

TITLE: Cone Beam Volumetric Tomography for Patients with Dental or Maxillofacial Abnormalities: Clinical Effectiveness and Guidelines

DATE: 14 January 2009

RESEARCH QUESTIONS:

1. What is the clinical effectiveness and safety of cone beam volumetric tomography for patients with dental and/or maxillofacial abnormalities in hospital and outpatient settings?
2. What are the guidelines for use of cone beam volumetric tomography in hospital and outpatient settings?

METHODS:

We contacted ECRI's hotline service to request information on cone beam volumetric tomography for dental or maxillofacial abnormalities. References and abstracts from the systematic review and observational studies identified by ECRI are included below.

Supplemental searches for reports from Canadian health technology assessment agencies were performed, along with European sources including National Institute for Clinical Excellence (NICE) and the NIHR Health Technology Assessment programme.

RESULTS:

ECRI provided the following documents, which are a guide to the available evidence on the topic with context about the evidence provided by ECRI. They are based solely on a review of the article abstracts, not an analysis of full published articles.

Hotline response:

Disclaimer: The Health Technology Inquiry Service (HTIS) is an information service for those involved in planning and providing health care in Canada. HTIS responses are based on a limited literature search and are not comprehensive, systematic reviews. The intent is to provide a list of sources of the best evidence on the topic that CADTH could identify using all reasonable efforts within the time allowed. HTIS responses should be considered along with other types of information and health care considerations. The information included in this response is not intended to replace professional medical advice, nor should it be construed as a recommendation for or against the use of a particular health technology. Readers are also cautioned that a lack of good quality evidence does not necessarily mean a lack of effectiveness particularly in the case of new and emerging health technologies, for which little information can be found, but which may in future prove to be effective. While CADTH has taken care in the preparation of the report to ensure that its contents are accurate, complete and up to date, CADTH does not make any guarantee to that effect. CADTH is not liable for any loss or damages resulting from use of the information in the report.

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Health Technology Assessment Information Service (HTAIS). *Cone-Beam Computed Tomography for Dental and Maxillofacial Imaging* [Hotline response]. Plymouth Meeting (PA): ECRI Institute; 2008.

Health Technology Assessment Information Service (HTAIS). *Three-dimensional Computed Tomography in Dentistry* [Hotline response]. Plymouth Meeting (PA): ECRI Institute; 2007.

References and abstracts from the systematic review and observational studies identified by ECRI are included below. One systematic review and 42 observational studies were identified. Two Canadian guidelines for the use of cone beam volumetric tomography were located in the supplemental search. No health technology assessments, randomized controlled trials, or controlled clinical trials were identified in the search. Some additional information contained in the ECRI report including recent narrative reviews on the topic are included in the appendix.

HTIS reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by economic evaluations, randomized controlled trials, controlled clinical trials, observational studies, and evidence-based guidelines.

Health technology assessments

No literature identified

Systematic reviews and meta-analyses

1. Hussain AM, Packota G, Major PW, Flores-Mir C. Role of different imaging modalities in assessment of temporomandibular joint erosions and osteophytes: a systematic review. *Dentomaxillofac Radiol* 2008;37(2):63-71. [PubMed: PM18239033](#)

Randomized controlled trials

No literature identified

Controlled clinical trials

No literature identified

Observational studies

2. Barragan-Adjemian C, Lausten L, Ang DB, Johnson M, Katz J, Bonewald LF. Bisphosphonate-related osteonecrosis of the jaw: model and diagnosis with cone beam computerized tomography. *Cells Tissues Organs* 2009;189(1-4):284-8. [PubMed: PM18703870](#)
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4. Cattaneo PM, Bloch CB, Calmar D, Hjortshoj M, Melsen B. Comparison between conventional and cone-beam computed tomography-generated cephalograms. *Am J Orthod Dentofacial Orthop* 2008;134(6):798-802. [PubMed: PM19061807](#)

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6. Draenert FG, Gebhart F, Neugebauer C, Coppentrath E, Mueller-Lisse U. Imaging of bone transplants in the maxillofacial area by NewTom 9000 cone-beam computed tomography: a quality assessment. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2008;106(1):e31-e35. [PubMed: PM18585609](#)
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9. Kumar V, Ludlow J, Soares Cevidanes LH, Mol A. In vivo comparison of conventional and cone beam CT synthesized cephalograms. *Angle Orthod* 2008;78(5):873-9. [PubMed: PM18298214](#)
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11. Loubele M, Maes F, Jacobs R, van SD, White SC, Suetens P. Comparative study of image quality for MSCT and CBCT scanners for dentomaxillofacial radiology applications. *Radiat Prot Dosimetry* 2008;129(1-3):222-6. [PubMed: PM18583372](#)
12. Loubele M, Bogaerts R, Van DE, Pauwels R, Vanheusden S, Suetens P, et al. Comparison between effective radiation dose of CBCT and MSCT scanners for dentomaxillofacial applications. *Eur J Radiol* 2008. [PubMed: PM18639404](#)
13. Loubele M, Jacobs R, Maes F, Denis K, White S, Coudyzer W, et al. Image quality vs radiation dose of four cone beam computed tomography scanners. *Dentomaxillofac Radiol* 2008;37(6):309-18. [PubMed: PM18757715](#)
14. Low KM, Dula K, Burgin W, von AT. Comparison of periapical radiography and limited cone-beam tomography in posterior maxillary teeth referred for apical surgery. *J Endod* 2008;34(5):557-62. [PubMed: PM18436034](#)
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Guidelines and recommendations

43. Lawson-Little W, Cohen J, Fyfe J, Issabiglou S. *Healing Arts Radiation Protection Commission report*. Toronto: Ministry of Health and Long Term Care. Government of Ontario; 2007. Available: http://www.health.gov.on.ca/english/public/pub/ministry_reports/harp/harp_report.pdf (accessed 2008 Dec 29).
44. *Report of the diagnostic imaging safety committee for computed tomography (CT)*. Toronto: Ministry of Health and Long Term Care. Government of Ontario; 2007. Available: http://www.health.gov.on.ca/english/public/pub/ministry_reports/disc_ct_mri/ct_report.pdf (accessed 2008 Dec 29).

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APPENDIX – FURTHER INFORMATION:

Review articles

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55. Thomas SL. Application of cone-beam CT in the office setting. *Dent Clin North Am* 2008;52(4):753-9, vi. [PubMed: PM18805227](#)
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Position Statement:

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Additional references

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Note: product descriptions, news and additional information are available for several products.
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