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

3

4 Originating Committee

5 Ad Hoc Committee on Pedodontic Radiology

6 Review Council

7 Council on Clinical Affairs

8 Adopted

9 1981

10 Revised

11 1992, 1995, 2001, 2005, 2009, 2017

12 Reaffirmed

13 1997, 2012

14

15

16 Purpose

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

22

23 Methods

24 The American Dental Association (ADA) initiated a review of “The Selection of Patients for X-
25 ray Examinations: Dental Radiographic Examinations”¹ in 2002. The AAPD, along with other
26 dental specialty organizations, participated in the review and revision of these guidelines. The
27 Food and Drug Administration (FDA) accepted them in November 2004.² This review included a
28 new ~~systematic literature~~ search of the MEDLINE/PubMed® electronic database using the
29 following parameters: Terms: “dental radiology”, “dental radiographs”, “dental radiography”,
30 “cone beam computed tomography” AND “guidelines”, “recommendations”; Fields: all; Limits:
31 within the last 10 years, humans, and English. In 2006 and 2012, the ADA Council on Scientific
32 Affairs published ~~an~~ updates to their recommendations for dental radiographs.[3,4] The AAPD

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33 continues to endorse the ADA/FDA's recommendations.

34

35 Background

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

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

49

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

59

60 Because the effects of radiation exposure accumulate over time, every effort must be made to
61 minimize the patient's exposure. Good radiological practices (~~e.g., use of lead apron, thyroid~~
62 ~~collars, and high-speed film; beam collimation~~) are important in minimizing or eliminating
63 unnecessary radiation in diagnostic dental imaging. Examples of good radiologic practice
64 include: 1) use of the fastest image receptor compatible with the diagnostic task (F-speed film or

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65 digital), 2) collimation of the beam to the size of the receptor whenever feasible, 3) proper film
66 exposure and processing techniques, 4) use of protective aprons and thyroid collars, when
67 appropriate, and 5) limiting the number of images obtained to the minimum necessary to obtain
68 essential diagnostic information. [4] The dentist must weigh the benefits of obtaining radiographs
69 against the patient's risk of radiation exposure.

70

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

90

91 Recommendations

92 The recommendations of the ADA/FDA guidelines are contained within the accompanying table.
93 ~~“The recommendations in this chart are subject to clinical judgment and may not apply to every~~
94 ~~patient. They are to be used by dentists only after reviewing the patient's health history and~~
95 ~~completing a clinical examination. Because every precaution should be taken to minimize~~
96 ~~radiation exposure, protective thyroid collars and aprons should be used whenever possible. This~~

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97 practice is strongly recommended for children, women of childbearing age, and pregnant
98 women.”² “These recommendations are subject to clinical judgment and may not apply to every
99 patient. They are to be used by dentists only after reviewing the patient’s health history and
100 completing a clinical examination. Even though radiation exposure from dental radiographs is
101 low, once a decision to obtain radiographs is made it is the dentist's responsibility to follow the
102 ALARA Principle (As Low as Reasonably Achievable) to minimize the patient's exposure.” [4]

103
104 Although standards are not officially developed for the use of CBCT, this advance in orofacial
105 dental imaging is an excellent adjunct for improvements in dental care. Intraoral imaging should
106 be maintained as the standard diagnostic tool. The use of CBCT should be considered when
107 conventional radiographs are inadequate to complete diagnosis and treatment planning and the
108 potential benefits outweigh the risk of additional radiation dose. It must not be routinely
109 prescribed for diagnosis or screening purposes in the absence of clinical indication. Basic
110 principles and guidelines for the use of CBCT include: The executive opinion statement of the
111 AAOMR provides initial guidance for the use of this technology.⁴ 1) use of appropriate image
112 size or field of view, 2) assess the radiation dose risk, 3) minimize patient radiation exposure and,
113 4) maintain professional competency in performing and interpreting CBCT studies. [5-8] Their
114 recommendations relate to the need for practices of qualified individuals to use this technology
115 with selection criteria which include clear indications that minimize radiation exposure while
116 maximizing diagnostic information obtained. When using CBCT, the resulting imaging is
117 required to be supplemented with a written report placed in the patient’s records that includes full
118 interpretation of the findings.

