The root canal treatment in maxillary and mandibular molars with five root canals: Two case reports with two years follow up

Ersan Çiçek, Ebru Özsezer Demiryürek, Semih Özsevik

ABSTRACT

Introduction: One of the most important steps in successful root canal treatment process is to understand the morphology of the root canal. Therefore, the clinicians should consider and release the anatomic variations in diagnosis and treatment of the mandibular and maxillary molars. Case Series: The aim of this case series is to present the successful root canal treatments completed in lower right first molar and in upper left first molar. In the first case; in right lower first molar five root canals were found, one root canal was in the mesibuccal root, one root canal was in the mesiolingual root and three root canals were in the distal root. This root canal treatment was completed in one session. In the second case, five root canals were found, two of them were in the mesibuccal root, in upper left first molar, two of them were in the distobuccal root and the fifth was in the palatal root. The root canal treatment process was completed in three sessions. The clinical follow up performed after two years revealed that no symptoms were observed in both cases and the teeth were radiographically healthy. Conclusion: Successful endodontic treatment starts with proper clinical and radiographic examinations. It is important for clinicians to be aware of all possible anatomic variations for a good endodontic practice.

Keywords: Anatomic variations, Maxillary and mandibular molar teeth, Root canal treatment

Çiçek E, Demiryürek EÖ, Özsevik S. The root canal treatment in maxillary and mandibular molars with five root canals: Two case reports with two years follow up. International Journal of Case Reports and Images 2012;3(5):11–15.

doi:10.5348/ijcri-2012-05-117-CS-2

INTRODUCTION

One of the most important steps of a successful root canal treatment process is to understand the morphology of the root canal. Therefore, the clinicians should consider and release the anatomic variations in the process of diagnosis and treatment of the maxillary and mandibular molars.

Ingle et al. [1] stated that one of the main reasons of endodontic failure is the incomplete obturation of the root canal system. Hence, the correct location, biomechanic instrumentation and hermetic obturation of all canals are essential procedures.

Martinez–Berna et al. investigated the anatomical configuration and the number of root canals of the mandibular molars in several in vitro and in vivo studies [2]. They reported 29 teeth with five root canals in a sample of 2362 mandibular permanent molars. Fabra–Campos [3] studied 145 mandibular first molars and found that 2.75% of the teeth had five canals. A
radiographic study performed on extracted teeth reported mandibular first molars had three mesial canals in 13.3% of specimens, four mesial canals in 3.3% of specimens, and three distal canals in 1.7% of specimens [2]. Clinical evaluations have shown a small but significant number of mandibular molars with five canals [2, 5].

Some authors [6–8] reported that the incidence of a mesiobuccal (MB) root with two canals varies between 64% and 96%. However, the incidence of two canals in the distobuccal (DB) root is unusual. Sert et al. reported that the incidence of two distobuccal canals was 9.5% [9]. Quite less frequent is the occurrence of five canals in maxillary first molars. Gray et al. reported five canals in 2.4% of two mesiobuccal, two distobuccal and one palatal canal [10].

The aim of this case report is to present two cases with successful root canal treatments completed in lower right first molar and upper left first molar. In the first case five root canals were found, one root canal was in the mesiobuccal root of lower right first molar, the other was in the mesiolingual root and three root canals were in the distal root. This root canal treatment was completed in one session. In the second case, five root canals were found, two of them were in the mesiobuccal root of upper left first molar, two of them were in the distobuccal root and the last one was in the palatal root. The root canal treatment process was completed in three sessions.

CASE SERIES

Case 1: Dental history was taken from 47-years-old male patient who presented to Ondokuz Mayis University, Faculty of Dentistry, Department of Endodontics, and he informed that he had complained in the right lower first molar. The patient had no significant medical history. No caries and no restoration were detected on clinical and radiographic examinations. Late response of the tooth to electrical pulp test was detected. It was concluded that the tooth could be partially non-vital. Also, there was a periodontal inflammation caused by an angler bone defect between right first molar and second molar teeth. The patient was referred Department of Periodontology. He was advised root canal treatment before periodontal flap and bone grafting operation. After a local anesthetic, ultracaine DS Fort (4% articaine with epinephrine 1/100000, Hoechst-Marion Roussel, Frankfurt, Germany) was administered by mandibular anesthesia, a rubber-dam was placed and access cavity was opened. When the access cavity preparation was complete and pulp tissue was removed, the canal orifices were localized easily (Figure 1). Five root canals were detected in total, three root canals in the distal root and one each in the mesiobuccal and mesiolingual root. The root canal treatment was completed in one session. Working length was defined with periapical radiography (Figure 2). The root canals were enlarged up to F3 with ProTaper rotary NiTi system (Dentsply, Brazil). Next, the root canals were filled with AH plus (Dentsply, De Trey, Konstanz, Germany) and gutta-percha (Dentsply, Maillefer, Brazil and Dia–Dent, Maillefer, Korea) by using the cold lateral compaction technique (Figure 3). Upon completion of the root canal therapy, the tooth was restored with composite resin materials (Clearfil AP-X; Kuraray Medical Inc, Tokyo, Japan). An 18-month postobturation x-ray confirmed the success of endodontic therapy (Figure 4).

