

MANAGEMENT OF RADIX ENTOMOLARIS WITH THE MIDDLE MESIAL CANAL – A CASE REPORT

Endodontics

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ABSTRACT

Mandibular first molars are frequently encountered with variations in their internal anatomy; among those is the presence of an extra canal in the mesial root called the middle mesial canal, and the presence of an additional distolingual root known as the radix entomolaris. The proper application of the magnification, such as the microscopes, loupes, and cone-beam computed tomography (CBCT), together with the usage of heat-treated flexible NiTi files augments the accomplishment in the endodontics while dealing with such rare cases. This case report describes the management of the mandibular first molar with unusual morphology having Radix entomolaris along with the middle mesial canal in a 32 years old female patient. The treatment approach included root canal treatment without the assistance of any magnification devices.

KEYWORDS

mandibular molar, radix entomolaris, middle mesial canal, missed canal

INTRODUCTION

Detection of anatomical and morphological differences through an inspection of the root canal system significantly increases the success and prognosis of endodontic treatment. Failure to detect anatomical and morphological variations in the root canal system, such as - additional canals or additional roots can have undesirable consequences ranging from teeth with poor prognosis to persistent periapical lesions which do not respond to treatment and may even lead to tooth loss. A clinicians' knowledge of the normal anatomy and possible variations of teeth is extremely crucial for the prognosis of endodontic treatment.^[1]

There are several atypical canal morphology in the mandibular molars, and some of the variations include an additional distolingual root and canal known as radix entomolaris^[2] and a third canal in the mesial root termed as the middle mesial canal (MMC)^[3]. The incidence of middle mesial canals ranges between, 0.26% to 53.8%^[4] in various populations and the incidence of radix entomolaris in the Indian population is <5%.^[5] Since the missing canals may contain necrotic debris, tissue remnants, or organic substrates that enable the growth of microorganisms, it is essential to locate all root canals, especially MMC and distolingual root canals, debride them thoroughly and prevent reinfection, to evade failure of endodontic treatment. The occurrence of RE with the MMC in the mandibular first molar is an unusual experience of the combined occurrence of two infrequent conditions requiring proper diagnosis and careful management.

Thus, this case report describes the treatment of acute apical periodontitis with an unusual morphology of mandibular first molar with RE and MMC in a 32 years old female patient.

Case Report

A 32 -year-old female patient reported to the department of Conservative and Endodontics with a chief complaint of pain in the lower right back tooth region for two weeks. On clinical examination, the right mandibular first molar (46) had deep occlusal caries and was tender on percussion. On vitality testing, the tooth showed a lingering response to cold and delayed response to electric pulp testing. A pre-operative radiograph revealed coronal radiolucency with pulp involvement and an additional distal root was identified (Figure 1).

Widening of periodontal ligament space around the mesial root was also seen and the lamina dura remained intact. On the basis of the above findings, the final diagnosis was symptomatic irreversible pulpitis with apical periodontitis in relation to #46. Based on the clinical and radiographic analysis, it was decided to perform endodontic therapy.



Figure 1: Pre-operative radiograph

After the patient's consent, the right inferior alveolar nerve was anesthetized using 2% Lignocaine with 1: 80,000 adrenaline (Lignox, Indoco Remedies Ltd, India). The pulp chamber was opened using a round bur and the access cavity was refined using Endo-Z bur (Dentsply). On exploration of the orifices with a sharp endodontic explorer a catch was found between the mesiobuccal and mesiolingual canal which was the middle mesial canal. A small instrument (#6 and 8 K File, Dentsply) was inserted into the root canal using watch winding motion and slowly advanced into each root canal and the inspection of the pulp chamber revealed five orifices (three mesial – Mesiobuccal [MB], Mesiolingual [ML], MMC and two distal – Distobuccal [DB], Distolingual [DL]) (Figure 2).

