GUEST EDITORIAL

Effective use of radiation in dentistry: Evolving concepts that promote efficacy

Steven R. Singer

Mel Mupparapu

Radiographic imaging in dentistry is often needlessly debated, despite the mounting evidence that confirms and builds upon the value placed on the American Dental Association/US Food and Drug Administration (ADA/FDA) guidelines, which have been in place since 1987 and periodically revised.[1] Although the dental radiographic guidelines should be followed universally, it is disappointing to find that debates erupt frequently among dental practitioners and educators as to when and how we should image patients and the frequency with which it should be done.[2] Unfortunately, radiographic procedures in dentistry have become highly commoditized, without improvement in patient care. Although clinicians readily adopt evidence-based methods for restorative, endodontic, and periodontal care, they somehow seem to scorn evidence-based radiographic practices.[3] This is not in epidemic proportions, but the level of harm to patients from increased amounts of radiation is greater than originally thought.[4] Further, the increase in nonproductive x-ray imaging appears to have no effect on patient care outcomes.

Evidence clearly points to patient benefit through dose-sparing protocols including individually selected digital radiographic examinations, fastest speed films (F or equivalent), rectangular collimations, as well as limitations on field of view (FOV) to the region of interest (ROI) in three-dimensional (3D) imaging, and working with an oral and maxillofacial radiologist (OMR). Recent concepts in radiographic imaging include not only As Low As Reasonably Achievable (ALARA), but also the newer As Low As Diagnostically Acceptable (ALADA). Choosing ALADA over ALARA does not mean higher dose, but carefully crafted practice based on anticipated findings. Radiographic examinations of teeth and jaws often may not warrant high-resolution, high-dose imaging protocols if the desired information is available in the resultant images or volumes already obtained. For instance, radiographs that are selected for repeat procedures may not require retaking if the desired area can be found elsewhere in the examination and is diagnostically acceptable.

Whereas following these concepts for two-dimensional imaging certainly lowers the dose to the patient while achieving optimal outcomes, the stakes are much greater with the increased radiation burden of 3D-imaging modalities like cone beam computed tomography (CBCT). While the benefits of CBCT when examinations are properly selected are indisputable, the additional radiation used has a higher level of justification.[5] Fortunately, manufacturers have responded to concerns over radiation dose and have improved machines by allowing variable FOV and improved detector and software technology to allow customized low-dose and high-yield examinations. However, it is still up to the user to protect their patients by carefully selecting the examination.

Steven R. Singer
Rutgers School of Dental Medicine, Newark, NJ, USA.

Mel Mupparapu
Scientific Associate Editor
University of Pennsylvania School of Dental Medicine, Philadelphia, PA, USA.

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