Case 2: A 22-years-old male patient presented to Ondokuz Mayis University, Faculty of Dentistry, Department of Endodontics with short and discontinuous pain in left upper first molar. He gave a history of pulp capping treatment and amalgam filling in the left upper first molar tooth approximately one year back (Figure 5). When the patient presented to our clinic approximately one year later, the patient reported spontaneous pain in the tooth, especially during the night. The patient was diagnosed with irreversible pulpitis.

![Figure 1: Working length radiography (Case 1).](image1)

![Figure 2: Access cavity preparation (Case 1).](image2)
percha (Dentsply, Brazil and Dia–Dent, Maillefer, Korea) using the cold lateral compaction technique and the tooth was restorated with amalgam (Figure 8). Two years postobturation X-ray confirmed the success of the root canal treatment (Figure 9).

**DISCUSSION**

Anatomical variations are more common in the molar teeth. So the variations play an important role in root canal treatment. Several studies reported the anatomy of root canal systems and the anatomical variations found in the different types of teeth. Studies on the anatomy of root canals carried out by Vande Voorde et al. [11] Badanelli et al. [12] and Fabra-campos et al. [3] reinforced the importance of an accurate clinical evaluation of the possible fourth and fifth root canal to ensure success of the endodontic treatment.

After ultracaine DS fort (4% articain with epinephrine 1/100000, Hoechst-Marion Roussel, Frankfurt, Germany) local anesthetic was administered by periapical infiltration, a rubber-dam was placed and access cavity was opened. When the access cavity preparation was completed and the mesiobuccal, distobuccal, and palatal root canals were easily detected. After removing the pulp tissue, one root canal was found in distobuccal root.

The working length was defined with periapical radiography. The root canals were enlarged up to F3 with ProTaper rotary NiTi system (Dentsply, Brazil). One week later the filling was removed and root canal treatment was renewed because of progressing pain. The root canal filling was removed and an extra canal in mesiobuccal region (MB2, Figure 7) was found next to first mesiobuccal canal (MB1, Figure 7), (Figure 6, 7). The canals were filled with medicament that contains calcium hydroxide paste (Kalsin, Aktu Tic., İzmir, Türkiye) and left for two weeks. After recovery of symptoms, the root canals were filled with AH plus (Dentsply, De Trey, Konstanz, Germany) and gutta-
Martínez-Berna et al. [2] remarked the importance of investigating the existence of a fourth and even a fifth root canal. Moreover, few studies [4, 14–17] found a third distal canal was in mandibular first molar.

A mandibular first molar with three distal canals was first reported by Berthiaume et al. [13]; however, the three distal canals ended in two apical foramina. Examples of mandibular first molars with three distal canals, all of which ended in separate apical foramina, have also been described [14–16]. In addition, Quackenbush et al. [17] reported the existence of three separate distal canals in two extracted mandibular first molars. In the present study, the distal root which had three separate canals ended in one apical foramina.

The maxillary first molar most commonly has three or four root canals, with one canal in both palatal and distobuccal roots and one or two in the mesiobuccal root. Çalışkan et al. [6] stated that a second canal is found in 65% of mesiobuccal roots of maxillary first molars. Bond et al. [18] reported a case of a maxillary first molar with six canals: two canals in the mesiobuccal root, two canals in the distobuccal root and two canals in the palatal root. Hulsmann et al. [19] presented a maxillary first molar with two canals in the distobuccal root. Martínez-Berna et al. [20] reported three cases of maxillary first molars with six canals, three canals in the mesiobuccal root, two canals in the distobuccal root and one canal in the palatal root. One palatal root canal ended in one apical foramina, two separate mesiobuccal canals ended in one apical foramina and two separate distobuccal canals ended in two separate apical foramina in the present study.

