DENTAL TRIBUNE
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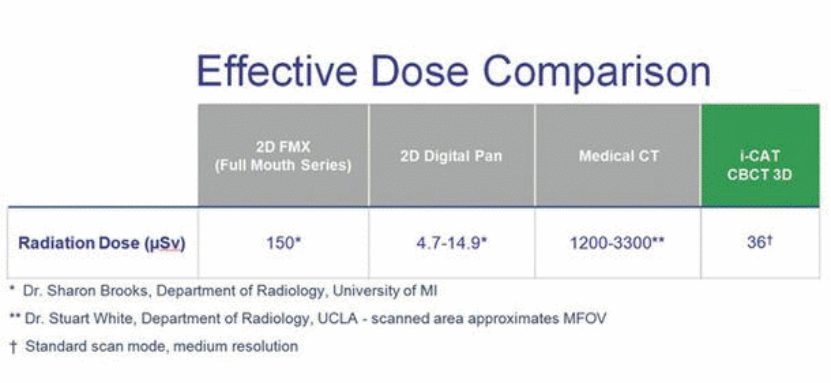

Effective Dose Comparison

	2D FMX (Full Mouth Series)	2D Digital Pan	Medical CT	i-CAT CBCT 3D
Radiation Dose (µSv)	150*	4.7-14.9*	1200-3300**	36†

* Dr. Sharon Brooks, Department of Radiology, University of MI

** Dr. Stuart White, Department of Radiology, UCLA - scanned area approximates MFOV

† Standard scan mode, medium resolution

The dental CBCT imaging method allows dentists to obtain vital three-dimensional information without exposing patients to high levels of radiation that come from medical CT scans.

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Facing the facts — dental CBCT and medical CT scans

by Dr Bruce Howerton, USA

Before a practitioner performs surgery, he/she should be equipped with up-to-date knowledge regarding the possible conditions located under soft tissue within the oral cavity.

Three-dimensional data generated by cone beam computed tomography (CBCT) technology offers a 'surgical view' or slices of the entire field of view from the front, side and under the patient. Cone beam scans assist with determining bone structure, tooth orientation, nerve canals and pathology; that in some cases may preclude the necessity for a surgical procedure.

In the past few weeks, various media sources have published articles regarding high exposure of radiation from *medical* CT scans. Unfortunately, these have generated misconceptions about the *dental* CBCT, or 3–D cone beam computed tomography scans. The dental CBCT imaging method allows dentists to obtain vital three-dimensional information without exposing patients to high levels of radiation that come from medical CT scans. An in-office imaging method is more convenient; it saves the patient travel time to and from the hospital and for follow-up examinations after treatment.

Dentists and other medical professionals ascribe to the ALARA (as low as reasonably achievable) protocol concerning radiation levels. This protocol guides practitioners to expose patients to the least amount of radiation possible while still gaining the most pertinent information for proper diagnosis. For example, for dentists placing implants, having this information beforehand is imperative to determining anatomical variations that can affect the procedure's success or failure.

The differences between dental and hospital scans derive, in part, from the method of capturing the information. The average medical CT scan of the oral and maxillofacial area can reach levels of 1200-3300 microsieverts, the measurement of radiation absorbed by the body's tissue. These significant levels are attributed to the method of exposing tissues to radiation.

With the hospital scan, the anatomy is exposed in small fan-shaped or flat slices, as the machine makes multiple revolutions around the patient's head. To collect adequate formation, there is overlapping of radiation. In contrast, the dental scan captures all the anatomy in one single cone-shaped beam rotation, decreasing the exposure to the patient of up to 10 times less radiation.

For example, radiation exposure using the standard full field of view from an i-CAT CBCT machine (Imaging Sciences International) is 36 microsieverts. These machines are also available in different fields of view, thereby reducing radiation exposure even more, depending upon the needs of the patient. For other comparisons of exposure, consider that a typical 2D full mouth series runs 150 microsieverts while a 2D digital panoramic image ranges between 4.7-14.9 microsieverts.

Researchers who have developed this technology have achieved the goal of allowing dentists to achieve the same information gained from medical CT, without the additional radiation exposure. Dentists who do not own their own CBCT machines can take advantage of this imaging method by referring patients to imaging centers to acquire this valuable information.

The knowledge obtained from capturing 3D scans has the ability to influence the effectiveness and efficiency of dental treatment. A dental CBCT scan offers the views and detail needed to perform the latest procedures, while avoiding the unnecessary higher levels of radiation emitted from hospital scans.

As the technology continues to evolve, the possibilities for improved dental care can only increase. Increased software compatibility with surgical guides and orthodontic applications has made CBCT scanners an imperative for some dental offices.

As an oral maxillofacial radiologist and an educator, I firmly believe that with knowledge comes responsibility to provide patients with the best dental care in the safest way possible — a dental CBCT accomplishes this goal without the additional risks involved with hospital scans.

Dr Howerton is a board certified oral and maxillofacial Radiologist who practices privately in Raleigh, NC, USA.

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