

# Cone beam scans detect dental anomalies before orthodontic treatment

*Dr. Steven Appel discusses how winning a cone beam scanner has improved his ability to diagnose and treat orthodontic patients*



"It's good!" Dr. Appel wins the i-CAT®

After winning the 2009 Win-A-Free i-CAT® Sweepstakes, my new cone beam scanner was installed in August 2010, about 6 months ago. Winning this machine was quite a thrill, but I didn't realize the true impact that it would have on my practice and my patients until it became an integral part of my diagnostic process.

Before discussing the positive changes that CBCT has made on my orthodontic practice, I want to emphasize that my patient's safety is always a priority, in all phases of treatment. With that in mind, my scans are captured with attention to ALARA principles (as low as reasonably achievable). The i-CAT's (Imaging Sciences International) capacity for collimation is a major asset. I am able to choose scan sizes from 2 cm to 13 cm, and all sizes in between.

For most cases, I take limited field-of-view scans, to view just the mouth area, and patients are protected with lead aprons and all of the normal precautions involved with radiography. I use the "5-second scan" on younger patients, when trying to determine whether they are ready for treatment, or if we have concerns about possible impactions. The scan helps me to

find out the answers and communicate with parents immediately. This type of imaging improves my capacity as an orthodontist. Although 2-D x-rays are valuable in dentistry, the diagnostic information obtained from a 3-D scan is light years ahead in comparison to the type of information we receive from 2-D radiographic methods.

Along with the diagnostic information I need when indicated, the scan also replaces my need for diagnostic impressions at the beginning of orthodontic treatment. This is a big plus because many of my patients really dislike the gagging and discomfort of taking molds, and I obtain a skeletal rendering of the bite. Questions about tooth-positioning issues, impacted cuspids, impacted third molars, transposed teeth, and other dental anomalies can be answered almost immediately, which is not possible with a 2-D panoramic x-ray. CBCT scans help patients and their parents to more easily understand the exact position of an anomaly in their jaw, explain why it will be a source of future difficulty for the patient, and what we have to do to remedy it. If I must refer a patient to an oral surgeon, for example, if an impacted cuspid needs to be exposed, I give the



Figure 1: 12-year-old male. Note upper left gingival prominence coincident with erupting teeth



Figure 2: Maxillary sinus asymmetry evident on left side of CBCT scan

scan to the patient. That way, the oral surgeon can obtain more information than from a 2-D x-ray. This allows the surgeon to pinpoint the tooth's location and perform less invasive surgery.

The i-CAT® scan had life-altering results in the first month that the machine was in service. A 12-year-old boy came for a consultation with an upper left premolar that was partially erupted (Figure 1). Upon an oral examination, I noticed a small amount of gingival irritation around the eruption site. This is not unusual when permanent teeth erupt, but in this particular situation, there appeared to be a little more swelling than was normal. I thought of some advice that I received when taking a course with Dr. Bruce Howerton at the 3-D Imaging Institute in North Carolina after I won the scanner. In his course on how to evaluate the scans, he recommended that we should scan from the back of the head moving forward on the face, as if we were looking at the patient head-on, and look for asymmetries or other unusual conditions. I was glad that I took his advice.

As I was scanning forward, when I approached the premolar (bicuspid) region, one sinus appeared to be almost obliterated (Figure 2). I referred the patient to a local university oral pathology center, where he was diagnosed with a fibrous dysplasia of the maxilla, an egg-shaped cyst that develops in the sinus. As a result of this condition, because of the egg-shaped mass on the left side between the upper jaw and his eye, as the patient's jaws grow, he will start to grow asymmetrically. His interpupillary line will cant upwards on the affected side and the patient will develop a downward cant of his occlusal plane because of the mass. To avoid this facial deformity from developing further, he is scheduled for surgery to have the mass removed to prevent the negative growth issues. Although the child had been seen by dentists all of his life, no one knew that there was a problem of this magnitude hiding in his jaw. His mother was incredibly thankful. When I sent

the patient for the consultation with the pathologist, I burned the i-CAT® scan and imaging software to a CD and gave it to the mother, so they had the anatomical information without having additional testing and radiography on the patient. We plan to continue with orthodontic treatment after the necessary surgery is completed.

Continuing education is widely available to learn how to use the cone beam scans responsibly. Webinars, seminars, both local and national, and CE courses in print, are just a few of the options for doctors to learn about the subject at their own pace. The Imaging Sciences website offers a number of these courses. The comprehensive 2-day course at the 3-D Imaging Institute was recommended to me by other orthodontists because of the wealth of information available on anatomical structures that are not typically seen on a 2-D x-ray. This course helped me tremendously.

From planning orthodontic treatment more precisely, to a more comfortable diagnostic workup, to finding anomalies that could change the course of a patient's life, the information that I obtain from these scans is invaluable. Upon winning the i-CAT®, I felt very lucky, but after having it for just a few months, I realize that the real winners are my patients. **DR**



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