Mini Implants: An Interview with Dr. Gordon Christensen

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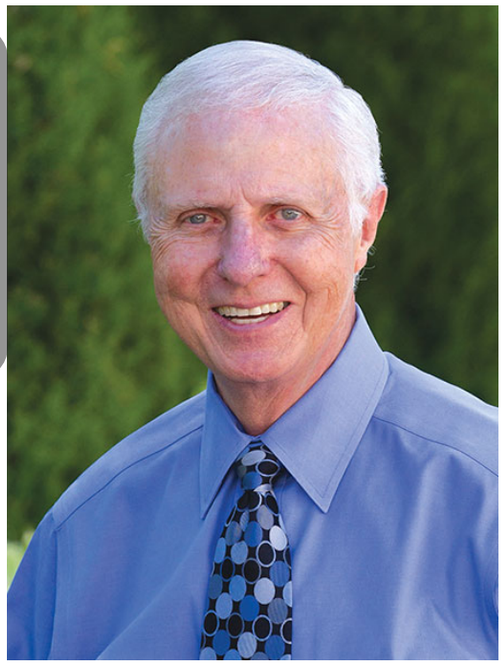

Interview of Gordon J. Christensen, DDS, MSD, Ph.D.

by Bradley C. Bockhorst, DMD

Dr. Gordon Christensen is a leading proponent of mini implants. For this issue of Inclusive™ magazine, he was kind enough to discuss his views on the subject in an exclusive phone interview.

Dr. Bradley Bucknorst: *I enjoyed your presentation at the American Academy of Implant Dentistry's 2010 Annual Meeting in Boston, Massachusetts, last October. You are one of the most outspoken proponents on mini implants and, as such, I appreciate you sharing your experience with us.*

Dr. Gordon Christensen: Thank you. By the way, I'm very pleased to take part in this interview. There are so many questions regarding small-diameter implants, and I'm happy to answer any questions related to them.

BB: *To start things off, how many years have you been placing small-diameter implants? And how many have you placed to date?*

GC: Probably the best answer to that question is going back to our CRA® Newsletter report (now the Gordon J. Christensen Clinicians Report®), which was published in November 2007. At that time, I had been placing mini implants since 1997 — only about three or four years. We had 200 people in that report who stated what they had observed during their use of mini implants. I had done only a few hundred at that particular point. The 200 respondents were all CRA Newsletter subscribers. The respondents were from five to 65 years out of dental school, with a mean of 27. They were in 34 states, Canada and elsewhere. Ninety-five percent were general practitioners, 4 percent were prosthodontists and 1 percent were periodontists. They had been in implant dentistry an average of 13 years. Approximately 74 percent of them did

surgery and prosthodontics. The rest performed either surgery or prosthodontics. As for in-house education, depending on the brand, most of them had taken a short course on mini implants. So that group represented basically thousands of mini implants among the 200 people who responded.

BB: *And within your practice, what percentage of implants placed would you say are small-diameter or mini implants?*

GC: I've been doing surgery and placing implants for 25 years. Each indication, of course, would have different percentages. Right now, in edentulous mandibles, I would say at least 50 percent of what I'm doing is small-diameter implants versus conventional diameter implants.

BB: *For the sake of some of our readers who may not be as aware of mini implants as others, what would you say are the primary benefits for this type of implant?*

GC: The primary benefit of mini implants is for the person who is too debilitated to undergo the surgery necessary for conventional implant placement; the person who does not have the money for a complex case, which very often might be better; or the person who will not accept, or cannot have for health reasons, a major bone graft.

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major bone graft.

BB: *What would you say are the primary benefits, from the clinician's standpoint?*

GC: Simplicity. Going back to that November 2007 CRA Newsletter report, when asked about difficulty of implant placement, respondents reported placement without a flap as "simple" and placement with a flap as "slightly more difficult." That's about what we saw for the major advantage to the clinician. I delivered a program at the World Congress of Minimally Invasive Dentistry, and it was on about 20 different minimally invasive techniques. And this was one of the major benefits for smaller-diameter implants.

Another significant advantage is that they can be immediately loaded in bone that is adequate. With Type I bone, there's no question; I've loaded hundreds of them immediately.

BB: *Initially, mini implants were primarily marketed as temporary or provisional implants. What would you say has changed to make them a viable long-term option?*

GC: Initially, I was using them as transitional implants when I had placed conventional implants and just wanted something to hold the denture or the fixed bridge in place while the conventional-diameter implants integrated. I found, after three or four months of waiting for the conventional-diameter implants to integrate, that I seldom could take the mini implants out easily. In fact, I had a couple that I practically had to cut out. That was

my turning event.

When the initial transitional implants were introduced, they were pure titanium. They were so weak that you could bend them with your finger. They were not adequate. However, Dr. Victor Sendax (a periodontist based in New York) got together with the IMTEC Corporation and alloyed them, and they became stronger. The combination of strength and ease of placement, and the fact that they could be loaded immediately, made me change my mind about using transitional implants.