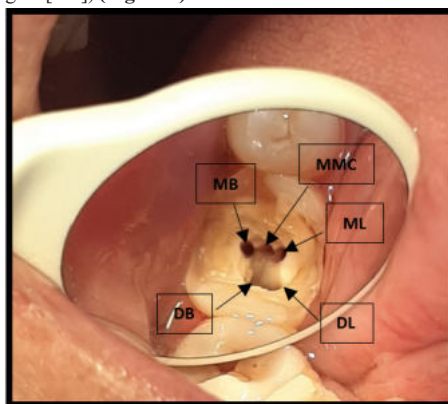


Figure 2: Pulp chamber showing the presence of five canals

Pulp extirpation was done, after checking the patency of all the five canals, with the #10K file (Mani, Inc; Tochigi, Japan). Working length radiograph was taken (**Figure 3 and 4**) and the presence of five canals was confirmed, and it showed the presence of a middle mesial canal and a radix entomolaris.



Figure 3 and 4: Working length radiograph

Orifices were enlarged using Protaper SX (Dentsply). Cleaning and shaping was performed with ProTaper Gold File system (Dentsply) with crown-down technique under abundant irrigation with 3% sodium hypochlorite solution in a 5 ml syringe and EDTA (Glyde, Maillefer, Dentsply, Ballaigues, Switzerland). The tooth was then temporized. The patient was then recalled after a week. The root canals were then dried with paper points; an appropriate size master-cone was selected (**Figure 5**).



Figure 5: Master cone radiograph

Cleaned canals were obturated with cold, laterally condensed gutta-percha and AH plus resin sealer (Maillefer, Dentsply, Ballaigues, Switzerland), and the orifices were sealed. A Post-obturation radiograph was taken to confirm the full-length canal filling (**Figure 6**).



Figure 6 - Post Obturation Radiograph

DISCUSSION

There are ample case reports in the literature that show the anatomical variations of mandibular molars. This should prompt the clinician to accurately detect the pulp chamber floor to locate possible canal orifices. Examining for additional canal orifices should be the regular practice for clinicians.

According to literature the prevalence of middle mesial canal in various races has been reported upto 53.8%.^[4] It is found that in most of the clinical cases reported the middle mesial canal joined the mesiobuccal or mesiolingual canal in the apical third.^[6-8] However, only a few mandibular first molars cases that had three independent canals in their mesial root have been reported in the literature. In this case report, the middle mesial canal was connecting to the mesiobuccal canal with no separate apical foramen. This finding is in agreement with Aminsobhani et al^[9] who found 44.5% middle mesial canal joined the mesiobuccal canal in the apical third and 14.8%, joined the mesiolingual canal in the apical area. These findings are also similar to a study done by Fabra-Compos^[10] which showed that the middle mesial canal joined to the mesiobuccal canal in most cases.

Mandibular first molars also have an additional root known as radix entomolaris which is located disto to mesio lingually from the main orifices.^[11] Presence of an extra cusp or more prominent distolingual lobe in combination with a cervical prominence can direct the presence of an additional root. An IOPA should be taken in multiple angular projection types of files to confirm about the additional root or extra canals. A straight line access, initiation of root canal exploration with small files (#10 K) together with the working length of root canal and curvature determination of the root canal by pre-curving the files and the establishment of a glide path before preparation are step-by-step movements that should be followed to evade procedural errors.^[12]

These types of anatomical variations should be approached with an angled periapical radiograph and digital imaging like CBCT image should be done for the understanding of tooth morphology.

In this case report, radix entomolaris with the middle mesial canal was detected, and all the five canals were systematically instrumented, debrided, and obturated up to the level of the apical terminus.

CONCLUSION

Radix entomolaris with the middle mesial canal is an extremely rare finding in Indian population. Knowledge about the variations in the anatomy of root canal system is important for successful endodontic therapy. In-depth search for additional canals while performing root canal therapy along the developmental grooves in the pulpal floor plays a very crucial role in management of root canal system.

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