Vol. 106 No. 4 October 2008

Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology

ORAL AND MAXILLOFACIAL RADIOLOGY Editor: Allan G. Farman

American Academy of Oral and Maxillofacial Radiology executive opinion statement on performing and interpreting diagnostic cone beam computed tomography

The American Academy of Oral and Maxillofacial Radiology (AAOMR) is the professional organization representing oral and maxillofacial radiologists in the United States. The Academy is a nonprofit professional society the primary purposes of which are to advance the science of radiology, improve the quality and access of radiologic services to the patient, and encourage continuing education for oral and maxillofacial radiologists, dentists, and persons practicing oral and maxillofacial imaging in allied professional fields.

The AAOMR embraces the introduction of cone beam computed tomography (CBCT) as a major advancement in the imaging armamentarium available to the dental profession.

The AAOMR is currently in the process of developing a position paper on appropriate application of CBCT to provide evidence-based guidelines. In the interim, the Executive Committee (EC) of the AAOMR considers it necessary to provide an opinion document addressing the principles of application of CBCT as it relates to acquisition and interpretation of maxillofacial imaging in dental practice.

RECOMMENDATIONS

The AAOMR EC believes that the practitioner should apply imaging procedures based on considerations of patient radiograph selection criteria, dose optimization, technical proficiency, and assessed diagnostic or treatment needs. The following guidelines have been formulated to assist practitioners in providing appropriate CBCT radiologic care. These guidelines are not inflexible rules or requirements of practice and are not intended, nor should they be used, to establish a legal standard of care.

1. **Use of CBCT**

CBCT imaging involves exposure of the patient to ionizing radiation. CBCT should be performed only by an appropriately licensed practitioner or certified radiologic operator under supervision of a licensed practitioner with the necessary training. CBCT examinations should be performed only for valid diagnostic or treatment reasons and with the minimum exposure necessary for adequate image quality.

2. **Practitioner responsibilities**

A practitioner who performs or supervises CBCT examinations must hold a valid license. Dentists using CBCT should be held to the same standards as board-certified oral and maxillofacial radiologists (OMFRs), just as dentists excising oral and maxillofacial lesions are held to the same standards as OMF surgeons. It is the responsibility of the practitioner obtaining the CBCT images to interpret the findings of the examination. Just as a pathology report accompanies a biopsy, an imaging report must accompany a CBCT scan.

Practitioners who operate a CBCT unit, or request CBCT imaging, should have thorough understanding of the indications for CBCT as well as a familiarity with the basic physical principles and limitations of the technology. Practitioners should be familiar with alternative and complementary imaging and diagnostic procedures and should be capable of correlating the results of these with CBCT findings. Practitioners using CBCT must have a thorough understanding of the operational parameters and the effects of these parameters on image quality and radiation safety.

It is desirable for practitioners to undergo specific training to perform CBCT examinations successfully. The practitioner who operates a CBCT unit, or requests a CBCT study, must examine the entire image dataset. This is predicated on a thorough knowledge of CT anatomy for the entire acquired image volume, anatomic variations, and observation of abnormalities. It is imperative that all image data be systematically reviewed for disease. The field of view will vary with the

system employed, positioning, and collimation, and can include intracranial structures, the base of the skull, the paranasal sinuses, the cervical spine, the neck, and the airway spaces. Qualified specialist OMFRs may be able to assist diagnostically when practitioners are unwilling to accept the responsibility to review the whole exposed tissue volume.

There may be a misconception on the part of some practitioners that the user has no responsibility for radiologic findings beyond those needed for a specific task (e.g., implant treatment planning). This assumption is erroneous.

CBCT operators should only be individuals who are legally permitted to perform CBCT procedures prescribed by a licensed dental practitioner. Such individuals may be employed by the dental practitioner or may perform CBCT procedures in an independent facility pursuant to all pertaining regulations. The CBCT operator must have a thorough understanding of the operating parameters of the CBCT system and the effects of these parameters on image quality and radiation safety. The CBCT operator has the responsibility for patient comfort, preparing and positioning the patient for the CBCT procedure examination, monitoring the patient during the examination, and obtaining the image data in a manner prescribed by the referring practitioner. The CBCT operator should also perform calibration and the regular quality control testing.

Before delegating the operation of CBCT units, the dental practitioner must confirm the legal authority for technical performance of CBCT imaging in his or her specific locality. As the CBCT system is considered to be a medical device in some localities, a dental auxiliary certified to perform dental radiographic procedures might not be qualified to perform CBCT.

3. **Documentation**

Documentary evidence should be provided to demonstrate the diagnostic or treatment guidance need of the CBCT examination. Appropriate demographic, clinical, and case history information should be available to permit the proper performance and interpretation of the CBCT examination.

To support the diagnostic necessity of the procedure and facilitate patient understanding, it is desirable that a separate patient consent be obtained for the CBCT procedure before imaging.

To facilitate image retrieval, the dataset itself should be stored in compliance with relevant legal and regional stipulations and should be exportable in a format compatible with the International Standards Organization (ISO)-referenced Digital Imaging and Communications in Medicine (DICOM) Standard. Distributed images are a component of the permanent record and should be stored in a suitable archival format. An interpretation report of the imaging findings should also be included in the patient's record.

4. **Radiation safety and quality assurance**

Facilities operating CBCT should have specific policies and procedures for dose optimization. These include, but are not limited to, custom examination exposure protocols taking into account patient body size, field limitation to the region of interest, and use of personal protective devices such as a lead torso apron and, where appropriate, a thyroid collar. Procedures should follow all pertaining regulations.

The purpose of a quality control program is to minimize radiation risk to the patient, personnel, and public, while sustaining adequacy of the diagnostic information obtained. The dental practitioner is responsible for the development of the program. The program should include documentation of the performance of calibration tests, a log of the results of equipment performance monitoring, facility dosimetry results, and a legible chart of patient- and task-specific technique exposure parameters.

The AAOMR EC encourages the use of CBCT technology within the practice of dentistry where this results in health care benefits for the patient.

The above represents the collective statement of the AAOMR EC as approved without dissent. Dr. William C. Scarfe was assigned the role of primary editor and coordinator for development of this statement.

Laurie Carter, DDS, MA, PhD
Allan G. Farman, BDS, PhD, EdS, MBA, DSc, DDS, MS
James Geist, DDS
William C. Scarfe, DDS
Christos Angelopoulos, DDS
Madhu K. Nair, BDS, DMD, MS, Lic.Odont., PhD
Charles F. Hildebolt, DDS, PhD
Donald Tyndall, DDS, MSPH, PhD
Michael Shrout, DMD, FAGD
American Academy of Oral and Maxillofacial Radiology
Executive Committee
P.O. Box 1010
Evans, GA 30809-1010

doi:10.1016/j.tripleo.2008.07.007