

Case Report

Endodontic Management of a Maxillary First Molar with Two Palatal Canals and Three Mesiobuccal Canals: A Case Report

Heshmattollah Shahraki Ebrahimi¹, Vida Masserat², Sahar Soltani³, Hani Bazayr⁴

¹Professor assistant in Zahedan University of dentistry- endodontics department, Iran

²Professor assistant in Zahedan University of dentistry-radiology department, Iran

³Post graduate endodontics student in Zahedan University of dentistry, Iran

⁴ Endodontists, Iran

***Corresponding author**

Arezoo hooshmandi

Email: hooshmandi_arezoo@yahoo.com

Abstract: This case report is presentation of a maxillary first molar requiring root canal treatment which had two palatal canals and three mesiobuccal canals. Root canal treatment was performed using mechanical instrumentation with NiTi files. This case demonstrates an uncommon anatomical variation. The purpose of this article is to emphasize on the importance of having a thorough knowledge about the root canal anatomy.

Keywords: anatomical variations, maxillary molars, number of canals.

INTRODUCTION

Canal morphology knowledge and its frequent variations is essential for endodontic therapy. These morphological variations in root canal anatomy play a significant role in the outcome of root canal therapy. The most common causes of treatment failures in permanent maxillary first molars is related to failure in detecting additional canals particularly in the mesiobuccal root [1]. Studies reported that the incidence of extra root canals in mesiobuccal root in vitro is greater than in vivo. Many of these in vitro studies of the mesiobuccal root canal anatomy reported the presence of a second canal but very few mentioned a third canal [2-4]. Two such studies reported their incidence to be between 1.1% and 10% [5, 6].

A case study of 140 extracted maxillary teeth showed three mesiobuccal canals in one tooth [7]. Ferguson and Favieri *et al.*; reported maxillary molars with three mesio-buccal canals with surgical operating microscope [8,9]. Adanir also reported a case with four roots and six canals [10]. Martinez-Berna and Ruiz-Badanelli and Beatty reported the maxillary first molar with three separated mesiobuccal canals with three separated foramina [11, 12]. Kottoor *et al.*; reported two maxillary first molars with three mesiobuccal canals in each tooth with Cone Beam Computed Tomography (CBCT) [13, 14].

The frequency of two palatal roots is low, a few cases have been reported in the literature. Bond *et al.*; [15], de Almeida-Gomes *et al.*; [16] Karthikeyan

and Mahalaxmi)(4 cases) [17], Albuquerque et al (3 cases) [18], Kottoor *et al.*; [13] reported two palatal canals in maxillary first molars .

CASE REPORT

A 33-year-old male patient referred to the Department of Endodontics of zahedan University of Dentistry for root canal treatment of right maxillary first molar (tooth no. 3), with a chief complaint of “my tooth had pain.” There was no significant finding in his medical history. Clinically the tooth had a deep carious lesion on the distoocclusal surface.

The tooth was tender to percussion. There was no mobility and periodontal status was within normal limits. Pulp vitality testing of the involved teeth with cold (DENRONIC, Aeronova GmbH & Co. KG, Germany) and electric pulp stimulation (Parkel Electronics Division, Farmingdale, NY, USA) were positive, so the provisional diagnosis was irreversible pulpitis with acute apical peridontitis so root canal therapy of the first maxillary molar was necessary.

After explaining the procedure, the informed consent was taken from the patient. The patient received local anesthesia of 2% lidocaine with 1: 80000 epinephrine (Persocaine-E, Darou Pakhsh, Iran). After removing caries of the tooth, a conventional endodontic access cavity was made. Rubber dam was placed. Clinical examination with a DG-16 endodontic explorer (Hu-Friedy, Chicago, IL, USA) revealed 4 distinct orifices: two palatals with one mesio buccal orifice and

one distobuccal orifice. The conventional access was modified to a trapezoidal shape to improve access to the palatal canals and extended to explore the likely second mesiobuccal canal. Surprisingly, we found two mesiobuccal canals other one we found before.

