



## Endodontic management of maxillary 2<sup>nd</sup> Molar with additional MB2 canal – 2 case reports.

### KEYWORDS

MB2 canal, maxillary 2<sup>nd</sup> molar, root canal treatment

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**ABSTRACT** *The success of endodontic treatment depends on the dentist's knowledge about root canal morphology and its possible anatomic variations. According to Ingle, occurrence of accessory canals in the mesiobuccal root of maxillary first molar is (61.1%), more than that of maxillary second molars(47.1%).<sup>17</sup> Failure to locate these extra canals may result in endodontic failure. This article presents two case reports of maxillary second molar, in which an extra canal in the mesiobuccal root was located using visual, tactile and magnifying devices, followed by endodontic treatment of the same using single cone technique.*

### Introduction:

An important prerequisite for successful endodontic treatment is the recognition of variations in the root canal morphology.<sup>4,15</sup> Inadequate knowledge about the canal morphology and missing root canals results in failure of root canal treatment.<sup>16</sup> The alterations in root canal morphology could be a result of ethnic background, age and gender of the population under study.

Maxillary second molars show considerable anatomic variation and abnormalities with respect to the number of roots and root canals. Traditionally, the maxillary second molar has been described to have 3 roots with 3 or 4 root canals, with the fourth canal commonly being found in the mesiobuccal root (MB2).<sup>8</sup> Locating, cleaning and shaping the entire canal system especially of the mesiobuccal root of maxillary molars presented a difficult challenge in nonsurgical endodontic treatment.<sup>12</sup> James C. Kulild and Donald D. Peters (1990) investigated the anatomy of mesiobuccal(MB) root of 51 maxillary first and 32 maxillary second molars and investigated that 95.2% of the MB root of both the first (96.1%) and second (93.7%) maxillary molars had two canals in the coronal half of the roots, out of which 26% of mesiobuccal root had separate and distinct canals from orifice to apex.<sup>9</sup> The presence of accessory canals can be detected using advanced techniques like, use of magnifying devices, radioopaque dye, CBCT, orifice openers, ultrasonic tips etc., which have countered majority of the endodontic problems. There are reported cases of 3 canals in the mesiobuccal root of maxillary molars.<sup>6,7</sup> There are also reported cases of maxillary second molar with the accessory palatal root and 5 roots with respective canals.<sup>5,10</sup>

This article presents case report of two cases of maxillary second molars, in which an extra canal in the mesiobuccal root were located using visual and magnifying devices, followed by endodontic treatment of the same.

### Case Report 1:

A 48-year-old male patient reported to the outpatient de-

partment of the Department of Conservative Dentistry, A.B. Shetty Memorial Institute of Dental Sciences, deralakatte, mangalore, with the chief complain of lingering pain in his left upper posterior region on consuming cold, hot food and drinks for the past 15 days. The pain was spontaneous and aggravated, particularly at night and on chewing food. The medical history was not contributory. Clinical examination detected dental caries in relation to the second maxillary molar, i.e., 27. Cold test gave a negative response and electric pulp test was nonresponsive. Radiographic examination using direct digital radiography revealed caries extension upto pulp. Based on these findings a diagnosis of acute irreversible pulpitis with apical periodontitis was made and endodontic therapy was planned.

The tooth was anaesthetized by local infiltration using lignocaine HCl with adrenaline-1:80,000. After the placement of a rubber dam (Hygenic Dental Dam, Colte'ne Whaledent, Langenau, Germany), the access opening was done using Endo Z bur (Dentsply/Maillefer). Once the pulp chamber was deroofed, a rhomboidal shaped access opening was obtained and the mesiobuccal (MB1), distobuccal and palatal root canals were detected. 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 (A Division of ACTEON North America), clearly unveiled the orifice of the additional canal, which was diagnosed as MB2 canal. This was further confirmed by using 5.25% NaOCl (Champagne test). To exclude the diagnosis of perforation, Apex locator (Propex II) was used. The canal was negotiated using small size instruments, i.e. 6,8,10 (Dentsply/Maillefer) and Dental operating microscope (Carl Zeiss, OPMI, pico) was used to confirm the location of orifices (Fig 1a). The mesiobuccal (MB1), distobuccal, and palatal canal orifices were located in their regular locations at the angles in the floor-wall junction. MB2 was located palatally approximately 2-3 mm away from the MB1 canal orifice in mesio-

