



ENDODONTIC MANAGEMENT OF PERMANENT MANDIBULAR FIRST MOLAR WITH SINGLE ROOT AND SINGLE CANAL

Dental Science

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ABSTRACT

A thorough knowledge of the root and root canal morphology along with their various anatomical variations is essential to achieve successful endodontic treatment. Most of the endodontic literature regarding variations in root anatomy and canal configuration of permanent mandibular first molar discuss about the additional roots and root canals. However, the clinician should also be aware of the possibility of the existence of fewer numbers of roots and canals in order to avoid excess removal of tooth structure in search of extra canals. The aim of this article is to present an endodontically managed permanent mandibular first molar with an unusual morphology of a single root and a single canal.

KEYWORDS

Permanent mandibular first molar, root anatomy, single root, single canal

INTRODUCTION

The mandibular first molar is the earliest permanent posterior tooth to erupt and requires root canal treatment most often.^[1] This tooth usually has two roots: a mesial root with two canals and a distal root with one or two canals. Literature regarding variations in number of roots and canal morphology in mandibular first molar is replete with cases with extra canals. However, the clinician should also be aware of the possibility of the existence of fewer root and/or canal numbers. Krithikadatta et al.^[2] have reported a case of a mandibular first molar with two roots and two root canals. Sooriaprakas et al.^[3] and Munavalli et al.^[4] reported a mandibular first molar with an unusual morphology of a single root and a single canal, which had not been reported in the literature until then.

The present case report describes one such rare case of a mandibular first molar with a single root and single canal.

Case report

A 37-year-old female patient with the chief complaint of pain in the lower left back tooth region for the past 2 days. She gave a history of intermittent pain for the past 3 months, which had increased in intensity for the past 2 days. The patient's medical history was noncontributory. Clinical examination of the left mandibular first molar (#tooth 36) revealed the presence of a large distoocclusal carious lesion and the tooth was tender on percussion. Periodontal probing around the tooth and mobility were within physiological limits. Thermal and electrical pulp testing elicited negative response. Preoperative radiograph showed widening of the periodontal ligament space with periapical radiolucency.



Figure 1: Pre-operative radiograph of # tooth 36

The radiograph also revealed an unusual anatomy of involved tooth with a single root and a single canal. From the clinical and radiographic examination, a diagnosis of nonvital left mandibular first molar with chronic apical periodontitis was made, and endodontic treatment was planned.

The tooth was anaesthetized by using 2% lidocaine containing 1:80,000 epinephrine. Access opening was done under rubber dam isolation. On examination, a single large canal was located in the centre of the pulp chamber and dentin map was not evident.

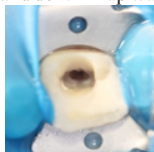


Figure 2: clinical picture of access opening showing single root canal orifice in #tooth 36

To confirm this unusual morphology, multiple X-rays in various horizontal angulations were taken. These X-rays revealed a single canal broader buccolingually. Working length was determined using apex locator (Root ZXII, Morita, Tokyo, Japan) and confirmed with radiographs (Ingle's method).

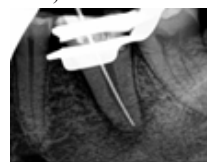


Figure 3: Working length radiograph of # tooth 36

Cleaning and shaping was done using circumferential filing technique with ISO 2% taper files up to size 50 (MANI Inc., Tochigi-Ken, Japan). Irrigation was done using 2.5% sodium hypochlorite solution, and 17% EDTA (Prime Dental Product Pvt. Ltd., Mumbai, India). When preparation was complete, the canal was dried with paper points and a calcium hydroxide dressing was placed (Ultralcal; Optident, Skipton, U.K.). One week later, the patient was asymptomatic and the root canal system was obturated using cold, lateral compaction of gutta-percha (Maillefer, Dentsply) and AH Plus resin sealer (Maillefer, Dentsply). After completion of root canal treatment, the tooth was restored using resin composite (Z250; 3M ESPE Dental Products, St. Paul, MN).

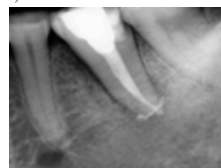


Figure 4: Post-operative radiograph # tooth 36

DISCUSSION

The form, configuration, and number of root canals present in mandibular first molars have been discussed extensively in endodontic literature. These include mandibular first molar with additional roots, more number of canals and "C" shaped canal.^[5,6,7] However, anomalies in root canal morphology can also be in the form of fewer roots and/or canal numbers.

This article highlights the unusual anatomy of mandibular first molar with a single root and a single canal. Such anatomical variation was reported in all the maxillary and mandibular second molars.^[8] This morphological variation in mandibular first molar has been documented once earlier in an *in vitro* study by Reuben et al.^[9] Out of 125 samples of mandibular first molars from an Indian population, only one sample had a single root and single canal.

Although extra canals are more of a rule than an exception, the clinician must be aware of the possible anatomic variations that include teeth with a lesser number of roots and canals. Lack of knowledge regarding such unusual morphology can lead to iatrogenic errors like excessive tooth removal and perforation in search for an extra canal.

Sabala et al.^[10] stated that the rarer the aberration is, the more likely it is to be bilateral in occurrence. Interestingly in the present case, right mandibular first molar also had a single root and a single canal.

Careful examination of the floor of the pulp chamber and multiple radiographs in variable horizontal angulations gives us a clue to the type of canal configuration present.

In the present case, however, we did not feel the need for any objective analytical tool, such as spiral CT or cone beam CT, to ascertain root canal morphology, as there were no doubtful circumstances. In this case, the canal orifice was located in the center of the access preparation and dentinal map was not evident. Radiographs of different angulations and clinical examination of the floor of the pulp chamber clearly depicted the variable anatomy.

CONCLUSION

This case report presents an unusual case of a mandibular first molar with a single root and a single canal. Documentation of such cases with unusual morphology in case reports reinforces clinicians' awareness of the variable morphology of root canals. Anatomical variations need not be in the form of extra roots and canals; it could also be in the form of fewer numbers of roots and canals. Knowledge of possible variations of root canal morphology along with thorough clinical and radiographic examination helps in avoiding iatrogenic access opening errors.

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