**CONCLUSION**

Successful endodontic treatment starts with proper clinical and radiographic examinations. It is important for clinicians to be aware of all possible anatomic variations for a good endodontic practice.

********

**Author Contribution**

Ersan Çiçek – Substantial contributions to conception and design, acquisition of data, Drafting the article, revising it critically for important intellectual content, Final approval of the version to be published.

Ebru Özszezer Demiryürek – Substantial contributions to conception and design, analysis and interpretation of data, Drafting the article, revising it critically for important intellectual content, Final approval of the version to be published.

Semih Özsевик – Substantial contributions to conception and design, Drafting the article, Final approval of the version to be published.

**Guarantor**

The corresponding author is the guarantor of submission.
Conflict of Interest
Authors declare no conflict of interest.

Copyright
© Ersan Çiçek et al. 2012; This article is distributed under the terms of Creative Commons attribution 3.0 License which permits unrestricted use, distribution and reproduction in any means provided the original authors and original publisher are properly credited. (Please see www.icasereportsandimages.com /copyright-policy.php for more information.)

REFERENCES

1. Ingle JI. Endodentics, 3rd ed. Philadelphia, PA: Saunders 1985.
2. Martínez-Berna A, Badanelli P. Investigación clínica de molares inferiores con cinco conductos. Boletín de información Dental 1983;43:27–41.
3. Fabra-Campos CH. Unusual root anatomy of mandibular first molars. Journal of Endodontics 1983;5:568–2.
4. Goel NK, Gill KS, Taneja JR. Study of root canals configuration in mandibular first permanent molar. Journal of Indian Society of Pedodontics and Preventive Dentistry 1991;8:12–4.
5. Bueno CE, Cunha RS, Dotto SR, Ferreira R. Un molar inferior com cinco canais-caso reportado. Revista da Faculdade de Odontologia da Universidade de Passo Fundo 2002;7:51–3.
6. Caliskan MK, Pehlivan Y, Sepetcioglu F, Türkün M, Tuncer SS. Root canal morphology oh human permanent teeth in a Turkish population. Journal of Endodontics 1995;21:200–4.
7. Stropto JJ. Canal morphology of maxillary molars: Clinical observations of canal configuraitons. Journal of Endodontics 1999;25:446–50.
8. Kulild JC, Peters DD. Incidence and configuraiton of canal systems in the mesiobuccal root of maxillary first and second molars. Journal of Endodontics 1990;16:311–7.
9. Sert S, Bayırli GS. Evaluation of the root canal configuraitons of the mandibular and maxillary permanent teeth by gender in the Turkish population. Journal of Endodontics 2004;30:391–8.
10. Gray R. The maxillary First molar. In Bjorndal A, Skidmore E, eds. Anatomy and morphology of the human teeth. Iowa City: University of Iowa College of Dentistry 1983:31–40.
11. Vande Voorde HE, Odendahl D, Davis J. Molar 4th canals: frequent cause of endodontic failure. III. Dental Journal 1975;44:779–6.
12. Badanelli P, Martínez-Berna A. Obturation de un molar inferior con cinco conductos. In: Lasala A, ed. Endodonticia. Barcelona: Salvat S A 1979:407.
13. Berthiaume JT. Five canals in a lower first molar. The Journal of the Michigan Dent Association 1983;65:213–4.
14. Stronger WF, Remeikis NA, Carr GB. Mandibular first molar with three distal canals. Oral Surgery 1984;57:554–7.
15. Beatty RG, Interian CM. A mandibular first molar with five canals: report of case. The Journal of the American Dental Association 1985;111:769–1.
16. Friedman S, Moshonov J, Stabholz A. Five root canals in a mandibular first molar. Endodontics and Dental Traumatolog 1986;2:226–8.
17. Quackenbush LE. Mandibular molar with three distal root canals. Endodontics and Dental Traumatology 1986;2:48–9.
18. Bond JL, Harwell G, Portell FR. Maxillary first molar with six canals. Journal of Endodontics 1988;14:258–60.
19. Hulsmann M. A maxillary first molar with two distobuccal root canals. Journal of Endodontics 1997;23:707–8.
20. Martínez-Berna A, Ruiz-Badanelli P. Maxillary first molars with six canals. Journal of Endodontics 1983;9:375–1.