Mandibular First Molar with Three Roots and Five Canals: A Case Report

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Clinicians may encounter morphological variations in the form of extra roots and extra root canals. Favorable endodontic treatment requires extensive study of the internal anatomy of teeth. The literature reiterates the incidence of more than three canals in mandibular molar. Radix entomolaris (RE) may complicate the root canal treatment of the tooth if left undiagnosed. The middle mesial canal is more common when compared to the middle distal canal. The combination of RE and three distal canals is a rare occurrence. This case report presents a discussion of root canal therapy in a left mandibular first molar with RE and five root canals.

**Keywords:** Internal anatomy, Mandibular first molar, Radix entomolaris, Three distal canals

**INTRODUCTION**

Precise study of the internal anatomy of teeth is a prerequisite for success in endodontic therapy. Morphological variations in the form of additional roots or root canals often result in untreated canals and thereby flare ups and failures. Contemporary endodontic retreatment reported 42% incidence of missed canals or roots in teeth.¹ Incomplete instrumentation, inadequate cleaning and shaping, and the subsequent defective obturation of root canals are the main causes of endodontic treatment failure.² Hess conducted a study with 512 mandibular first molars and reported that 0.3% of the teeth had only one, 17.7% had two, 78% had three, and 4% had four canals.³ De Deus studied 75 mandibular molars and reported that 8% had two, 56% had three and 36% had four canals.⁴ Skidmore and Bjorndal have all reported that mandibular first molars have three or four canals.⁵⁻⁷ Fabra Campos studied 145 mandibular molars out of which 2.75% had five canals.⁸ Martinez Berna and Badanelli studied 2362 mandibular first molars out of which 1.23% had five canals.⁹ Along with the number of root canals, the number of roots may also vary. A major variant is the mandibular first molar which has three roots. This third lingual root, first mentioned in the literature by Carabelli, is called the radix entomolaris (RE).¹⁰ De Moor et al. reported that mandibular first molars occasionally have an additional distolingual root (RE) in about 5-30% of cases.¹¹ Very few case reports with more than one distal root and three distal canals have been published.¹²

The present case describes the successful endodontic treatment of mandibular first molar with three roots and five root canals.

**CASE REPORT**

A 33-year-old male patient reported to Department of Conservative Dentistry and Endodontics with the chief complaint of continuous toothache in his left lower back tooth. Patient’s medical history was non-contributory. Clinical examination revealed a deep mesio-occlusal carious lesion of the lower left mandibular first molar. Tooth was tender on percussion and the pulp tests were negative. Radiographic examination revealed deep carious lesion and minor changes in the apical region along with an additional distolingual root (RE). Diagnosis of chronic irreversible pulpitis was made and the patient was advised to undergo root canal treatment.

The left inferior alveolar nerve was anesthetized using 2 ml of 2% lidocaine with 1:80,000 adrenaline (lignox). After
rubber dam placement, all the carious tissues were removed. Access preparation was modified to a trapezoidal form and it revealed two mesial and three distal canal orifices. The working length was determined using an electronic apex locator (E magic finder EMF-100). Two separate mesial root canals and three distal canals were confirmed with a radiograph. The canals were prepared up to size F2 using rotary ProTaper Universal files (Dentsply Maillefer) under copious irrigation with 2.5% NaOCl solution and 17% EDTA. Endodontic microscope (G6 Global) at ×8 magnification was utilized to visualize the canal orifices. The canals were dried, calcium hydroxide intra canal dressing was placed, and Cimpat Pink (Septodont) coronal sealing was done (Figure 1).

After 7 days, the tooth was asymptomatic. The canals were obturated with F2 ProTaper gutta-percha points and AH Plus sealer (Dentsply) using the lateral condensation technique. The coronal buildup was done using miracle mix (GC Corporation).

**DISCUSSION**

The mandibular first molar is the first permanent tooth to erupt in the oral cavity and also a most common tooth to undergo root canal treatment in the adult dentition. Normally mandibular first and second molars have two roots, that is mesial and distal, and three main canals namely mesiobuccal, mesiolingual, and distal.

Studies about the anatomy of root canals conducted by Vande Voorde et al.\(^\text{13}\) and Fabra-Campos\(^\text{8}\) reinforced the importance of an accurate clinical evaluation of a possible fourth or fifth root canal to ensure success of endodontic treatment.

In a systematic review by de Pablo et al.\(^\text{14}\) on root anatomy and canal configuration of the permanent mandibular first molars, the third root was present in 13% of cases, and it was ethnically dependent. Cone-beam computed tomography helps in accurate diagnosis of the third root and can avoid complications or a “missed canal” during root canal treatment.\(^\text{15}\) A new nomenclature for root canals has been proposed by Valerian Albuquerque et al.\(^\text{16}\) to provide a clear picture of any existing root and canal anatomy in mandibular molars.

Clinical evaluations have shown a small but significant number of mandibular molars with five canals which may be three canals in the mesial root or three canals in the distal root. The combination of RE and five root canals in a mandibular molar is a rare occurrence.

The region between the distolingual and distobuccal canals should be carefully examined in case of the possible occurrence of a fifth canal. Use of microscopes for locating the root canal orifices substantially improves the treatment outcome.

The uniqueness of the present case is RE and three distal root canals. In the present case, distolingual root (RE) had one root canal and the main distal root or distobuccal root had two canals terminating in one apical foramen. The presence of any one morphological variation must lead to detection of additional variations.

**CONCLUSION**

The clinician must be aware of the incidence of additional roots and root canals in mandibular first molar. The present case indicates that proper radiographic interpretation, detailed examination of the floor of the pulp chamber, and modified access cavity preparation lead to detection of extra roots/root canals and thereby long-term success in endodontic therapy.
REFERENCES


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