



## RARE VARIATION IN MAXILLARY FIRST MOLAR WITH FIVE ROOT CANALS

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### ABSTRACT

Maxillary first molars can present severe variations in their root canal morphology. A significant proportion of these teeth require root canal treatment during their life as these have a high incidence of caries. Knowledge of exceptional variations in these teeth can help in successful outcome of endodontic treatment. This case report attempts to highlight a need to confirm presence of such anomalies during treatment.

### INTRODUCTION

The goal of root canal treatment is thorough cleaning, shaping and obturation of complete root canal system of infected tooth. Prime reasons in endodontic failure are apical percolation, continued presence of microorganisms caused by incomplete instrumentation, inadequate debridement, insufficient canal obturation and the presence of untreated canals<sup>1</sup>. A thorough knowledge of entire root canal system morphology including possible morphologic variations is an essential prerequisite to reduce incidence of endodontic failure.

Incidence of two or more root canals in a single root of multirooted maxillary molars is not uncommon. Abnormal root and root canal morphologies associated with maxillary molars have been recorded in several studies<sup>2-4</sup>. Cleghorn *et al*<sup>1</sup> reported findings of 4 root canals in as many as 25% of maxillary first molars. Pecora *et al*<sup>3</sup> found regular occurrence of 3 canals in maxillary first, second, and third molars in 75%, 58%, and 68% of these teeth, respectively; in a study of 370 teeth. The fourth canal when present was invariably located in the mesiobuccal root of these teeth. Other studies<sup>5-9</sup> have noted several physiological and clinical factors such as difficulty of access, bifurcation of canal within root and age related calcification; that complicate visual determination of multiplicity of root canals, especially in maxillary molars.

#### Case Report

A 31-year-old woman was diagnosed with acute irreversible pulpitis in maxillary right first molar and was scheduled for

root canal therapy. There was a history of severe continuous pain in a previously restored tooth. On radiographic examination, evidence of secondary caries and thickening of lamina dura of palatal root was detected.

Clinical examination revealed the tooth to be symptomatic, also eliciting tenderness on percussion. A conventional access cavity was prepared under local anaesthesia. After removal of pulp tissue, exploration with DG-16 (Hu-Friedy, Germany) explorer revealed five discrete orifices. On examination under operating microscope (Seiler, St Louis, US) two of these were found to be of mesiobuccal canals, one of distobuccal and two were palatal [Fig.1]. Working length was determined with an apex locator (RootZX, JMorita, Japan) and confirmed radiographically by placing files in all 5 canals [Fig.2]. Root canal preparation was done with Protaper system (Dentsply, Switzerland) under copious irrigation with 2.5% sodium hypochlorite and 17% EDTA until size F1 for all canals. The canals were dried with sterile absorbent points. Calcium hydroxide was placed in the root canals until next appointment. Access cavity was sealed with Cavit (3M ESPE, Germany).

Patient was recalled after 3 weeks. Master cone radiograph was made with corresponding protaper gutta percha followed by obturation with AH plus sealer (Dentsply, Germany). Two palatal canals joined to form a single canal apically as is evident in radiograph [Fig.3,4]. Subsequent to this, the access cavity was restored with composite. The tooth was asymptomatic in the follow up period.



Fig.1 - Preoperative radiograph showing Access Cavity



Fig.4 - Completed obturation



Fig.2 - Working length radiograph



Fig.3 - Master-cone and obturation radiographs

## DISCUSSION

A perusal of dental literature and published case reports makes it evident that knowledge of anatomic morphology of maxillary molars is essential for ensuring success of their endodontic treatment<sup>10-16</sup>. Although several techniques and diagnostic aids have been employed to accurately determine the number of orifices and root canals in any individual tooth<sup>17-21</sup>, it is important that detailed attention is paid to locate any additional root canals, apart from the routinely expected complement. Anatomic variations are not uncommon and can be found in maxillary first molars.

This article presents a case with an unusual number and arrangement of palatal and mesiobuccal canals. Even though the incidence of two palatal and two mesiobuccal canals is low and has been rarely described, such an anomaly should not be discounted or left out of consideration during endodontic treatment. Aggarwal *et al*<sup>19</sup> described the existence of a double palatal root canal as a very infrequent anomaly. Other studies<sup>9,14</sup> showed that this two-canal variation is more frequent in second maxillary molars.

Intensive radiographic cone-beam or spiral computed tomography scans are being employed as valuable diagnostic aids in identification of the internal and external morphology of endodontic systems of multirouted teeth<sup>19-21</sup>. With increasingly affordable availability of these diagnostic techniques, their use is expected to become common in the next decade.

## CONCLUSION

Anatomic variations can occur in many teeth. Root canal system variations in multirouted maxillary molars are no exception and happen to be rather uncommon. Thus, careful examination of routine intraoral radiographs and the internal anatomy of teeth is essential for successful endodontic treatment. Such cases with multiple root canals can be successfully managed with careful access and use of newer root canal preparatory instruments.

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