

Cone Beam Computed Tomography and Radiation Dose

Carestream Dental strongly believes that technological advances in our digital imaging systems have significantly increased the level of detailed clinical information available to oral health practitioners while mitigating the level of patient radiation exposure.

- One of the most important innovations in dental diagnostics has been the advent of cone beam computed tomography (CBCT), which has proven effective for many applications in oral healthcare. CBCT is a technology that is considered by some to be the standard of care where 3D imaging is necessary in dentistry.¹ This technological leap allows practitioners to gain immediate access to accurate 3D images of anatomical structures, which often are critical to precise diagnoses, more effective treatment planning and increased case acceptance.
- Carestream Dental believes that, as CBCT is adopted by more practitioners, it will continue to provide numerous benefits for practitioners and patients, including improved outcomes; reduced need for exploratory procedures; improved treatment predictability; reduced morbidity; and potentially lowered cost and time savings.
- Throughout all customer outreach, education and communication materials, Carestream Dental reinforces that any use of ionizing radiation should only be used when and where it is indicated. We recommend patients should always be informed of the potential risks, benefits and alternatives. Carestream Dental also advocates adherence to the ALARA Principle, or “As Low as Reasonably Achievable,” which dictates that every precaution should be taken to minimize radiation exposure.
- While oral health professionals have long relied on 2D imaging for diagnosis and treatment planning, this technology typically requires multiple exposures and, with them, multiple doses of radiation. With a properly prescribed 3D scan, practitioners have gained the ability to collect much more data – often with a single scan and potentially with a lower effective patient dose.
- Carestream Dental is committed to educating oral health practitioners about the benefits of CBCT technology and how to use it safely for the maximum benefit of patients. The company regularly sponsors education on 3D imaging, such as the recent 3D Symposium event, “The Right Image for the Right Task: Managing Dose and Risk in CBCT Imaging,” presented by Dr. John Ludlow from the University of North Carolina School of Dentistry. The company also works closely with various academies on their professional training initiatives, and is the primary corporate sponsor of the American Academy of Oral and Maxillofacial Radiology.

¹Scarfe WC, Levin MD, Gane D, Farman AG. Use of Cone Beam Computed Tomography in Endodontics. Int J of Dent, submitted Jul 29, 2009.

Dosimetry of the Kodak 3D Imaging Systems

Table 1

Dosimetry of the Kodak 9000 3D Extraoral Imaging System		
Technique	Effective dose*	Days of per capita background*
Max Right Posterior	9.8	1
Max Anterior	5.3	1
Mand Left Posterior	38.3	5
Mand Anterior	21.7	3
Posterior Bite Wing	22.8	3
Panoramic	14.7	2

Table 2

Dosimetry of the Kodak 9500 Cone Beam 3D System		
Technique	Effective dose *	Days of per capita background *
Large (Full) FOV		
Small Adult	93	11
Medium (Jaw) FOV		
Small Adult	76	9

*Effective dose in μSv * ICRP 2007 tissue weights

References:

Table 1: Ludlow JB: Dosimetry of Kodak 9000 3D Small FOV CBCT and Panoramic Unit, Univ of N Carolina School of Dentistry, Chapel Hill, NC, 2008. Abstract presented to AAOMR Annual session 2009.

Table 2: Ludlow JB: A manufacturer's role in reducing the dose of CBCT examinations: Dosimetry of the Kodak 9500, a technical report submitted to Dentomaxillofacial Radiology