Guideline on Prescribing Dental Radiographs for Infants, Children, Adolescents, and Persons with Special Health Care Needs

Originating Committee
Ad Hoc Committee on Pedodontic Radiology
Review Council
Council on Clinical Affairs

Adopted
1981

Revised

Reaffirmed
1997, 2012

Purpose
The American Academy of Pediatric Dentistry (AAPD) intends this guideline to help practitioners make clinical decisions concerning appropriate selection of dental radiographs as part of an oral evaluation of infants, children, adolescents, and persons with special health care needs. The guideline can be used to optimize patient care, minimize radiation burden, and allocate health care resources responsibly.

Methods
The American Dental Association (ADA) initiated a review of “The Selection of Patients for X-ray Examinations: Dental Radiographic Examinations”[1] in 2002. The AAPD, along with other dental specialty organizations, participated in the review and revision of these guidelines. The Food and Drug Administration (FDA) accepted them in November 2004.[2] This review included a new systematic literature search of the MEDLINE/PubMed® electronic database using the following parameters: Terms: “dental radiology”, “dental radiographs”, “dental radiography”, “cone beam computed tomography” AND “guidelines”, “recommendations”; Fields: all; Limits: within the last 10 years, humans, and English. In 2006 and 2012, the ADA Council on Scientific Affairs published updates to their recommendations for dental radiographs.[3,4] The AAPD
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continues to endorse the ADA/FDA’s recommendations.

Background

Radiographs are valuable aids in the oral health care of infants, children, adolescents, and persons with special health care needs. They are used to diagnose and monitor oral diseases, evaluate dentoalveolar trauma, as well as to monitor dentofacial development and the progress of therapy. The recommendations in the ADA/FDA guidelines were developed to serve as an adjunct to the dentist’s professional judgment. The timing of the initial radiographic examination should not be based upon the patient’s age, but upon each child’s individual circumstances.

Radiographic screening for the purpose of detecting disease before clinical examination should not be performed. [4] Because each patient is unique, the need for dental radiographs can be determined only after reviewing consideration of the patient’s medical and dental histories, completing completion of a thorough clinical examination, and assessing assessment of the patient’s vulnerability to environmental factors that affect oral health. Review of prior radiographs, when available from within the same practice or through record transfer, also contributes to the decision of radiographic necessity.

Radiographs should be taken only when there is an expectation that the diagnostic yield will affect patient care. The AAPD recognizes that there may be clinical circumstances for which a radiograph is indicated, but a diagnostic image cannot be obtained. For example, the patient may be unable to cooperate or the dentist may have privileges in a health care facility lacking intraoral radiographic capabilities. If radiographs of diagnostic quality are unobtainable, the dentist should confer with the parent to determine appropriate management techniques (e.g., preventive/restorative interventions, advanced behavior guidance modalities, deferral, referral), giving consideration to the relative risks and benefits of the various treatment options for the patient.

Because the effects of radiation exposure accumulate over time, every effort must be made to minimize the patient’s exposure. Good radiological practices (e.g., use of lead apron, thyroid collars, and high-speed film; beam collimation) are important in minimizing or eliminating unnecessary radiation in diagnostic dental imaging. Examples of good radiologic practice include: 1) use of the fastest image receptor compatible with the diagnostic task (F-speed film or
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digital), 2) collimation of the beam to the size of the receptor whenever feasible, 3) proper film exposure and processing techniques, 4) use of protective aprons and thyroid collars, when appropriate, and 5) limiting the number of images obtained to the minimum necessary to obtain essential diagnostic information. [4] The dentist must weigh the benefits of obtaining radiographs against the patient’s risk of radiation exposure.

