

Endodontic management of the maxillary first molars with two root canals: A rare case report

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Abstract

The basis of successful endodontic therapy resides on sound and thorough knowledge of the root canal anatomy, its variations and the clinical skills. The importance of the knowledge of the anatomy of root canals cannot be overemphasized. Unusual root and root canal morphologies associated with maxillary molars have been reported in several studies, in the literature. The morphology of the maxillary first molar has been studied and reviewed extensively. However, the presence of two roots in a maxillary first molar is a rare occurrence and such cases have seldom been reported in literature. This clinical report presents a permanent maxillary first molar with an unusual morphology of two roots with two canals.

Keywords: Anatomy; Dental Pulp Cavity; Maxillary Molar; Tooth Abnormalities; Two Roots

Introduction

Success of a root canal therapy requires a thorough knowledge of root and root canal morphology. [1]. The anatomy and morphology of roots and root canals vary greatly. Among all of the permanent teeth, maxillary first molars have the highest rates of root canal therapy failure in clinical practice [2,3] because of associated complexities and anatomic variations [4,5]. The number of roots in

maxillary first molars detected by endodontists and general dentist's ranges from one to five, according to the literature [6-9]. The number of root canals has been reported to range between one to eight [7-9], and even a C-shaped root canal has been observed [6,13]. Over 95% of maxillary first molars have three roots [14] and most have three to four root canals [15]. In the literature, various cases of maxillary first molar have been found with more number of roots and root canals, but only very few cases have been reported with less number of roots and root canals. The presence of two canals in a two-rooted maxillary first molar has rarely been reported in studies describing tooth and root canal anatomy [10]

The present case report documents the successful endodontic management of a maxillary first molar with two roots and two root canals with Vertucci's Type I canal configuration which was diagnosed clinically & by Intraoral Periapical Radiography.

Case Report

A 42 year old female patient came to the department with the chief complaint of pain in her left maxillary first molar for the last 2 days. Patient's medical history was noncontributory. Clinical examination revealed deep mesial caries with maxillary left first molar & distal caries

with 25. Electric pulp test was done there was no response with 26, normal response with 25 and was tender to vertical percussion. Radiographic examination showed radiolucency approaching the pulp. A diagnosis of irreversible pulpitis with apical periodontitis was established with 26 & reversible pulpitis with 25. Root canal treatment advised with 26, pulp capping with 25. On preoperative radiograph, radicular pattern gave suspicion of the presence of two roots only. This finding was present unilaterally [Figure A]. Under local anesthesia and rubber dam isolation, access cavity was prepared. After the removal of caries, the roof of the chamber was removed completely. Dentinal map connecting two orifices only was seen after deroofing. One orifice was present in the buccal aspect, and other orifice was present in the palatal aspect [Figure B]. The diameter of the buccal orifice was larger than the typical mesiobuccal or distobuccal orifices in the maxillary first molar. The shape of access cavity was ovoid rather triangular or rhomboidal. Working length was determined with apex locator (Root ZX, J Morita Mfg. Corp., Japan). Since the buccal canal was large, it was prepared till ISO size no 80 followed by circumferential filing using ISO taper files. Palatal canal was prepared till F5 Protaper (Dentsply Maillefer, Switzerland) NiTi instruments using crown down technique. 5.2% sodium hypochlorite and 17% EDTA were used as an irrigant. After drying the canals with paper points, large buccal canal was obturated with Gutta-percha cones (Dentsply, Maillefer, Switzerland) using lateral compaction technique and Selapex (Dentsply, De Trey, Germany) whereas palatal canal was obturated with F5 Gutta-percha cones (Dentsply, Maillefer, Switzerland) [Figure C,D]. The access cavity was permanently restored with resin composite and crown was placed. The patient was asymptomatic during the follow-up period.

