



MB2: An Essential Auxiliary of Maxillary Molars

Aryama Balodi^{1*}, Advaita Anand¹, Pallabi Sarkar¹, Ayushi Bangari¹,
Sugandha Sati¹ and Anil Dhingra²

¹PG 3rd year, Department of Conservative Dentistry and Endodontics, Seema Dental College and Hospital, Rishikesh, India

²Professor and Head of the Department of Conservative Dentistry and Endodontics, Seema Dental College and Hospital, Rishikesh, India

***Corresponding Author:** Aryama Balodi, PG 3rd year, Department of Conservative Dentistry and Endodontics, Seema Dental College and Hospital, Rishikesh, India.

DOI: 10.31080/ASDS.2023.07.1609

Received: February 27, 2023

Published: March 27, 2023

© All rights are reserved by **Aryama Balodi, et al.**

Abstract

The second mesiobuccal canal in mesiobuccal roots in maxillary molars is a common finding in root canal treatments. Failure on the location of these canals is associated with a high rate of unsuccessful treatments of maxillary molars. Its prevalence has been assessed in several in vitro and in vivo studies, presenting variations according to the methodology applied, along with the population of interest. While the anatomy of these teeth is well defined in micro-computed tomography studies, the clinical management is a great challenge for the practitioner. The use of a dental operating microscope has rendered a better clinical outcome when considering the location and treatment of this canal. On the other hand, cone-beam computed tomography use is still controversial in the efficacy of MB2 canal location. The association of a dental operating microscope with troughing performed with ultrasonic tips is an essential step in this location. Moreover, sodium fluorescein might be applied for root canal location. Due to the high rate of unsuccessful cases when the MB2 canal is not initially found, several cases are performed aiming to address the cases of missed MB2 canals. Therefore, the clinician should discuss the best possible approach, whether surgical or clinical. This article presents an overview of the importance of the MB2 canal on the outcomes of root canal treatments of maxillary molars. Solutions based in current literature will be presented accordingly.

Keywords: MB2 Canal; Extra Canal; Elusive Canal; Maxillary Molar

Introduction

The success of endodontic therapy is mainly dependent on the quality of the cleaning of the entire root canal system. Thus, it is of major importance to identify and to subsequently prepare all the root canals. Various authors have reported that the mesiobuccal root of upper molars frequently has two canals [3].

A review of the literature on the anatomy of the maxillary second molar reveals that this tooth has three roots in its standard anatomical form [2]. In a study by Wolcott, *et al.* (2005) examination of 5616 endodontically treated and retreated maxillary first and second molars was made in an attempt to determine the percentage of MB2 canals that could be located routinely, and evaluate if there were any significant differences between initial treatments and retreatments. The teeth examined were 3578 first molars and 2038 second molars treated consecutively over a 5-yr period by six endodontists. Overall the MB2 canal was found in 2133 (60%)

first molars, and 712 (35%) second molars. The incidence of a MB2 canal in first molar retreatments was 66% compared to a 58% incidence in initial treatments. Whereas in second molars the retreatment incidence was 40% compared to 34% in initial treatments. The significant difference in the incidence of a MB2 canal between initial treatments and retreatments suggests that failure to find and treat existing MB2 canals will decrease the long-term prognosis [1].

The following case report presents with maxillary molars with extra mesiobuccal canal (MB2)

Case 1

An intermittent toothache that had been bothering a 42-year-old patient's left posterior tooth region for seven days was his main complaint when he visited the Department of Conservative Dentistry and Endodontics. The pain was made worse by chewing and

