3-D imaging: increasing implant accuracy

Implants are making news on a global scale. According to The Wall Street Journal’s Market Watch, the implant market ‘is mainly driven by the rising edentulous population, increasing adoption of advanced dentistry in the developed countries, an increase in disposable incomes and increasing awareness of dental care.’

And while this procedure is growing globally, the report notes ‘The North American market is expected to grow at a higher pace than Europe mainly due to lower penetration and the high adoption rate of advanced dentistry.’ While types of materials and implants are evolving in the market, imaging is key to knowing the precise details of the patient’s dentition that can affect a favorable result. i-CAT FLX has gained a wide reputation for image quality, smooth workflow and low radiation dose.

For planning, i-CAT scans show true anatomy in full 3-D volume and high-resolution individual slices for accurate measurement of bone density and alveolar nerve location. Practitioners can avoid potential surgical complications by checking for root entanglement prior to extractions with automatic nerve canal tracing.

Oral and maxillofacial surgeon, Dr Steven Guttenberg noted that CBCT offers him ‘the data to evaluate potential implant sites, and confidently develop a treatment plan. I can place implants exactly, avoiding anatomical structures, such as the sinuses and nerves, and I can establish precise angles to fit the implant properly in the available bone. With CBCT, my patients’ confidence grows and so does as my confidence to treat them properly and safely.’

In combination with Tx STUDIO software clinicians can combine their 3-D images with intraoral scans for a more complete representation of the anatomy, hard and soft tissues, to increase accuracy of implant placement and restoration design. With these proprietary software planning tools, clinicians can map an entire course of treatment from surgical placement of the implant and abutment, all the way to final restoration. Tx STUDIO 5.3 in conjunction with scans facilitates implant treatment planning of single or multiple implants. The Explorer tool offers a 3-D view with cross-sectional images of a particular point for more detailed visualization of root fractures, sinuses, and pathology. Patients can be more involved in the process with the Video Simulation Tool that can improve understanding and result in greater case acceptance.

To streamline the implant process, an extensive library of implant templates affords best possible selection of suitable implant type, size, location and angulations prior to surgery. To facilitate easy communications with the lab, as well as developing 3-D treatment plans, clinicians can choose to import STL files from either digital models or their intraoral scanner and easily register those with their i-CAT 3-D scan in Tx STUDIO software. This communication with the lab can create the final restorations based on the practitioner’s exact design. Also, i-CAT scan files are universally compatible with all leading surgical guide providers to expand implant planning capabilities.

With all of the implant planning and implementation tools available with i-CAT, an important as-
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*Actual product may differ from the image above.*
pect of the i-CAT brand is the emphasis on control over radiation dose. The i-CAT FLX offers step-by-step guidance for selecting the appropriate scan for each patient at the lowest acceptable radiation dose, as well as full dentition 3-D imaging at a dose comparable to a 2-D panoramic X-ray with QuickScan+. Dr Randolph Resnik said that the lowered radiation is a valuable aspect of the i-CAT system. He notes: ‘The i-CAT scanners produce unparalleled images which are so crucial in the treatment planning for dental implants. Additionally, the flexibility of these units allows the clinician to collimate and select various fields-of-view, thus drastically reducing the radiation exposure to the patient’.

Having experienced the inherent differences in 2-D and 3-D planning, Dr John Russo, concludes, ‘3-D imaging provides safety for my patients and confidence that I am formulating a good diagnosis before developing a surgical treatment plan’. In the Internet age, where more patients can learn about implants as a treatment option, 3-D imaging can help to guide clinicians from plan to scan to treat increasing surgical predictability and facilitating precise implant placement – with low radiation dose. Cone beam 3-D imaging continues to revolutionize 3-D dental and maxillofacial radiography.

References