After scouting the canals with no.10 and no.15 K-files (Mani INC, Tochigi, Japan), coronal flaring with Protaper Universal Shaping file Sx and S1 (Dentsply, Maillefer, Switzerland) was done. Working lengths were estimated with an apex locator (Root ZX, J. Morita Mfg Corp, Kyoto, Japan) and it was confirmed with periapical radiography (Figure 2). The canals were initially instrumented to a size no.15 K-file (Mani INC, Tochigi, Japan), under copious irrigation with 5.25% sodium hypochlorite. Canal preparation was performed using the crown-down technique with Protaper Universal Rotary NiTi files (Dentsply, Maillefer, Switzerland).

Figure 3 shows the radiography of the pulp chamber after instrumentation. Final irrigation was done with 20 ml EDTA 17% then 20 ml sodium hypochlorite 5.25% followed by 20 ml normal saline irrigation. The canals were dried with paper points. Canals were obturated using cold lateral compaction of gutta-percha (GAPADENT Co. LTD, China) and AH 26 sealer (Dentsply Tulsa).



Fig-1:

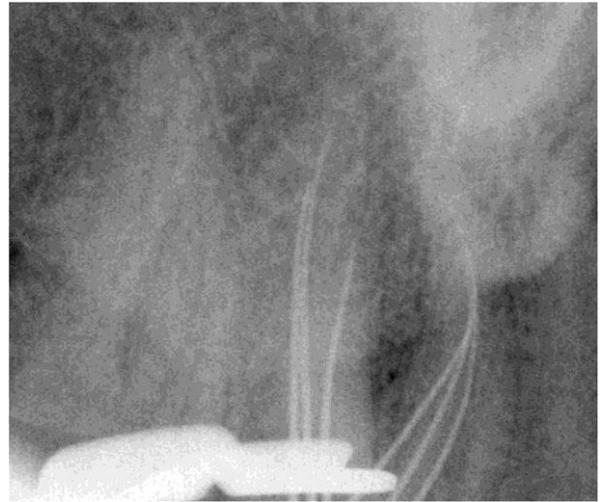


Fig-2

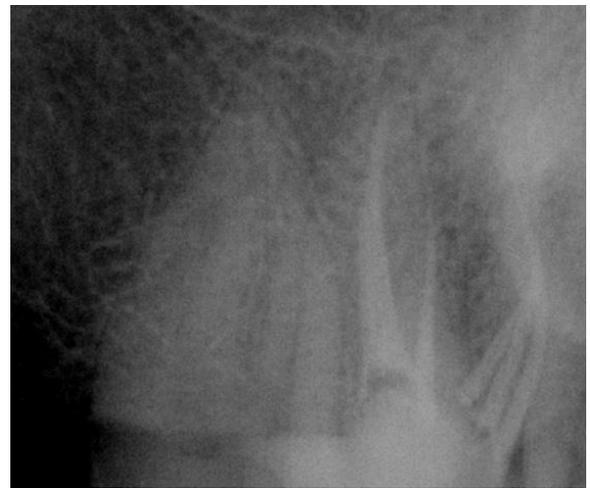


Fig-3



Fig-4



Fig-5



Fig-6

(Figure 5, 6) is final radiography of root canal treatment. Cavit was used as a temporary filling material. Patient was referred to restorative department.

DISCUSSION

This case is considerable because it has two palatal canals in a palatal root and three mesiobuccal canal. A thorough literature search in PubMed site was done by the author revealed that the present case is apparently the first reported case of endodontic management of a maxillary first molar with three mesiobuccal canals and two palatal canals that was reported.

Kottoor *et al.*; reported two maxillary first molars with three mesiobuccal canals in each tooth with Cone Beam Computed Tomography (CBCT) [13, 14]. The frequency of two palatal roots is low; a few cases have been reported in the literature. Radiographic examination is a necessary part of the management of endodontic problems. Confirmation of this unusual morphology by CBCT is use full but we did not use CBCT because of ethic and economic issues related to the patient.