while sleeping. The patient’s medical background was not relevant. Clinical examination revealed that the left maxillary second molar tooth number 17 had a deep carious lesion, was responsive to pressure, and did not have a fistula or sinus tract. Upon radiographic examination, the tooth showed radiolucency involving enamel, dentin, and tissue nearly surrounding the pulp. As a result, symptomatic irreversible pulpitis with apical periodontitis was determined to be the cause. The tooth was isolated with a rubber dam after being sedated with 2% lignocaine and adrenaline. An endo access bur is used to prepare the access cavity. Deroofing the pulp chamber allowed for the creation of a shaped access entrance and the extension of the cavity into a trapezoidal shape. A groove was visible between the palatal and mesiobuccal orifices on the dentinal map when the pulp chamber’s floor was carefully visualised. An extra mesiobuccal canal that was roughly 2-3 mm away from the MB1 orifice was discovered after careful examination and exploration of the groove with a DG 16 explorer. The canal was negotiated with the aid of small-sized instruments (6, 8, and 10 Mani K-files), and the working length was determined with the aid of an apex locator and later confirmed using a radiograph. Rotary tools (Protaper next SX, S1, S2, F1, F2) with the crown down technique were used for cleaning and shaping. Normal saline, 2.5% sodium hypochlorite solution, and 17% EDTA were utilised in the irrigation process. 2% chlorhexidine digluconate was used as the final irrigant. The canals were obturated with bioceramic sealer and cold lateral compaction after being dried with absorbent points. The tooth was then restored.

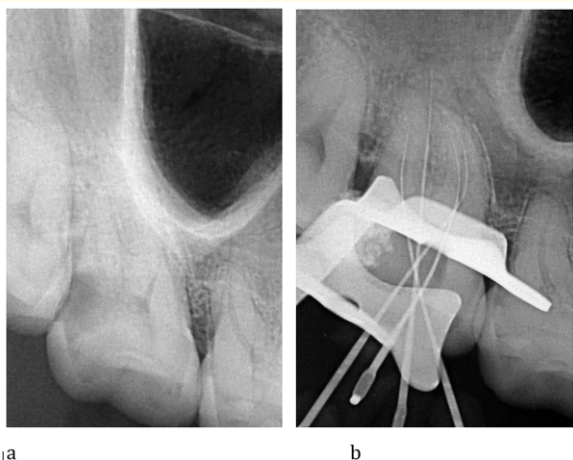


Figure 1: a: Preoperative, b: Working length determination.

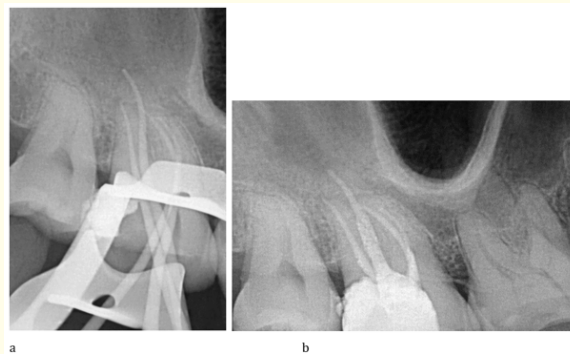


Figure 2: a: Master Cone, b: Post Operative.

Case II

A 32 year old female patient reported to the department of conservative dentistry and endodontics, seema dental college and hospital, rishikesh with the chief complain of pain in upper left back tooth region. Patient gave history of restoration in the same tooth 3 months back. On clinical and radiographic examination, there was initiation of root canal treatment i.r.t 26 and temporary restoration was done. Cold test gave lingering response irt 26. On the basis of clinical, radiographic examination and diagnostic test, diagnosis made was previously initiated therapy irt 26 and treatment plan was non surgical root canal treatment irt 26.