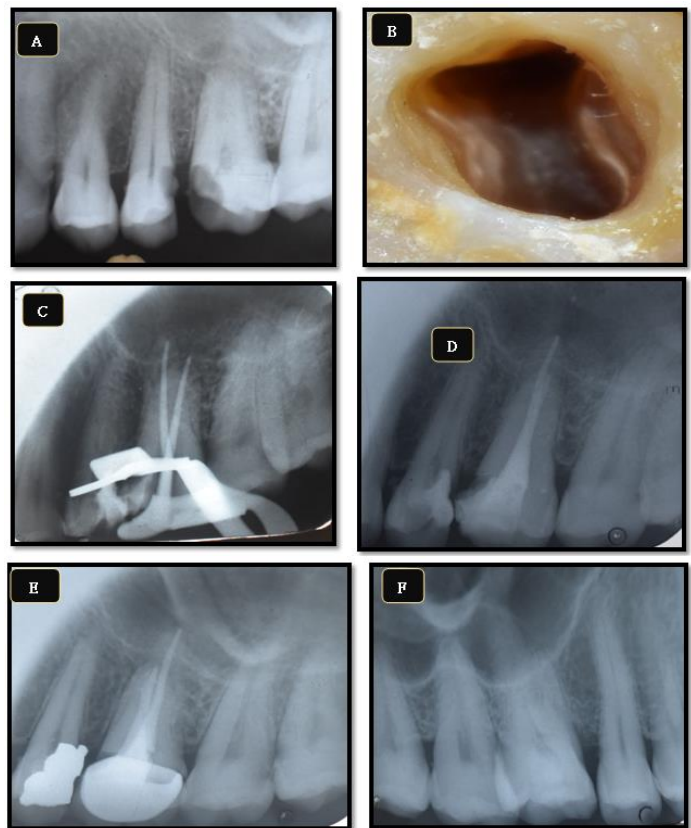


Figure A) Preoperative radiograph of two-rooted maxillary molar; **B)** Access cavity reveals one buccal and one palatal canal; **C)** The master apical cones confirmed the measured lengths; **D)** Final radiograph; **E)** 10-month follow-up; **F)** Intraoral periapical radiograph with 16 months confirming no bilateral occurrence of two roots with maxillary molar.

Discussion

The basis for success in any endodontic procedure depends on a clinician's sound scientific knowledge, accurate diagnosis and precise clinical skills. As described by Burns RC the maxillary first molar is possibly the most treated and least understood posterior tooth. Therefore, a thorough understanding of the variations occurring in the root canal system is an absolute necessity in achieving endodontic success.^[42] We conducted an extensive literature search using Google scholar searching, PubMed to identify cases reporting the unusual anatomy of two roots in a maxillary first molar.

Table- 1 Available case reports of maxillary first molar with two roots and two canals

Reference	Country	Gender	Canal Configuration(Vertucci's)		Symmetry or not
			Buccal	Palatal	
Newton et al ^[21] (1984)	United States	Male	Type 1	Type 1	N/A
DeMoore et al ^[22] (2002)	Belgium	Male	Type 1	Type 1	No
Yilmaz et al ^[23] (2006)	Turkey	Female	C shaped canal	Type 1	N/A
Ma et al ^[24] (2009)	China	Female	Type 1	Type 1	Yes
Martins et al ^[25] (2013)	Portugal	Male	Type 1	Type 2	Yes
Bansal, et al ^[26] (2018)	India	Male	Type 1	Type 1	N/A
Liu J et al ^[27] (2019)	China	Female	Type 1	Type 1	Yes
(case 1 & 2)					
Present study	India	Female	Type 1	Type 1	No

DB: Distobuccal; MB: Mesio Buccal; N/A: Not available; P: Palatal.

The case reports with their respective morphology are summarized in [Table-1]

Root canal morphology should be examined further during treatment by evaluation of radiographs taken from different horizontal angles. The use of a preoperative radiographs and additional radiographic views with 20-degree mesial or distal angulations are good techniques for the assessment of root canal morphology and anatomy [28, 30].

Conclusion

As clinicians we need to develop our observational and clinical skills as well as amend our understanding of the intricacies of the canal anatomy. The permanent maxillary first molars with two root canals and two roots are rare and unusual clinical cases. Attention should be paid to patients with fewer root canals and root anatomical variations to overcome the fixed idea regarding the morphology of molars.

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