

Mandibular Molar with Mid Mesial Root Canal: A Case Report

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Abstract

The aim of this case report was to illustrate how crucial it is to understand the core structure of root canals, aimed at the effectiveness of endodontic therapy. One of the primary reasons endodontic therapy fails has been identified as a lack of understanding of anatomic variants and their features in various teeth. The authors of this paper examine the significance of identifying and treating mandibular first molars with numerous root canals, to assess frequency of such cases, and to element endodontic treatment of patients.

Keywords: mandibular molar, mid mesial root canal, root canal anatomy, endodontic therapy

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I. Introduction

Understanding the root canal anatomy of various teeth is essential since it contributes to the effectiveness of endodontic therapy. The primary reasons of endodontic management failure are imperfect instrumentation, poor shaping and cleaning, and the erroneous obturation of root canals. Endodontic practitioners frequently encounter issues related to the anatomical characteristics of various tooth types and potential changes [1, 2].

Precise access into pulp chamber, permitting admittance to the root canal orifices and an optimum vision of pulp chamber floor, is a superfluous step in endodontic management as it empowers documentation of any disparity in number and location of root canals. A number of studies have gauged progression of variance in number of roots with the canals in first molars of the mandible [1, 3].

As reported, pervasiveness rate of a third canal in mesial root of mandibular first molars is 1 to 15%. This extra canal probably may unite apically to the mesio lingual or mesio buccal canals, or it may have its own foramen [4]. Three canals were found in the mesial root of 1.5% of the 1418 teeth, according to Martinez-Berna and Badanelli (1985) [5, 6]. Fabra-Campos (1985) & (1989) reported that middle mesial canal was present in 2.1% and 2.6% of the teeth, correspondingly [5, 7, 8]. According to recent research, mesial root of mandibular first molar teeth in 3.3% of South Asians and 2% of Sudanese people had three canals [9, 10].

A mandibular first molar with five canals-three mesial and two distal is described in this clinical case report. Mid-mesial, or simply mesial canal, is the name given to third canal of mesial root. In addition to debating the clinical case and appraising germane research, the authors offer assistance on how dentists should scrutinize pulp chamber in order to efficaciously treat occurrences in cases that are similar.

II. Case Presentation

A patient, 21 years old, complained of widespread pain in mandibular left first molar. Intense pain resulted from percussion and pulp testing in the area, persistent discomfort indicative of irreversible acute pulpitis. Radiographs revealed deep occlusal caries in the tooth with no alterations in the apical region. There were no visible anatomical abnormalities on the radiograph. The endodontic procedure carried out is stated below.

Satisfactory anaesthesia was attained and pulp chamber was visualized. As the conciliation of canals began with a no. 10 K file, a third canal originated in mesial root amid the formerly recognized mesio-lingual and mesio-buccal canals. An attempt was made to search for presence of extra canal in distal root.

Following the biomechanical preparation of cervical third of the root canals, presence of all five root canals was verified using a dental operating microscope with 8X magnification. Marshall and Papin's hybrid crown-down approach was used to instrument the first two thirds of all the five visible canals [11]. A no. 15 K

file and an apex locator (PropexPixi, Dentsply Maillefer) were utilized to determine the working length, which was assisted by radiographic verification.

For all canals, a no. 30 K file was used during the hybrid step-back technique's second instrumentation phase.

The canals were shaped, cleaned and then final irrigation was done with EDTA for three minutes. The canals were dehydrated using paper points, and an intracanal dressing with calcium hydroxide was administered for fourteen days. (Fig1, Fig 2 & Fig 3)

The master cone fit was examined, calcium hydroxide intracanal dressing was removed, and the root canals were dried with absorbent paper point tips at the second appointment.

Tagger described a hybrid approach for obturating root canals [12]. A permanent restoration following the obturation of the tooth, was done (Figure 4)

III. Discussion

It is clear from the research and from our clinical case that understanding anatomical differences between mandibular molars is vital for effectiveness of endodontic treatment. Because they are not searched, canals are frequently neglected, according to Cohen and Burns [5, 13].

Appropriate access cavity preparation is a fundamental requirement for the examination and efficacious identification of all root canal orifices after endodontic treatment has begun. Dentists can confidently discover and treat additional canals thanks to the use of microscopes [5, 14].

Several researchers observed structural differences between various types of teeth and root canal systems in order to deliver facts that contribute to enhance the results of endodontic therapy. Few researches, meanwhile, have addressed possibility of a third mesial canal in first molar of mandible

Modern tools like the dental operating microscope significantly enhances visualization of root canal orifices and provides excellent magnification and illumination of the operating region. According to Carvalho and Zuolo (2000), using a microscope to locate root canal orifices can appreciably augment the treatment results [5,15].

According to Jacobsen et al., 12 out of the 100 mandibular first molars they examined had a third mesial canal, indicating a significant incidence of this condition [16]. There are a tiny but noteworthy number of mandibular molars with five canals, according to clinical examinations. In the event that a fifth canal or an extra sixth canal develops, the area between the mesio-lingual and mesio-buccal canals, or the disto-buccal and disto-lingual canals, should be closely inspected [5,17].

In this case report, middle mesial canal joined the mesio-lingual canal one-third apical after beginning as a distinct orifice. Pomeranz et al. (1981) classification places the middle mesial canal in the confluent category [18]. Numerous previous researches have concluded that the long-term prognosis of endodontic treatment has negatively impacted when additional canals in any root are not traced and cleaned. If there are any additional canals, they should all be located.

IV. Conclusions

This case report validates that mandibular first molar mesial roots or distal roots can have three canals. Despite the low occurrence of middle mesial canals, root canal therapy for mandibular molars must take this variation into account to guarantee long-term therapeutic success. An understanding of dental anatomy is crucial for practicing endodontics well. After attaining good coronal access, dental operating microscopes are a great clinical auxiliary tool for locating of the root canals.

