Interview with Charles Goodacre

Yours has proven to be a very impressive clinical academic career. How did it all start?

My choice of a career was made in seventh grade. My father was a railroad engineer, and a local dentist who worked for the United States Public Health Service providing dental care at the local United States Coast Guard base in Cape May, New Jersey happened to be a train enthusiast. He and my father had much in common, and as a result the families would often get together. That was my first social encounter with a dentist, and I liked what I observed. His name was Dr Donald Bowen and he was a graduate of Loma Linda University. Therefore, I decided to become a dentist and to attend Loma Linda University.

The decision to pursue an academic career was a result of many factors. In high school, I worked as a student assistant to the chemistry teacher, helping him with different responsibilities and grading some papers. In fact, he and his wife thought Ruthy and I would be a good match, so they facilitated our relationship—a very fortuitous experience, as Ruthy has been an ideal wife. In college, I enrolled in the usual science classes as dental prerequisites but particularly enjoyed my chemistry teacher and would have had a chemistry major, except that I was admitted to dental school after 3 years of college. I chose to enter after 3 years to avoid taking a speech class, as I could not imagine standing up in front of a class and giving a speech.

In dental school, I was asked by Dr Norman Ensminger to be a student teacher in the Fixed Prosthodontics preclinical laboratory course. As a student I worked for Dr John Neufeld, who was Chair of Prosthodontics. He would hire students to do laboratory work for his private patients after they passed muster in his course and in clinic. He asked another classmate, David Rynearson, and me to provide this service. I completed all the laboratory procedures for three or four sets of dentures each week for over a year, from record bases and wax rims, to tooth arrangements and fabricating wax trial dentures, to processing and finishing—an exceptional educational experience from an excellent clinician. I completed a research project during my third year under the guidance of Dr Lloyd Baum. Along with a classmate, Ronald Gardner, we won first prize at the Loma Linda research competition and I represented the two of us at the national competition during the 1970 American Dental Association meeting, where the project was awarded second place nationally. These factors instilled an interest in prosthodontics and also materials science. Dr Melvin Lund, Chair of Restorative Dentistry at Loma Linda, made me aware of a program at Indiana University that combined dental materials with prosthodontics under the auspices of the National Institute for Dental Research. I applied for this program and received the fellowship for the 3-year combined program under the direction of Ralph Phillips in Dental Materials and Roland Dykema in Prosthodontics. Each of them had written classic textbooks and lectured extensively. Their mentorship further embedded the idea of a career in dental education in my mind. When I completed the 3-year program in 1974, Dr Dykema offered me a full-time faculty position that started my memorable 23-year journey at Indiana University. They both encouraged me, pushed me when necessary, and were always willing to help me and discuss any topics. Since they were both involved in education, research, publications, and textbooks, I guess some of that must have rubbed off over time.

Who were your role models during the early years, and how did they influence your subsequent career decisions and trajectory?

In dental school, there were multiple teachers who excited me about dentistry. One was Melvin Lund, Chair of Restorative Dentistry, who was kind and gracious but had high expectations. From him I developed the concept that you should treat students with the highest level of dignity and respect while expecting and requiring the highest possible performance for their level of education. We had to have a little brown book at our cubicle every day so a faculty member could write a note in it when we did not do something to the expected level. In my 4 years in school I only had one note in the little brown book, and that was written by Dr Lund, but in such a manner that I learned from it rather than seeing it as a negative experience. He was a researcher as well as an excellent clinician and educator.

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Dr John Neufeld was Chair of Prosthodontics. He was a student of Carl Boucher who returned to Loma Linda and taught my course in complete dentures. As I mentioned earlier, he asked me to be one of two students to do laboratory work for his private patients.

Dr Lloyd Baum was also an influence because he was innovative and technically gifted. I completed a student research project under his guidance that won second place at the ADA meeting.

During my advanced education program at Indiana University, both Drs Dykema and Phillips were exceptional mentors. They had both written classic textbooks and lectured extensively. In fact, they both at one time or another asked me to accompany them on lectures they were giving, saying they needed my expertise. I was pleased and flattered, not realizing that they were helping me more than I could ever help them. Eventually, the light bulb came on and I realized what they had done. From being with them, I learned about making professional presentations and basing the presentation, whenever possible, on evidence. Their mentorship further embedded the idea of a career in dental education in my mind. As I mentioned, when I completed the 3-year program Dr Dykema offered me a full-time faculty position. I remember Dr Dykema coming into my office one day and simply saying, "It's time for you to take the American Board of Prosthodontics examination." That's all it took. Since they were both involved in education, research, publications, and textbooks, I guess I slowly absorbed some of that over time.

