

- Title** Cone Beam Computed Tomography
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- Reference** Technology Review Report – 005/2014, online:
http://www.moh.gov.my/index.php/database_stores/store_view_page/30/242

Aim

To reviewed evidence on the effectiveness, cost-effectiveness and safety of using Cone Beam Computed Tomography (CBCT) in Ministry Of Health dental facilities.

Conclusions and results

There was fair level of retrievable evidence to indicate that Cone Beam Computed Tomography is effective in improving dental diagnosis such as Inflammatory Roots Resorption, Root Fractures, Mandibular invasion by lower gingival carcinoma, assessment of fracture line, clarify morphology of periapical defect, detecting canine impaction and irreversible pulpitis. Subsequently, CBCT also can improve treatment plan compared to conventional radiography.

There was no retrievable scientific evidence on the safety or adverse events related to the use of CBCT in improving dental diagnosis and treatment planning from the scientific database. However, the United State Food & Drug Administration (US FDA) has cleared CBCT for premarket notification (510k) to sell in the US market and subjected to strict safety and quality rules (registered medical device). The US FDA regulates manufacturers of dental CBCT devices through the Electronic Product Radiation Control (EPRC) and medical device provisions of the Federal Food, Drug, and Cosmetic Act. Dental CBCT systems are classified under 21 CFR 892.1750. The American Dental Association (ADA) and the FDA recommended that clinicians perform dental X-ray examinations, including dental CBCT, only when necessary for the diagnosis or treatment of disease.

There was only one study reporting about cost analysis on CBCT in different health care systems. The cost of CBCT examination seemed to be vary in different health care systems, highest being in Malmö (€556.93), Sweden and the lowest being in Leuven (€233.06), Belgium. The capital cost of CBCT was reported to be in the range of £95,000 to £130,000 (depending on the software package).

Recommendations (if any)

Based on the review, although CBCT seemed to be effective for diagnosis and treatment planning for dental conditions, there is great concern on the safety of its use on a long term basis due to higher radiation dose compared to panoramic radiography. In view of that, CBCT is not recommended for routine practice. However, strict guidelines on the use of CBCT is required to guide dentists in diagnosing and treatment planning for certain diseases such as Inflammatory Roots Resorption, Root Fractures, Mandibular invasion by lower gingival carcinoma, assessment of fracture line, clarify morphology of periapical defect, detecting canine impaction and irreversible pulpitis.

Methods

Literatures were searched through electronic databases specifically PubMed, Medline, Cochrane, Ovid, Horizon scanning databases, other websites; US FDA, MHRA and from non scientific database - Google search engine. In addition, a cross-referencing of the articles retrieved was also carried out accordingly to the topic. Relevant articles were critically appraised and evidence graded using US/Canadian Preventive Services Task Force.

Further research/reviews required

Research is warranted to provide high quality scientific evidence to support the use of CBCT in dental field. Although CBCT seem to be effective for diagnosis and treatment planning, however, evidence about its safety, particularly relating to radiation concern is warranted and need further research.

Written by

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