



**ENDODONTIC MANAGEMENT OF MIDDLE MESIAL CANAL IN A PERMANENT MANDIBULAR SECOND MOLAR- A CASE REPORT**

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**ABSTRACT**

A detailed knowledge and understanding of root canal anatomy is required for a successful endodontic treatment. Mandibular second molars frequently show variation in its morphology such as intercanals and anastomosis. Inability to identify an extra canal may lead to failure of endodontic therapy. Hence, constant efforts should be made to negotiate these aberrant canal configurations. The present case report was aimed at identification and management of middle mesial canal in a permanent mandibular second molar.

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**INTRODUCTION**

Root canal cleaning and shaping plays a crucial role in a successful endodontic therapy. It is important to eliminate all the irritants from root canal system including necrotic pulp tissue, micro-organisms and their byproducts. Mandibular molars are the most common teeth to undergo endodontic therapy and usually contain two canals in mesial root and one or two canals in the distal root.<sup>[1]</sup> Although, literature shows variety of different patterns ranging from single canal with single apical foramen to five canals with four apical foramen.<sup>[2]</sup>

However, a third mesial canal may be occasionally present between the mesiobuccal and mesiolingual canals, referred to as the middle mesial canal. An incidence of middle mesial canal in mandibular first and second molar is ranging from 0.95 to 15 percentage and 2.6 percentage respectively.<sup>[3, 6]</sup> Middle mesial canals can be detected using various methods like clearing method, scanning electron microscopy, Micro computed tomography, use of a file under magnification. While troughing in the floor of the pulp chamber has been proposed by many authors.<sup>[4, 5]</sup>

The aim of this present case report was to successfully treat a mandibular second molar with three mesial canals.

**Case Report**

A 27 years old male patient reported to the department of Conservative Dentistry and Endodontics with a chief

complaint of decayed tooth in left mandibular posterior region since last 5-6 months. Intraoral examination revealed deep class I carious lesion associated with tooth number 37. The tooth was non-mobile with mild tenderness on percussion. On electric pulp testing the tooth gave negative response. The preoperative diagnostic radiograph revealed a deep carious lesion occlusally involving the pulp along with widening of periodontal space apically. Based upon clinical and radiographic findings, a provisional diagnosis of chronic irreversible pulpitis with apical periodontitis was made. Treatment plan was explained to the patient and written consent was obtained. Endodontic treatment was started in the same visit. After administration of local anesthesia and isolation with rubber dam, access cavity was prepared. Initial access revealed two mesial canals and two distal canals. On careful examination of isthmus between mesiobuccal and mesiolingual canal, middle mesial canal orifice was identified (Fig.I and II) and canal was negotiated with number 10 K-file (Mani dental products, India). Working length was determined with an electronic apex locator (Root ZX, J. morita) and number 10 k file (Mani dental products, India) was used to confirm three canals in the mesial root radiographically.

Radiograph showed that middle mesial canal was confluent with mesiobuccal canal (Fig. III). All the canals were instrumented till F1 Protaper Universal rotary files (Dentsply Tulsa). 17% EDTA (Ethylene diamine tetra acetic acid, Prime dental products, India) was used during instrumentation and copious irrigation was done with 3% sodium hypochlorite. Canals were dried with paper points and an intracanal medicament of calcium hydroxide was placed for one week. At the subsequent visit, the tooth was asymptomatic. Obturation was done with warm vertical condensation using calcium

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hydroxide based sealer (Apexit plus, Ivoclar vivadent). The patient was checked for postoperative pain and an appropriate post obturation restoration was performed in later visit in order to ensure an adequate coronal seal (Fig.IV).

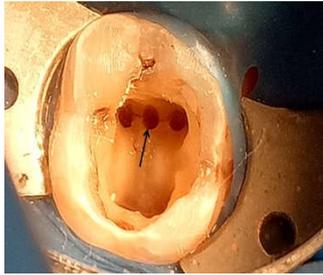


Fig I An intraoral mirror image showing three separate canals in mesial root of tooth number 37

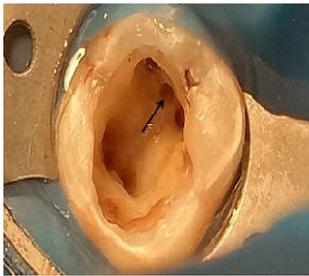


Fig II An intraoral mirror image showing five separate canals in tooth number 37



Fig III Working length radiograph



Figure IV Radiograph showing obturation and post-obturation restoration with 37

## DISCUSSION

Failure to remove bacterial biofilms from the root canal ramifications including isthmus may lead to persistent endodontic infection.<sup>[6]</sup> A missed canal may cause failure of endodontic therapy. Therefore, every effort should be made to locate additional canals. The floor of pulp chamber can be used as a guide to locate the possible canal orifices. A careful radiographic examination using conventional radiograph serves as an important tool for evaluation of canal configuration. Digital radiography at different angles can also be used effectively. Various other diagnostic aids like dyes, champagne bubble test, ultrasonics, micro-openers and trans-illumination aids could rather be used to visualize the pulp chamber properly. At the same time, observing the pulp

chamber for bleeding spots also commendably helps in locating additional canal orifices.<sup>[4]</sup>

Middle mesial canal has been documented by various authors. According to Pomeranz, it is classified as follows-

1. Independent- When prepared canal has a separate orifice and a separate foramen.
2. Confluent- When prepared canal originates as a separate orifice and joins the mesiobuccal or mesiolingual canal apically.
3. Fin- When an instrument freely passes between mesiobuccal or mesiolingual canal and middle mesial canal at any stage during debridement.<sup>[6]</sup>

In the present case report, radiographically middle mesial canal was seen to be confluent with mesiobuccal canal. Troughing technique with a small size bur was used to locate the middle mesial canal. It causes less damage to the remaining tooth structure and helps in achieving possibly better outcome.<sup>[7, 8]</sup> This is in accordance with a study conducted by Baume and Wallace which showed that the prevalence of middle mesial canal increased by almost 40%.<sup>[2]</sup> Also using sodium hypochlorite as an irrigant had an effect on cleanliness of isthmus of canal. This is in accordance with a study conducted by Burleson A *et al.*<sup>[9]</sup>

However, proper cleaning and shaping of extra canals improves the prognosis of a tooth, clinical studies with long term observation and follow ups are needed to determine the final outcome of endodontic therapy.

## CONCLUSION

Key factors for a successful endodontic treatment are identification and proper instrumentation of extra canals. Clinician's thorough knowledge about the variations in tooth morphology and appropriate use of diagnostic tools also ensures the long term success of endodontic treatment.

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