119

120 References

- 121 1. Joseph LP. The Selection of Patients for X-ray Examinations: Dental Radiographic
122 Examinations. Rockville, Md: The Dental Radiographic Patient Selection Criteria Panel, US
123 Dept of Health and Humans Services, Center for Devices and Radiological Health; 1987.
124 HHS Publication No. FDA 88-8273.
- 125 2. American Dental Association, U.S. Dept of Health and Humans Services. The selection of
126 patients for dental radiographic examinations—2004. Available at: “[http://](http://www.ada.org/sections/advocacy/pdfs/topics_radiography_examinations(1).pdf)
127 [www.ada.org/sections/advocacy/pdfs/topics_radiography_examinations\(1\).pdf](http://www.ada.org/sections/advocacy/pdfs/topics_radiography_examinations(1).pdf)”. Accessed
128 September 28, 2016. “[CCA2016 2c. E_Radiographs-Final](https://www.fda.gov/downloads/Radiation-</div><div data-bbox=)

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- 129 EmittingProducts/RadiationEmittingProductsandProcedures/MedicalImaging/MedicalX-
130 Rays/ucm116505.pdf". Accessed: November 6, 2016. (Archived by WebCite® at
131 "http://www.webcitation.org/6owR38t1A")
132
- 133 3. American Dental Association Council on Scientific Affairs. The use of dental radiographs:
134 Update and recommendations. J Am Dent Assoc 2006;137(9):1304-12.
- 135 4. American Dental Association Council on Scientific Affairs, U.S. Dept of Health and
136 Humans Services Public Health Service Food and Drug Administration Dental Radiographic
137 Examinations: Recommendations for Patient Selection and Limiting Radiation Exposure.
138 Available at
139 "http://www.ada.org/~media/ADA/Member%20Center/Files/Dental_Radiographic_Examin
140 ations_2012.ashx" Accessed November 6, 2016. (Archived by WebCite® at
141 "http://www.webcitation.org/6owRE7cx3")
- 142 ~~4. Carter L, Farman AG, Geist J, et al. American Academy of Oral and Maxillofacial~~
143 ~~Radiology executive opinion statement on performing and interpreting diagnostic cone beam~~
144 ~~computed tomography. Oral Surg Oral Med Oral Pathol Oral Radiol Endod~~
145 ~~2008;106(4):561-2.~~
- 146 ~~5. Farman AG, Scarfe WC, Haskell BS. Cone beam computed tomography. Seminars in~~
147 ~~Orthodontics 2009;15 (1):1-77.~~
- 148 ~~6. De Vos W, Casselman J, Swennen GRJ. Cone beam computerized tomography (CBCT)~~
149 ~~imaging of the oral and maxillofacial region: A systematic review of the literature. Int J~~
150 ~~Oral Maxillofac Surg 2009;38(6):609-625.~~
- 151 5. American Academy of Oral and Maxillofacial Radiology. Clinical recommendations
152 regarding use of cone beam computed tomography in orthodontics. Position statement by the
153 American Academy of Oral and Maxillofacial Radiology. Oral Surg Oral Med Oral Pathol
154 Oral Radiol 2013;116:238-257
- 155
- 156 6. Special Committee to Revise the Joint AAE/AAOMR Position Statement on use of CBCT in
157 Endodontics. AAE and AAOMR Joint Position Statement: Use of Cone Beam Computed
158 Tomography in Endodontics 2015 Update. Oral Surg Oral Med Oral Pathol Oral Radiol. 2015
159 Oct;120(4):508-12
- 160
- 161 7. American Dental Association Council on Scientific Affairs. The use of cone-beam computed
162 tomography in dentistry. An advisory statement from the American Dental Association
163 Council on Clinical Affairs. J Am Dent Assoc 2012;143(8):899-902.
- 164
- 165 8. A report prepared by the SEDENTEXCT project www.sedentexct.eu. Radiation protection:
166 cone beam CT for dental and maxillofacial radiology. Evidence-Based Guidelines. Available

This draft does not constitute an official AAPD health oral policy or clinical guideline until approval by the General Assembly. Circulation is limited to AAPD members.

167 at: <https://ec.europa.eu/energy/sites/ener/files/documents/172.pdf>. Accessed: November 6,
168 2016. (Archived by WebCite® at "<http://www.webcitation.org/6owRWlv64>")

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Guidelines for Prescribing Dental Radiographs					
	Patient Age and Dental Developmental Stage				
Type of Encounter	Child with Primary Dentition (prior to eruption of first permanent tooth)	Child with Transitional Dentition (after eruption of first permanent tooth)	Adolescent with Permanent Dentition (prior to eruption of third molars)	Adult, Dentate or Partially Edentulous	Adult, Edentulous
New patient* being evaluated for dental diseases and dental development <u>oral diseases</u>	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.	Individualized radiographic exam consisting of posterior bitewings with panoramic exam or posterior bitewings and selected periapical images.	Individualized radiographic exam consisting of posterior bitewings with panoramic exam or posterior bitewings and selected periapical images. A full mouth intraoral radiographic exam is preferred when the patient has clinical evidence of generalized dental <u>oral</u> disease or a history of extensive dental treatment.		Individualized radiographic exam, based on clinical signs and symptoms.
Recall patient* with clinical caries or at increased risk for caries**	Posterior bitewing exam at 6-12 month intervals if proximal surfaces cannot be examined visually or with a probe.			Posterior bitewing exam at 6-18 month intervals.	Not applicable
Recall patient* with no clinical caries and not at increased risk for caries**	Posterior bitewing exam at 12-24 month intervals if proximal surfaces cannot be examined visually or with a probe.		Posterior bitewing exam at 18-36 month	Posterior bitewing exam at 24-36 month	Not applicable
Recall patient* with periodontal disease	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.				Not applicable