I was fortunate, like others, to have excellent role models.

What led to your move away from running a major clinical department to accept the position of Dean at Loma Linda University?

I think it was a lack of good judgment that caused me to become a dental school dean. I had decided to leave Indiana University because changes were made at the school that I did not feel were in the best interest of the institution and I did not feel the administration at that time was focused in the right direction. I had interviewed for a chair position at another university when Loma Linda contacted me to see if I would be interested in their dean's position. I remember for years saying that anyone who wanted to be a dean needed their head examined. In fact, when the vice president of Loma Linda contacted me, I told him what I had been saying. He encouraged me to at least make a visit, which I did. During my visit, I was impressed with Dr Lyn Behrens and her vision for the university. That, coupled with my loyalty to my alma mater and a feeling that this is what God wanted me to do, caused me to accept the position I had not sought.

I enjoyed my 19 years as dean, never expecting to serve for that long.

From both professional and educational viewpoints, you presided over a remarkable period of change in dental education. Which changes most impressed you and impacted your career?

Many changes occurred during my tenure in dental education. The most significant was the introduction of osseointegrated dental implants. That, more than anything else, altered the paradigm of diagnosis and treatment for patients. While esthetics assumed a more prominent role, dental materials were vastly improved, and more conservative treatment methods emerged, it was dental implants that had the greatest impact.

Another substantial change was in the manner in which educators interact with students. A higher level of respect for students emerged that is most appropriate for those individuals who will shortly be our colleagues.

The emergence of evidence-based dentistry also made a substantial impact as we all endeavored to base our treatment on the strongest level of available evidence and challenge the cherished methods of treatment that had been espoused for generations.

The emergence of digital technology made it possible to develop educational resources that enriched the education of our students, provided resources for faculty to enhance their teaching, and opened up new avenues for the continuing dental education that has been substantial and will be even more important in the future. I am convinced that when the students of today become the educators of tomorrow, the learning experiences of students will be different. We need more interactivity in class. Some people believe that PowerPoint or Keynote presentations are state of the art. Actually, they are just chalkboard presentations on steroids rather than innovative new methods of educating students.

The development of a focus on student learning instead of teaching is also a very encouraging trend in dental education.

The IJP—indeed, the entire profession—continues to acknowledge the near-revolutionary change in management of complete and partial edentulism as a result of the introduction of the osseointegration (OI) technique. And very early on, you were one of the few senior dental educators who rapidly embraced the technique's merits and incorporated Brånemark's protocol into routine teaching. How far has prosthodontics come in reconciling OI with evidence-based

educational programs, as opposed to technique-driven courses that almost suggest a panacea approach to most prosthodontic challenges?

I was so pleased to see prosthodontics embrace osseointegration. I believe the introduction of osseointegration caused prosthodontic educators, who had all too often adopted a negative attitude toward implants because of history with previous designs, to gain a fresh and more flexible outlook regarding treatment options. Many times during my early career, I noted that prosthodontists seemed to be averse to new developments and spend time criticizing new concepts and treatment modalities rather than see the potential they might provide for patient care, particularly if competent, conscientious practitioners were to aid the development process. I also noted that it was a unique experience for many educators to transition from teaching step-by-step technical procedures to the incorporation of evidence-based principles. I believe we have now reached the threshold where educators have learned to embrace and combine available evidence with the necessary orderly technical procedures required to provide optimal patient care.

What were your experiences in nudging (maybe even pushing) older and highly gifted colleagues to consider changing their minds about expert opinion and traditional patient management approaches? Was it an uphill battle on the different fronts you dealt with—faculty, specialty organizations, and personal friends in the profession?

Early in my career I was reluctant to try new treatment paradigms and use new materials because of a preconceived concept that what I was currently doing was the best and would remain at the pinnacle of dental care. As I began to introduce new ideas, I observed reluctance on the part of colleagues to adopt a flexible outlook. In fact, I remember one colleague who told me that polysulfide impression material is the only material that should be used for complete denture impressions! I still smile when I think of this statement.

I often used students to help initiate change. Students have always been very smart and generally have good intuition regarding different methods of providing care. Some overextend their flexibility, but most recognize when a change would be positive if given good rationale for the change. I would therefore introduce the students to different concepts, and they would help drive the change through their interactions with faculty and administrators. External pressure has an interesting effect. I also would invite other faculty members, with different perspectives, to make presentations.