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BB: *As with conventional-diameter*

implants, have manufacturers added different types of surfaces to increase bone-to-implant contact?

GC: Yes, they have. There are numerous companies now involved with making small-diameter implants. By far the most well known is IMTEC. Intra-Lock is making some major introductions as well. We're seeing about 10 companies that are involved with small-diameter implants at this point, and at least three of them are major companies.

BB: *One of the challenges in gaining widespread acceptance of smaller diameters is the perception of a lack of long-term published studies. I know you just referred us to the CRA study. Are there any other studies out there for people to reference for relieving that fear?*

GC: These are from various years, but Shatkin[1] was one of the major ones, from Shatkin F.I.R.S.T., LLC out of Amherst, New York, that found 94.2 percent retention. Other studies found 91 percent retention, 97.4 percent retention, 94.2 percent retention and 95.5 percent retention.[2-5]

BB: *As far as implant diameters, IMTEC started out with the 1.8 and has added larger diameters. Other companies, such as OCO Biomedical, started with the 3.0 and are adding narrower diameters. So several companies now have this range. What diameter do you typically prefer?*

GC: It depends on the bone. For Type I bone, I still very strongly prefer the 1.8 mm diameter. As you know, a small-diameter implant would go, in the current

marketplace, from 1.8 mm to 2.9 mm. That directly relates to the FDA clearance of these types of implants back in 1997 — 14 years ago. Standard-diameter implants — 3 mm and larger — were cleared by the FDA a long time ago, in 1976. So the differentiation of small diameter versus conventional diameter would be at the 3.0 mm diameter level. The sizes of mini-diameter implants typically start at 1.8 mm and go to 2.4 mm, 2.5 mm, 2.9 mm.

In good Type III bone, which is obviously softer but usually more homogeneous, I would use a 2.4 mm diameter. And in the lower anterior, I tend to prefer the 1.8 mm because, when going to a larger diameter, I have broken them from the torque required to insert them. I've only broken one screwing it in, but I have broken one. And I had one break, as I mentioned at the AAID meeting in October, in service in Type I bone. So it varies with the bone density. The more dense the bone, the smaller the diameter. The more porous the bone, the larger the diameter.

BB: *Along that same line, most of the clinicians who are placing implants are putting them in with a winged driver, not with a torque wrench. Is there a maximum torque where you say, OK, stop, let's run the drill down the osteotomy again?*

GC: Yes, you need about 30 Ncm to feel like you're at an appropriate level of primary stability. If at 30 Ncm you're not making any progress, then that makes me quite nervous. So I would screw the thing out and make a little deeper cut or use a wider-diameter implant. As a dentist becomes more familiar with these, they will soon

sense when threading it into place whether the torque is approaching 30 Ncm. Let me put it this way: Dentists need to have a torque wrench.

BB: *One of the other presentations at the AAID meeting was by Dr. Sendax. His take away message was bicortical stabilization. That's doable in the symphysis region. How do you handle that in other regions, such as the posterior mandible? Are you a proponent of bicortical stabilization, or do you have a different approach as far as placement?*

GC: Type II bone typically found in the posterior mandible is not a particularly good indication for small-diameter implants, in my opinion, because the bone density of the cortical plate may be 1000 on the Hounsfield unit (HU) scale. However,

the cancellous bone may be as low as 40 or 50 HU. The bottom line is, I'm usually reaching for a large-diameter implant, like a 6 mm, to better engage the cortical bone. With the exception of the small triangle of bone that's usually directly distal to the mental foramen, I'm wary of small-diameter implants in Type II bone in the posterior mandible.

BB: *What's your approach in the maxilla?*

GC: About the same. As you approach the sinus, which would be the first and second premolar, that Type III bone is going to be relatively dense. Anything distal to that — wow! — is not for mini implants, in my opinion.

BB: *That's great feedback. Besides the quality of the bone, what are other caveats*

when considering mini implants?

GC: There are many reasons for mini-implant failure. Over the 10 years I've done this, I have lost only 10. Now that sounds like a pretty egotistical statement, but when they have failed, and when I've seen them fail as they've come into our lab — and we do not solicit people sending their cases to our lab — is when we see these things: Improper radiography and lack of thorough treatment planning. I strongly suggest a facial-lingual radiograph for any treatment plan — either a tomograph or a CBCT scan. The quality and quantity of bone, as well as the ideal location of the implant, can be evaluated pre-surgically.

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Too much soft-tissue thickness on the ridge is another issue. If the thickness of the soft tissue is over 2 mm, the clinician should take a V-wedge out and allow the soft tissue to heal before he or she even considers making any kind of an impression. About 2 mm should be the maximum on the crest. I've seen clinicians stick the implant through 4 mm or 5 mm of soft tissue. That's like sticking a 6-foot beanpole in a foot of mud — just absolute stupidity.