palatal direction. Working lengths were determined using an electronic apex locator (Propex II), and a radiograph was taken to confirm the working length (Fig 1b). The radiograph demonstrated that MB1 completely separated from MB2 canal (Type III according to weine's classification). The root canals were prepared using ProTaper-6%(Dentsply Maillefer, Ballaigues, Switzerland) nickel-titanium (NiTi) rotary instruments with X-Smart endodontic motor till finishing file F2 (Dentsply/Maillefer) and were copiously irrigated with 5.25% sodium hypochlorite (NaOCl) and 17% ethylene-diamine-tetraacetic acid - EDTA (Glyde, Dentsply/Maillefer). Canals were dried using paper points. ProTaper master cone No.F2 (Dentsply/Maillefer) gutta-percha point was checked for apical fit in all the canals and the canals were obturated with resin based sealer (AH Plus) using the cold lateral compaction technique. Tooth was temporized using CAVIT. Patient was asymptomatic on recall after 1 week and access restoration was completed using low shrink posterior restorative composite (3M ESPE, Filtek).

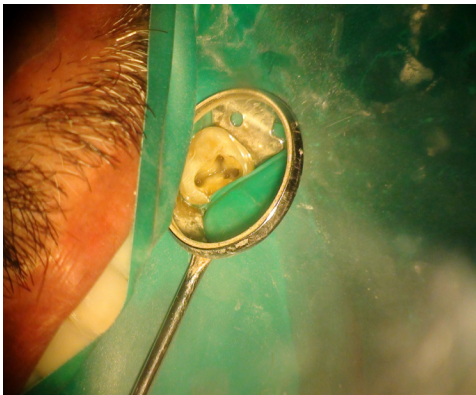


Fig 1a. Four orifices located using DOM



Fig 1b. Working length determination

#### Case report 2:

A 37 year male patient complained of a dull pain on mastication in the upper left back region of jaw. The medical history was non contributory. Clinical examination detected caries in relation to the second maxillary molar, i.e, 27. Vitality test was done using electric pulp test and cold test which gave a negative response. Radiographic examination using direct digital radiography revealed pulpal exposure with the same. Based on the findings a diagnosis of acute irreversible pulpitis with apical periodontitis was made. The tooth was anesthetized, isolated and a rhomboidal shape access cavity preparation was done as in previous case. On careful visualisation of the pulp chamber floor, it showed the presence of a long groove following the dentinal map. Further examination and exploration with DG 16 endodontic explorer disclosed an extra mesiobuccal canal around 2mm away, in the mesial

and palatal direction. The canal were negotiated followed by biomechanical preparation and obturation was done same as in case 1 (Fig 2).



Fig 2: Obturation of maxillary second molar depicting four canals, including MB2.

#### Discussion:

The human teeth have a complex pulp space anatomy. The presence of patent furcal, lateral and accessory canals are the portals of entry and exit between the root canal space and periodontal ligament.<sup>3</sup> It is imperative for the operator to have detailed knowledge of the root canal anatomy of the teeth being treated.<sup>1</sup> Moreover in order to master anatomical concept, the operator must develop a mental three dimensional image of the internal anatomy of the tooth from pulp horn to the apical constriction.<sup>2</sup>

Maxillary 2<sup>nd</sup> molar usually contains 3 roots and three canals. Usual anatomical variation is presence of extra canal in mesiobuccal root. According to studies done by James Wolcott et al 35% of maxillary 2<sup>nd</sup> molars had MB2 canal compared to 60% that of maxillary 1<sup>st</sup> molars. Moreover more incidence of finding this accessory canal in retreatment cases compared to initial treatment indicating main reason of endodontic treatment failure.<sup>11</sup> According to Weine one of the causes of endodontic failures in maxillary second molars is the lack of locating the second mesiobuccal canal and the subsequent absence of its debridement and obturation.<sup>13</sup> The MB2 canal is challenging to negotiate. The openings of MB2 canals are localized on an imaginary line between the MB1 and palatal orifice.<sup>14</sup> 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 millimetres 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.<sup>8</sup> Dental operating microscope can provide good visibility and the use of ultrasonic tip can create a deeper trough in the dentin.<sup>14</sup>

Weine's classification<sup>13</sup> 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 III. After their negotiation canals were carefully cleaned and shaped using normal rotary system followed by single cone obturation.

