction with printed or milled

“Digital options have become available for each phase of care.”

master casts, or can transfer implant position directly into software for the design of prostheses. CAD/CAM methods can then be used to fabricate individual prostheses from a variety of contemporary prosthetic materials.

This article illustrates a range of digital procedures that have been utilized in treating a patient with a missing lateral incisor. The implant was positioned according to a digitally developed plan. A digital volume was obtained of the site with a radiographic template in position illustrating the ideal position for the implant. A guided surgical method was used to communicate this position. ■



Figure 1. The patient returned for prosthodontic rehabilitation of the dental implant (Straumann bone level implant NC; diameter 3.3mm, Institut Straumann AG) positioned in site 10 (maxillary left lateral incisor).



Figure 2. An impression coping compatible with a digital impression was positioned subsequent to removal of the healing abutment. (NC Mono Scanbody, Institut Straumann AG). The scanbody was torqued to the recommended 15Ncm.

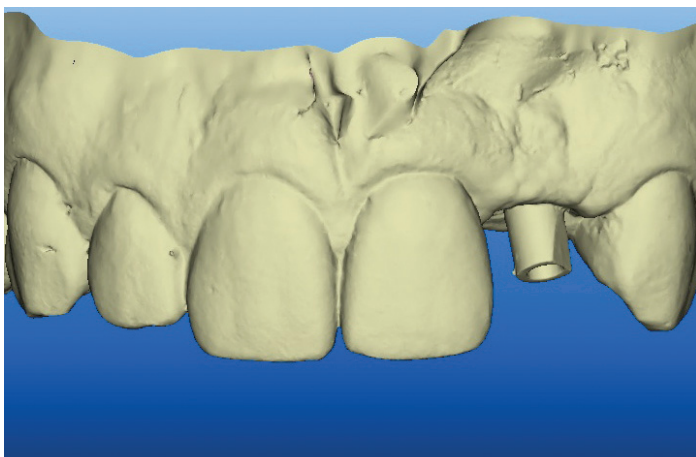


Figure 3. An intra-oral digital scanner (Cadent iTero; Cadent Ltd) was used according to instructions to make the definitive impression of the scanbody, impression of opposing arch and to obtain an interocclusal registration.



Figure 4. The approved digital impression was forwarded to the manufacturer according to protocol for removal of digital noise and verification (Cadent iTero; Cadent Ltd). The digital impression was then directed to the selected dental laboratory for fabrication of the milled definitive polyurethane cast. The milled polyurethane definitive cast and antagonist cast were returned articulated on a specifically designed hinge articulator (iTero Articulator; Cadent Inc). The casts were rearticulated on a semi-adjustable instrument using a facebow and interocclusal record.



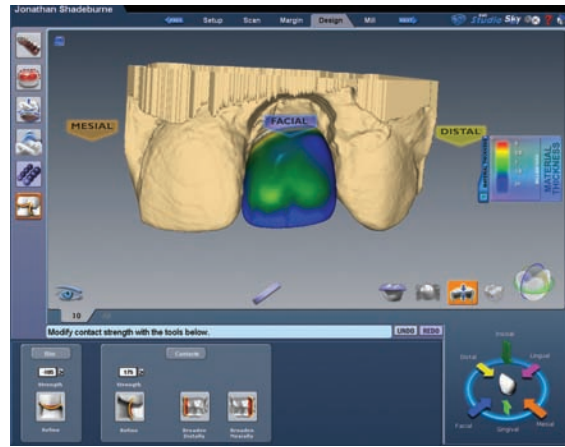
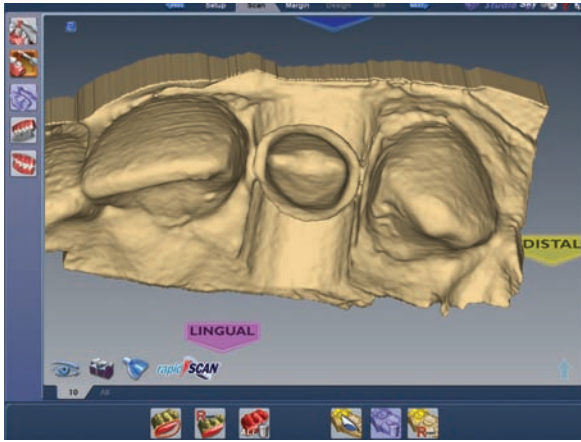
Figure 5. The corresponding removable implant analog (Reposition analog for iTero System, RC; Institut Straumann AG) was inserted into the milled polyurethane definitive cast. A temporary abutment for the chosen implant was customized and light-polymerizing composite resin (Radica; DENTSPLY Prosthetics, York, PA) was used to fabrication the interim implant supported restoration.



Figure 6. The peri-implant soft tissue profile developed by the interim restoration was transferred to the milled polyurethane definitive cast with vinyl polysiloxane material (Softtissue Moulage; Kerr Dental). A prefabricated titanium abutment with minimal mucosal height (NC 2-piece titanium cementable abutment, diameter 3.5mm, abutment height 5.5 mm; Institut Straumann USA) was selected and connected to the definitive cast. This component is characterized by a 1mm titanium height from the connection to the prosthesis margin on the abutment.



