

Mandibular First Molar with Three Canals in the Mesial Root: A Case Report

Prashant P. Shetty¹, Arpit Viradiya², Mukundi Dhaduk³, Shubhprabhat Gupta⁴

Abstract

The aim of this case report was to describe the unusual root canal anatomy that was detected in the mandibular first molar during the routine endodontic treatment. The clinical and the radiographs examinations allowed the detection of the middle mesial root canal

between the mesiobuccal and the mesiolingual root canals and this report highlights the importance of such examinations. In this report, the authors describe the endodontic treatment of a mandibular first molar with five root canals.

Key Words: Mandibular; Molar; Obturation; Root Canal Therapy; Tooth; Dentition; Root Canal Preparation; Mandibular First Molar with Three Canals in the Mesial Root; Five canal

INTRODUCTION

The successful endodontic treatment involves an accurate diagnosis, the biological principles and excellent execution of the treatment. The main objective of root canal treatment is the thorough mechanical and chemical cleansing of the entire pulp space followed by complete obturation with inert filling material.[1] Therefore, it is imperative that aberrant canal is identified before and during root canal treatment of such teeth. Since 1974 when Vertucci and Williams [2] first reported the presence of a middle mesial (MM) canal in a mandibular molar, there have been multiple case reports of aberrant canal morphology [3-7]. One of the main reasons for the failure of root canal treatment is the inadequate removal of pulp tissue and microorganisms from the root canal system [8]. The diameter of these middle mesial canals is smaller than other two [9,10] and is age related due to dentinal apposition [11]. This case report has described the endodontic therapy of permanent mandibular first molar with 3 canals in the mesial root.

CASE REPORT

A 37-yr-old Asian male patient presented to the department of conservative dentistry and endodontics, Pacific dental college and hospital, Udaipur, Rajasthan, India, with a complaint of severe pain from last 5 days. The pain kept him awake at night and was radiating up the side of his face. His medical history was found to be non-contributory. The clinical examination revealed a restoration on tooth 46 (figure 1). The tooth was very sensitive to percussion and was nonresponsive to Endo Ice (Hygienic Corp., Akron, Ohio) and to the Electronic pulp tester. The adjacent teeth responded normally to pulp testing. Periodontal probing and mobility were within physiological limits. Periapical radiograph showed a restored tooth with secondary carious lesion approximating the pulp and a normal canal configuration.

A diagnosis of necrotic pulp with acute apical periodontitis was made based on the examination results, the patient was recommended to undertake endodontic treatment. After rubber dam application emergency treatment involved access cavity preparation. Straight-line access was made using the long neck round-shaped drills, cone-shaped drills with non-aggressive tips, and ultrasonic tips. Examination of the pulp chamber floor was performed with a DG16 endodontic probe.

After access preparation, four root canals were located and the orifice of the MM was found after isthmus preparation with

ultrasonic tips in the mesial root between the previously identified mesiolingual and mesiobuccal canals. The pulp chamber was rinsed with 5.25% sodium hypochlorite. The canals were negotiated with a slightly bent 08 K-file (Dentsply Maillefer) coated with Glyde™ (Dentsply Maillefer) lubricant using a watch-winding motion. Clinical photograph showing five canals that is mesiolingual (ML), middle mesial (MM), and mesiobuccal (MB) canals, distolingual (DL) and distobuccal (DB) canals. (Fig 1). Clinical photograph of 46 showing five canals (fig 2). Working length of 46 was taken using Propex (Dentsply Maillefer) apex locator and confirmed using periapical radiograph (Fig 3). Chemomechanical preparation was performed using Protaper hand files (Maillefer, Dentsply, Ballaigues, Switzerland). And the tooth was sealed with a cotton pellet and temporary material.



Fig1: Preoperative radiograph of 46

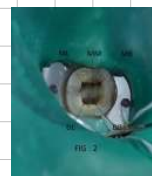


Fig2: Clinical photograph of 46 showing five canals.



Fig3: Working length determination in relation to 46 & confirmed using periapical radiograph.

Two weeks later, the patient returned for completion of endodontic therapy. After rubber dam application, removal of the temporary restoration was done.

Irrigation was done with the help of 5.25% NaOCl activated by ultrasonic tips,

Irrigation with 17% EDTA activated by an ultrasonic tip was used to remove the smear layer followed by 2% chlorhexidine for 3 to 5 minutes and activated by an ultrasonic tip helped to produce a successful treatment outcome.

All master cones were fitted and set to working length and master cone periapical radiograph was taken (Fig 4). The root canals were dried with absorbent paper points and obturated with gutta-percha (Maillefer, Dentsply, Ballaigues, Switzerland) and resin sealer (AH plus sealer, Maillefer, Dentsply, Ballaigues, Switzerland). Post obturation radiograph (Fig 5) was taken. The patient experienced no postoperative pain and was referred for appropriate coronal restoration.



Fig4: Mastercone of 46 & confirmed using periapical radiograph.

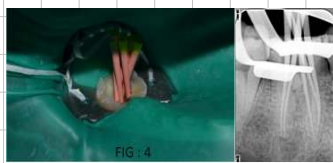


Fig5: Postobturation Radiograph

DISCUSSION

Successful endodontic therapies depend on many factors, the most important step being sound background knowledge of the internal anatomy of the teeth. Several reports have described the presence of aberrant canals in the mandibular first molar that includes the presence of three canals in the mesial root.

