



MANAGEMENT OF MID MESIAL & MID DISTAL CANAL IN MANDIBULAR MOLARS

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ABSTRACT Success of endodontic therapy depends on the negotiation of all the canals, thorough debridement and proper sealing. At times, the clinicians are challenged with variations in morphology of root canal. The presence of middle mesial (MM) root canal of mandibular molars has been reported by various authors. This case report describes management of a unique cases of mandibular second and third molar with endodontic therapy and having 5 independent canals including the missed middle mesial canal in mandibular second molar.

KEYWORDS : Middle mesial canal, Middle distal canals, Five canals, Mandibular molar.

INTRODUCTION

For a successful root canal treatment, it is necessary to locate all root canals, debride them thoroughly and seal them completely with an inert root filling material. Missed canals and spaces within the root canal system may contain microorganisms and their by-products and may contribute to failure of therapy. Thus, thorough debridement of the canal system of organic substrate, infected pulp tissue, and microorganisms and to three dimensionally seal the root canal space are the main objectives of endodontic treatment.¹

There are reports of unusual canal anatomy associated with all teeth, and the mandibular second molars are no exception. Literature on mandibular second molar teeth indicates a variety of different patterns, ranging from single canal with single apical foramen to five canals with four apical foramina. C-shaped canal systems in mandibular second molars have also been reported by various authors.²

The middle mesial canal has been more commonly located in mandibular first molars and rarely in mandibular second molars.³ The clinician must have a thorough understanding of the anatomy of the root canal system and of common variations from normal for a given tooth.

In 1974, Vertucci and Williams, as well as Barker et al., described the presence of independent middle mesial (MM) canal.^{4,5}

Middle mesial canal in all the cases joined to mesiobuccal or mesiolingual canals. None of the teeth consisted of three independent canals with three apical foramina. Beatty and Krell⁶ described a mandibular first and second molar with three independent canals in the mesial root. This case report presents a mandibular Second molar with five root canals and mandibular third molar with mid-mesial canal containing three independent canals in its mesial root.

Case Report 1

A 28-year-old male patient presented to the Department of Conservative Dentistry and Endodontics VYWS dental college and hospital, Amravati, with a spontaneous pain in the lower right second molar area. Intraoral examination revealed class I deep carious lesion in 47.

His medical history was noncontributory. Periodontal probing was within the normal limits. The mandibular right first molar was tender on vertical percussion. Tooth gave a negative response to heat test and a mild reaction to an electric pulp tester. The preoperative diagnostic

radiograph of 47 [Figure 1] revealed a deep carious lesion involving the pulp with widening of the apical periodontal ligament space. A provisional diagnosis of necrotic pulp with apical periodontitis was made and endodontic treatment was scheduled.

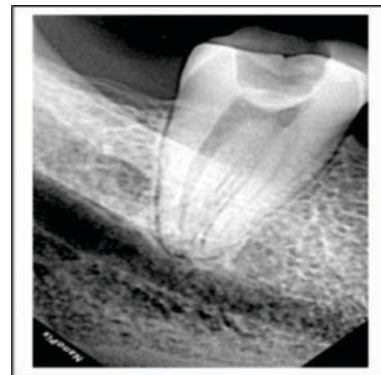


Fig 1- Pre-Operative Radiograph

After administration of local anesthesia and rubber dam isolation, the carious lesion was removed and an adequate endodontic access made. Inspection of the pulp chamber floor showed orifices corresponding to mesiobuccal, mesiolingual, and distal canals [Figure 2].

On careful examination of the groove between the mesiobuccal and mesiolingual canal orifices, the middle mesial canal orifice was identified and the canal subsequently negotiated [Figure 3]

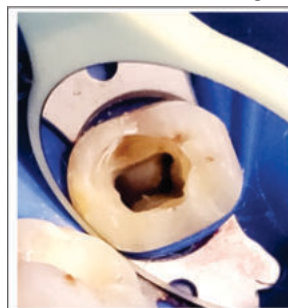


Fig-2

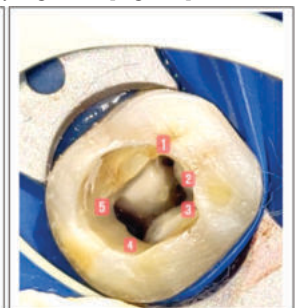


Fig-3

The working lengths were established with an electronic apex locator, and size 10 K files of 21 mm length (Dentsply, Maillefer, Ballaigues, Switzerland) were used to confirm three canals in the mesial root radiographically [Figure 4.1 and 4.2].