Figure 7. The planned abutment consisted of two components. The titanium abutment would be used to screw retain the prosthesis to the implant. A customized wax pattern was developed on the prefabricated titanium abutment, defining a crown margin and preparation form. This pattern was invested and heat-pressed in lithium disilicate pressable ceramic (HO ingot, IPS e.max Press; Ivoclar Vivadent). The lithium disilicate structure was luted to the prefabricated titanium abutment with dual polymerizing resin cement (Multilink Implant; Ivoclar Vivadent). The definitive abutment was therefore esthetic in character, while maintaining the biomechanical compatibility of the titanium connection and initial emergence.



Figures 8 and 9. The completed titanium/lithium disilicate abutment was scanned with an intraoral scanner compatible with a chairside milling unit (E4D Dentist; D4D Technologies, Richardson, TX). The scan captured the margin to which the definitive crown would adapt, and the remaining preparation form. The definitive crown was then designed using compatible software.

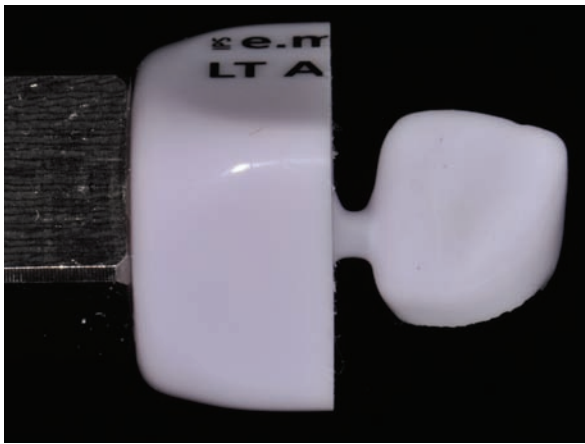


Figure 11. The anatomic full contour crown was designed on the scanned abutment, and milled from a machineable lithium disilicate ceramic block (IPS e.max CAD, LT, Ivoclar Vivadent).



Figure 12. Cutback of the machined crown was performed and a layering process was completed with low-fusing nanofluorapatite glass-ceramic veneering porcelain (IPS e.max Ceram; Ivoclar Vivadent).



Figure 13. The definitive prosthesis was tried in and was considered acceptable from an esthetic and occlusal perspective. Patient satisfaction with the prosthesis was confirmed. The customized abutment was positioned and the retaining screw torqued to recommended value (35Ncm). The crown was then luted to the abutment with dual polymerizing resin cement (Multilink Implant; Ivoclar Vivadent).

About the authors

Dr. Wei-Shao Lin is Assistant Professor, Department of Oral Health and Rehabilitation, University of Louisville School of Dentistry. Dr. Dean Morton is Professor and Chair, Director of Advanced Education in Prosthodontics, Department of Oral Health and Rehabilitation, University of Louisville School of Dentistry.

Is there a role for Health Technology Assessment in prosthodontics?

Clark M. Stanford, D.D.S., Ph.D.

The application of technology in health care is a strong opportunity for both added value and potential risk. In this context, technology is envisioned to encompass materials, technique, instruments and procedures, essentially combining both the hardware of devices and materials with the software of a clinician's experience, knowledge and training.

In our specialty, it is critical that as we look at a potential technology, we ask the "next day" question. If I am excited today with the innovation and value proposition that incorporating a piece of technology or process into my practice will significantly improve patient outcomes (at a cost they can afford), will I feel the same when I've slept on the decision? Buyer's remorse is an awfully expensive form of continuing education. Is there a process to assist in evaluating the value-add of a new technology?

Many of the elements in the process of Health Technology Assessment can be helpful. Modern HTA is an outgrowth of a process introduced in the 1960's and is used by many groups including regulatory agencies, healthcare payers, professional organizations, healthcare product manufacturers, and government as well as investors in healthcare industries.



There are three approaches in HTA: Technology-oriented, Problem-oriented and Project-oriented evaluations (Goodman C., 2004). For instance, we may want to evaluate the impact of image-based implant placement through the use of Stereo Lithographic guides (and in turn, convince a 3rd party payer of the added value relative to cost). An HTA can do this.

Alternatively, we may be interested in novel approaches to capture the contours of an edentulous ridge without distortion and thus an HTA would assist in adapting technologies (often from

other disciplines, such as topographical geomapping in this case) that would allow applications of knowledge from a very different use to help solve a clinical problem.

Third, the issue may be project-oriented, in which a local office or university could look at specific issues in the community that could bring together technologies to solve a local problem. One example would be an electronic patient record system that belongs to the patient, not the dental office, based in a cloud server. Each dental office needing to interface in the

“In our specialty, it is critical that as we look at a potential technology, we ask the ‘next day’ question.”

care of that patient could access this one database for accurate recording and communication in (near) real time between diverse treatment teams. This would certainly help me communicate with the diverse set of orthodontists I work with and allow an easy solution to the ACA mandate of patient record access. Two birds, one stone.

So what is a HTA? Partly based on scientific literature and partly on economic modeling, it can be boiled down to essentially five steps: (1) assessment of the technical properties, (2) safety, (3) efficacy (and, maybe the effectiveness) (4) the economic attributes or impact and (5) the social, legal, ethical and perhaps political

impact (think, fluoridation). In the end, as we consider the incorporation of any technology into our practice, we need to continuously balance each of these features so that our patients are the ones to enjoy the fruits of our care. ■

About the author

Dr. Clark Stanford is Associate Dean for Research at the University of Iowa College of Dentistry.