It could be argued that what the OI technique does best is to provide a safe, predictable, and dentist-controlled form of retention/stabilization for prostheses, and with the added versatility of the option of fixed or removable versions. Does this new alternative to traditional technical approaches suggest/demand that its teaching become an integral part of undergraduate dental curricula? Match current emphasis on the evolved tooth attachment with a similar one resulting from a dentist-induced surgical healing response? Or should dental schools continue to regard the therapeutic paradigm shift as one that is best accommodated via continuing education courses and specialty meetings?

We, as dental educators, have an obligation to provide our students with the best available information relative to optimal patient care. It was in the late 1990s that I worked with Dr Jaime Lozada to establish an in-depth, semester-long course in implant dentistry for dental students at Loma Linda. We reasoned that the development of a digital education resource that would form the foundation for the course would increase course efficacy and provide a format for enhanced student learning. As a result, in 1999 the first Implant Dentistry CD-ROM program was developed, mainly due to the technical expertise of Dr Lozada. Together we created the evidence-based content and determined the program format that would appeal to students. That particular program has transitioned from CD-ROM, to DVD, to a downloadable computer-based program. Once the program was developed, students were assigned to read a chapter, review the images, study the literature references that were paraphrased, and look at the included videos. A quiz was given at the beginning of the period to encourage students to actually complete the assignment. There would then be a brief (about 10 minutes) review of the most pertinent content in the chapter in the form of a PowerPoint presentation. The rest of the period was devoted to interactive dialogue with the students. We encouraged them to challenge the principles, concepts, and clinical procedures advocated in the digital program they had just studied. This educational technique was used before either of us had ever heard the term "flipped classroom." It just seemed like a good idea that could stimulate interactivity, creativity, and the ability to examine a process and see if there could be a better way to accomplish the same treatment goal.

As the Education Chair of the recently formed Foundation for Oral Rehabilitation (FOR), do you think it is possible to expand the scope of patient management in a different form—one exclusively

driven by evidence-based information and in a manner that is readily and globally available, somewhat along the lines of electronically based programs?

When I was approached to chair the Education Council of the Foundation for Oral Rehabilitation, I was excited by the possibility of creating a global resource that could provide evidence-based information for students and practitioners worldwide. This dream has become a reality through the FOR.org website, where a continually expanding series of learning resources is available.

I believe that when the students of today become the educators of tomorrow, the currently used educational methods will change. In this digitally immersed world, everyone is accessing information in ways I never dreamed would occur.

This year—2015—honors the memory of two remarkable scholars—P.I. Brånemark and his osseointegrated implant therapy, and David Sackett with his clinical epidemiology leadership. The IJP paid tribute to these physicians in our issues 1 and 4. Any suggestions on how these two scientific pedigrees can be recruited into routine dental education, given their twin impact?

Telling stories has always been an exceptional method of gaining and maintaining the attention of audiences. I might suggest that as educators, we continue to tell personal stories of individuals who had a dream that turned into a vision that eventually created change.

You certainly led from the front when it became immediately apparent that the availability of implant therapy demanded an equal partnership of prosthodontic technology and leadership. Your teaching and publications continue to underscore your conviction and commitment to growing prosthodontic interventions in new and exciting CAD/CAM-influenced directions. Where are we heading with these innovations that appear to risk being eclipsed by a very determined commercial role in implant education, and one that is far too often surgically prioritized? Are we dealing with competing educational directives, or are the surgical/prosthodontic synergies strong enough to ensure that patient-mediated concerns are not being overlooked?

Given the continually expanding interest of the younger generation in being competent in both prosthodontics and surgical implant placement, I believe we need to engage with this mixture and teach the principles by which these two entities can be synergistically merged without compromising the quality of care we provide for patients. We, as educators, must emulate what we desire to see in our students and what we desire for the future of our profession.

We must also become engaged in the continually emerging CAD/CAM processes to be sure these new technologies enhance patient care and are not just techniques that create crowns with casual relationships to the teeth and mediocre prostheses. Production must not only be expeditious, it must provide better quality and precision. It is this mindset that caused me to become involved with development of the AvaDent Digital Denture process. I observed colleagues initially trying the method in its early days and abandoning the process because it was not refined to their level of expectations. I believe it is better to help create the needed changes. All of these new technologies need the assistance of experienced, quality-oriented practitioners to become all they are capable of becoming.

You must feel gratified by the realization that your career has been such an outstanding one and that you have presided over what has arguably been the most exciting three decades in the profession. Any regrets? Is there anything you feel you missed out on or would have done differently?

I have thoroughly enjoyed my career as a dental educator and practitioner. I would walk the same path if I were to repeat my life. The only thing I would do differently is spend more time learning about leadership early in my career rather than developing it through experience. I would like to recall certain leadership experiences. In addition, I could have been much more helpful to the colleagues with whom I worked and interacted as their leader if I had learned from those with special expertise in leadership.

