

Endodontic Management of Maxillary First Molar with 7 Root Canals with Post-Treatment Adjunct of Cone Beam ST: A Case Report

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Abstract

The internal morphology of the maxillary first molar has been heavily studied and reported in the literature. In classic literature, the root canal anatomy of maxillary first molars has been described as three roots with three canals and the most common variation is the presence of a second mesiobuccal canal (MB2).

Keywords: Root Canals • Endodontics • Tooth

Introduction

The incidence of MB2 has been reported to be between 56.8% and 96.1% [1-5]. Cleghorn et al. found that the incidence of a second root canal in the distobuccal root is 1.7% and less than 1.0% in the palatal root [6]. Palatine root canal variations were well established by Christie et al., who reported the endodontic treatment of maxillary molars with two palatine roots and classified these teeth as types I, II, and III, according to root degree of divergence [7]. In literature, numerous cases reported of varying root canal configuration from one to eight root-canals [8-10]. This article will discuss the nonsurgical endodontic management of permanent maxillary first molar presenting with the anatomical variation of 3 roots and six canals.

Case Report

A 42-year-old male patient was referred to the Department of Endodontics at Alnoor dental centre from primary health care unit for complete root canal treatment of upper left 1st molar tooth. He gave a history of severing toothache before seeking emergency dental treatment of primary health care one week before. The clinical examination of tooth #16 revealed extensive occluso-mesial temporary restoration and the Probing depths and mobility were within normal limits. The tooth was slightly tender to percussion and palpation. Electrical and thermal tests are not indicated as the pulp previously treated. Radiographic examination revealed unusual root canal anatomy with localised loss of PDL space. The diagnosis confirmed as previously initiated root canal treatment with asymptomatic apical periodontitis. Treatment plan discussed and complexity of root canal anatomy well explained to the patient. Unfortunately, Cone-beam computed tomography was not available in our treatment centre. The only aid of magnification is eye loupe of 2.5x. Tooth anaesthetised with buccal infiltration injection of 2% lidocaine with 1:100000 epinephrine: rubber dam isolation and access opening modified with Endo Z bur. The root canals were identified

at different stages of treatment procedures. All root canal instrumented with profile rotary system in the crown down technique [11]. MB2 joint MB3 and DB1 joint DB2 shortly. Patency and glide path was created in every root-canal [12,13]. The working length determined with apex locator and confirmed with an intraoral radiograph. The primary irrigation solution is sodium hypochlorite of 5.25% and 17% Ethylene Diamine Tetraacetic Acid (EDTA) [11].

The root canals obturated with cold lateral compaction and zinc oxide sealer. The Cavit is used as temporary restoration between visits. Finally, the tooth restored with an amalgam filling. The total treatment sessions are three of an hour for each, and the inter appointment interval was of two weeks. The patient referred to Prosthodontics' section for coronal coverage. Due to the complexity of root canal treatment, patient referred to Um-Alqura University, the dental school for Cone-Beam Computed Tomography (CBCT). CBCT axial images confirmed the presence of three roots and seven root canals, namely MB1, MB2, MB3, DB1, DB2 and two palatal canals DP and MP are joining together at the middle root (class 1 canal configuration). The MB2 is, usually, located palatally and mesially to the MB1, but in this case, additional MB3 was identified. CBCT is vital for understanding tooth morphology, internally and externally, and surrounding tooth structure [14]. It is usually, obtained before treatment or during treatment procedures when the endodontist faces quarry situation [15]. CBCT scanning, in our case, was helpful as a post-treatment radiograph. It is guided for evaluation of the quality root canal obturation and predicts the outcome of the treatment of this unusual root canal system [15]. CBCT scan slices show seven canals three mesiobuccal, (MB1, MB2, MB3)), two distobuccal (DB1, DB2) and two palatal canals (MP and DP) in the right maxillary first molar. MB2 and MB3, DB1 and DB2 and MP and DP show Vertucci class II canal configuration (Figures 1-5).



Figure 1. Pre-operative radiograph.

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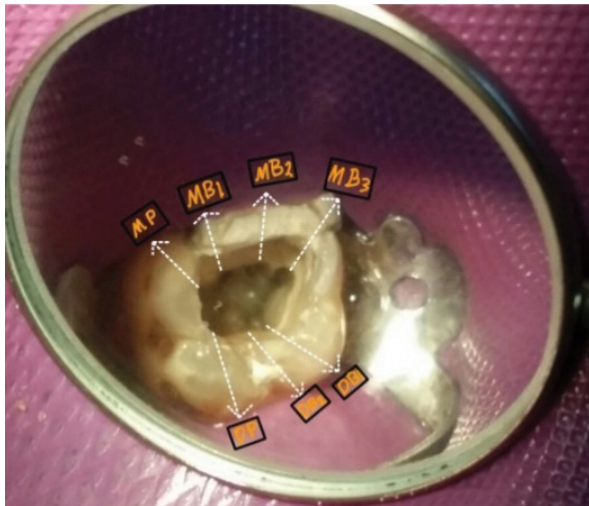


Figure 2. Access opening.