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Mentors



*Ghadeer N. Thalji,
D.D.S., Ph.D.,
F.A.C.P.*

Growing up, I often accompanied my dad to his dental office, which inspired me to choose dentistry and further prosthodontics as career paths. My dad has always been there for me when I needed advice or support. As I was preparing to begin my graduate training, my dad gave me two pieces of advice. He told me, “Every minute in your graduate training counts. Learning is an investment. The more you put into it, the more it’ll give you back.” He also said, “Feedback is an opportunity to learn. The more you can open yourself to criticism, the more you can use it to enhance your performance.”

The biggest mistake a resident can make is thinking that becoming a prosthodontist is about finishing the requirements and reading the literature that is assigned. Residency is about maximizing how much you can learn while you are surrounded by many talented prosthodontists as well as specialists from the other disciplines. Residents can have many opportunities to experience new technologies and techniques that, in my experience, have ranged from digital impressions to milled prostheses to guided surgeries. We often learned together. Learning can be more fun if you do it as a team. You can learn much more by sharing your experiences with your co-residents. This opportunity comes once in a lifetime.

At the University of North Carolina, I was inspired to seek a dual training career path, combining clinical prosthodontics with my Ph.D. My dedication to clinical prosthodontics stems from our ability as prosthodontists to transform patients’ lives. Our patients can feel

our enthusiasm and care for them. We should always strive for excellence and remember that our goal for perfection is attainable with hard work and persistence. Getting dual training was very important for me in my pursuit of an academic career in terms of scholarship and

“My dedication to clinical prosthodontics stems from our ability as prosthodontists to transform patients’ lives.”

preparing me to becoming an educator. Research is a very important endeavor, both to advance our field and provide the best care for our patients.

I now serve as the program director at the University of Iowa. I relish my job as a clinician-educator-researcher, as it enables me to see my resident-colleagues develop into confident prosthodontists. I also appreciate the constant stimulation of working in an academic center with great research capabilities, in addition to being able to provide patient care, which is something I love. A word of wisdom that I would share about my journey is that mentors are a critical element in our career development and that having the advantage of prudent advice from a caring mentor on a regular basis is invaluable. My prosthodontic mentors have been wonderful. ■

About the author

Dr. Ghadeer Thalji earned her D.D.S. from the University of Jordan and her dual training in Prosthodontics and a Ph.D. in Oral Biology from the University of North Carolina at Chapel Hill. She now serves as the graduate prosthodontics program director at the University of Iowa.

Denture materials and innovation

Q: What are the teeth for full dentures made of?

A: Artificial teeth for complete dentures are either made from porcelain or a polymer such as acrylic resin or composite. Porcelain teeth can wear less but are subject to chipping and a sharp clacking sound when eating. The polymer teeth are hard but are softer than porcelain so they will wear down over time, but may be gentler to the underlying ridge. Artificial teeth can sometimes be set to provide better lip support and lip form. This aspect may be very important to the women so that they have an adequate lip line for the placement of lipstick and occasionally may reduce those vertical folds also known as wrinkles.



Q: Can a person be allergic to denture materials?

A: Only the dentist or a physician can diagnose a true allergy to the denture. Allergy testing may be required. If an allergy is not the cause of the problems then the dentures may need to be adjusted. There is only one material used to make dentures so it is very rare to see a true allergy to the material. Dentures can cause a choking feeling or a sore throat if they are too long. Gum soreness can also mean the dentures need to be adjusted. If this is the first set of dentures you have worn, it will take time to get used to them. The dentures will feel bulky. It can take months to get used to speaking and swallowing with new dentures.

Q: What are cast metal partial dentures?

A: The longest lasting partial dentures have a metal part that attaches to some of your teeth and also has plastic replacements for your missing teeth that attach to the metal. The metal helps keep the partial denture from coming loose too easily and the replacement teeth can be attached to the metal by using some pink plastic that resembles your gums.

Q: What are mini-implant supported dentures?

A: Mini-implants are smaller diameter implants that can be used to with dentures to help hold them in place. These small implants have not been used for a long enough time to know how effective they will be after many years. They are considered temporary implants in that they are intended for short periods of use.

Q: Is there research into more flexible, thinner material available for the roof of the mouth portion of a denture?

A: The dental profession is always researching new and better materials to serve our patients. The thinnest material (that provides the proper contours and stability needed in the palate) is a cast metal or heat-cured acrylic (plastic). Lightweight titanium is now being used to make the denture lighter but the cost makes the denture more expensive. Flexible materials are not recommended in the roof of the mouth for dentures or partial dentures because they are not strong enough to hold the two sides of the denture together. ■

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Course Director

Steven J. Sadowsky, D.D.S., F.A.C.P.,
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November 15-16, 2013

This two-day course describes prosthodontic treatment approaches that meet esthetic and functional goals expected by patients and clinicians. The course also outlines key concepts based on evidence that interweaves diagnosis and planning with treatment. Results are expected to provide confidence in treatment predictability.

Who Should Attend?

This course is intended for attendees who would like to stay up to date on the latest trends in prosthodontics, as well as prosthodontists who want to become board certified, prosthodontic residents who are taking the board exam, and dental professionals who are interested in the specialty.

