



## NCRP Report No. 177: RADIATION PROTECTION IN DENTISTRY AND ORAL & MAXILLOFACIAL IMAGING

National Council on Radiation Protection and Measurements

NCRP Report No. 177, *Radiation Protection in Dentistry and Oral & Maxillofacial Imaging*, is an update of NCRP Report No. 145 on *Radiation Safety in Dentistry*. Radiology is an important and common diagnostic tool in dentistry, with approximately one billion images made annually. Since the publication of Report No. 145, three innovations have seen increasing use in dentistry: digital imaging, handheld intraoral imaging, and cone-beam computed tomography (CBCT). This new Report provides a practical radiation protection guide for dentists and their staff, updating guidance to address the use of these new technologies and to promote use of dose-reduction methods that are not used universally in day-to-day radiology.



The goals of the Report are to:

- eliminate unnecessary radiation dose to patients by ensuring that images are obtained only when clinically needed and that radiation dose is as low as reasonably achievable (ALARA);
- ensure that imaging equipment operates properly;
- ensure that images are of high diagnostic quality; and
- limit radiation dose to staff and patients in accordance with ALARA principles.

The Report makes a number of recommendations to achieve these goals in dental practice.

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#### **What's New in NCRP Report No. 177?**

In addition to reiterating the important general recommendations for generating diagnostic images and minimizing radiation dose in dental radiology, this Report provides new recommendations concerning digital, handheld, and CBCT imaging, such as to:

- employ rectangular collimation for all intraoral imaging unless patient anatomy prevents its use;
- employ appropriate selection criteria for obtaining CBCT images;
- acquire CBCT images using the smallest field-of-view (FOV) and acquisition technical factors that deliver the needed diagnostic information at the lowest possible radiation dose;
- use only x-ray units which have been cleared by the U.S. Food and Drug Administration, especially for handheld, intraoral x-ray devices;
- conduct imaging exams only when clinically warranted; and
- embrace the efforts of The Alliance for Radiation Safety in Pediatric Imaging and its “Image Gently®” campaign, which encourages practitioners to be mindful of the greater sensitivity of children to radiation and reduce radiation doses accordingly, with consideration of the diagnostic requirements of the imaging task.

The Report also discusses quality assurance of radiology in dental offices and describes the need for additional training of staff to ensure safe and effective use of these technologies.

Report No. 177 was prepared by national and international experts from universities, medical centers, government agencies, and private industry. Many dental clinicians may not have easy access to guidance documents, so this Report can serve as a complete reference for most dental imaging applications. The Report provides specific guidance for dentists, their clinical staff, and qualified experts conducting radiation protection surveys, equipment performance evaluations, and determining facility shielding and layout designs. It is also useful for institutions and organizations providing education and training to dental students, dentists, and associated clinical staff.

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