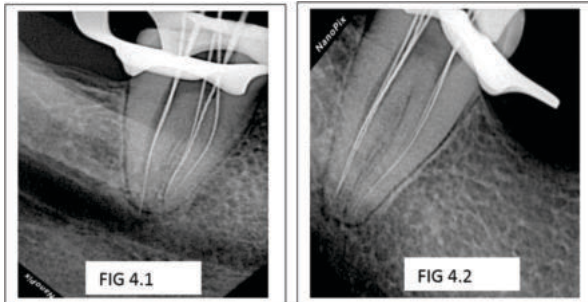


Fig 4.1
FIG- 4.1 working lengths 10 K files to confirm three canals in the mesial root radiographically
Fig 4.2
FIG -4.2 working lengths 10 K files to confirm two canals in the Distal root radiographically

The working length measurement radiograph showed three independent mesial root canals. The canals were instrumented with stainless steel hand instruments – K files of 21 mm length (Dentsply, Maillefer) – and the orifices were shaped with 19 mm Sx Rotary file. (Dentsply, Maillefer)

Irrigation was done with copious amounts of 3% sodium hypochlorite (prime dental Pvt. Ltd., thane India) and 17% ethy lenediamin etetraacetic acid (EDTA; (prime dental Pvt. Ltd., thane India)). The canals after preparation were finally flushed with sterile saline, dried with sterile paper points, and a calcium hydroxide dressing was given. At the subsequent visit after a week, the tooth was asymptomatic and was obturated with gutta percha cones (Dentsply, Maillefer) using sealapex sealer (seal apex Root canal sealer Base and Catalyst tube by Kerr Sybron Endo) [Figures 5]



FIG-5 Post-obturation radio
graph of 37
FIG 6- Post Endodontic
Restoration radiograph

The patient experienced no postoperative sequelae and an appropriate post-endodontic restoration was performed in a subsequent appointment to ensure an adequate coronal seal Figure 6

Case Report 2

A 34-year-old Female patient presented to the Department of Conservative Dentistry and Endodontics VYWS dental college and hospital, Amravati, with a spontaneous pain in the lower left third molar area. Intraoral examination revealed class I deep carious lesion in 38.

Her medical history was noncontributory. Periodontal probing was within the normal limits. The mandibular left third molar was tender on vertical percussion. Tooth gave a negative response to heat test and a mild reaction to an electric pulp tester. The preoperative diagnostic radiograph was not recorded with 38. A provisional diagnosis of necrotic pulp with apical periodontitis was made and endodontic treatment was scheduled.

After administration of local anesthesia and rubber dam isolation, the carious lesion was removed and an adequate endodontic access made. Inspection of the pulp chamber floor showed orifices corresponding to mesiobuccal, mid- mesial and mesiolingual, and distal canals.

The working lengths were established with an electronic apex locator, and size 10 K files of 21 mm length (Dentsply, Maillefer, Ballaigues,

Switzerland) were used to confirm three canals in the mesial root radiographically [Figure 1].

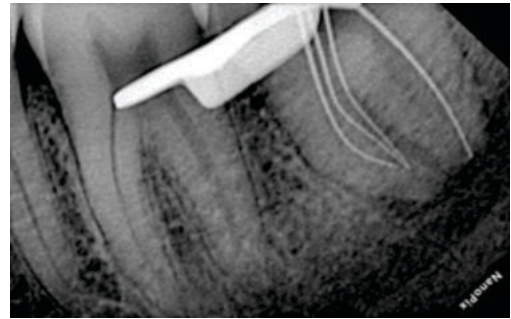


Fig 1 – Working Length Radiograph

The working length measurement radiograph showed three independent mesial root canals. The canals were instrumented with stainless steel hand instruments – K files of 21 mm length (Dentsply, Maillefer) – and the orifices were shaped with 19 mm Sx Rotary file. (Dentsply, Maillefer). Canal instrumented with rotary file (Micro Mega Hero Gold HEAT TREATED NITI ROTARY FILES till 25.06 in distal canal and all three mesial canals instrumented with 20.04 [Figure 2].



Fig 2- Master Cone Radiograph

Irrigation was done with copious amounts of 3% sodium hypochlorite (prime dental Pvt. Ltd., thane India) and 17% ethylenediamine tetraacetic acid (EDTA; (prime dental Pvt. Ltd., thane India)). The canals after preparation were finally flushed with sterile saline, dried with sterile paper points, and canal was obturated with gutta percha cones (Dentsply, Maillefer) using zinc oxide eugenol sealer [Figures 3] an appropriate post-endodontic restoration was performed to ensure an adequate coronal seal. Figures 4]

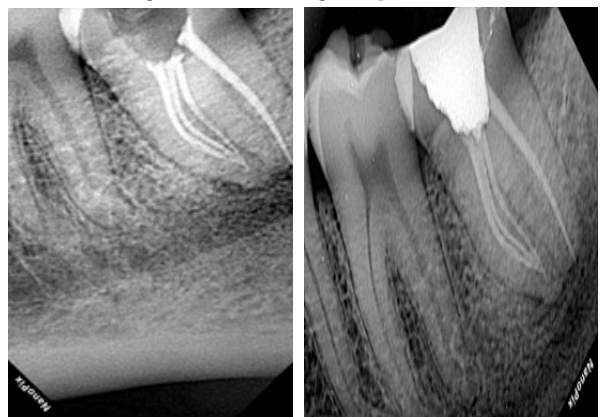


Fig 3- Obturation Radiograph
Fig 4- Post Operative Radiograph

Case Report 3

A 34-year-old male patient presented to the Department of Conservative Dentistry and Endodontics VYWS dental college and hospital, Amravati,