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Registration Information

\$925 Members, \$495 Students/
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The New Horizons Partnership Initiative – Renew the lease on our collective future



Lily T. Garcia,
D.D.S., M.S., F.A.C.P.
ACPEF Chair

I just had lunch with two young, married prosthodontists. One is in private practice as an associate in an established practice, and the other is an Assistant Professor in academia. I asked them how they are doing and both responded positively with a wonderful sense of optimism. The prosthodontist who is working as an associate says he is ready to buy into the practice and believes he is on the right track for doing well in the private sector. The faculty prosthodontist is beginning to negotiate the maze of academia to create a path for success. They both are bright, smart people and are on track for fulfilling professional lives. They expressed their gratitude for great experiences in their residencies and for the relationships forged through their professional experiences.

As you trudge along day to day, living to enrich your personal life balanced with your professional goals for success, I hope you are able to see the value of investing in our next generation of prosthodontists. Whether you

“Whether you are working hard in private practice, federal & military service, or academia, it is important to invest in those that will follow.”

are working hard in private practice, federal & military service, or academia, it is important to invest in those that will follow.

I ask for your consideration and financial support as many of our fellow member prosthodontist-volunteers working on behalf of the ACP Education Foundation have breathed life back into our specialty by investing in our future. We are seeing growing interest in our specialty, and applications to our advanced training programs are at a high as compared to 10-15 years ago. The best and the brightest want to be prosthodontists!

Help us continue the momentum. Be one that sustains our specialty. Your contributions are our means for advocacy and leading the future. ■





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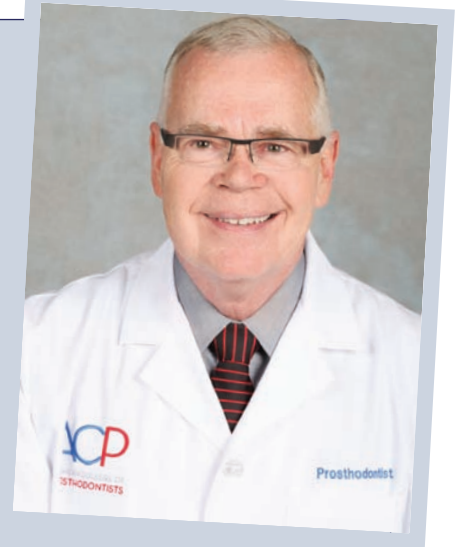

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Loma Linda University tribute to ACP member

Loma Linda University's *Dentistry* magazine featured a heartfelt tribute to ACP member Dr. Charles Goodacre (pictured), who stepped down as the School of Dentistry dean in June but will remain as a professor in the Department of Prosthodontics. His legacy has spanned 19 years of deanship, including curriculum development to emphasize evidence-based learning, establishment of a Center for Dental Research and the beginning of several new degree programs.

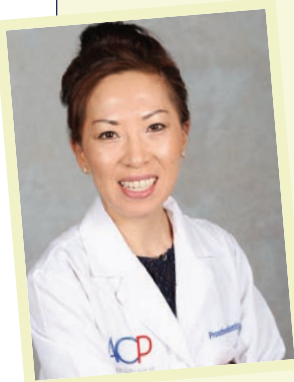
"On a personal level, I can tell you that he inspires me every time we interact, offering suggestions, ensuring that he keeps me involved and engaged in his projects and offering his considerable advice whenever required, helping me become a better prosthodontist and educator," said ACP member Dr. Mathew Kattadiyil, director of the school's Advanced Specialty Education Program in Prosthodontics. "Dr. Goodacre, we cannot thank you enough for your service and dedication."



ACP student members receive Litvak Fellowships

Dr. Boopakorn Pattarageattipong and Dr. Heba Elkassaby have been named recipients of the Dr. Harold Litvak Junior Fellowship in Prosthodontics. Drs. Pattarageattipong and Elkassaby, who are both student members of the ACP, earned their certificates in prosthodontics from the New York University College of Dentistry's Advanced Program in Prosthodontics for International Dentists, and are currently enrolled in the Jonathan and Maxine Ferencz Advanced Education Program in Prosthodontics. Dr. Pattarageattipong, who earned her D.D.S. from Chulalongkorn University in Bangkok, and Dr. Elkassaby, who earned her B.D.S. and M.D.Sc. from Ain Shams University in Cairo, both intend to pursue careers in teaching and private practice.

"Dr. Pattarageattipong and Dr. Elkassaby were awarded the fellowship based on their academic excellence, outstanding commitment to patient care, and positive interactions with faculty and peers," said Dr. Mijin Choi (pictured), clinical associate professor of prosthodontics and director of the Jonathan and Maxine Ferencz Advanced Education Program in Prosthodontics.



The Litvak Fellowship was established in 1999 in honor of Dr. Harold Litvak, a clinical professor of prosthodontics at the New York University College of Dentistry and recipient of the 2012 Dan Gordon Award from the American College of Prosthodontists.

Lively debate at New Jersey Section Meeting



With about 40 people in attendance, the New Jersey Section of the ACP held its annual Spring Meeting on April 19. Their meeting format centers on a friendly debate between two speakers, with time set aside for a "rebuttal." This year, Drs. Arnold Weisgold and James Ryner delivered a point/counterpoint on long term predictable prosthetic and periodontal care: teeth vs. implants. The last portion of the format involves reviewing cases during the "Clinical Scenario" session, in order to discuss treatment planning options between the two speakers. "Our attendees truly enjoy the format," said New Jersey Section President Dr. Reena M. Varghese. "Discussions and debates usually spark across the room over treatment planning which is always exciting to witness."