References

- [1] Barletta FB, Dotto SR, Reis MSR, Ferreira R, Travassos RMC: Mandibular Molar With Five Root Canals. *Aus Endod J.* 2008, 34(12):132. 10.1111/J.1747-4477.2007.00089
- [2] Al-Rammahi HM, Chai WL, Nabhan MS, Ahmed HM: Root And Canal Anatomy Of Mandibular First Molars Using Micro-Computed Tomography: A Systematic Review. *BMC Oral Health.* 2023, 23:339. 10.1186/S12903-023-03036-5
- [3] Weine FS, Healey HJ, Gerstein H, Evanson L: Canal Configuration In The Mesio-buccal Root Of The Maxillary First Molar And Its Endodontic Significance. *J Endod.* 2012, 38(10):1305-1308. 10.1016/J.Joen.2012.08.005
- [4] Baugh D, Wallace J: Middle Mesial Canal Of The Mandibular First Molar: A Case Report And Literature Review. *J Endod.* 2004, 30:185-186. 10.1097/00004770-200403000-00015
- [5] Reyhani MF, Rahimi S, Shahi S: Root Canal Therapy Of A Mandibular First Molar With Five Root Canals: A Case Report. *Iran Endod J.* 2007:110-112. 10.22037/Iej.V2i3.321
- [6] Penukonda R, Pattar H, Nambiar P, Al-Haddad A: Middle Mesial Canal In Mandibular First Molar: A Narrative Review. *Saudi Dent J.* 2023, 35:468-475. 10.1016/J.Sdentj.2023.05.008
- [7] Ballullaya SV, Vemuri S, Kumar PR: Variable Permanent Mandibular First Molar: Review Of Literature. *J Conserv Dent.* 2013, 16:99-110. 10.4103/0972-0707.108176
- [8] Fabra-Camos H: Three Canals In The Mesial Root Of Mandibular First Permanent Molars: A Clinical Study. *Int Endod J.* 1989, 22:39-43. 10.1111/J.1365-2591.1989.Tb00503
- [9] De Pablo OV, Estevez R, Péix Sánchez M, Heilborn C, Cohenca N: Root Anatomy And Canal Configuration Of The Permanent Mandibular First Molar: A Systematic Review. *J Endod.* 2010, 36:1919-1931. 10.1016/J.Joen.2010.08.055

- [10] Ahmed HA, Abu-Bakr NH, Yahia NA, Ibrahim YE: Root And Canal Morphology Of Permanent Mandibular Molars In A Sudanese Population. *Int Endod J.* 2007, 40:766-771. 10.1111/J.1365-2591.2007.1283
- [11] Nagmode PS, Patel AV, Satpute AB, Gupta PL: Endodontic Management Of Mandibular First Molars With Mid Mesial Canal: A Case Series. *J Conserv Dent.* 2017, 20:137-140. 10.4103/0972-0707.212246
- [12] Saunders EM: The Effect Of Variation In Thermomechanical Compaction Techniques Upon The Quality Of The Apical Seal. *Int Endod J.* 1982, 22(4):163-168. 10.1111/J.1365-2591.1989.Tb00918.
- [13] Mushtaq M, Farooq R, Rashid A, Robbani I: Spiral Computed Tomographic Evaluation And Endodontic Management Of A Mandibular First Molar With Three Distal Canals. *J Conserv Dent.* 2011, 14:196-198. 10.4103/0972-0707.82602
- [14] Kontakiotis EG, Tzanetakakis GN: Four Canals In The Mesial Root Of A Mandibular First Molar A Case Report Under The Operating Microscope. *Aust Endod J.* 2007, 33:84-88. 10.1111/J.1747-4477.2007.00068
- [15] De Carvalho MC, Zuolo ML: Orifice Locating With A Microscope. *J Endod.* 2000, 26:532-534. 10.1097/00004770-200009000-00012
- [16] Jacobsen EL, Dick K, Bodell R: Mandibular First Molars With Multiple Mesial Canals. *J Endod.* 1994, 20:610-613. 10.1016/S0099-2399(06)80088-9
- [17] Venumuddala VR, Sridhar M, Rajasekaran M, Poorni S, Senthilkumaran G: Endodontic Management Of Mandibular First Molar With Middle Distal Canal: A Case Report. *Case Rep Dent.* 2012:458079. 10.1155/2012/458079
- [18] Pomeranz H, Eidelman D, Goldberg M: Treatment Considerations Of The Middle Mesial Canal Of Mandibular First And Second Molars. *J Endod.* 1981, 7:565-568. 10.1016/S0099-2399(81)80216-6

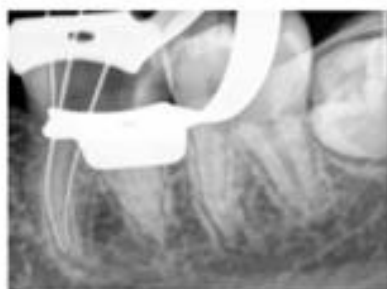


PREOPERATIVE
RADIOGRAPH

Fig 1

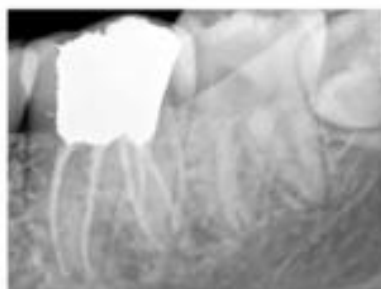


Fig 2



WORKING LENGTH
RADIOGRAPH

Fig 3



POST OPERATIVE
RADIOGRAPH

Fig 4