

MB2 in Maxillary Molars: Location and Alternatives for Treatment

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ABSTRACT

The success of endodontic treatment depends on the location of all root canals, so that they can be cleaned, shaped and filled. Therefore, the objective of this article was to review the literature on existing alternatives to facilitate the localization and negotiation of second canal in mesiobuccal root (MB2) and to illustrate, through two clinical cases, some of these alternatives. In case one we show the management of a biopulpectomy of an upper molar. In the second case, a pulp necrosis, with fistula in which there was only regression after localization, negotiation and intracanal medication of MB2. It should be emphasized that in the maxillary molars, the endodontist should always go in search of MB2, using all available tools, accessible and necessary for each case and this conduct is determinant for the endodontic success of many treatments.

Keywords: Endodontics; Maxillary First Molar; Secondary Mesiobuccal Canal (MB2)

Introduction

In endodontics, the maxillary first molars present a constant challenge, given the difficulty in locating and treating the fourth canal, called the second canal in mesiobuccal root or MB2 [1-3]. The MB2 starts from the pulp chamber at a steep mesial slope and then bends back distally, which makes its detection and negotiation challenging [4]. The inability to detect and treat this canal is the reason for many endodontic failures since there is a high incidence of localization of these canals in cases of retreatment followed by uncomplicated healing, which suggests that failure rates may correlate with the inability to detect additional channels in the first treatment [5-7] demonstrated that teeth with an untreated canal are 4.38% more likely to be associated with injuries. The study by Nascimento et al. [8] showed that the most frequent technical error in maxillary molars was not filling the MB2. It is important to remember that changes in endodontic access and detection techniques along with improvements in illumination and magnification have helped in locating and treating MB2 [9]. Many studies [10-12] have shown a significant increase in detection

of these channels when we associate the Microscope (MO) with ultrasound. Cone Beam Computed Tomography has also been found to be of great importance in endodontics, including the detection of additional channels, as some studies [2,13,14] have shown a significantly higher rate of MB2 when it was requested.

After the location of MB2, we have the challenge of exploring and negotiating this curved, narrow and often calcified channel. Not all additional channels can be negotiated [14-16]. Some work has shown alternative techniques for this approach such as using reciprocating [17-19] and rotating [20-23] instruments to exploit and achieve working length. It is also noted that operator experience increases the ability to locate and treat additional channels [24]. Given the above, this paper is justified due to the great difficulty in locating and accessing the MB2 in maxillary molars, as well as the need for the Endodontic Specialist to be updated on the tools that can assist in achieving the success of maxillary first molar treatment. The aim of this paper was to review the literature on existing alternatives to facilitate localization and negotiation of

MB2 and to illustrate, through two clinical cases, some of these alternatives.

Literature Review

Morphology of the First Maxillary Molar

The buccal mesial root of the upper first molar contains a dual canal system (92%) more often than a single canal (8%) [14]. Also, this dual system has a single foramen approximately twice as often in proportion to the that two [1]. The prevalence of MB2 decreases as the root approaches the apical third and the older the patient, the less MB2 are found [3,25]. The MB2 entrance is small and not easily seen. It is often hidden under a dentin shoulder or calcifications in a small groove where selective dentin removal is often required [3]. Many studies have been done to give the clinician a geometric location of the MB2 [26,27] suggest using the center of the MB1 channel as a reference parameter and from this point explore 2.68mm (+ - 0.49) in a palatal direction and 1.25 (+ - 0.34) in the mesial direction.

Microsonics Filosofy

The use of microscope with ultrasound is called Microsonics Filosofy. Magnification, illumination and ultrasonic inserts significantly improves the operator's ability to identify and access root canal inputs [28-30]. A study of 150 patients showed a 36% to 72% increase in MB2 detection with the associated use of microscope with selective dentin removal [3]. Other studies [10,29] also found a significant increase in MB2 detection rate with this association. Ultrasound has many important applications in endodontics, including the more conservative and safe selective removal of dentin, to have access to MB2, since we have been able to remove dental structure in hard places [31,32].

MB2 Negotiation and Preparation

The use of rotary systems to prepare MB2 channel has been reported as a highly successful alternative [21-23]. Buchanan [20], describes a technique for calcified channels using the GT files system. According to this technique, the canals must first be emptied with hand files # 0.8, # 0.10 and # 0.15 not to compress the contents of the canals in the apical region and after motorized instrumentation should be started from crown to apex in order to achieve the desired working length and taper. Zuolo et al. [17] studied the frequency at which Reciprocal 25 (VDW, Maillefer Germany) is able to explore and reach the working length of upper molar MB2. In this work, the manual technique was used with reference, and Reciprocal 25 was 32% more effective in trading. Reciprocal 25, according to Zuolo et al. [17] acts as a hole opening instrument and its effectiveness can be explained by the high flexibility, cutting capacity and relative force on the tip.