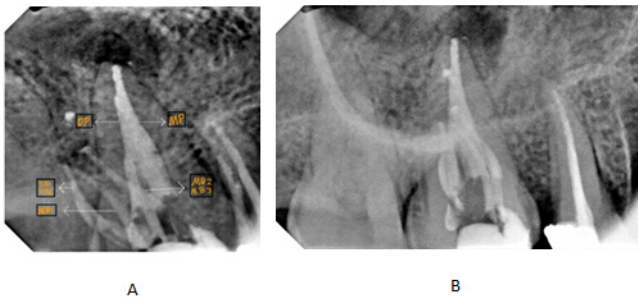


Figure 3. (A and B) Post-operative radiograph straight and mesial angle views.

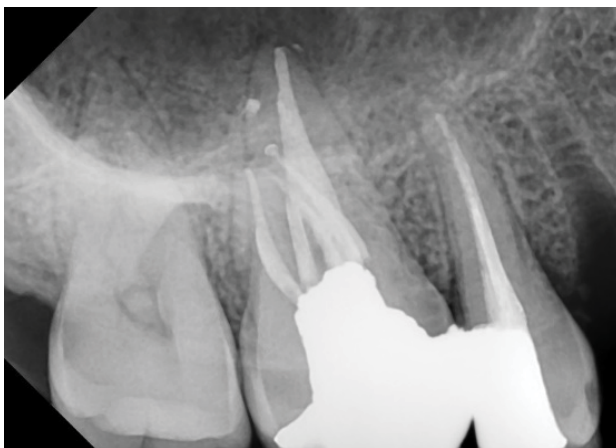


Figure 4. Final radiograph with amalgam build-up.

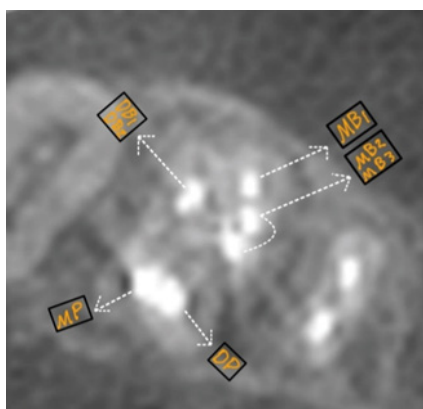


Figure 5. Post-treatment CBCT axial view.

Discussion

Traditionally, root canal morphology of upper 1st molar has three roots of 4 root canals [16]. It is distributed as the following, MB1, MB2, DB and P [17]. As the operator experience has a significant role in the identification and management of complex root canals [18]. Other factors, such as Dental Operating Microscope (DOM) [19,20], ultrasonic tip instrument [20] and 3-dimensional radiograph (cone-beam computed tomography) [21] have ultimate benefit in such cases. In the first appointment, we explore four root canals. In the second appointment, we can locate two more root canals. The total root canals shaped and cleaned is six in the third appointment at just before obturation we discovered the DP root canals, the seventh one. Unfortunately, in our center, at the time of case management, no DOM, or ultrasonic or CBCT. The dental loupe of 2.5X power is very helpful in the exploration of canal orifices. In a clinical study, 312 cases of root canal treatment on the first and second maxillary molars. The endodontists, who used the microscope, identified 57% of the MB2 versus 55% who used dental loupes [2]. This result shows the importance of any magnification power in the location and management of the root canal system. In this case, counting numbers of root canals come with the problem as MB1 and MB2 and DB1 and DB2 are joint shortly to form single canal about 3-4 mm from pulpal floor. According to Stropko description in his meticulous work, these canals count as a separate root canal [22]. In our case, Post-treatment CBCT shows some difficulty in clarity of the pulpal floor and coronal anatomy of the tooth, due to beam hardening phenomena, that result in image distortion [23]. The traditional radiograph of two-dimensional view of limited help in such case. We relay in to determine the working length on apex locator. In published case reports, there is a limited number of upper 1st molar with more than five root canals.

Conclusion

This case provides evidence of variations in the root canals of the mesiobuccal, distobuccal and palatal roots of a maxillary first molar tooth. Complete clinical and adequate knowledge of morphology with an advanced diagnostic and management tools are necessary for successful clinical outcome.