You recently retired as dean of one of the continent's most highly regarded dental schools. Where do you go from here vis-à-vis new challenges and hopes for a better world of clinical dental education?

In 2013 I retired as dean after 19 years of service. I have said many times that I am a slow learner, as most individuals would not have served in this position for 19 years. I am reminded of Thomas Jefferson's description of his presidency of the United States as "splendid misery." My time as dean provided me with the most rewarding opportunities of my career and also some of the most challenging situations. But I

thoroughly enjoyed my time and I hope I contributed to enhancing the education, research, and service missions of the school.

I have no interest in retirement and plan to stay active with some of the professional activities I find most rewarding. I am teaching part-time in the Graduate Prosthodontics program at Loma Linda University and also continue to help dental students learn through presentations I provide in some of their courses. In addition, I plan to continue with at least three other activities.

First, I will continue my work with the Foundation for Oral Rehabilitation. Their first eBook, entitled *Single Implants and Their Restoration: From Diagnosis to Maintenance*, was introduced in February 2015. A second eBook entitled *The Temporomandibular Joint: Structure, Function, and Dysfunction* was recently completed and is now available on the FOR.org website. Additionally, I have been working with Dr W. Patrick Naylor and we are nearly finished editing another eBook on implant overdentures to serve as a companion to the single implant eBook. None of these eBooks would have been possible without the special expertise generously provided by a large number of practitioners and educators throughout the world. It is my goal to continue developing resources that will meet the anytime, anywhere learning needs of students and practitioners.

Second, I plan to continue activities with eHuman.com in their development of additional educational programs to enhance the learning of dental students. I have been involved with developing content for two of their programs, entitled "Dental Anatomy and 3D Interactive Tooth Atlas" and "The Atlas of Dental Occlusion and the Temporomandibular Joint." They are now putting the finishing touches on a new program entitled "Head and Neck Anatomy for Dentistry." In addition, plans are well underway for development of another digital education resource about removable partial dentures.

Another equally stimulating involvement has been with Global Dental Science, the developers of the AvaDent Digital Denture process. Their initial process of fabricating complete dentures now includes implant prostheses as well as monolithic designs where the denture teeth and base become one unit. Working with their special engineering expertise and providing clinical advice has been most rewarding. I believe the advantages of this process will ultimately make it the dominant method of fabricated prostheses.

Literature Abstract

Economic Modeling of Sealing Primary Molars Using a "Value of Information" Approach

The objective of the study was to evaluate two primary molar sealant strategies for publicly insured children using an expected value of perfect information (EVPI) approach. The two primary molar sealant strategies were always seal (AS) and standard care (SC). By adopting a EVPI approach, the author aimed to develop a population-level model that examined the opportunity losses associated with AS primary molars, and to estimate the EVPI that would result from perfect selection of publicly insured children to receive primary molar sealants. A total of 286,400 children under the age of 18 years were enrolled under the Iowa Medicaid dental program. Model-based, child-level economic simulation models were then developed from the public payer perspective using claims data from the Iowa Medicaid program and the published literature. Opportunity losses were calculated for children who had AS treatment when SC would have been the optimal choice, and vice versa. Results revealed that the AS strategy cost $43.68 over SC (95% CI = −$5.50, $92.86) per child per restoration or extraction averted under the high intrachild correlation assumption, and $15.54 (95% CI = $7.86, $23.20) under the low intrachild correlation. Under high intrachild correlation, mean opportunity losses were $80.28 (95% CI = $76.39, $84.17) per child, and AS was the optimal strategy in 31% of children. Under low correlation, mean opportunity losses were $14.61 (95% CI = $12.20, $17.68) and AS was the optimal strategy in 87% of children. The EVPI was calculated at $530,813,740 and $96,578,389 (for high and low intrachild correlation, respectively), for a projected total incident population of 8,059,712 children. The evidence appears to suggest that sealing all primary molars is more effective than standard care. However, if implemented widely, this would result in large opportunity losses among publicly insured children. Thus, future studies should strive to identify the risk factors for caries in young publicly insured children and assess the specificity and sensitivity of risk factors so that primary molar sealant strategies can be optimized. Identifying relevant risk factors would then allow categorization of subgroups of children who would benefit most from this potentially cost-saving and effective public health intervention.

Ney JP, van der Goes DN, Chi DL. *J Dent Res* 2014;93:876-881. **References:** 32. **Reprints:** University of Washington, Department of Oral Health Sciences, Box 357475, Seattle, WA 98195, USA; Email: dchi@uw.edu—*Sheralyn Quek, Singapore*