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The Winds of Change: New Paradigms in Dentistry

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In an interview conducted by Dr. Damon Adams, Dentistry Today's editor-in-chief, Dr. Gordon Christensen candidly expresses his thoughts on 5 of today's most clinically relevant dental topics and how they might impact your practice. Dr. Christensen is Founder and Director of Practical Clinical Courses in Utah and senior academic advisor of the Scottsdale Center for Dentistry in Arizona. Both are international continuing education organizations providing courses and videos for dental professionals.

TOPIC NO. 1: CONSERVATIVE PERIODONTAL THERAPY

Dr. Adams: Why is conservative periodontal therapy desirable?

Dr. Christensen: Periodontists do a fantastic job treating the patients who find their way to them. There are roughly 5,000 periodontists in the United States and they have a couple of thousand patients each. However, I have found the amount of surgical periodontal therapy accomplished by general dentists to be minimal-to-almost none. If it were not for dental hygienists, we would have almost no perio done in the United States. As a result, the advent of conservative periodontal therapy is highly critical and, in my opinion, one way we are going to help treat the 35% of the population that has moderate to severe periodontal disease in our country. Additionally, general dentists should treat more periodontal patients with conventional periodontal therapy.

Dr. Adams: What are the clinical components of conservative periodontal therapy?

Dr. Christensen: Conservative periodontal therapy involves a number of therapies that have been proven individually, but not collectively. As an example, routine scaling and root planing every 3 months or more frequently has been advocated and researched for almost 3 decades. We know that same rate of tooth survival occurs with frequent, conservative root planing and scaling as when more invasive conventional periodontal surgery is accomplished. Knowing that conservative therapy works is essential. Conservative periodontal therapy also includes the use of antibiotic rinses, subsystemic antibiotics, and local antibiotics, as well as tongue scraping. Laser therapy for periodontal disease is under scrutiny. Some of the results are optimistic. We will watch the research carefully.

In my lifetime, life expectancy has doubled. We now we have the need to preserve the teeth to correspond with increased patient longevity. Using the previously mentioned methods, conservative periodontal therapy works well to preserve dentition for the moderate periodontal disease cases. While we don't have enough research on using the various methods together, we do have research on their individual results. Conservative periodontal therapy carried out by the hygienist or dentist provides not only an excellent service for patients, but also a revenue center for the practice.

Dr. Adams: Which periodontal patients are best suited to conservative therapy?

Dr. Christensen: Conservative periodontal therapy relates primarily to those with moderate periodontal needs. As I mentioned before, when we observe the overall periodontal needs of Americans, about 35% of the adult population has moderate to severe periodontal disease. I personally believe that it's a moderate periodontal disease orientation that relates to this conservative therapy and not particularly the more severe cases, which require more comprehensive surgical treatment, including grafting if natural teeth are going to be retained.

TOPIC NO. 2: DIGITAL RADIOGRAPHY

Dr. Adams: Let's talk about digital radiography. How do digital radiographs compare to analog radiographs?

Dr. Christensen: Looking at digital radiography is indeed a frustrating thing to me. I've been in dentistry now for many decades, and as I think back over the past, I remember when I could actually see initial dental caries on a dental radiograph back in the 1950s and 1960s, when higher amounts of radiation were used. Over numerous years, as the federal government forced us to reduce the radiation used, it became very evident that we could only see about one half of an initial carious lesion when compared to an analog radiograph taken with a higher amount of radiation. What happened when digital technology came on the scene? Radiation is now 7 to 9 times lower with digital radiography than with analog radiographs. The ability to determine initial caries has decreased even more. Digital radiographs are not as accurate in identification of initial carious legions compared to analog radiographs of even of 5 or 10 years ago, and they are not even close to radiographs of 40 to 50 years ago. Does that mean that we should condemn them? No, it does not. Digital radiographs have the advantage of images being able to be stored and pulled up out of the computer in an instant. We have the ability to enlarge, to color, and to texture them. We have the ability to change contrast, making the overall diagnostic capability of digital radiographs probably superior to analog. However, if we look at a single image of digital versus analog of the same size, analog is better.