References

- Almeida Gos and Machado Rajmohan. "Maxillary First Molar with 8 Root Canals Detected by CBCT Scanning: A Case Report." *Gen Dent* 63 (2015): 68-70.
- Buhrley Lan and Barrows Jones. "Effect of Magnification on Locating the MB2 Canal in Maxillary Molars." *J Endodont* 28 (2002): 324-327.
- Ibrahim Ali Ahmad and Anas Al-Jadaa. "Three Root Canals in the Mesiobuccal Root of Maxillary Molars: Case Reports and Literature Review." *J Endodont* 40 (2014): 2087-2094.
- Howard M. Fogel and Rodrigo Sanches Cunha. "Maxillary First Molars with 2 Distobuccal Canals: A Case Series." *J Endodont* 43 (2017): 1925-1928.
- Brent M. Hiebert, Kenneth Abramovitch, Dwight Rice and Mahmoud Torabinejad. "Prevalence of Second Mesiobuccal Canals in Maxillary First Molars Detected using Cone-beam Computed Tomography, Direct Occlusal Access, and Coronal Plane Grinding." *J Endodont* 43 (2017): 1711-1715.
- Blaine M. Cleghorn, William H. Christie and Cecilia C.S. Dong. "Root and Root Canal Morphology of the Human Permanent Maxillary First Molar: A Literature Review." *J Endodont* 32 (2006): 813-821.
- William H. Christie, Marshall D. Peikoff, Howard M. Fogel. "Maxillary Molars with Two Palatal Roots: A Retrospective Clinical Study." *J Endodont* 17 (1991): 80-84.
- Hany Mohamed Aly Ahmed, Mohd Fadhli Khamis and James Leo Gutmann. "Seven Root Canals in a Deciduous Maxillary Molar Detected by the Dental Operating Microscope and Micro-Computed Tomography." *Scan* 38 (2016): 554-557.
- Gautam P. Badole, Manjusha M. Warhadpande, Pratima R. Sheno and Chandrakant Lachure, et al. "A Rare Root Canal Configuration of Bilateral Maxillary First Molar

- with 7 Root Canals Diagnosed using Cone-Beam Computed Tomographic Scanning: A Case Report." *J Endodont* 40 (2014): 296-301.
10. Kishan Kambale, Das Devika, Chhabra Naveen and Vishnu Pratap Singh Rathore, et al. "Management of Maxillary First Molar with Six Canals using Operating Microscope." *Ind J Dent Res* 29 (2018): 683-686.
 11. Carrotte, Pat. "Endodontics: Part 1 The Modern Concept of Root Canal Treatment." *Br Dent J* 197 (2004): 181-183.
 12. David Uroz-Torres, María Paloma González-Rodríguez and Carmen María Ferrer-Luque. "Effectiveness of a Manual Glide Path on the Preparation of Curved Root Canals by using Mtwo Rotary Instruments." *J Endodont* 35 (2009): 699-702.
 13. Damiano Pasqualini, Caterina Chiara Bianchi, Davide Salvatore Paolino and Lucia Mancini, et al. "Computed Micro-Tomographic Evaluation of Glide Path with Nickel-Titanium Rotary Path File in Maxillary First Molars Curved Canals." *J Endodont* 38 (2012): 389-393.
 14. Parker James and Mol Aam. "CBCT Uses in Clinical Endodontics: The Effect of CBCT on the Ability to Locate MB2 Canals in Maxillary Molars." *Int Endodont J* 50 (2017): 1109-1115.
 15. Zhi-Hui Zhang, Hai-Lin Yao, Yan Zhang and Xiao Wang. "Endodontic Management of the Maxillary First Molar with Special Root Canals: A Case Report and Review of the Literature." *World J Clin Cases* 8 (2020): 2590-2596.
 16. Fernando B Barletta, Caroline Solda, Eduardo G Reston and Alissa L Zurawski, et al. "Mesiolingual Canal Prevalence in Maxillary First Molars assessed through Different Methods." *J Contemp Dent Pract* 19 (2018): 959-963.
 17. Jorge N.R. Martins, Duarte Marques, Emmanuel João Nogueira Leal Silva and João Caramês, et al. "Second Mesiobuccal Root Canal in Maxillary Molars: A Systematic Review and Meta-Analysis of Prevalence Studies using Cone Beam Computed Tomography." *Arch Oral Biol* 113 (2020): 104589.
 18. Roberta Kochenborger Scarparo, Letícia Pereira, Diana Moro and Grasiela Gründling, et al. "Morphologic Variations of Maxillary Molars Palatal Root and the Importance of its Knowledge for Endodontic Practice: A Case Series." *J Contemp Dent Prac* 12 (2011): 138-142.
 19. Oliveira Lan and Silva Martus. "The Impact of a Dental Operating Microscope on the Identification of Mesiolingual Canals in Maxillary First Molars." *Gen Dent* 67 (2019): 73-75.
 20. Khalid Alfouzan, Abdulmohsen Alfadley, Lubna Alkadi and Abdullah Alhezam. "Detecting the Second Mesiobuccal Canal in Maxillary Molars in a Saudi Arabian Population: A Micro-CT Study." *Scan* 2019 (2019): 1-6.
 21. Pablo Betancourt, Pablo Navarro, Gonzalo Muñoz and Ramón Fuentes. "Prevalence and Location of the Secondary Mesiobuccal Canal in 1,100 Maxillary Molars using Cone Beam Computed Tomography." *BMC Med Imag* 16 (2016): 66.
 22. Stropko, John. "Canal Morphology of Maxillary Molars: Clinical Observations of Canal Configurations." *J Endodont* 25 (1999): 446-450.
 23. Conor Durack and Shanon Patel. "Cone Beam Computed Tomography in Endodontics." *Br Dent J* 23 (2012): 179-191.

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