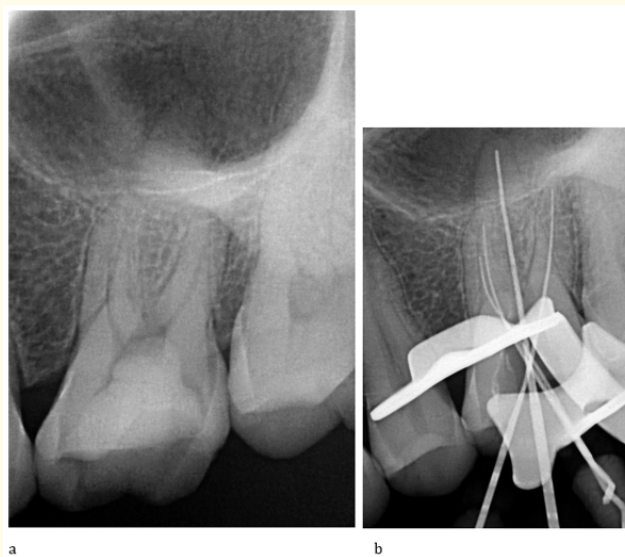


Figure 3

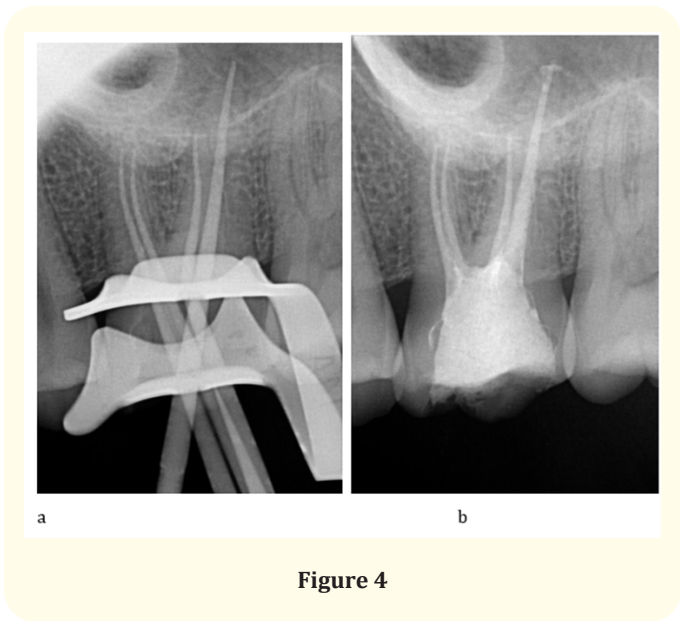


Figure 4

Case III

A 16 year old boy reported to the Department of Conservative Dentistry and Endodontics with a chief complaint of spontaneous toothache in his right back tooth region for 7 days and on elaborating the chief complaint the pain was intermittent in nature, aggravated during mastication and during sleep. The patient’s medical history was non-contributory. On clinical examination there was deep carious lesion w.r.t the tooth number 16 and there was tenderness on percussion, no fistula and sinus tract were seen. Cold test gave a lingering response and on radiographic investigation, the tooth revealed the presence of radiolucency involving enamel, dentin and the pulp.

Hence a diagnosis of symptomatic irreversible pulpitis with apical periodontitis was made. The tooth was anesthetized using 2% lignocaine with adrenaline and was isolated using a rubber dam. Access cavity is prepared using an endo access bur. Once the pulp chamber was deroofed, a shaped access opening was obtained and the cavity was extended to a trapezoidal form. On careful visualization of the floor of the pulp chamber, the dentinal map showed a groove between the palatal and the mesiobuccal orifices. Careful examination and exploration of the groove with a DG 16 explorer which resulted in the detection of an extra mesiobuccal canal

which was roughly about 1 mm away from the MB1 orifice and with the help of small sized instruments (6, 8, 10 Mani K-files) the canal was negotiated and The working length was determined with the help of an apex locator and later confirmed using a radiograph, palatal - 23.5 mm, MB 1 – 19.5mm, MB 2 - 19 mm, Distobuccal - 19 mm, Cleaning and shaping was done using rotary instrument with crown down technique. Irrigation was performed using normal saline, 2.5% sodium hypochlorite solution, and 17% EDTA, 2% chlorhexidine digluconate was used as the final irrigant. The canals were dried with absorbent points and the canals were obturated using bio ceramic sealer and cold lateral compaction of gutta-percha the tooth was subsequently restored.