Dr. Adams: What are the advantages and disadvantages of digital radiography as you see them in a busy practice?

Dr. Christensen: The expense of putting digital radiography in a dental practice is high. Currently, I am now adding cone beam to my already present digital tomographs, cephalometric radiographs, external bite-wings, and periapical and panoramic radiographs. However, the cost is similar to buying a couple of cars. Does it pay off overall? With regard to the actual cost of doing digital radiography: if you spread out the cost over a number of years; and also consider the elimination of the developer and fixer solutions, as well as the developing device itself; the revenue factor bringing monies into the practice pretty much takes care of that initial cost over a reasonable length of time. Eventually, digitial radiography becomes economically feasible.

Dr. Adams: So where do we currently stand in the United States with regard to digital radiography implementation? Where is the profession going relative to cone beam and other forms of digital radiography?

Dr. Christensen: At the present time, the majority in the profession in the United States are still using a lot of analog radiographs. In a typical continuing education audience, 20% to 40% of the attendees are using digital at this point. If I observe other developed countries, most of them are far ahead of us in the acceptance of digital radiography. We're going to see the continued rise of digital radiography until it slowly becomes the norm in America.
I'm now using external bite-wings where there is nothing put inside the mouth for the patient to bite down on. I'm also using tomographic radiographs to identify how much bone is present from facial to lingual, as well as the quantity and quality of that bone.

Dr. Adams: What are your observations regarding cone beam technology?

Dr. Christensen: Cone beam is used for many different aspects of dentistry. Implant dentistry is one of the major areas, however, they're mainly used in the comprehensive cases where multiple implants are being placed. Am I going to move rapidly to cone? As I mentioned previously, yes. Do I expect more ability to definitively diagnose initial caries or other small things? No, initial carious lesions are more difficult to observe, and the cost is high at this time. Large clinics, oral surgeons, periodontists, prosthodontists, and those who are doing more comprehensive and difficult treatment will gradually use cone beam. Some may be buying cone beam devices as a group, but for many it's not going to happen soon because the devices are too expensive. I see a need for these more comprehensive radiographic devices in the implant area, but I do not see them becoming the norm soon.

TOPIC NO. 3: ZIRCONIUM OXIDE UPDATE

Dr. Adams: What is the status of zirconium oxide based crowns?

Dr. Christensen: About 8 years ago, I was sitting at the University of Zurich where I was giving a lecture. I was with Dr. Peter Sherer (now deceased) who was a world-class Swiss prosthodontist. As we talked, I asked Peter what he was up to in his practice and research. He said, "I'm replacing PFM restorations." I said, "You are? With what?" Peter said, "Zirconia." I said, "What's zirconia?" (Remember that this was 8 years ago.) He said, "It's an oxide of zirconia and we're going to mill it and it will be like 'white steel'."

Well, it is 8 years later and we're currently running a study which my wife, Dr. Rella Christensen, is coordinating. It has 900 units in the study and the majority of those are zirconia-based. She has controls that are PFM using noble metal, along with other controls which are well known and commonly used in the profession. At 4 years we're seeing zirconia performing very well as a substructure. The zirconia substructures are comparable to the PFM at this time. However, at this particular point in history, she is seeing that some of the superficial (layering) porcelains have demonstrated flaws more than PFM controls.

Dr. Adams: How do they compare with PFM crowns? Should dentists be changing to zirconium-based restorations instead of PFM restorations?

Dr. Christensen: Currently, I consider that zirconia development is where PFM was in the mid 1960s. In other words, it's evolving and it works, but there some problems that primarily involve the superficial ceramics used over the zirconium copings. I attribute these problems to a lack of interaction between laboratory technicians and the dentists on issues related to proper prep design—proper reduction, proper taper, margin configuration, and so forth. In my opinion, we're going to see zirconia-based restorations gradually dominate the fixed prosthodontic market place. However, there is still a need for PFM, and all-metal restorations for day-to-day procedures.

