



# Great Options with CBCT

By Alexandre Balaci DMD

Technological advances in medicine and dentistry have significantly changed the way patients are cared for. In the past, advanced radiologic studies such as computed tomography (CT) were only available within a hospital setting. Oral & maxillofacial surgeons were accustomed to using CT in patients with trauma and pathology conditions. In a dental setting, however, practitioners depended entirely on two-dimensional plain films.

In 1998, Mozzo reported on the first cone beam CT (CBCT) unit developed specifically for dental use. By 2003 it was reported that CBCTs produced better image quality with a much lower radiation dose than the newest multidetector row helical CT unit.

Compared to “medical” CT scanners, CBCT machines have two major differences. First, CBCT uses a low-energy fixed anode tube, similar to that used in dental panoramic x-ray machines. Second, CBCT machines rotate around the patient only once, capturing the data using a cone-shaped x-ray beam. These changes allow for a less expensive, smaller machine that potentially exposes the patient to less radiation than a full-mouth periapical series.

## What It Can Do For Us

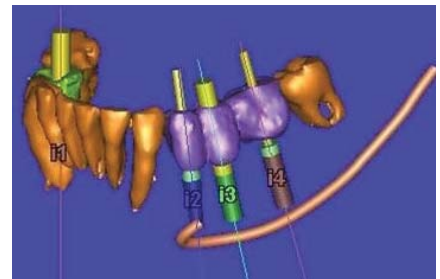
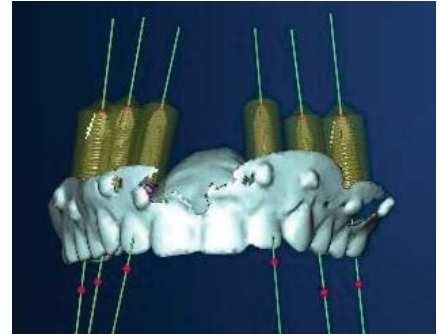
Since the affordability of this technology has improved dramatically over the last few years, its use within dental practices has increased dramatically. The ability to visualize anatomical structures prior to treatment has improved almost every aspect of the field of dentistry.

In orthodontics, for example, soft and hard tissue landmarks can be easily identified without magnification of an image. Facial deformities can be diagnosed and measured based on 3D structures. We can obtain virtual models of the patient’s dentition and accurately predict and determine the final occlusion.



All aspects of oral & maxillofacial surgery benefit from visualizing the third dimension. The relationship of impacted teeth to the mandibular canal, adjacent teeth, sinus walls and cortical borders can be determined, ultimately improving the outcome of the planned surgical procedures. Advantages of using CBCT can also be applied to identifying and treating pathologic conditions, trauma, sleep apnea, TMJ disorders, and craniofacial/cleft surgery.

CBCT’s most significant impact has been its use in relation to implant dentistry. Distortion-free 3D imaging allows the surgeon to fully evaluate a potential implant site. Anatomical structures and variations in anatomy can be fully mapped and can give the surgeon the ability to actually visualize the surgery prior to its completion. The use of third party software also allows for virtual surgical and prosthetic completion. Fabricating surgical guides from virtual data allows for a more predictable surgical procedure and for completing temporary and final prosthetic components prior to the actual surgery. If these delicate surgeries are planned and performed in a proper manner, we can minimize post-



operative complications and maximize patient satisfaction.

## What We Need to Remember

The true benefits of CBCT use in the dental profession are just starting to be realized. As we modify and advance applications, however, we must still keep technical goals in mind. For example, study resolutions must be maximized with the lowest possible dosage of radiation. Societal drivers for real-time treatment options must be weighed against the overall cost versus the true benefit of CBCT’s use. When indicated, it will allow for better patient care through better radiologic evaluation. Knowing the terrain leads to surgical predictability and improved patient satisfaction.

[drbalaci@jawcare.com](mailto:drbalaci@jawcare.com)

references upon request