On behalf of the New Jersey Section, Dr. David Lipani presented a special award of recognition to Dr. Stephen Bergen (pictured) for a lifelong commitment to the education and practice of prosthodontics.



Recognizing prosthodontics and prosthodontists



Lee M. Jameson, D.D.S.,
M.S., F.A.C.P., ACP
President

The Council on Dental Education and Licensure is the ADA agency that “studies and makes recommendations” on the recognition of dental specialties. The requirements state: “In order for an area to become and/or remain recognized as a dental specialty, it must be represented by a sponsoring organization: (a) whose membership is reflective of that proposed or recognized dental specialty; (b) that demonstrates the ability to establish a certifying board.”

The underlined words are most important. The ABP and ACP periodically submit data to CDEL to remain recognized as a dental specialty. It is disconcerting when educationally qualified individuals rationalize not pursuing certification if their state doesn’t require it to practice as a specialist. ABP certification is about standards and supporting the specialty, not who is better than someone else.

The basic requirements to be recognized by the ADA as a specialty are: (1) representation by a sponsoring organization and (2) establishment of a certifying board. 33 states do not require any specialty examination or American Board certification to be licensed as a specialist. Consumers are confused about who has dental specialty credentials in those states, and will be more confused if the 2013 ADA House of Delegates passes

the areas of interest resolution in general dentistry.

Some think one only needs to complete an ADA accredited advanced dental education prosthodontic program without taking a national certifying examination. Variability exists in prosthodontic

“Strength and voice within the dental profession are in the numbers. We have to increase our membership and close the gap between us and the next largest specialty.”

programs. Accreditation requirements permit each program to define their own competencies “based on their school’s goals, resources, and accepted general practitioner responsibilities...” The ABP determines the scope and depth of prosthodontic knowledge of candidates using psychometric testing methodology and calibration of examiners. The process provides a valid and reliable standard for the public to differentiate between generalist and specialist.

We are the third oldest specialty and rank fifth in the number of board certified members. Strength and voice within the dental profession are in the numbers. We have to increase our membership and close the gap between us and the next largest specialty. We are trending in the right direction as the College’s overall membership has grown 32% from 2004 to

2013 with student membership increasing 57% during that time.

Equally important is the need for consumer recognition of prosthodontics.

Consultants tell us that it takes an estimated investment in television advertisement of \$2,000,000/year for 4-5 years before consumer behavior will change. This would necessitate an annual special assessment of \$9,091 from 2,200 ACP members. Obviously this is not realistic and is why the College opts for cost-effective public relations.

The College's public relations program has had measurable impact. For example, the media

monitoring service, Cision, reported 867 media mentions in 2011 for the terms prosthodontist(s) and prosthodontics(s) compared to 3,353 media mentions as of August 2013. Public relations require continual efforts to change consumer behavior and perception.

We are living in an era of coarseness, polarization and misinformation. It is a time of blurring the lines among specialties and courts determining professional credentials. We must meet and exceed the standard of our specialty and work together as prosthodontists: private practitioners, federal services, maxillofacial, and academia, to let all know who we are. ■

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FR Case 1



FR Case 2



FR Case 3

*For cases cited above, Titanium Abutments are recommended.

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Perceptions: Attracting the best and brightest to the specialty

Stephen D. Campbell, D.D.S., M.M.Sc.

I have been blessed over a long professional career with the opportunity to listen to individuals from a broad range of our community, those from inside and outside of the specialty of prosthodontics.

Most predoctoral students and the professional community simply do not understand what daily life as a prosthodontist is like. Predoctoral students are exposed to snippets of our very broad scope through a series of disconnected courses in removable, fixed and implant therapy. Many simply believe that this is what a prosthodontist does, so why would they go to three more years of school, and further increase their debt?

In talking with and surveying our dental students we have found that many do not understand the true breadth and depth of the specialty until it is too late. They frequently recognize this during their fourth year or shortly after graduation. Students must decide on a specialty by the end of their third year. The application process occurs before most have had an opportunity to discover the true nature of prosthodontics and they recognize their interest in the specialty too late. In many cases students also feel excluded rather than included in the specialty. They frequently just want to be invited in and included. We are missing an incredible opportunity.

Many schools have embarked on strategies such as predoctoral Prosthodontic Clubs, to encourage interest in the specialty. Structured programs in our dental schools can address these issues and create an environment of inclusion for predoctoral students. These programs can provide role models and opportunities to learn about the specialty as first, second, and third year students. The fourth year is simply too late. The emphasis through our

ACP Educators Programs has been very beneficial and has helped expand the applicant pool in recent years but we need to do better and must be certain that all of our programs have access to the top students in our graduating classes.

We recently began a Prosthodontic/Implant Club (PIC UIC) to offer our second and third year students additional opportunities to learn about comprehensive care at the specialty level. We were more than a little surprised when we had 115 predoctoral students from these two classes submit membership applications and

“Most predoctoral students and the professional community simply do not understand what daily life as a prosthodontist is like.”

participate in the club. With the addition of our new second year students, the membership has swelled.

This provides an opportunity to help students learn about prosthodontics and prosthodontists at the most critical time in their formative dental education. It is an opportunity to see the meticulous manner in which we approach caring for patients, as well as all of the exciting treatment modalities and our future, such as the advancing role of dental implant therapy and the broad range of modern digital technologies. This helps them see the specialty in a different light and understand who we actually are. Our residents support this role by providing 15-minute patient presentations over lunch. We also invite outside prosthodontists to share with the students what prosthodontic practice and their lives are like.