CONCLUSION

The present case report is about the endodontic management of an unusual case of a maxillary first molar with three roots and six canals and also highlights the importance of finding additional canals particularly in the mesiobuccal root. Most common causes of treatment failures in permanent maxillary first molars are related to failure in detecting additional canals.

REFERENCES

1. Weine FS, Healey HJ, Gerstein H, Evanson L; Canal configuration in the mesiobuccal root of the maxillary first molar and its endodontic significance. *Oral Surgery, Oral Medicine, Oral Pathology.* 1969;28(3):419-25.
2. Neelakantan P, Subbarao C, Ahuja R, Subbarao CV, Gutmann JL; Cone-beam computed tomography study of root and canal morphology of maxillary first and second molars in an Indian population. *Journal of endodontics.* 2010;36(10):1622-7.
3. Hartwell G, Bellizzi R; Clinical investigation of in vivo endodontically treated mandibular and maxillary molars. *Journal of endodontics.* 1982;8(12):555-7.
4. Kulid JC, Peters DD; Incidence and configuration of canal systems in the mesiobuccal root of maxillary first and second molars. *Journal of endodontics.* 1990;16(7):311-7.
5. Verma P, Love R; A Micro CT study of the mesiobuccal root canal morphology of the maxillary first molar tooth. *International endodontic journal.* 2011;44(3):210-7.
6. Degerness RA, Bowles WR; Dimension, anatomy and morphology of the mesiobuccal root canal system in maxillary molars. *Journal of endodontics.* 2010;36(6):985-9.
7. Baratto Filho F, Zaitter S, Haragushiku GA, de Campos EA, Abuabara A, Correr GM; Analysis of the internal anatomy of maxillary first molars by using different methods. *Journal of endodontics.* 2009;35(3):337-42.
8. Ferguson DB, Kjar KS, Hartwell GR; Three canals in the mesiobuccal root of a maxillary first molar: a case report. *Journal of endodontics.* 2005;31(5):400-2.
9. Favieri A, Barros FGBd, Campos LC; Root canal therapy of a maxillary first molar with five root canals: case report. *Brazilian dental journal.* 2006;17(1):75-8.
10. Adanir N; An unusual maxillary first molar with four roots and six canals: a case report. *Australian dental journal.* 2007;52(4):333-5.
11. Martinez-Berna A, Ruiz-Badanelli P; Maxillary first molars with six canals. *Journal of endodontics.* 1983;9(9):375-81.
12. Beatty RG; A five-canal maxillary first molar. *Journal of endodontics.* 1984;10(4):156-7.
13. Kottoor J, Velmurugan N, Sudha R, Hemamalathi S; Maxillary first molar with seven root canals

- diagnosed with cone-beam computed tomography scanning: a case report. *Journal of endodontics*. 2010;36(5):915-21.
14. Kottoor J, Velmurugan N, Surendran S; Endodontic management of a maxillary first molar with eight root canal systems evaluated using cone-beam computed tomography scanning: a case report. *Journal of endodontics*. 2011;37(5):715-9.
 15. Bond JL, Hartwell G, Portell FR; Maxillary first molar with six canals. *Journal of endodontics*. 1988;14(5):258-60.
 16. de Almeida-Gomes F, Maniglia-Ferreira C, de Sousa BC, dos Santos RA; Six root canals in maxillary first molar. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*. 2009;108(3):e157-e9.
 17. Karthikeyan K, Mahalaxmi S; New nomenclature for extra canals based on four reported cases of maxillary first molars with six canals. *Journal of endodontics*. 2010;36(6):1073-8.
 18. Albuquerque DV, Kottoor J, Dham S, Velmurugan N, Abarajithan M, Sudha R; Endodontic management of maxillary permanent first molar with 6 root canals: 3 case reports. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*. 2010;110(4):e79-e83.