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<p>Patient (<u>New and Recall</u>) for monitoring of growth and development, and/or assessment of <u>dental/skeletal relationships</u></p>	<p>Clinical judgment as to need for and type of radiographic images for evaluation and/or monitoring of dentofacial growth and development <u>or assessment of dental and skeletal relationships</u></p>	<p>Clinical judgment as to need for and type of radiographic images for evaluation and/or monitoring of dentofacial growth and development, <u>or assessment of dental and skeletal relationships.</u> Panoramic or periapical exam to assess developing third molars.</p>	<p>Usually not indicated <u>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.</u></p>
<p>Patient with other circumstances including, but not limited to, proposed or existing implants, <u>pathology other dental and craniofacial pathoses.</u> restorative/endodontic needs, treated periodontal disease and caries remineralization</p>	<p>Clinical judgment as to need for and type of radiographic images for evaluation and/or monitoring <u>in of</u> these circumstances.</p>		

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172 * Clinical situations for which radiographs may be indicated include but are not limited to:

173 A. Positive Historical Findings

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

181 B. Positive Clinical Signs/Symptoms

- 182 1. Clinical evidence of periodontal disease
- 183 2. Large or deep restorations
- 184 3. Deep carious lesions
- 185 4. Malposed or clinically impacted teeth
- 186 5. Swelling
- 187 6. Evidence of dental/facial trauma
- 188 7. Mobility of teeth
- 189 8. Sinus tract (“fistula”)
- 190 9. Clinically suspected sinus ~~pathology~~ pathosis
- 191 10. Growth abnormalities
- 192 11. Oral involvement in known or suspected systemic disease
- 193 12. Positive neurologic findings in the head and neck
- 194 13. Evidence of foreign objects
- 195 14. Pain and/or dysfunction of the temporomandibular joint
- 196 15. Facial asymmetry
- 197 16. Abutment teeth for fixed or removable partial prosthesis
- 198 17. Unexplained bleeding
- 199 18. Unexplained sensitivity of teeth
- 200 19. Unusual eruption, spacing or migration of teeth
- 201 20. Unusual tooth morphology, calcification or color
- 202 21. Unexplained absence of teeth
- 203 22. Clinical erosion
- 204 23. Peri-implantitis

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206 ** Factors increasing risk for caries may include but are not limited to:

207 1. High level of caries experience or demineralization

208 2. History of recurrent caries

209 3. High titers of cariogenic bacteria

210 4. Existing restoration(s) of poor quality

211 5. Poor oral hygiene

212 6. Inadequate fluoride exposure

213 7. Prolonged nursing (bottle or breast)

214 8. Frequent high sucrose content in diet

215 9. Poor family dental health

216 10. Developmental or acquired enamel defects

217 11. Developmental or acquired disability

218 12. Xerostomia

219 13. Genetic abnormality of teeth

220 14. Many multisurface restorations

221 15. Chemo/radiation therapy

222 16. Eating disorders

223 17. Drug/alcohol abuse

224 18. Irregular dental care

225

226

227 * From: ~~American Dental Association, US Food & Drug Administration. The Selection of~~
228 ~~Patients for Dental Radiograph Examinations.~~

229 Available at:

230 "[http://www.ada.org/sections/advocacy/pdfs/topics_radiography_examinations\(1\).pdf](http://www.ada.org/sections/advocacy/pdfs/topics_radiography_examinations(1).pdf)".

231 American Dental Association Council on Scientific Affairs, U.S. Dept of Health and Humans

232 Services Public Health Service Food and Drug Administration Dental Radiographic

233 Examinations: Recommendations for Patient Selection and Limiting Radiation Exposure.

234 Available at

235 "[http://www.ada.org/~media/ADA/Member%20Center/Files/Dental Radiographic Examination](http://www.ada.org/~media/ADA/Member%20Center/Files/Dental_Radiographic_Examination)

236 [s_2012.ashx](http://www.ada.org/~media/ADA/Member%20Center/Files/Dental_Radiographic_Examination_s_2012.ashx)". ("Archived at <http://www.webcitation.org/6owRE7cx3>")