Clinical Case Report

Case 1

Patient, MCKS, female, 18 years old, went to Endodontic Specialization to treat the first left maxillary molar. After clinical

and radiographic examination (Figure 1) the diagnostic was irreversible pulpitis. Anesthesia was performed with Mepiadre (DFL, Rio de Janeiro, Brazil) absolute isolation, coronary opening, location of channels, and working length was performed with apex locator (Romiapex A-15, Romidan Ltd, Kiryat Ono, Israel). The MB2 was localized using the # 0.10 C pilot file (VDW, Munich, Germany). Cervical preparation was performed with Protaper Universal SX instrument (DentisplyMailefer, Switzerland) and chemical-mechanical preparation with reciprocating Wave One Gold Primary instrumentation (Dentisply-Maillefer, Switzerland), irrigation with 2.5% sodium hypochlorite. The smear layer was removed and then an intracanal medication with calcium hydroxide paste was applied (SS WHITE, Rio de Janeiro, Brazil) and the teeth was sealed with Glass Ionomer (SS WHITE, Rio de Janeiro, Brazil). In the second appointment, the palatine root has been expanded with Wave One Gold Large (Dentisply-Maillefer, Switzerland), smear layer was removed and obturation performed (Figure 2).

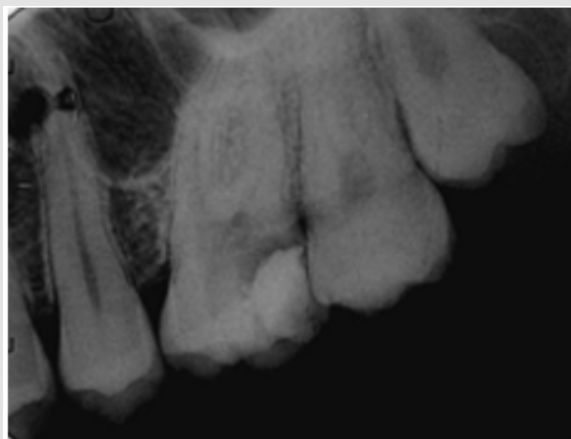


Figure 1: Initial radiograph showing extensive carie and provisional restoration with infiltration.



Figure 2: Final radiograph of endodontic treatment.

Case 2

Patient M.A.R., female, 27 years old, went to Endodontic Specialization to treat the first right maxillary molar. The emergency treatment was done in a health Center one month ago. Radiography was performed (Figure 3) and the clinical examination verified

the permanence of the fistula (Figure 4). After endodontic access and irrigation with 2.5% sodium hypochlorite (Iodontosul, Porto Alegre, Brazil), the MB2 was localized with # 10 C pilot file (VDW, Munich, Germany) (Figures 5 & 6). Root canal system exploration and electronic working length were performed (Romiapex A-15, Romidan Ltd, Kiryat Ono, Israel). After Glide Path with Proglider was done (Dentisply-Maillefer, Switzerland) and preparation of all channels with Wave One Gold Primary (Dentisply-Maillefer, Switzerland) (Figure 7) The smear layer was removed and calcium hydroxide intracanal medication was done (SS WHITE, Rio de Janeiro, Brazil) and glass ionomer sealing (SS WHITE, Rio de Janeiro, Brazil) were placed. Patient returns after 40 days, and on clinical examination, fistula regression is observed (Figure 4). In the second appointment, the MB1, MB2 and distal root were enlarged with Wave One Gold Medium (Dentisply-Maillefer, Suiça) and palatine root has been expanded with Wave One Gold Large (Dentisply-Maillefer, Switzerland), smear layer was removed and obturation performed (Figures 8 & 9).

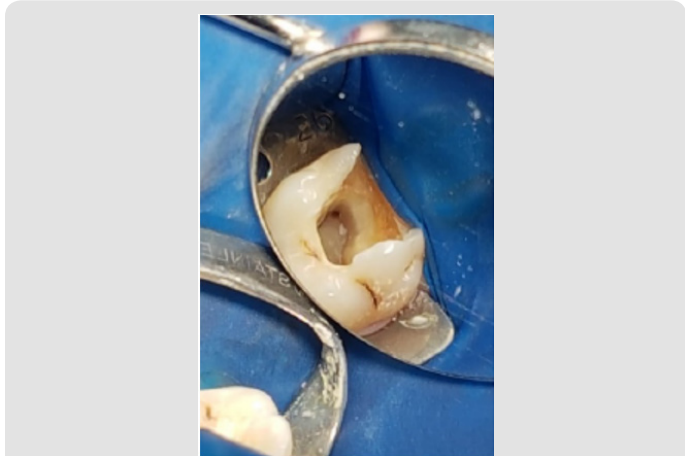


Figure 5: Maxillary right molar with MB1 located in emergency care.

