

# A World With a New Dimension

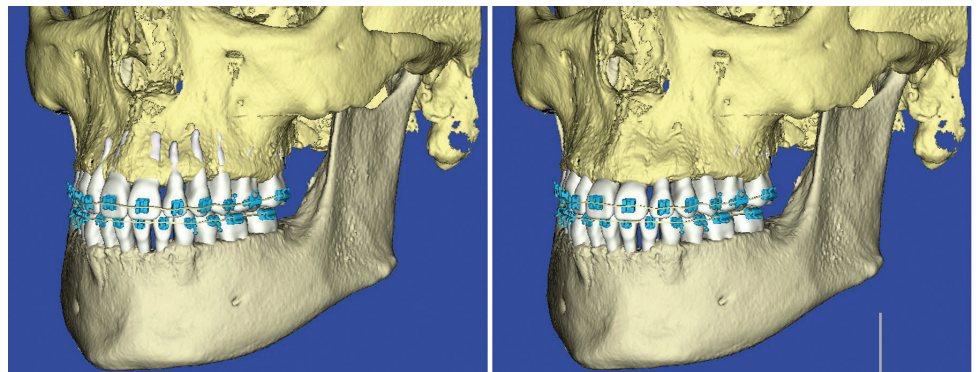
BY MARTIN F. VAN VLIET, DMD

Three years ago, I implemented two i-CAT® Next Generation 3D cone beam systems for my orthodontic practices.

At that time, I believed that this technology would enhance my diagnostic skills and orthodontic treatment planning. However, I did not realize that this versatile imaging modality would lead to a complete metamorphosis in the evaluation and treatment of my orthodontic patients.

Three-dimensional imaging and CBCT provide me with accurate pictures without any distortions of the teeth, including roots, structures of the jaws and skull, sinuses, upper respiratory airway, and temporomandibular joints (TMJ). I am able to view the exact locations of unerupted teeth, supernumerary and impacted teeth, as well as abnormalities and pathology.

It is well documented in the literature that a limited upper respiratory airway has a tremendous effect on the growth and development of a child's face. Before visualizing upper respiratory airway with 3-D imaging, many children with restrictive airway disease (RAD) and pediatric sleep apnea (PSA) went undiagnosed, potentially affecting the development and growth of their face, as well as the effectiveness of their orthodontic treatment. In adults, RAD can affect their dental health in addition to the quality and longevity of their life. Viewing the CBCT scan in 3-D software, such as Tx STUDIO® or Dolphin 3D, airways can be evaluated from all angles, and the airway volume can be measured in detail.



Appropriate medical referrals and adjustments in orthodontic treatment can be made.

In the late 1990s, the first generation of 3-D orthodontics was introduced with Invisalign® orthodontic treatment. I began to see the importance of treatment planning and projecting orthodontic treatment prior to implementation. SureSmile® 3D treatment then became available with the use of traditional braces and customized robotic wires. I could now obtain superior orthodontic results with less office visits and decreased treatment times of 30%–50%. Initially, I used a white light intraoral scanner to obtain images of only the crowns of the teeth. However, when the i-CAT system was approved for SureSmile treatment, I immediately incorporated this technology to obtain clearer 3-D images of the entire dentition including the roots, as well as using the scans for diagnosis.

Orthodontic treatment is also affected by the capacity for bone visualization. With the use of i-CAT 3-D imaging and new enhanced tools such as SureSmile 6.0's Bone Modeling, I am able to see how the roots of the teeth are positioned within the limits of the alveolar bone. With this feature, the bone measurement is accurate

i-CAT scan in SureSmile 6.0 software—  
Note root movement within the bone

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to consider 0.2 mm on average. In addition, I can visualize the final position of the roots at the end of orthodontic treatment, making outcomes more predictable and accurate.

An exciting and enhanced world lies ahead for orthodontists who implement 3-D imaging. All of these innovations stand at the center of this new world, allowing us to treat orthodontic patients more quickly and effectively than ever before. Once you live in the 3-D world, you will never return to a world without this new dimension.