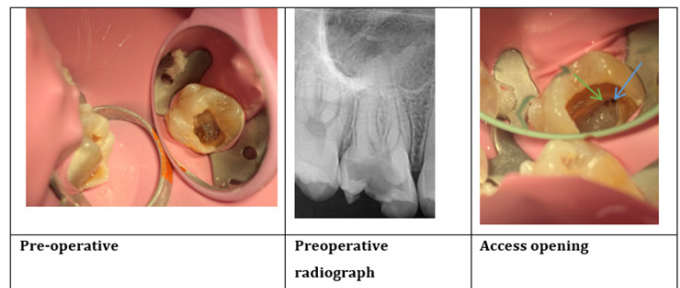


Figure 5

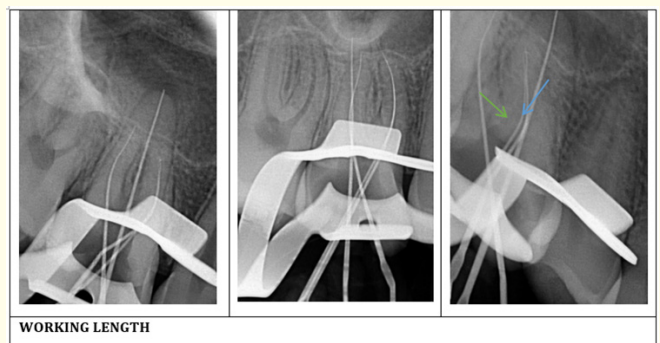


Figure 6

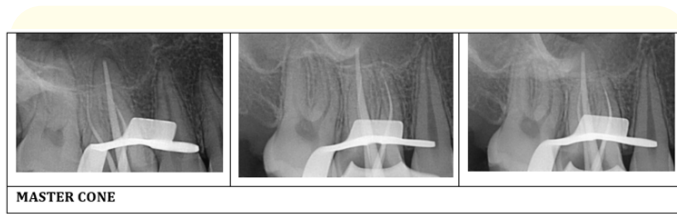


Figure 7



Figure 8

Case Report IV

A patient came to the department with the chief complaint of food lodgement in upper right back tooth region since 5 months. Clinical examination showed deep proximal caries i.r.t 16 radiographic examination showed periapical radiolucency in palatal root. A treatment plan of non-surgical root canal treatment followed by crown. in first visit rubber dam isolation was done and access opening was done followed by working length determination radiographically. Shaping and cleaning was done upto master apical file and intracanal placement was done for 14 days. After 14 days the tooth was asymptomatic and it was obturated upto the mater gutta percha cone and a provisional restoration was placed.

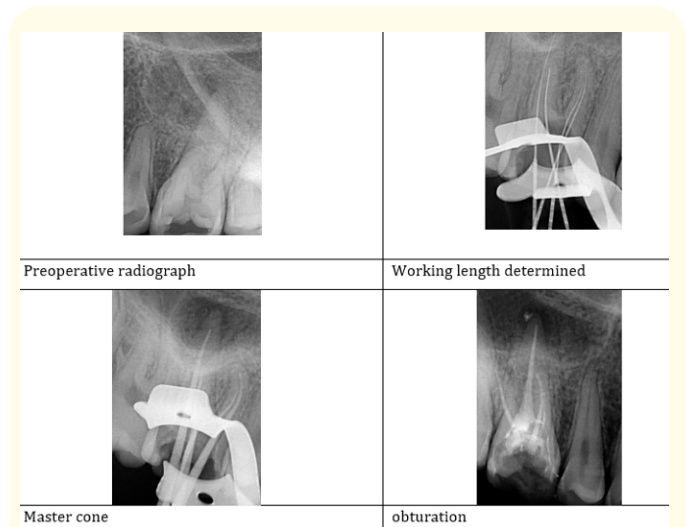


Figure 9

Case V

Patient had come with a chief complaint of pain and food lodgement on upper left back region of mouth since 3 months. On clinical examination patient had deep proximal caries i.r.t 26. On cold test patient had lingering response i.r.t. 26. On radiographic examination radiolucency involving enamel, dentin and pulp was noticed. The diagnosis was symptomatic irreversible pulpitis with apical periodontitis i.r.t. 26. Non-surgical root canal treatment was advised i.r.t 26. Access opening was done under local anaesthesia i.r.t 26. Working length determination was done and Biomechanical preparation done using standard irrigation protocol. Master cone selection was done and obturation was completed using Apex-it as sealer. Post endodontic restoration was placed using composite.

Discussion

The maxillary molars are among the largest tooth in volume and one of the most complex in root and canal anatomy. Prior to an article written by Weine, *et al.* in 1969, virtually all dentists thought the mesiobuccal root of the maxillary first molar had only one

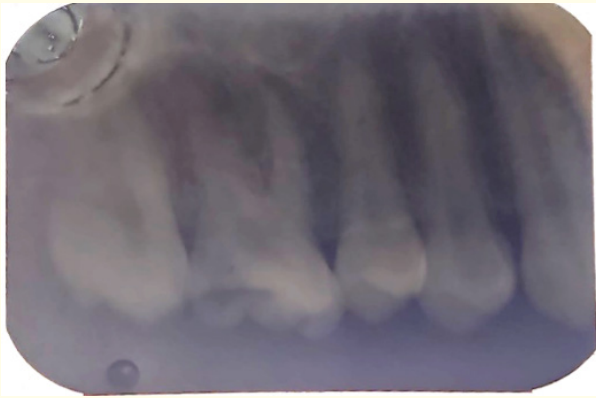


Figure 10: Pre-operative Radiograph.