April 2013 meeting of the Prosthodontic/Implant Club at the University of Illinois at Chicago

We offer many benefits including increased interactions with the prosthodontic residents (patient presentations and chairside assist rotations), ACP student membership (*Journal of Prosthodontics*, ACP Messenger, Prosthopedia, and much more), and prosthodontic externship/rotation

opportunities. We offered a competition this year to support four students to attend our annual ACP meeting. Students had to answer the question: What is prosthodontics, what is a prosthodontist? The responses were inspiring. The four winners will be presenting table clinics at the ACP meeting in Las Vegas. They will then present to PIC UIC when we return in October.

Most importantly.... We have created an environment and culture of including them rather than excluding. What an incredible time for OUR specialty. I hope to see you in Las Vegas. ■

About the author

Dr. Stephen D. Campbell is Professor and Head of the Department of Restorative Dentistry and Director of the Implant and Innovations Center at the University of Illinois at Chicago, and a member of the Board of Directors of the ACP Education Foundation.

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Digital planning and workflow

Thomas M. Olsen

The American College of Prosthodontists has been a unified resource for the specialty of prosthodontics for over 40 years. This organization's ability to inform its members about innovations and best practices in restorative and implant dentistry is to be commended. As a long-term supporter of the efforts of the ACP, Nobel Biocare is aware of the unique treatment modalities this community is increasingly turning to for improved patient outcomes.

With a strong focus on patient safety and treatment efficiency for dental professionals and their patients, Nobel Biocare is developing a seamless workflow from patient diagnostics and treatment planning to surgery and prosthetics – all efficiently and digitally connected through Nobel Biocare's secure online network, NobelConnect™. The next linked steps in this process were recently previewed during Nobel Biocare's Global Symposium in June and continue to strongly build on the individual strengths and expertise

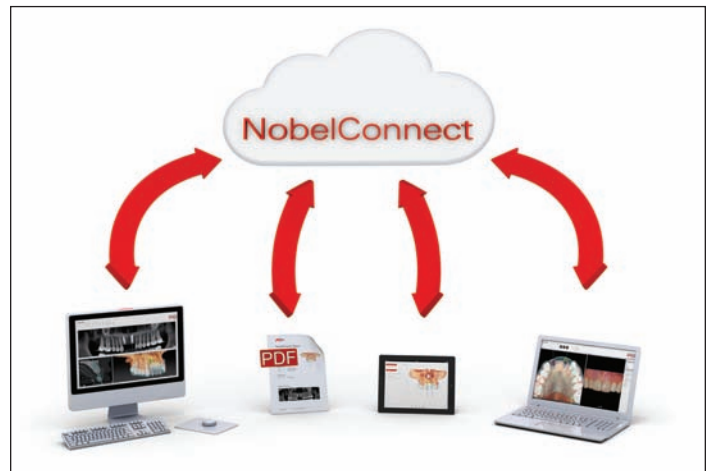
“The goal of this digital workflow is to provide the clinician and technician with tools to communicate with each other in a more cost and time effective way while providing a communications trail to prevent miscommunication.”

within the treatment teams, connecting in this case a prosthodontist and lab technician together digitally.

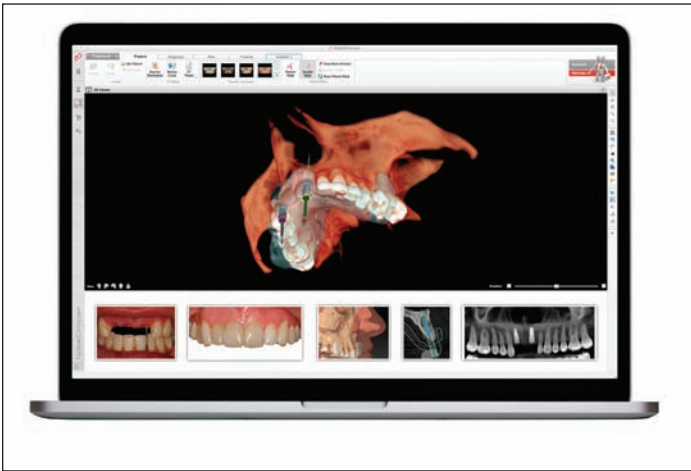
Starting with diagnostics and treatment planning in the NobelClinician™ Software, the highly accurate surface model obtained from the second-generation NobelProcera 2G Scanner can now be added to the scene at any stage of the treatment through a fully-automated and precise smart fusion technology. This enables even better representation of intraoral tissues for diagnostics and planning. Furthermore it reduces (procedural) treatment costs and shortens timelines by allowing (CB)CT scans to already be taken at the first patient visit which offers clinicians a truly flexible way of working.



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Radiographic guides, specific markers and double scan protocols are no longer needed for partially edentulous patients. The decision for guided surgery can be taken at any stage. Fully-automated precision-fitting surgical templates are automatically generated at the click of a button using the integrated surface scan and planned implant positions. Next to the traditional fully-guided approach, NobelGuide® will now also offer options for guided pilot drilling. The decision for the position, orientation and depth of the first drill during the implant site preparation is one of the most crucial steps for a clinician.