New imaging technologies [i.e., cone beam computed tomography (CBCT)] have added three-dimensional capabilities that have many applications in dentistry. Evidence-based guidelines and policies currently are under development by organizations such as the American Academy of Oral and Maxillofacial Radiology (AAOMR).4 The usefulness and future of CBCT have been reviewed with an introduction to issues related to criteria, ramifications and medico-legal considerations.5 Certain principles clearly are emerging and point to the need for standards of provisions of care.6 The use of CBCT has been valuable as an adjunct diagnostic tool in assessing periapical pathosis in endodontics, oral pathology, anomalies in the developing dentition (i.e., impacted, ectopic, or supernumerary teeth), oral maxillofacial surgery (e.g., cleft palate), dental and facial trauma, and orthodontic and surgical preparation for orthognathic surgery. The American Academy of Oral and Maxillofacial Radiology (AAOMR) has published position statements which summarize the potential benefits and risks of maxillofacial CBCT use in orthodontic and endodontic diagnosis, treatment, and outcomes and provides clinical guidance to dental practitioners. [5, 6] The AAOMR’s position statements support and affirm the position of the American Dental Association Council on Scientific Affairs in that the selection of CBCT imaging must be justified based on individual need. [5-7] Because this technology has potential to produce vast amounts of data and imaging information beyond initial intentions, it is important to interpret all information obtained, including that which may be beyond the immediate diagnostic needs or abilities of the practitioner.

Recommendations

The recommendations of the ADA/FDA guidelines are contained within the accompanying table. “The recommendations in this chart are subject to clinical judgment and may not apply to every patient. They are to be used by dentists only after reviewing the patient’s health history and completing a clinical examination. Because every precaution should be taken to minimize radiation exposure, protective thyroid collars and aprons should be used whenever possible. This
practice is strongly recommended for children, women of childbearing age, and pregnant women. These recommendations are subject to clinical judgment and may not apply to every patient. They are to be used by dentists only after reviewing the patient’s health history and completing a clinical examination. Even though radiation exposure from dental radiographs is low, once a decision to obtain radiographs is made it is the dentist’s responsibility to follow the ALARA Principle (As Low as Reasonably Achievable) to minimize the patient's exposure.” [4]

Although standards are not officially developed for the use of CBCT, this advance in orofacial dental imaging is an excellent adjunct for improvements in dental care. Intraoral imaging should be maintained as the standard diagnostic tool. The use of CBCT should be considered when conventional radiographs are inadequate to complete diagnosis and treatment planning and the potential benefits outweigh the risk of additional radiation dose. It must not be routinely prescribed for diagnosis or screening purposes in the absence of clinical indication. Basic principles and guidelines for the use of CBCT include: The executive opinion statement of the AAOMR provides initial guidance for the use of this technology. [4] 1) use of appropriate image size or field of view, 2) assess the radiation dose risk, 3) minimize patient radiation exposure and, 4) maintain professional competency in performing and interpreting CBCT studies. [5-8] Their recommendations relate to the need for practices of qualified individuals to use this technology with selection criteria which include clear indications that minimize radiation exposure while maximizing diagnostic information obtained. When using CBCT, the resulting imaging is required to be supplemented with a written report placed in the patient’s records that includes full interpretation of the findings.

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CCA2016 2c. E_Radiographs-Final
# Guidelines for Prescribing Dental Radiographs

