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# MAXILLARY FIRST MOLAR WITH SEVEN ROOT CANALS: A CASE REPORT

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**ABSTRACT**

The article focuses on the importance of having a thorough knowledge about the root canal anatomy and the importance of proper diagnosis. This article presents the endodontic management of a maxillary first molar with three roots and seven canals. The clinical detection of the seven canals was made using cone-beam computed tomography (CBCT) scanning. This report describes and discusses the variation in canal morphology of maxillary first molar and the use of latest advancement in successfully diagnosing them.

**Key Words:**Cone Beam Computerized Tomography Scanning, Maxillary First Molar, Seven Root Canals etc.

## INTRODUCTION

The incidence of second mesio-buccal canal in the maxillary first molar has been reported to be between 18% and 96.1% [1]. The root canal anatomy of maxillary first molars has been described as three roots with three canals, and the commonest variation is the presence of a second mesio-buccal canal only [2]. Other variations include one, four and five roots and unusual morphology of root canal systems within individual roots. Case reports with five and six root canals or with a C-shaped canal configuration have also been reported earlier. Maggiore reported the maxillary first molar having six canals with two mesio-buccal, three palatal and one disto-buccal whereas Adanir reported a clinical case having four roots (and six canals with one mesio-buccal, two mesio-palatals, two disto-buccal and one palatal [3]. Of the various comprehensive maxillary first molar ex vivo studies in the dental literature, only BarattoFilho reported a maxillary first molar with three roots and seven root canals. Of the 140 extracted maxillary first molars, only one tooth showed seven root canals in which three mesio-buccal canals, 3 disto-buccal canals and one palatal canal were identified [4]. The discussed case report discusses the successful endodonticmanagement of a maxillary first molar presenting with three roots and seven root canals which was confirmed with the help of cone beam computerized tomography (CBCT) scans [5].

### Case Report

A 67 year old man presented with the chief complaint of spontaneous toothache in his left posterior maxilla for 2 days. The pain intensified by thermal stimuli and on mastication. History revealed intermittent pain in the same tooth with hot and cold stimuli for the past 3 month. A clinical examination revealed a carious maxillary left first molar, which was tender to percussion. Palpation of the buccal and palatal aspect of the tooth did not reveal any tenderness. The tooth was not mobile and periodontal probing around the tooth was within physiological limits. A diagnosis of symptomatic irreversible pulpitis with symptomatic apical periodontitis was made and endodontic treatment was suggested to the patient after examination of radiographs. The tooth was anesthetized with 1.8 ml 2% lignocaine containing 1:200,000 epinephrines. An endodontic access cavity was established. Clinical examination with an endodontic explorer revealed two canal openings in each of the disto-

buccal, mesio-buccal and palatal root. During further examination, a third canal was located midway between the mesio-buccal and palatal orifices. Coronal enlargement was done with a nickel-titanium Pro-Taper series orifice shaper to improve the straight line access. The working length was determined with the help of an apex locator and later confirmed using a radiograph. Multiple working length radiographs were taken at different angulations. However, the radiographs did not clearly reveal the number and morphology of root canal systems. To confirm this unusual morphology, it was decided to perform CBCT imaging of the tooth. Access cavity was sealed with IRM cement. An informed consent was obtained from the patient and a multislice CBCT scan of the maxilla was performed. The involved tooth was focused and the morphology was obtained in transverse, axial and sagital sections of 0.5 mm thickness. CBCT scan slices revealed seven canals (three mesio-buccal, two palatal and two disto-buccal) in the left maxillary first molar. CBCT images provided valuable information regarding the canal configuration and confirmed the seven canals that were not clearly seen in the conventional radiograph. At the second appointment, the canals were prepared, irrigated and dried with absorbent points and obturation was performed using cold lateral compaction of gutta-percha and AH Plus resin sealer. The tooth was then restored with a posterior composite resin core. The patient was advised a full coverage porcelain crown and was asymptomatic during the follow-up period of 3 month. No post operative complications were seen.

## DISCUSSION

Radiographic examination is a basic component and need of the management of any endodontic problem [6]. Newer diagnostic methods such as computerized axial tomography scanning greatly facilitate access to the internal root canal morphology. One distinct advantage of CT scanning over the conventional radiograph is that it allows the operator to look at multiple slices of tooth roots and their root canal systems. The use of spiral computerized tomography (SCT) scans in dentistry has increased dramatically [7]. SCT scans acquire raw projection data with a spiral-sampling locus in a relatively short period. Without additional scanning time, these data can be viewed as conventional trans-axial images such as multi-planar reconstructions or as three dimensional reconstructions [8]. With SCT scans, it is possible to reconstruct overlapping structures at arbitrary intervals and the ability to resolve small subjects is increased. They have drastically reduced scan time and effective dosages but they still are not as accurate and do not limit the dosage as low as reasonably achievable. CBCT scanning is a relatively newer diagnostic imaging modality that has been used in endodontics for the effective evaluation of the root canal morphology. Even though the use of CBCT scanning involves less radiation than conventional CT scanning, the radiation dose is still higher than regular conventional intra-oral radiographs [9]. At this point in time, CBCT scanning is limited to major metropolitan areas and is very expensive also. Limitations also include medico-legal issues pertaining to the acquisition and interpretation of CBCT data. In the present case, CBCT scanning was used for a better understanding of the complex root canal anatomy. CBCT axial images confirmed the presence of three roots and seven root canals though the tooth appeared to have normal root canal anatomy. CBCT axial images also showed that both the palatal and disto-buccal root present with a Vertucci type II canal pattern (i.e., two canal orifices join together and exit as one apical foramen), whereas the mesio-buccal root showed a Sert and Bayirli type XV canal configuration (i.e., MB1and MB2 joined at the middle third of the root and exit in one apical foramen, whereas MB3 has a separate canal orifice and exiting foramen). The MB2 is usually located palatally and mesially to the MB1 but in this particular case MB2 was located between MB1 and DB1 and this peculiar location was confirmed in the CBCT axial images. Thus, CBCT scanning was pivotal in the diagnosis of this unusual root canal system and towards its successful endodontic management [10].

## CONCLUSION

The case report discusses the endodontic management of an unusual case of a maxillary first molar with three roots and seven canals and also highlights the role of CBCT scanning as an objective analytic tool to ascertain root canal morphology. It also tells us the importance of proper diagnosis and its crucialness in the management and treatment of the tooth.

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