

ENDODONTIC MANAGEMENT OF A MID-MESIAL CANAL IN A MANDIBULAR FIRST MOLAR

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DOI: <https://doi.org/10.5281/zenodo.23118168>

How to cite this Article: 1*Dr. Wineet Magdum, 2Dr. Nandan Rao K, 3Dr. Amit Padmai, 4Dr. Shilpa Shetty, 5Dr. Sourabh Patil, 6Dr. Atharv Jere. (2026). Endodontic Management Of A Mid-Mesial Canal In A Mandibular First Molar. European Journal of Pharmaceutical and Medical Research, 13(10), 354-355.

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Article Received on 05/09/2026

Article Revised on 25/09/2026

Article Published on 01/10/2026

ABSTRACT

This case report describes the diagnosis and successful endodontic treatment of a rare mid-mesial canal in a mandibular first molar. Careful radiographic examination, magnification with dental loupes and an operating microscope, ultrasonic troughing, and proper cleaning, shaping and obturation resulted in successful management of this anatomical variation.

INTRODUCTION

Successful root canal treatment depends on identifying and treating all root canals. The mandibular first molar may occasionally present with an additional mid-mesial canal, which can be easily missed and may lead to treatment failure if left untreated.

CASE PRESENTATION

Patient Details - Age: 39 years.

Gender: Female

Chief Complaint: - Pain and swelling in the lower left back tooth region since 15 days.

Clinical and Radiographic Findings

Clinical examination and intraoral periapical radiograph showed deep caries involving the pulp of the mandibular left first molar, indicating the need for root canal treatment.

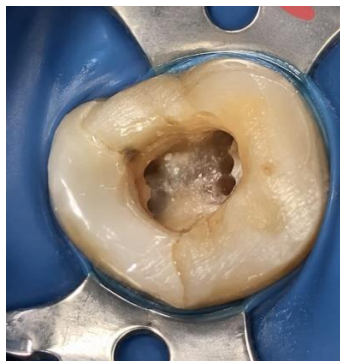
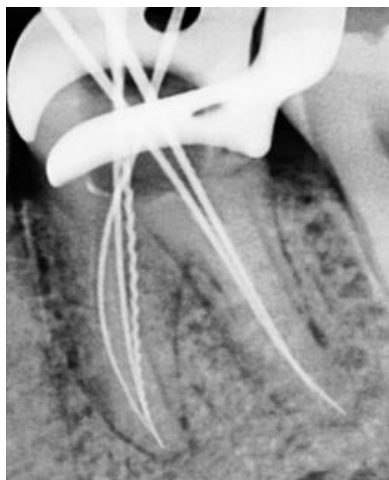


Pre operative radiograph

Diagnosis: - Irreversible pulpitis with apical periodontitis: 36.

Treatment Procedure

- Local anaesthesia administered and rubber dam isolation achieved.
- Conventional access cavity prepared.
- Initially, four canals were identified.
- Under 3× dental loupes and a dental operating microscope, a bleeding point between the mesiobuccal and mesiolingual canals suggested an additional canal.
- Ultrasonic tips were used to locate and negotiate the mid-mesial canal.
- Working length was determined using radiograph.
- Cleaning and shaping were performed using rotary files rotary files with 3% sodium hypochlorite and 17% EDTA irrigation.
- Obturation was completed using warm vertical compaction with gutta-percha and resin based sealer.
- The access cavity was restored with composite resin.

**Access cavity preparation****Working length determination****Master cone****Obturation and Crown**

OUTCOME

Post-operative radiographs confirmed successful obturation. The mid-mesial canal merged with the mesiobuccal canal in the middle third of the root. The tooth was restored successfully, and symptoms were relieved.

DISCUSSION

The present case demonstrates the successful management of a mandibular first molar with an uncommon root canal anatomy consisting of three canals in the mesial root and two canals in the distal root, resulting in a total of five canals. This case emphasizes the importance of thoroughly examining the pulp chamber floor, as failure to detect an additional canal may compromise disinfection and lead to endodontic failure.

The middle mesial canal is a relatively rare anatomical variation, with a reported incidence ranging from 0.95% to 15%. Because of this variability, clinicians should not

assume the presence of only two mesial canals in mandibular first molars. A detailed understanding of root canal morphology is essential for achieving complete cleaning, shaping, and obturation of the root canal system.

In this case, the use of 3× magnification enabled identification of the additional mesial canal, allowing all five canals to be negotiated, instrumented with the rotary file, irrigated with 3% sodium hypochlorite, and obturated successfully. This highlights the value of magnification and meticulous access cavity preparation in detecting complex canal anatomy.

The successful outcome of this case supports previous reports that careful clinical examination, adequate access preparation, and the use of magnification significantly improve the detection of middle mesial canals and reduce the risk of missed canals.

CONCLUSION

Clinicians should always consider the possibility of a mid-mesial canal while treating mandibular first molars. The use of magnification, ultrasonics, and meticulous cleaning and obturation significantly improves treatment success and long-term prognosis.

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