There are some physiologic advantages to zirconia. One is related to the gingival sensitivity that many females commonly have to the metals used in dentistry. I have polled many audiences over the years as to how many attendees have had red reactions in their gums related to PFM restorations, and who has skin reactions to watches, rings, bracelets, anklets, and other metal jewelry. I find in most audiences that at least 50% of women have experienced reactions to these metals. The same metals that are used in jewelry, such as copper, palladium, nickel, chrome, and gold; are identical to the ones we use in the mouth! This is a significant point relative to why patients with these reactions to metal should not have these metals in the mouth.

Dr. Adams: Then, are you implying that gold alloy restorations are out-of-date and should not be used?

Dr. Christensen: Gold is still the "gold standard." It lasts longer and serves better than any other indirect restoration—period. There's no arguing about that, however gold restorations can be aesthetically unpleasing, even when used in the posterior part of the mouth. We are still seeing gold used for those patients who accept that lack of aesthetic acceptability. However, to say that gold is going to continue to play a major role in restorative dentistry is probably only wishful thinking. In my opinion, it will continue to be used by those who want long-term service in nonaesthetic areas, however, it is never going to return to its previous levels of use because of the aesthetic fetish that the public has.

TOPIC NO. 4: DIGITAL IMPRESSIONS

Dr. Adams: What are some of the current devices for making digital impressions, and why would a dentist want to use digital systems?

Dr. Christensen: At the present time, there are several companies that have brought digital impressions into the marketplace. The first one to emerge was Cadent with the introduction of the iTero device. We have evaluated that system in CLINICIANS REPORT (formerly CRA). We had numerous CR evaluators come in and learn how to make digital impressions. The digital impressions were then sent to labs that work with iTero. Those laboratories constructed crowns and bridges that were made with either physical impressions made in the standard way, or by the digital impression method. Then, we coded the inside of the restorations, and the dentist did not know which laboratory method had been used. Surprisingly to us, given the choice between conventionally made or digitally made restorations, almost every restoration that the dentist elected to cement was the digitally made one. That was an interesting study. 3M ESPE is now introducing the Lava Chairside Oral Scanner (COS) Digital 3-D Scanner system. They have done similar studies to the one I described, and have found the same thing. When crowns and bridges were constructed, either using digital impressions or conventional impressions, the preponderance of dentists elect to cement the digitally made ones. Therefore, we know the accuracy is present. There are other companies in digital impression technology; such as Sirona (CEREC 3), D4D (E4D), and others, orienting themselves toward making digital impressions, not just for crowns and bridges, but also for orthodontic reasons, for implants, and for many other different kinds of clinical situations.

Dr. Adams: What are some of the advantages of digital impressions for patients?

Dr. Christensen: Digital impressions are desirable for patients because they do not have impression material in their mouths, and the digital impressions eliminate the mess associated with standard impressions. They are advantageous for both patients and the dentists because of their accuracy. However, doctors must still practice excellent tissue management or they will not make an adequate digital impression. I see the interest in and the use of digital impressions growing. I predict that in 5 to 10 years digital impressioning will be commonplace.

Dr. Adams: Do you think that digital impressions will completely eliminate conventional impressions as we know them? Will this be a problem for companies that will still be making physical impression materials?

Dr. Christensen: In my opinion, it will be a slow evolution to digital impressions. Therefore, it will not be a significant problem. Look at the example of the air rotor. As the air rotor was introduced in the late 1950s and early 1960s, doctors still had belt-driven handpieces and they said that the air rotor was too expensive. On the other hand, use of belt-driven handpieces reduced very slowly as the air rotor took over. I see the same thing happening with digital impressions. I see a slow, gradual demise of conventional impression materials as digital impressions become more widely used.

TOPIC NO. 5: SOFT-TISSUE LASERS

Dr. Adams: What kind of impact do you see soft-tissue lasers making on the profession?

Dr. Christensen: It has been estimated that approximately 15,000 lasers being used in the US. When you consider that's roughly one tenth of the general dental population, they have not yet made a major impact. I used lasers as early as the mid 1960s. They were large, aggressive machines. We experimented on many uses of lasers in those days. I did not see a use for them at that point in time. Slowly, use of lasers has evolved. About 20 years ago, we did a study on dogs comparing the various wavelengths of the thenpresent lasers including Nd:YAG, Argon, and CO_2. Subsequently diode lasers came into dentistry and that wavelength became the most predominantly used one today.