The iPad®-operated drilling unit, OsseoCare™ Pro, truly sets a smarter standard in safety and efficiency and is seamlessly linked to NobelConnect. This allows the secure transfer of digital plans from the software directly into the intelligent device for free hand surgeries or guided surgery options – all immediately and neatly documented into automated clinical reports. After the surgery, patient-specific data is exported back to the software and stored in a fully-encrypted file for later reference.

The goal of this digital workflow is to provide the clinician and technician with tools to communicate with each other in a more cost and time effective way while providing a communications trail to prevent miscommunication. The innovative NobelClinician Communicator iPad® App allows for the clinician and patient to review and discuss a planned procedure in advance. It allows for the clinician to visually show a patient the recommended plan so that they can better understand the proposed treatment.

Digital planning allows for the clinician and technician to create custom-designed individualized prosthesis. We understand this process and provide direct access to our production facilities for the manufacturing and delivery of functional and natural-looking dental restorations designed to last a lifetime. With NobelProcera you have the flexibility to realize every prosthetic possibility. You can choose between implant platforms and a variety of materials including zirconia, titanium, alumina, acrylic, full contour crowns and cobalt chromium.

The specialty of prosthodontics has made a great difference in the lives of countless individuals over the years. In partnership with the ACP we are committed to help you treat more patients better with our superior products and solutions. ■

About the author

Thomas M. Olsen is President & General Manager of Nobel Biocare, North America. He also serves as a member of the ACP Education Foundation Board of Directors.

Employment Opportunities



U.S. (Air Force) – Providing dental care to more than 300,000 Airmen around the world, in addition to their families, falls to a select group of dental professionals. As a Prosthodontist in the Air Force, you'll be a member of this group working to provide the best care possible for every patient you see. And since you won't have to worry about dealing with insurance companies or running a practice, you'll be able to do just that. To learn more, visit AIRFORCE.COM/HEALTHCARE or email 318rcs.training@us.af.mil.

Florida (University of Florida, Hialeah) – The University of Florida College of Dentistry is recruiting a non-tenure accruing, part-time (adjunct) Clinical Assistant/Associate Professor in the Prosthodontics division within the UFCD AEGD clinic in Hialeah, FL. Responsibilities include graduate-level didactic, pre-clinical and clinical instruction for Internationally Educated Dentists in a CODA-accredited program. For application information, <http://dental.ufl.edu/about/human-resources/career-opportunities>

California (Sacramento) – Exceptional opportunity for enthusiastic outgoing prosthodontists to replace retired partner in multi-specialty, multi-doctor, multi-location, dental group. Associate leading to equity partnership. Contact Dr. Brock Hinton at 916-454-0855 or BHinton@prosthogroup.com.

Illinois (University of Illinois at Chicago) - The Department of Restorative Dentistry in the College of Dentistry at the University of Illinois at Chicago, under the leadership of Stephen D. Campbell, DDS, MMSc, is seeking applications for two full-time faculty positions (non-tenure track) at the Clinical Assistant/Associate Professor levels. Duties: Responsibilities include preclinical and clinical instruction in all aspects of Prosthodontics and Restorative Dentistry. Opportunities for teaching exist at the Pre-doctoral and Advanced Program level and include implant prosthodontics. Future tenure track options exist for qualified/successful candidates. Qualifications: Qualifications include a DDS/DMD degree and advanced training in Prosthodontics (board certification, eligibility desirable, but not required). Candidates with training and/or experience in research are preferred. Clinician Scientists are strongly encouraged to apply.

For fullest consideration, applicants must apply online at <https://jobs.uic.edu/job-search/job-details?jobID=33244> and submit a cover letter, CV, and names of three (3) references by December 6, 2013. Review of applications will begin immediately and continue until the positions are filled. Salary and academic rank commensurate with experience and qualifications. The positions will begin August 2014. If you have any questions, please contact Ms. Anna Panova, UIC College of Dentistry (M/C 555), 801 S. Paulina Street, Chicago, IL 60612 or e-mail annap22@uic.edu. The University of Illinois at Chicago is an Affirmative Action/Equal Opportunity Employer. The College encourages applications from minorities, women, and persons with disabilities.

Louisiana (Baton Rouge) – Louisiana State University Health Sciences Center, School of Dentistry seeks an applicant for a full-time faculty position with the rank of Assistant Professor in the Department of Prosthodontics. Responsibilities include pre- and post- doctoral didactic and clinical teaching in Fixed, Removable and Implant Prosthodontics, and conducting research. Applicant must have a DDS or DMD degree or equivalent and a certificate in Prosthodontics from an ADA accredited program. Board certification is highly desirable, but not required. Teaching, clinical experience or knowledge in conducting research will increase the possibility for acceptance. This position is offered to permanent residents of the U.S. or to American Citizens only. LSUHSC offers an excellent benefits package which includes intramural faculty practice. Salary will be commensurate with qualifications and experience.

Applicants should send a letter of intent, curriculum vitae and list of references to: Dr. Arturo J. Mendez, Chairman, Department of Prosthodontics, LSUHSC School of Dentistry, 1100 Florida Ave., Box 222, New Orleans, LA 70119. Amende@lsuhsc.edu. LSUHSC-NO is an Equal Opportunity/Affirmative Action Employer.

Maine (South Portland) – Quality driven prosthodontic practice seeks experienced practitioner with advanced prosthetic training for associateship leading to partnership. Practice with a highly motivated staff of professionals in a modern facility complimented by our own, nationally recognized, in-house laboratory in one of the most beautiful, rapidly growing coastal areas of New England. Interested and qualified? Contact Prosthodontics Associates, P.A., 207-775-6348 or prosthodont@maine.rr.com. Dr. Luis Sarmiento and Dr. Paul Best.