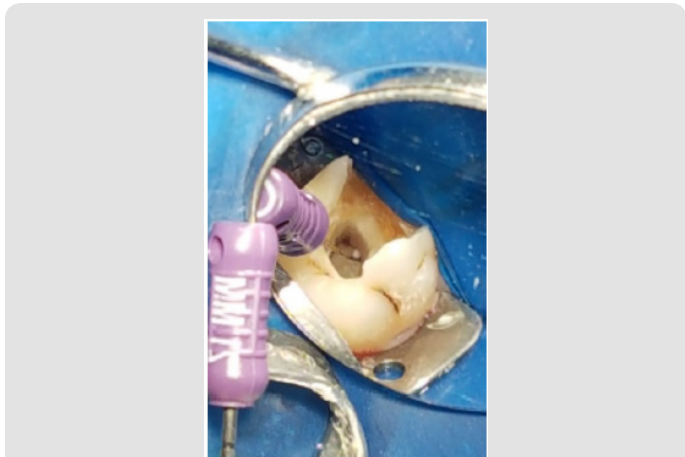


Figure 6: photograph showing the location of the MB2 with C-pilot # 10 file.

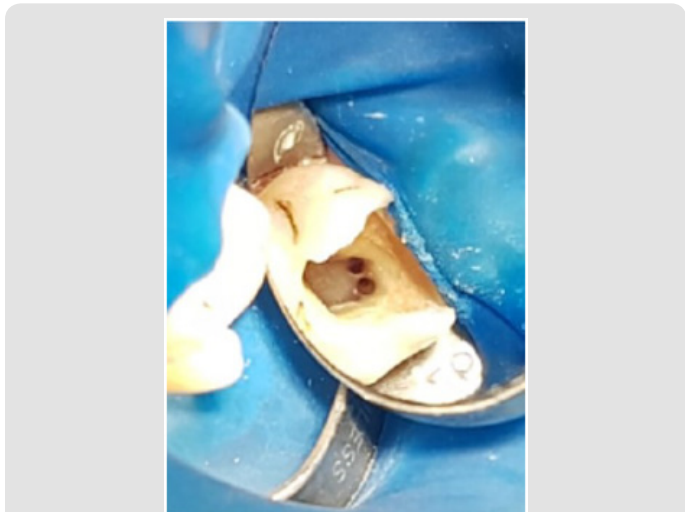


Figure 7: Maxillary right molar after mechanical chemical preparation, showing MB1 and MB2.



Figure 3: Initial radiograph showing the emergency treatment done in the health center one month ago.



Figure 4.



Figure 8: Clinical situation after forty days of calcium hydroxide medication, showing regression of the fistula.



Figure 9: Final radiograph of endodontic treatment.

Discussion

Endodontic treatment of the upper first molars encourages the operator to locate and the second buccal mesial root canal, known as the second buccal mesial canal or MB2, which is present in 90% of situations [13,14]. It is evident that in the two clinical cases presented, the localization of this channel was performed with the C-pilot # 10 files, which is one of the resources currently available for identification and initial negotiation of the referred channel [33-39]. In case two, during emergency care there was no localization of MB2, and fistula persisted, which suggests that failure to find this could lead to failure as previously reported [5,6]. Adequate preparation and negotiation possibly fistula regression as well as the intracanal medication used (Calcium hydroxide) which has antimicrobial properties and an important role in inactivating LPS produced by Gram negative bacteria [40-45]. The glide path was done with manual files on case 1 and with Proglider instrument in case two (Dentsply-Maillefer, Switzerland). Some authors [46,47] have reported that the mechanical glide path is easier and safer to perform pre-enlargement while maintaining the original canal curvature, but also reduced the frequency and intensity of postoperative complications such as pain. and flare ups. A recent study [48] comparing the torsion properties of various

mechanized glide path instruments showed that Logic 25.01 (Easy, Belo Horizonte, Brazil) had the highest torsional force.

It should be noted that in case two, that was pulp necrosis with fistula, we chose to enlarge the foramen of the buccal canals to medium (#35) and palatine canal to large (#45), due to the need for decontamination. In addition to conservative expansion, passive ultrasonic irrigation (PUI) and Easy Clean (Easy Dental Equipment, Belo Horizonte, Brazil) are tools that enhance the action of irrigating solutions [32,49] and their use promotes greater cleaning. of the canal and isthms [50]. In both cases, we did not request preoperative Cone Beam Tomography because the patients treated have a poor socioeconomic condition. In addition, we agree with Hiebert et al. [14] that we should only order a Cone Beam Tomography in cases where MB2 is not clinically located. In both cases, we localized MB2 clinically and negotiate without using this feature that our patients do not always have access to. We agree with the various authors [3,10,32] that removal of the dentin shoulder under which the MB2 is located is greatly facilitated with the use of ultrasonic inserts. The reported cases will be followed clinically and radiographically, following the literature [51,52] in Endodontic Specialization.

Conclusion

The knowledge of teeth internal anatomy is critical to the success of endodontic treatment. This paper reported two clinical cases where MB2 was successfully located and negotiated, even without the aid of more sophisticated equipment. We conclude that in endodontic treatment of maxillary molars, the endodontist should always look for MB2, using all available, accessible and necessary tools for each case.

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