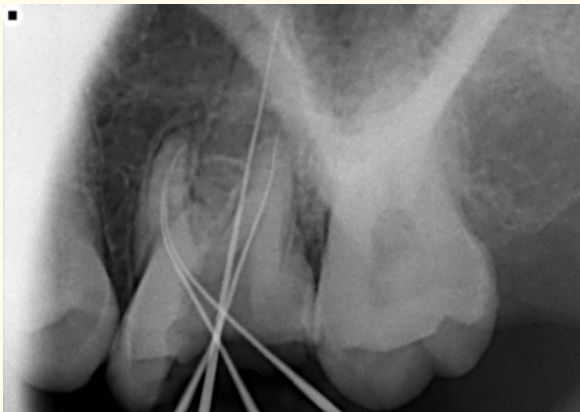
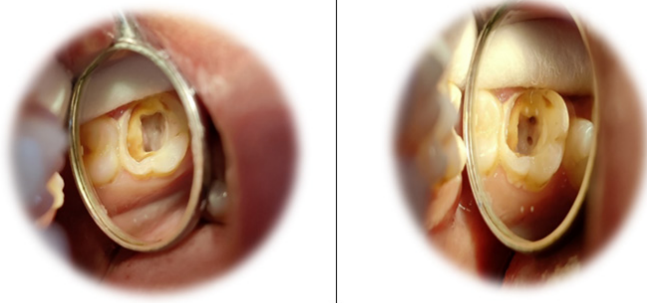


Figure 11: Working Length Determination.



Access Opening

Figure 12



Mastercone Selection



Post obturation Radiograph.

Figure 13

canal. Various researches has shown that a large number of mesiobuccal roots contain two canals, therefore, the Clinicians must assume that MB2 does exist in the mesiobuccal root of maxillary molars in 100% of cases until careful examination proves otherwise [4].

The orifice of MB2 is located on the groove that joins the palatal and mesiobuccal canals at a variable distance from later. The location of the MB2 orifice is approximately 2 mm lingual to the mesiobuccal orifice [5-7].

Sometimes, this orifice is along a direct line between the mesiobuccal and palatal canals. Most often, it is mesial to the line connecting these 2 canals, appearing to be under the mesial marginal ridge.

Conclusion

The proper location and treatment of MB2 canals are essential for the success of treatment of maxillary molars. The clinician should be able to locate and manage these cases in primary treatments and also choose the best option when the initial treatment fails.

Bibliography

1. Wolcott, *et al.* "MB2: Treat vs. Retreat II". *JOE* 31 (2005).
2. MD Peikoff, *et al.* "Maxillary second molar anatomy BlackweUScienceLtd, lHter (1996).
3. Dr T Schwarze, *et al.* "Identification Of Second Canals In The Mesio Buccal Root Of Maxillary First And Second Molars Using Magnifying Loupes Or An Operating Microscope". *Australian Endodontic Journal* 28.2 (2002).
4. Weine FS, *et al.* "Canal configuration in the mesiobuccal root of the maxillary first molar and its endodontic significance". *Oral Surgery* 28 (1969): 419-425.
5. Walton RE and Verneti FJ. "Internal Anatomy In; Walton RE, Torabinejad M. Principles and practice of endodontics, 3rd edition". Philadelphia: WB Saunders Company (2002): 166-181.
6. Berkovitz BK, *et al.* "Tooth morphology". In: Berkovitz BK, Holland GR, Muxham BJ, eds. *Oral anatomy Histology and Embryology*. London: Wolf (1992): 24-43.
7. Figun ME and Garino RR. "Morfologia dentaria. En: Figun ME, Garino RR, eds. *Anatomia odontologica funcional y aplicada*, 2a edition, Buenos Aires: El Ateneo (1986): 213-271.