On clinical examination, there was gross decay in the mandibular right first permanent molar (tooth 46). The patient's medical history was noncontributory. Periodontal probing was within the normal limits. History reveals that the pain on food lodgment and diagnosis of symptomatic irreversible pulpitis with symptomatic apical periodontitis was made for tooth 46, and root canal treatment was scheduled

Radiographic evaluation of the tooth indicated a normal root canal anatomy (Fig.7). Following local anesthesia with 2% lignocaine containing 1: 200 000 epinephrine, an endodontic access cavity was prepared under rubber dam isolation on tooth 46. On examination with a DG-16 endodontic explorer, the pulp chamber had five canals (mesiobuccal, mesiolingual, distobuccal medial distal and distolingual).

The working length measurement radiograph showed three independent distal root canals. (Fig 8)

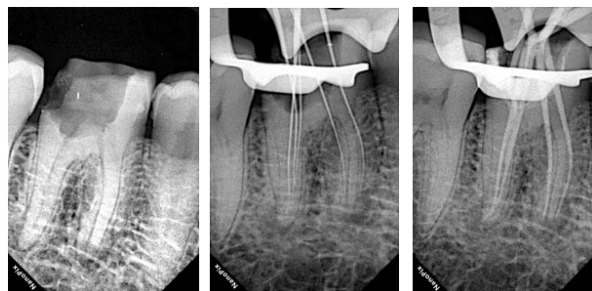


Fig-7

Fig-8

Fig-9

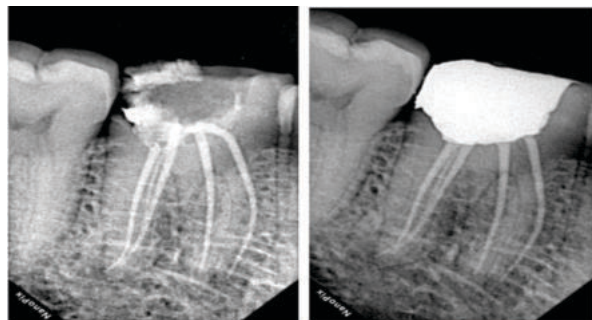


Fig 10 And 11

Canal instrumented with rotary file (Micro Mega Hero Gold HEAT TREATED NITI ROTARY FILES till 25.04 in all canals. Fig 9].

The canals after preparation were finally flushed with sterile saline, dried with sterile paper points, and canal was obturated with gutta percha cones (Dentsply, Maillefer) using zinc oxide eugenol sealer Fig 10] an appropriate post-endodontic restoration was performed to ensure an adequate coronal seal. Fig 11]

DISCUSSION

There are number of reports that reveal the anatomic variations of root canals in mandibular molars. The presence of a third canal (middle mesial) in the mesial root of the mandibular molars has been reported to have an incidence of 0.95–15%. [7]

Presence of a third canal (middle mesial) in the mesial root of the mandibular molars has been reported to have an incidence of 0.95–15%. [8,9,10]

Although many authors have agreed on the presence of three foramina in mesial root, only few have reported the presence of three independent canals, which presents itself as a rare anatomic variant. [11]

This additional canal may be independent with a separate foramen or the additional canal may have a separate foramen and join apically with either the mesiobuccal or the mesiolingual canal. [12]

The clinician should accurately observe the pulp chamber floor to locate possible canal orifices. Pulp chamber floor and wall anatomy

provide a guide to determine the root canal morphology. Krasner and Rankow [13-14] made a rational approach to study the relationship of the pulp chamber to the clinical crown and the pulp chamber floor.

Their observations, presented in the form of laws, are valuable aids to the clinician searching for elusive canals. Failure to identify extra canals and to recognize any unusual canal configuration is implicated as one of the most common reasons for the failure of endodontic therapy [15-16]

A round bur or an ultrasonic tip can be used for removal of any protuberance from the mesial axial wall, which would prevent direct access to the developmental groove between mesiobuccal and mesiolingual orifices. This developmental groove should be carefully checked with the sharp tip of an endodontic explorer. If depression or orifices are located, the groove can be troughed with ultrasonic tips at its mesial aspect until a small file can negotiate this intermediate canal (Vertucci, 2005). [17,18]

Various diagnostic aids like dyes, champagne bubble test, ultrasonic, micro openers and trans-illumination aids, irrigators to improve pulp chamber visibility (Stropko) and observing the chamber for bleeding spots could be used by the clinician as an effective means to locate additional canal orifices.

The present report confirms that the third canal in the mesial root of mandibular second molar does occur and must be sought along the line between the two mesial canals after accessing the pulp chamber and any cervical stenosis in this zone that might cover the opening of the canals, using burs or ultrasonic tips. [19-20]

CONCLUSION-

While treating further abnormal canals can be difficult, failures can occur if root canals are not found. The physician should be aware of the presence of a midmesial canal, and a comprehensive examination of the pulp chamber, combined with the use of diagnostic aids, can help discover overlooked canals, resulting in complete debridement and a higher probability of long-term success in endodontic therapy.

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