The occurrence of middle mesial canal in the lower mandibular molar ranges from 1–15%. This canal is also called “intermediary mesial canal” or “medial mesial canal” since it is situated centrally between the main buccal and lingual root canals(12-14).

Pomeranz et al(15) classified them into three morphologic categories: fin, confluent, and independent. According to their classification, an independent canal implies the canal originated as a separate orifice and terminated as a separate foramen. According to Pomeranz's classification this case is classified as confluent middle mesial canal and type VIII root canal morphology according to Vertucci's classification.

Failure to recognize the anatomy of a root canal system & developmental anomalies might lead to inadequate debridement of the root canal system and leads to unfavourable endodontic treatment outcome & the subsequent need for retreatment or surgical intervention.

Endodontic success in teeth depends on multiple, preoperative radiographs, digital radiography, coronal flaring, examination of the pulp chamber floor with a sharp explorer, troughing of the grooves with ultrasonic tips, staining the chamber floor with 1% methylene blue dye, and visualizing canal bleeding points are all important aids in locating root canal orifices.

The search for an extra orifice is also aided by the use of magnifying loupes, fiber-optic transillumination to locate the developmental line between the mesiobuccal and mesiolingual orifice, use of computerized tomography imaging enabled a significant increase in canal detection as compared to conventional radiography. The introduction of operating microscope¹⁶ has revolutionized the practice of endodontics as it provided enhanced lighting & visibility: color changes, fine instrumentation, better understanding of floor map, co-axial illumination & magnification for conventional endodontics as shown in visualization of maxillary first molar with two palatal roots.

CONCLUSION

Inability to find and properly treat root canals may cause failures

and although the incidence of root and canal variations is rare, every effort should be made to find and treat all canals for successful clinical results. Careful clinical examination, multiple radiographs like proper mesial & distal angulation and interpretation of radiographs help in the better and successful endodontic treatment outcome.

Clinical significance: The concept of two canals in the mesial root of the mandibular first molar should not be considered as a rule but clinicians always should search for additional canals whenever they prepare root canal therapy.

REFERENCES:

1. Vertucci FJ. Root canal anatomy of the human permanent teeth. *Oral Surg Oral Med Oral Pathol* 1984;58:589-99.
2. Vertucci FJ, Williams RG. Root canal anatomy of the mandibular first molar. *JNJ Dent Assoc* 1974;48:27-8.
3. Weine FS. Case report: three canals in the mesial root of a mandibular first molar. *J Endod* 1981;8:517-20.
4. Bond JL, Hartwell GR, Donnelly JC, et al. Clinical management of middle mesial root canals in mandibular molars. *J Endod* 1988;14:312-4.
5. Fabra-Campos H. Unusual root anatomy of mandibular first molars. *J Endod* 1985;11:568-72.
6. Min KS. Clinical management of a mandibular first molar with multiple mesial canals: a case report. *J Contemp Dent Pract* 2004;3:142-9.
7. Ricucci D. Three independent canals in the mesial root of a mandibular first molar. *Endod Dent Traumatol* 1997;13:47-9.
8. Garg AK, Tewari KR, Kumar A, Hashmi SH, Agrawal N, Mishra SK. Prevalence of three-rooted mandibular permanent first molars among the Indian population. *J Endod* 2010;36(8):1302-6.
9. Weine FS. Case report: three canals in the mesial root of a mandibular first molar. *J Endod* 1982;8:517-20.
10. Ricucci D. Three independent canals in the mesial root of a mandibular first molar. *Endod Dent Traumatol* 1997;13:47-9.
11. Fabro-Campos H. Three canals in the mesial root of a mandibular first permanent molar: a clinical study. *Int Endod J* 1989;22:39-43.
12. Weine FS. Case report: three canals in the mesial root of a mandibular first molar. *J Endod* 1981;8:517-20.
13. Ricucci D. Three independent canals in the mesial root of a mandibular first molar. *Endod Dent Traumatol* 1997;13:47-9.
14. Shetty PS S Pankaj. Mandibular First Molar with Three Canals in the Mesial Root: A Case Report. *BUJOD* 2014; 4(2):68-71.
15. Pomeranz HH, Eidelman DL, Goldberg MG. Treatment considerations of the middle mesial canal of mandibular first and second molars. *J Endod* 1981;7:565-8.
16. Shetty PP, Astekar MS, Jain A, Pandya M. Maxillary first molar with palatal roots located under dental operating microscope. *Clin Prac* 2012;2(e26):60-62.

PARTICULARS OF CONTRIBUTORS :

- 1) Professor, Department of Conservative Dentistry & Endodontics, PAHER University, Pacific Dental College & Hospital, Udaipur, India.
- 2) PG Student, Department of Conservative Dentistry & Endodontics, PAHER University, Pacific Dental College & Hospital, Udaipur, India.
- 3) PG Student, Department of Orthodontics & Dentofacial Orthopaedics, PAHER University, Pacific Dental College & Hospital, Udaipur, India.
- 4) Senior Lecturer, Department of Conservative Dentistry & Endodontics, PAHER University, Pacific Dental College & Hospital, Udaipur, India.

ADDRESS FOR CORRESPONDENCE:

Prashant P. Shetty, Department of Conservative and Endodontics,
PaHER University, Pacific Dental College and Hospital,
Udaipur-313024 (Rajasthan), India.
Contact no : +91.09649685646
Email : drprashant10@rediffmail.com

Source of Support : NIL
Conflict of Interest : NOT DECLARED
Date of Submission : 10-01-2016
Review Completed : 10-04-2016