



Endodontic Retreatment of Maxillary first Molar with Additional MB 2 Root Canal.

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ABSTRACT: For root canal treatment to be successful, the clinician should have thorough knowledge of the internal anatomy and morphology of permanent teeth. Occurrence of the second mesiobuccal canal (MB2) is a frequent finding in maxillary molars. Failure to locate these extra canals may result in endodontic failure. This article presents an retreatment of maxillary first molar, in which an extra canal in the mesiobuccal root was located using visual, tactile and magnifying devices.

Keywords: Retreatment, MB2, maxillary first molar, ultrasonic tip.

I. INTRODUCTION

One of the major causes of failure in endodontic treatment is the impossibility of locating and treating the entire root canal system, a result of the lack of knowledge regarding the dental, internal or external anatomy.[1,2] Awareness and understanding of the presence of unusual external and internal root canal morphology contributes to the successful outcome of the root canal treatment. Maxillary molars are known to have an additional canal (MB2) in the mesio buccal root. The occurrence of second mesiobuccal canal is a common variation. Weine stated that frequent failure of endodontic treatment in maxillary first permanent molar teeth was likely due to the failure to locate and fill the second mesiobuccal canal.[3]

Stropko conducted a study on 1096 maxillary first molars over an 8-year period and concluded that MB2 canals were found in 93% and 73.2% of first molars with and without the use of surgical operating microscopes.[4] Somma et al, studied the root canal morphology of 30 extracted human maxillary first molars with the aid of micro CT and concluded that the mesio buccal root canal anatomy was complex, with incidence of MB2 root canals, isthmuses, accessory canals, apical delta and loops.[5] Endodontically retreated teeth were found to contain more undetected MB2 canals than first-time treated teeth, suggesting that failure to treat existing MB2 canals leads to a poorer prognosis.[6]

Complex root canal anatomies have been conventionally diagnosed by radiographs, which provide sufficient information to the clinician.[7] Although periapical and panoramic radiography produce acceptable details in the mesio-distal direction, the observation of details in the bucco-lingual dimension is inadequate. The purpose of this article is endodontic retreatment of maxillary first molar with additional MB2 root canal.

II. CASE REPORT

A 16-years-old male patient without any history of systemic disease was referred to my clinic, with chief complaint of severe spontaneous pain in the right maxillary first molar. The endodontic treatment had already been performed on this tooth once, but the patient's symptoms did not relief. Vitality tests on tooth showed painful response to cold, heat and electrical pulpal test. Tooth response to percussion and palpation was within normal limit. Radiographic evaluation showed incomplete obturation of distobuccal and palatal root canals, and missed mesiobuccal root canal. (Figure 1a).

Figure 1. (a) Preoperative radiograph of maxillary first molar (b) clinical image of access cavity revealing four canals (c) Master cone radiograph (d) Post obturation radiograph.



Figure 1a

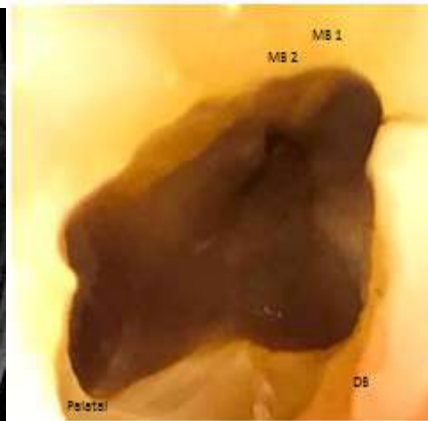


Figure 1b



Figure 1c



Figure 1d

Non-surgical endodontic retreatment was planned for right maxillary first molar. The patient was anesthetized with 2% lidocaine and 1:80,000 epinephrine. After isolation with rubber dam, access to the pulp chamber was made. Once the pulp chamber was deroofed, a rhomboidal shaped access opening was obtained and the mesiobuccal (MB1), distobuccal and palatal root canals were detected. Gutta-percha was removed using rotary files in distobuccal and palatal root canal.