Too few implants placed can also be a major problem. For Type I bone, four mini implants in the anterior region of an edentulous mandible is more than enough. I usually say two small-diameter implants would equal one conventional-diameter implant. Having done hundreds of cases with conventional-diameter implants in the two canine areas, we're now putting four in the anterior edentulous mandible, spread either equally across from what was canine to what was canine, or emphasizing the canine areas with two in that area spread 4 mm or 5 mm apart, and the same in the other canine area. And then on the upper, IMTEC and others say six implants. I have, in relatively dense Type III bone, gotten along with four implants very nicely on the maxillary arch, although it's safer to place six. I've seen clinicians try to put two minis in an edentulous case. You need four to six in an edentulous case — four in the mandible, six in the maxilla.

Besides diameter, the length of the implant must be considered. Ten mm is very borderline. If you're going through 2 mm of soft tissue, you really don't have enough bone-to-implant contact. Thirteen is the standard length used by the profession.

Regarding lining up the implants — and this is totally empirical — I do not like anything greater than 15 degrees from parallel. Usually, the housings will compensate for that quite nicely. If the divergence is too great, the O-rings will wear more quickly. It has also been reported in the literature that the metal ball of the implant may wear if the housing is sliding off and on at too odd an angle.

And poorly adjusted occlusion is a total killer. If clinicians attempt to put minis in the mouth of a bruxer, they're kidding themselves. I don't even like conventional-diameter implants in that situation. So, poorly adjusted occlusion or not respecting the fact that he or she is dealing with aggressive occlusion is problematic.

BB: *As far as four or six implants in an edentulous maxilla, do you typically go with the palate, or is a palate-less overdenture an option?*

GC: That's a question that comes up routinely. I try to keep a person with a palate if I possibly can. Usually they've had a palate before and, with the exception of the few people who would complain about the palate and opt not to have it, I try to get them into a palate because then we have some hard bone for support, and the lever going distal from the implant is reduced. I prefer to have a palate present.

But if I don't have a palate present, the minis have to be placed more distally. And you know the problem there. In the maxillary arch, you might get one mini distal to where the canine was, and you've still got a Class I lever going distally. I would strongly prefer to have the palate, even if six implants are planned.

BB: *What is the minimum vertical space needed to make sure there is enough room for the O-ring housing?*

GC: The minimum — and this would relate not only to small-diameter implants but also conventional-diameter implants — is about 4 mm, and that's very borderline. I would like 5 mm of acrylic resin around the housing.

BB: *OK. From a lab perspective, if we're going to process a new denture, we would recommend some kind of a casting.*

GC: Exactly. Especially if the occlusion is

intense. A very thin chrome-cobalt framework processed into the denture with a finger extending over the top of the housing adds strength and will prevent the attachment from breaking through the denture.

BB: *If you're going to have a new denture made, do you typically want the lab to process the housings in, or do you prefer to pick them up chairside?*

GC: Now, I know who I'm talking to, and I know you guys do excellent work; however, if the dentist is using a lab that has not done this, picking them up is far better. I have to say only about 5 percent of mine have been picked up. I strongly prefer to have the lab do it, but the lab has to know what it's doing.

BB: *If you're going to pick them up chairside, and say you're dealing with four implants, how many housings could you pick up at once, versus trying to pick up all four at the same time?*

GC: You know as well as I, if there is too much material placed into the well that they have cut in the denture, the denture will lift right off the base. I would recommend a small vent hole be drilled somewhere in the palate, or in the lingual if it's a mandibular overdenture, so that as they chew on that material for several minutes, the denture can completely seat. I don't like to do more than two at a time. Then I want to make sure the occlusion is correct and that there is material oozing out of the vent hole. To just stuff a large amount of resin in the denture and have the patient bite down is, again, stupid. The

prosthesis will not be completely seated.

BB: *Is there a particular material you prefer to use when you're picking up the housings?*

GC: There are many out there, as you know, but I prefer Sterngold pick-up material.

BB: *OK, very good. To wrap things up, do you have any tips or techniques you would recommend to our audience as far as minis, either from the surgical or the prosthetic side, that you would like to share at this time?*

GC: The list I gave you addressed the main reasons for mini failure. There are people placing them in Type IV bone. There are people placing them in Type II bone, with

nothing on the internal portion of the cortical plate. We know what makes them fail. We know what makes them succeed. Let's just kind of cap it off with that.

Making minis succeed means adequate numbers of implants and adequate planning. It means parallelism. It also means not having too much soft tissue coronal to the bone. It means adjusting occlusion impeccably well after the prosthesis is delivered. And — something I haven't mentioned yet — in the event that the bone is of questionable quality, it means waiting, with soft denture reline, for several months before loading. It may be three to four months until they are actually loaded. However, most of the small-diameter implants I have placed were loaded immediately.

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But there is a cautionary note, and that is recognizing what makes them fail. If clinicians respect the several points I've mentioned, the minis will work. If they don't respect those points, the minis will indeed fail, much faster than conventional-diameter implants.

BB: *That brings us to the final question. How can clinicians obtain more information on small-diameter implants and get adequate training?*

GC: There are numerous courses given by manufacturers, and they're fine. But as with any implant, I usually suggest to a person who wants information about large-