

THE TAKE-AWAYS

- Cone beam technology is becoming the standard of care for implant treatment planning.
- Online consultation with imaging companies makes treatment planning easier for the GP.

3D: Your baseline for success

Part I of a three-part series on how CBCT is transforming treatment planning for implants.

by MICHAEL TISCHLER, DDS

THE TEAM

Bringing together a variety of voices for the best advice and big ideas.

TEAM MEMBERS

- Dr. Brian Harvey (Lead)
- Dr. Michael Tischler
- Dr. Lee Gause
- Dr. Joyce Warwick

ABOUT THE AUTHOR

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THE SET-UP

“With this article, Dr. Tischler lays the groundwork for incorporating cone beam CT technology into every-day implant practice, emphasizing the importance of ‘beginning with the end in mind.’ When planning implants, the benefits of having a 3-D perspective are difficult to overstate. Cone beam technology dramatically reduces radiation exposure when compared to older spiral CT technology, although patient radiation doses are still far higher than for traditional, non-computed radiographic techniques, a fact that should be taken into account when considering utilizing CTs for dental implants.”—DR. BRIAN HARVEY

IN the January 2010 issue of DPR, Dental Implant Clinical 360° team lead Dr. Brian Harvey did a wonderful job of answering the question, “Why implants?” Dr. Harvey’s article clearly spelled out the importance of dental implants for the general dentist, and how relevant implant dentistry will be for the general practitioner in the future.

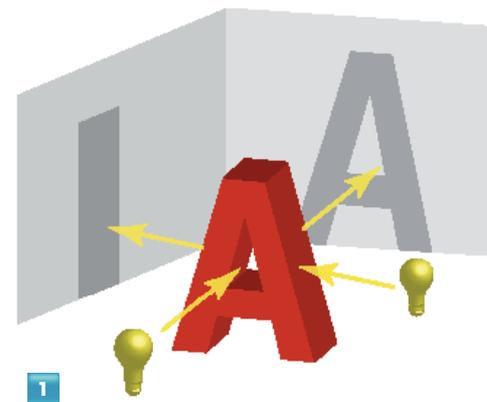
This article starts a three-part series on how Cone Beam CT (CBCT) is clearly the foundation for treatment planning dental implants for the general practitioner as more and more GPs are getting involved with implant

12% of respondents **currently own** a cone beam imaging system.

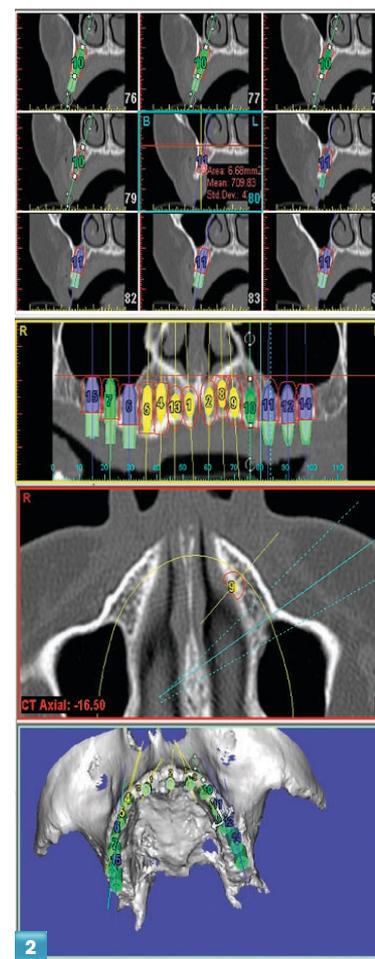
Source: 2009 DPR Tech Census

dentistry. This includes dentists either placing *or* restoring dental implants, since implant dentistry is a team approach between the surgical and restorative dentists. I will show the reader how current online imaging services will almost “hold your hand” to treatment plan with CBCT, eliminating the need for any software training or the need to purchase software. Because of these online imaging services, there is really no excuse not to bring CBCT into the treatment planning sequence.

AT A GLANCE



1



2

FIGS. 1-2 How multiple views of a CT show a 3D view (Fig. 1). Multipane view of a SimPlant CT imaging program (Fig. 2).

WHAT'S NEXT?

Part II of the series...

Dr. Tischler will cover clinical examples of the treatment planning process and utilizing CT for simpler dental implant cases.

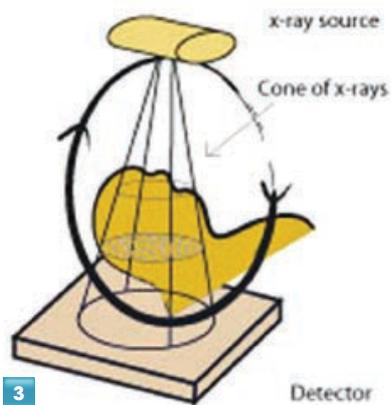
Part III of the series...

He will tie it all together with CT imaging for larger complex implant cases with multiple implants, and for implants in the esthetic zone.