Oklahoma (University of Oklahoma) – A full-time consecutive-term position, as Chair of the Department of Prosthodontics at the University of Oklahoma College of Dentistry, will be available effective September 1, 2013. Responsibilities include administration of the clinical and preclinical courses in fixed prosthodontics, removable prosthodontics and occlusion. Candidates must possess highly developed leadership capabilities and an established record in teaching, clinical service and scholarly activity will be preferred. Required qualifications include a DDS/DMD degree from a US accredited dental school, and eligibility for licensure in Oklahoma. Post-graduate training in prosthodontics from an accredited dental school preferred. Salary and rank will be commensurate with qualifications and experience. Participation in intramural practice is available. Initial review of applications will begin immediately. Please send a letter of intent and curriculum vitae to Dr. Paul Mullasseril, Associate Professor and Chair, Division of Restorative Dentistry, College of Dentistry, University of Oklahoma Health Sciences Center, 1201 N. Stonewall Avenue, Oklahoma City, OK, 73117-1214, or via email to paul-mullasseril@ouhsc.edu. The University of Oklahoma is an EEO/AA employer.

Pennsylvania (Fort Washington) – Energetic and forward thinking prosthodontist for a position in large implant driven practice with clinical, research and academic opportunities. A good fit could lead to partnership. Exceptional staff and on site laboratory support. Please send CV to linda.maroney@pidentalcenter.com.

Washington, D.C. – Quality practice seeks experienced practitioner for associateship / leading to potential sale. High-tech all-digital office. Implant surgery training in addition to prosthodontic training a must. Email tkristalis@aol.com.

Practices for Sale

Arizona (Scottsdale) – Prosthodontic practice, well-established in Scottsdale, Arizona for 30 years. The office has 8 operatories & a laboratory and full-time technician. It is ideal for 2 or more prosthodontists / surgeons. The seller is motivated and would like to continue working in the practice. Contact: mgibbonsdmd@gmail.com.

California (Central Coast) – Prosthodontic practice in California's Central Coast area with 4 operatories, a full in-house lab with IOS, mill, casting ovens and ceramic ovens in a beautiful area near shopping area. Doctor had over 1.1M in Gross Receipts in 2011/12. Contact: Jim Engel 925-330-2207.

Colorado (Front Range) – Annual Revenues \$1.5M, 6 ops, 3837 square feet, 4.5 days per week, doctor retiring. Contact ADS Precise Consultants, 1-888-886-6790, www.adsprecise.com.

California (San Diego, Mission Valley) – Location, location, location! Beautiful, seven operator prosthodontic practice centrally located to surrounding referring dentists. The award winning facility, prime location, long-term goodwill, experienced staff and annual collections exceeding \$1,000,000 combine for an amazing opportunity. Selling due to health reasons. Practice Transition Partners, 888-789-1085, www.practicetransitions.com.

Hawaii (Maui) – Comprehensive restorative practice. All phases of prosthodontics, perio, implant placement. In practice over 30 years. Desire to stay 1 or 2 days per week for 2 years to transition. Excellent opportunity to grow practice. Email mauidsdmsd@yahoo.com.

Kansas (Kansas City/Overland Park) – Long-established practice consisting of a full scope of fixed and removable restorative dentistry specializing in implant placement and restoration. Nationally known clinician. Personal introduction to referring doctors and offices. Experienced long term staff and lab technician willing to stay. High tech equipment, laser, surgical Piezo, Cercon lab system. For further information contact Kyle Francis, Professional Transition Strategies, (719) 459-1021.

Maryland (Suburban Washington, D.C.) – High end “Fee for Service” general practice in vastly expanding Rockville Pike area (suburban Washington, D.C.) in prestigious Montgomery County. State of the art equipment with digital radiography in all 5 operatories plus a digital panorex machine. Office is 2200 sf. with Dentrix software, over 2000+ active patients, grossing over \$2.7 million. Call Dr. William Karpa with Karpa Dental Brokerage at (301) 233-1814 or email wkarpa@karpadentalbrokerage.com.

North Carolina (Western) – In the beautiful North Carolina mountains, 25 minutes from Asheville. Quality of life, diversity, and cultural. Architect-designed, stand-alone building. Adult restorative practice requires experienced practitioner or prosthodontist. 100 percent fee-for-service. No insurance assignment, zero accounts receivable. Two operatories and one hygiene, 175 days, approximately \$1 million production. Opportunity to expand services and add additional operatories. Contact Diane at 828.627.1800.

Texas (Houston) – “The Energy Capital Of The World”! Growing Prosthodontic practice for sale in prosperous Northwest Houston. 5 fully-equipped operatories, all digital imaging in free standing 3200 sq. ft. building in Medical/Dental Complex. Strong Referral Base, 2012 collections \$616k 3 day/week, 2013 collections on track for \$757k 4 day/week. Fixed, Removable and Implant Prosthetics. Contact: TEXASPROS.PRACTICE@gmail.com.

Washington (Seattle/Tacoma) – Great Pros practice collected \$795,000 last year. Located in 2,200 sq. ft. w/3 beautiful ops. Fully computerized w/ digital x-ray. Great location, low overhead and great cash flow. For more info contact Mark at mfleming@paragon.us.com or 360-317-5242.



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