Further exploration was carried out using DG-16 endodontic explorer (Hu-Friedy) and a sticky point was located palatal and mesial to MB1 canal. Further removal of dentinal shelf beginning from the orifice of the mesiobuccal canal (MB1) and moving toward the orifice of the palatal canal with ultrasonic micro endodontic tip (ET 18D tip, Satelec), under magnifying loupes (Carl Zeiss, 3.5X magnification) clearly unveiled the orifice of the additional canal, which was diagnosed as MB2 canal. The canal was negotiated using small size instruments, i.e. 6,8,10 (Dentsply/Maillefer). Working length was established with the use of an apex locator (Root ZX, J. Mortina Inc, USA). The canals were cleaned and shaped with hand k-files (Maillefer Dentsply, Baillaigues, Switzerland) and Revo S NiTi rotary files in crown down manner up to final canal size #0.06/25 in palatal canal and #0.04/25 in buccal canals. Clinical image of access cavity revealing all four canals were taken (Figure 1b). Canals were irrigated with 5.25% sodium hypochlorite, 17% EDTA and 2% Chlorhexidine. Canals were dried using paper points and a master cone radiograph was taken (Figure 1c) to check the apical fit in all the four canals. Finally canals were obturated with Gutta-percha and AH-26 sealer (Dentsply, De Trey, Konstanz, Germany) using warm vertical compaction (Figure 1d). The access preparation was sealed and the post-endodontic restoration was planned.

III. DISCUSSION

An inability to recognize the presence of and to adequately treat all the canals of the root canal system may be a major cause of the failure of root canal therapy.[9,10] The morphology of the mesiobuccal root of maxillary molars has been documented as a complex root canal system with fins, isthmuses, transverse anastomoses, and even the presence of a third canal. A second canal in the mesiobuccal root in permanent maxillary molars is one of the common variations.[11]

Beer and Baumann suggested a geometric aid to locate the extra canal. [12] First a line 1 was drawn connecting the mesiobuccal and palatal canals, then a line 2 was drawn perpendicular to the line 1, at a point one

third the intercanal distance from the palatal canal such that this line passes over the distobuccal canal. A fourth canal lies somewhere along line 3, which deviates approximately 10° .

The MB2 canal is challenging to negotiate. The canal has a marked incline immediately apical to its orifice in the coronal 1-3 mm. When an attempt is made to instrument MB2, the tip of the file tends to catch against the mesial wall of the canal, preventing apical progress. This is because MB2 canal is smaller and usually narrower than MB1. After locating the MB2 orifice, inclining the dental handpiece to the distal, as far as the access preparation permits us to enter the first few millimeters of this overlying “roof” of calcified tissue to be safely eliminated. After this “refinement” of the access preparation, a more desired straight line access can be achieved. Sometimes, the MB2 lies in the same orifice as MB1. When there was a shared or common orifice, many times the opening was more oval in shape. Infrequently, but on occasion, the MB2 orifice was harbored within or just apical to, that of the palatal canal.[4]

The teeth, in which the MB2 canal was not located under direct vision, were examined under magnification using dental operating microscope with the help of explorer and MB2 canals were located in additional 28 (29%) maxillary first molar teeth. This finding is consistent with the findings of other clinical studies where use of magnification increased the number of MB2 canals detected.[12,13]

Apart from preoperative radiographs of varying horizontal angulations, various intraoperative procedures of detecting extra canals are available. They may be adequate access widening for enhanced visualization, careful observation and exploration of the dentinal map, looking for bleeding spots and uncovering calcifications from the chamber floor.[14]

Weine’s classification[3] has been used to describe four common configurations of the maxillary MB root. Type I is a single canal from orifice to apex, Type II has two orifices that converge to one, Type III has separate and distinct canals from orifice to apex, and Type IV begins as one canal and diverges into two separate canals. In our case configuration of the MB root was of Type II.

IV. CONCLUSION

It is imperative for a dentist performing endodontic therapy on maxillary first molars to examine carefully the pulpal floor to locate the orifices of any “extra” canals, especially the second mesiobuccal canal. . Re-treatment reduces the prognosis. Therefore, clinicians should pay more attention during initial root canal treatment to obtain maximal treatment benefits.

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