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Cone-Beam CT assisting in detecting multiple root canals for endodontic treatment

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Aims: The use of a three-dimensional (3D) cone beam computed tomography (CBCT) reconstruction of the pulpal space within the root and coronal area outlines the anomalies clearly.

Methods: A 12-year-old male patient was referred by his local dentist to the Endodontic Department of China Medical University Hospital for treatment of the mandibular left second premolar. Intraoral examination showed that dens evaginatus occurred on all the four mandibular premolars. We took periapical film, panorex as routine check, then cone-beam CT (CBCT) for further confirmation.

Results: Using CBCT, an interesting finding was detected. This is a rare case of bilateral both four mandibular premolars with three roots and bilateral two mandibular canines with two roots. The special anatomy of such a mandibular left second premolar tooth was double confirmed by CBCT. After rubber dam application, careful access cavity preparation, mesiolingual (ML), distolingual (DL), and buccal (B) canals were located using dental microscope, cleaned and shaped thoroughly, and then the canals obturated by a warmed gutta-percha compaction method. At the three- month follow-up examination for this patient, the tooth was noted to be asymptomatic and radiographic re-assessment shows commencement of periapical healing.

Conclusions: CBCT is characterized by the rapid acquisition of volume images from a single low- radiation-dose scan of the patient and is of value in assessing the occurrence and the frequency of anomalous canal morphology. The correct diagnosis of these alterations by the analysis of preoperative 2D radiographs and 3D CBCT can help the location of more canals, thereby avoiding root therapy failure.