## Patient Age and Dental Developmental Stage

<table>
<thead>
<tr>
<th>Type of Encounter</th>
<th>Child with Primary Dentition (prior to eruption of first permanent tooth)</th>
<th>Child with Transitional Dentition (after eruption of first permanent tooth)</th>
<th>Adolescent with Permanent Dentition (prior to eruption of third molars)</th>
<th>Adult, Dentate or Partially Edentulous</th>
<th>Adult, Edentulous</th>
</tr>
</thead>
<tbody>
<tr>
<td><em><em>New patient</em> being evaluated for dental disease and dental development oral diseases</em>*</td>
<td>Individualized radiographic exam consisting of selected periapical/occlusal views and/or posterior bitewings if proximal surfaces cannot be visualized or probed. Patients without evidence of disease and with open proximal contacts may not require a radiographic exam at this time.</td>
<td>Individualized radiographic exam consisting of posterior bitewings with panoramic exam or posterior bitewings and selected periapical images.</td>
<td>Individualized radiographic exam consisting of posterior bitewings with panoramic exam or posterior bitewings and selected periapical images.</td>
<td>Individualized radiographic exam, based on clinical signs and symptoms.</td>
<td></td>
</tr>
<tr>
<td><em><em>Recall patient</em> with clinical caries or at increased risk for caries</em>*</td>
<td>Posterior bitewing exam at 6-12 month intervals if proximal surfaces cannot be examined visually or with a probe.</td>
<td></td>
<td>Posterior bitewing exam at 6-18 month intervals.</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td><em><em>Recall patient</em> with no clinical caries and not at increased risk for caries</em>*</td>
<td>Posterior bitewing exam at 12-24 month intervals if proximal surfaces cannot be examined visually or with a probe.</td>
<td>Posterior bitewing exam at 18-36 month</td>
<td>Posterior bitewing exam at 24-36 month</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td><em><em>Recall patient</em> with periodontal disease</em>*</td>
<td>Clinical judgment as to the need for and type of radiographic images for the evaluation of periodontal disease. Imaging may consist of, but is not limited to, selected bitewing and/or periapical images of areas where periodontal disease (other than nonspecific gingivitis) can be identified clinically.</td>
<td></td>
<td></td>
<td>Not applicable</td>
<td></td>
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</tbody>
</table>
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<table>
<thead>
<tr>
<th>Patient (New and Recall) for monitoring of growth and development, and/or assessment of dental/skeletal relationships</th>
<th>Clinical judgment as to need for and type of radiographic images for evaluation and/or monitoring of dentofacial growth and development or assessment of dental and skeletal relationships</th>
<th>Clinical judgment as to need for and type of radiographic images for evaluation and/or monitoring of dentofacial growth and development, or assessment of dental and skeletal relationships.</th>
<th>Usually not indicated for monitoring of growth and development. Clinical judgment as to the need for and type of radiographic image for evaluation of dental and skeletal relationships.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient with other circumstances including, but not limited to, proposed or existing implants, pathology other dental and craniofacial pathoses, restorative/endodontic needs, treated periodontal disease and caries remineralization</td>
<td>Clinical judgment as to need for and type of radiographic images for evaluation and/or monitoring in these circumstances.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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* Clinical situations for which radiographs may be indicated include but are not limited to:

A. Positive Historical Findings

1. Previous periodontal or endodontic treatment
2. History of pain or trauma
3. Familial history of dental anomalies
4. Postoperative evaluation of healing
5. Remineralization monitoring
6. Presence of implants, or evaluation for implant placement, previous implant-related pathosis or evaluation for implant placement

B. Positive Clinical Signs/Symptoms

1. Clinical evidence of periodontal disease
2. Large or deep restorations
3. Deep carious lesions
4. Malposed or clinically impacted teeth
5. Swelling
6. Evidence of dental/facial trauma
7. Mobility of teeth
8. Sinus tract (“fistula”)
9. Clinically suspected sinus pathosis
10. Growth abnormalities
11. Oral involvement in known or suspected systemic disease
12. Positive neurologic findings in the head and neck
13. Evidence of foreign objects
14. Pain and/or dysfunction of the temporomandibular joint
15. Facial asymmetry
16. Abutment teeth for fixed or removable partial prosthesis
17. Unexplained bleeding
18. Unexplained sensitivity of teeth
19. Unusual eruption, spacing or migration of teeth
20. Unusual tooth morphology, calcification or color
21. Unexplained absence of teeth
22. Clinical erosion
23. Peri-implantitis
Factors increasing risk for caries may include but are not limited to:

1. High level of caries experience or demineralization
2. History of recurrent caries
3. High titers of cariogenic bacteria
4. Existing restoration(s) of poor quality
5. Poor oral hygiene
6. Inadequate fluoride exposure
7. Prolonged nursing (bottle or breast)
8. Frequent high sucrose content in diet
9. Poor family dental health
10. Developmental or acquired enamel defects
11. Developmental or acquired disability
12. Xerostomia
13. Genetic abnormality of teeth
14. Many multisurface restorations
15. Chemo/radiation therapy
16. Eating disorders
17. Drug/alcohol abuse
18. Irregular dental care


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