#### Conclusion:

The ultimate goal of dental research and technology in Endodontic is to retain natural teeth for a lifetime. This goal enables the practitioners to identify, disinfect, and obturate root canal systems predictably and efficiently for the teeth with

pulpal and/or periradicular pathology. Locating the number and position of orifices on the floor of the pulp chamber is at times difficult. In our case use of tactile sensation was a diagnostic tool for locating MB2 canal endodontic procedure. Moreover, various advances in dentistry like, use of magnifying devices, radioopaque dye, CBCT, advances in instruments, ultrasonics etc. have countered majority of the endodontic challenges.

## REFERENCE

1. Aditya Shetty, Mithra N. Hegde, Uday S. Mahale, Pooja Shetty, VijaynS. Bhat, Amit Malhotra: Study of pulp space anatomy using Multi Slice computed tomography (MSCT) An in vitro study. JCAESOK, April 2012, Vol.2, No.1:24-7. | 2. Prof. (Dr) Mithra N.Hegde, Dr. Siddharth Naik, Dr. Aditya Shetty, Dr. Garima Soni: Management of mandibular premolars with unusual morphology using 'Saigram': Journal of Clinical Dentistry, Mumbai, Nov. 2008: 36-42. | 3. Shetty Aditya, Hegde Mithra, Tahiliani Divya, Joshi Aum, Devadiga Darshana: Study on the efficacy of Iodine based contrast media for interpretation of root canal anatomy. Int. Res. J. Pharm. 2013, 4(3): 207-210. | 4. Mithra N. Hegde, Aditya Shetty, Rekha Sagar: Management of a Type III Dens Invaginatus using a combination Surgical and Non-surgical Endodontic Therapy: A Case Report. The Journal of Contemporary Dental Practice, September 2009; 10(5): 1-6. | 5. Dr. Janeesha C., Prof. (Dr.) Priyadarshini Hegde, Prof. (Dr.) Mithra N. Hegde, Dr. Ganesh T.Bhat : Management of Maxillary second molar with two palatal roots : A case report. Indian Journal of Applied Research, Volume 3, Page No. 522-523, July 2013. | 6. Erhan Ozcan, Ali Murat Aktan, and Hale Ari: A case report: Unusual anatomy of maxillary second molar with 3 mesiobuccal canals. Oral Surg Oral Med Oral Pathol Oral Radiol Endod, 2009;107:e43-e46. | 7. Ankit Arora, Shashi Rashmi Acharya, Muliya Vidya Saraswathi, Padmaja Sharma, Amber Ather: Dilemmas pertaining to three canals in the mesiobuccal root of a maxillary second molar: a case report. Restor Dent Endod, 2013;38(3):172-177. | 8. Prakash R, Bhargavi N, Jeyavel Rajan, Reuben Joseph, Velmurugan N, Kandaswamy D: MB2 in maxillary second molar. Indian J Dent Res, 18(1), 2007. | 9. James C. Kulild and Donald D. Peters : incidence and configuration of canal systems in the mesiobuccal root of maxillary first and second molars. JOE 16(7), July 1990. | 10. Jojo Kottoor, Senthilkumar Hemamalathi, Rajmohan Sudha and Natanasabapathy Velmurugan: Maxillary second molar with 5 roots and 5 canals evaluated using cone beam computerized tomography: a case report. Pathol Oral Radiol Endod, 2010;109:e162-e165. | 11. James Wolcott, Dave Ishley, Wade Kennedy, Scott Johnson, Scott Minnich, John Meyers: A 5yr Clinical Investigation of second mesiobuccal canals in endodontically treated and retreated maxillary molars. JOE 51(4), April 2005, 262-264. | 12. Jim Corcoran, Michael J. Apicella, Pete Mines: The effect of Operator Experience in locating additional canals in maxillary molars. JOE – 33(1), January 2007. | 13. Weine FS. Endodontic therapy. 5th ed. 1996. | 14. Harry H. Peeters, Ketut Suardita and Darmawan Setjanto: Prevalence of a second canal in the mesiobuccal root of permanent maxillary first molars from an Indonesian population. Journal of Oral Science, Vol. 53, No. 4, 489-494, 2011 | 15. Ng YL, Aung TH, Alavi A, Gulabivala K. Root and canal morphology of Burmese maxillary molars. Int Endod J 2001; 34: 620-30. | 16. R. R. Slowey, "Radiographic aids in the detection of extra root canals," Oral Surgery Oral Medicine and Oral Pathology, vol.37, no. 5, pp. 762-772, 1974. | 17. Ingle's Endodontics 6th edition, 2008, 175-179. |