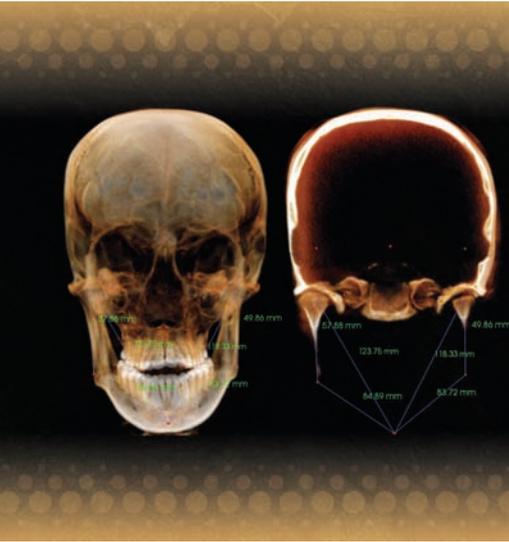


CT-guided Implant Surgery: You Have Nothing to Fear but Fear Itself!

by Jay B. Reznick, DMD, MD



“ Within 10 years, CT-guided implant surgery will become the standard of care for implantology. ”

Dentists can be a funny bunch. We all, for the most part, like new technology and gadgets, yet it is very difficult for some of us to change the way we do things, especially when it comes to our practices. Some of our colleagues would be content if they could continue doing procedures and using clinical techniques just as they learned them in dental school. If they never had to learn anything new, they would be very content. Fortunately, I am privileged to be associated with a very select group of forward-thinking, technology-embracing, progressive and sophisticated dentists. I am speaking, of course, of Townies.

On September 18, 2009, a few hundred Townies and similar 21st Century dentists witnessed history in the making – a true milestone in the practice of dentistry, that represents only a tip of the iceberg of what is to come. This event was the first live presentation of the merging of the two most significant technological advances in dentistry since the first dental radiograph was taken in 1896. The first is the CEREC CAD/CAM system, which allows dentists to accurately scan a dental preparation and then create a restoration that is milled from a solid piece of ceramic or composite material. The second is the GALILEOS cone beam CT scanner. This revolution in implant dentistry transfers the image of the dental and soft tissue topography in and around an edentulous space into a three-dimensional radiograph of the patient’s jaws. This information is then used for the planning of dental implants. This is the next quantum leap in the evolution of CT-guided dental implantology.

It is my belief that, within 10 years, CT-guided implant surgery will become the standard of care (I hate using this term) for implantology. There are already a number of dental implant manufacturers who have embraced this technology and developed CT-guided surgical kits for their implant systems. There are also a number of fine software packages on the market that allow for CT-based implant planning and the manufacture of a guided surgical stent. So, for those of you who are not familiar with this technology, I will elaborate.

When I began practicing almost 20 years ago, implant surgeons would plan their dental implant placement off of a study model and panoramic radiograph. We would lay a large flap to visualize the bony anatomy and place the implants to engage the greatest volume of bone. Six months later, we would uncover the implants and send the patient to their restorative dentist and hope that the implant fixtures were positioned well enough to be restored. Sometimes they were. Sometimes they were not, in which case, the implant would be “buried” and never restored. Fortunately, today we are a little smarter. Implantology today is, at least theoretically, restoratively driven. That makes sense, since the goal of tooth replacement therapy with dental implants is to give the patient a functional and aesthetic prosthesis to restore their chewing function and self-confidence. However, most dentists today still use a stone model and panoramic radiograph to design the surgical stent. Sometimes at surgery, it is discovered that the implants cannot be placed where desired, and so the implant position or angulation is

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“adjusted” to try to accommodate. Other times, the postoperative radiograph reveals that the actual implant placement was less than ideal.

3D CT-guided dental implant surgery virtually eliminates these problems. This technology allows patients to have true restoratively-driven implant treatment. We start with the restoring dentist creating the ideal prosthesis for the edentulous site, and then a radiographic template is made for the CT scan. Knowing the size and position of the ideal restoration, the implant surgeon uses a 3D radiograph of the jaws to plan the implant placement sites, taking into account the bone volume and anatomy at each site, as well as the position of the prosthesis. If there is a bone deficiency requiring grafting, or if an angled abutment will be needed, this information is known *before* surgery and adjustments are made accordingly. This is all done in “virtual reality” on the computer screen using the patient’s actual data. Then, all this treatment planning data is used to create a custom surgical guide that accurately transfers the treatment plan from the computer screen to the patient’s mouth. And if that is not enough, the implant placement is so accurate, that the surgical guide can be used to create a master model that is used to design an abutment and restoration that are placed at surgery, with very little or no adjustment. Not only that, but this technique allows the surgery to be performed through a very small incision, in half the time of traditional implant surgery. In addition, the patient usually has a faster and more comfortable recovery, even when multiple implants are placed.