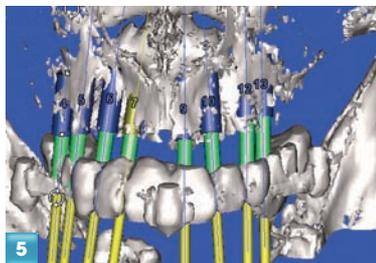


WEB EXCLUSIVE

To download detailed charts outlining the various categories and available products for caries intervention, go to dentalproductsreport.com.



FIGS. 3-5 Schematic of a CBCT (Fig. 3). Image of a CT radiographic template showing final tooth position (Fig. 4). 3D view from SimPlant showing final prosthetic tooth position.



This month, I will cover the basics of CBCT imaging, a little historical perspective of CT imaging, and the basics of utilizing CT for treatment planning.

What is Cone Beam CT?

It has only been since the late 1980's that computerized tomography has been used in dentistry and since the early 1970's that it has been used in medicine. The x-ray energy from a CT

machine is directed toward an object from multiple orientations. The best way to explain how multiple orientations benefit diagnosis is to observe the diagram in Fig. 1 of a woman holding two pieces of fruit. Because of the multiple views taken of this woman, a 3D view can be reconstructed showing the entire picture. This is what is done in the mouth with a CT, creating multiple views that are put together in a 3D manner (Fig. 2). Traditional CT machines seen in hospitals create a fan-shaped beam with a spiral radiation pattern. CBCT machines utilize a more targeted cone shaped beam that is specifically targeted for the head and neck regions (Fig. 3) In addition to being more targeted, CBCTs are faster and have 20% of the radiation of a traditional spiral CT; they also have a small footprint similar to a dental panograph. All of this, coupled with the cost of a CBCT machine being feasible for an implant practice, has created a dramatic increase in CBCT use in the past five years.

3% of respondents **plan to purchase** a cone beam imaging system.

Source: 2009 DPR Tech Census

CBCT's relevance to implant dentistry

It is an accepted concept that the success of implant dentistry lies in correct treatment planning. It also is clear to most clinicians that the prosthetic end result of dental implant support should drive the treatment planning of any implant case. Dr. Gordon Christensen has stated, "that the people ultimately responsible for the success of dental implants are the prosthodontist and the general dentist." This underscores the importance of the restorative aspect of dental implant treatment.

When one looks at the literature and listens to clinicians on the podium, it is evident that utilizing CBCT is the best



Imaging Sciences International's i-CAT system. Go to imagingciences.com for details.

available technique to treatment plan for dental implants and to tie together the

surgical and prosthetic aspects of treatment. In my practice, every implant that I place has a CBCT associated with it. It is rapidly becoming the standard of care and many clinicians feel it already is.

Treatment planning

Although CT use might be the standard of care, a general dentist restoring or placing dental implants may be intimidated by the software needed to analyze a CBCT, or where to find a CT site. The good news is that there are many available imaging services to guide you to a CBCT site, then create an online meeting with you to review the CT data, treatment plan the case and create a presentation that you can review with your patient. This online meeting can also include the surgical and restorative dentist so that a true team approach can be had.

Once a CT scan is taken the raw DICOM data must be reconstructed so that 3D planning can take place. Many software programs are available to

"It is rapidly becoming the standard of care and many clinicians feel it already is."

analyze CT data. Examples of imaging programs include:

- ⦿ SimPlant (Materialise Dental)
- ⦿ Implant Logic Systems (BioHorizons)
- ⦿ Noble Guide (Noble Biocare)
- ⦿ EasyGuide (Keystone Dental)
- ⦿ Dolphin (Dolphin Imaging)

Many dentists have purchased programs and have been trained to utilize them and plan their own cases. This knowledge of software and financial investment is not needed if one of the currently available imaging processing companies—such as 360 Imaging in Atlanta or nSequence in Reno—are utilized.

These imaging companies can create a treatment plan and radiology report using the various programs that you as the clinician choose. An online meeting is then set up to discuss the plan. You can begin simply by establishing an account with the company. Although these organizations do most of the work and assist in treatment planning and analyzing the CT data, the dentist must supply them with a radiographic representation of the final prosthetic tooth position on the CT (Figs. 4, 5). This final prosthetic tooth position allows the CT to be used to plan for bone grafting and exact implant positions to support that prosthetic end result.

on this
PAGE

Imaging Sciences International's i-CAT was pictured as part of the story. Here are three additional cone beam systems.



Planmeca

ProMax 3D

The **ProMax 3D** CBVT allows users to choose a region of interest for a procedure through segment selection, reducing scan time and radiation. planmecausa.com



PracticeWorks Inc.

Kodak 9500

The **KODAK 9500** Cone Beam 3D System is capable of providing anatomically-correct 3D images down to 0.2 mm voxel size. kodakdental.com



Gendex

GXCB-500

The **GXCB-500's** Amorphous Silicon Flat Panel sensor yields highly detailed images at an 8.9-second scan rate and a 20-second reconstruction rate. gendex.com

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