Dr. Adams: In your opinion, what is still needed to improve lasers and to get more dentists to use lasers in their practices?

Dr. Christensen: I'm working with the laser companies routinely. I tell them that we need narrower cuts and the ability to cut soft tissue in such a way that the time involvement is reduced significantly. Currently, the time involved in cutting soft tissue with a popular diode laser is more than the time necessary for electrosurgery. The fact that laser cutting is slower has a positive orientation, because there is not as much potential for a nonplanned cut or slip. On the other hand, if I'm doing a significant amount of soft-tissue remodeling, I want to do it faster than most of the popular lasers of today. On the other hand, management of soft tissue for fixed prosthodontic impressions can be done adequately with laser.

There are also some half-truths. Among them is the belief that laser is painless related to laser use—try it on yourself! Yes, we are using anesthetic for a lot of situations. For a minor procedure, you may not need anesthetic. My wife, Dr. Rella Christensen, is doing a major study on the ability of lasers to disinfect or sterilize periodontal pockets. She and her team are also planning to investigate if periodontal fibers grow back into the tooth surface after a laser has been used. Currently, many are claiming that gingival reattachment is occurring. However, we need more legitimate and noncommercial research proof. She's working on that subject, and she will have nonbiased results within a year.

Currently, laser use is slower than other modalities and there is not a single therapy I can't do with other treatment modalities. In my opinion, it is still a technology looking for major singular use. We hope that we find its use in periodontal therapy. There is a lot to be done

in the development of laser technology, and I certainly hope, without wanting to sound pessimistic, that we find uses that cannot be done with other modalities.

CLOSING COMMENTS

Dr. Adams: We want to thank you for your time to do this interview for *Dentistry Today*! Thanks also for your dedication and tireless service in continuing education. Do you have any closing thoughts that you would like to share?

Dr. Christensen: We are now faced with innumerable technological changes including CAD/CAM in the office, CAD/CAM in the laboratories, as well as all kinds of techniques, materials, and devices that can help us do dentistry faster, easier, and better. I have enjoyed discussing a number of those paradigm shifts with you, how they relate to doctors, and more importantly to the patients that we serve.

Dr. Christensen has presented more than 45,000 hours of continuing education throughout the world and has published many articles and books. Dr. Christensen and Dr. Rella Christensen are co-founders of the non-profit Gordon J. Christensen CLINICIANS REPORT (previously CRA), which Dr. Rella Christensen directed for many years. Since 1976, they have conducted research in all areas of dentistry and published the findings to the profession in the well-known CRA Newsletter now called *CLINICIANS REPORT*. Dr. Christensen's degrees include: DDS, University of Southern California; MSD, University of Washington; PhD, University of Denver; an honorary Doctor of Science from Utah State University, and an honorary Doctor of Dental Education and Research from Utah Valley University. Early in his career, Dr. Christensen helped initiate the University of Kentucky and University of Colorado Dental Schools and taught at the University of Washington, and is currently is a practicing prosthodontist in Provo, Utah. Dr. Christensen is a Diplomate of the American Board of Prosthodontics, a Fellow and Diplomate in the International Congress of Oral Implantologists, a Fellow in the Academy of Osseointegration, American College of Dentists, International College of Dentists, American College of Prosthodontists, Academy of General Dentistry (Hon), Royal College of Surgeons of England, and an Associate Fellow in the American Academy of Implant Dentistry. Some of his other memberships include: American Academy of Esthetic Dentistry; International Association of Dental Research; Academy of LDS Dentists; American Academy of Restorative Dentistry; American Academy of Fixed Prosthodontics; Academy of Operative Dentistry; and International College of Prosthodontists. He can be reached at info@pccdental.com or at (801) 226-6569.

Disclsoure: Dr. Christensen has been involved with product evaluation and consultation with many companies for more than 30 years. He has no financial obligation to any company.