So, with all these benefits, why is it that CT-guided implant surgery is not the “norm” today? I think that it goes back to the first paragraph of this column. Most

dentists are afraid of leaning a new way of doing something, especially when it is so revolutionary that it completely changes our concepts and workflow in a particular clinical discipline. But I want to tell you not to fear the future. Embrace it. This technology, even though it seems very complicated, will actually make your life easier and your patients happier. CT-guided implant surgery allows us to get the best results, while improving the experience for our patients. We are starting with the ideal final result, and working backwards to get there. This technology facilitates more accurate treatment planning and implant placement, leading to fewer complications and an overall greater implant success rate.

Like any other innovation, in order to be adopted by the masses, it needs to be easy to use. Given that this technology evolved from the medical-grade CT scanner, most of the earlier implant planning software programs required the dentist to be both a radiologist and a computer engineer. They also required the data from the CT scan to be put on a CD, to be imported into the implant planning program. This usually took a significant amount of time, which more than offset the time saved by using a CT-guided surgical stent. As a result, very few practitioners adopted this technology. The development of cone beam CT scanners brought this technology into the hands of dentistry and into our offices. Dental manufacturers began making the scanners more user-friendly, and the developers of dental implant planning software have followed suit. A few of the systems available today make the work flow of implant planning and manufacture of the surgical guide a

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Author's Bio

Dr. Reznick is a Diplomate of the American Board of Oral and Maxillofacial Surgery. He received his Dental degree from Tufts University, and his M.D. degree from the University of Southern California, and trained in Oral and Maxillofacial Surgery at L.A. County- USC Medical Center. His special clinical interests are in the areas of facial trauma, jaw and oral pathology, dental implantology, sleep disorders medicine, laser surgery, and jaw deformities. He also has expertise in the integration of digital photography and 3-D imaging in clinical practice. Dr. Reznick is one of the founders of the Web site OnlineOralSurgery.com, which educates practicing dentists in basic and advanced oral surgery techniques. He is the Director of the Southern California Center for Oral and Facial Surgery in Tarzana, California. He can be reached at jreznick@sccofs.com.



smooth, seamless process. In my practice, implant planning is done immediately after the patient is scanned. The patient participates in the process and is educated about implant dentistry, and can see first-hand if there is bone deficiency or pathology that will need to be addressed. The entire process, from opening the scan to planning the implants and ordering the surgical guide takes just a few minutes.

More and more implant manufacturers are seeing the writing on the walls and developing CT-guided surgical kits for their implant systems. The smart implant companies are committed to being "open source", meaning that they are cooperating with a variety of software and surgical guide manufacturers, so that the practitioner can choose their favorite implant system and surgical planning software and use CT-guided technology to provide tooth replacement therapy to their patients. I am certain, that within a few years, all of the major implant systems will have this capability.

Once you have started using CT-guided technology, you will not want to do it the "old-fashioned way" again. You will be convinced by the accuracy and precision of treatment planning and implant placement, the reduced surgical time, the ease of restoration and the increased case acceptance. The biggest hurdle is to convince yourself it is no different than making the switch from a typewriter to a word processor. Sure, it was a little intimidating at first, but once you got the hang of it, you were correcting, deleting and reformatting like a pro. The same thing goes for the switch from mallet and chisel to the high speed handpiece for exodontia. It seemed like a radical change, but would you go back to your typewriter or chisels? Change is a good thing, especially when it improves the quality of your practice, and gives your patients a better experience and a better result. It's pretty cool, too! ■

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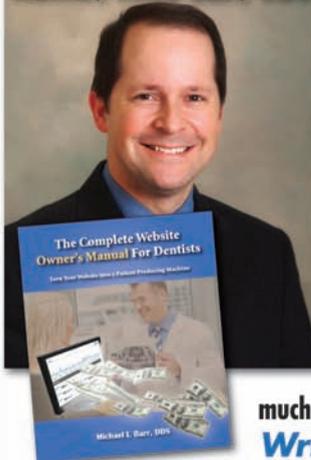
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