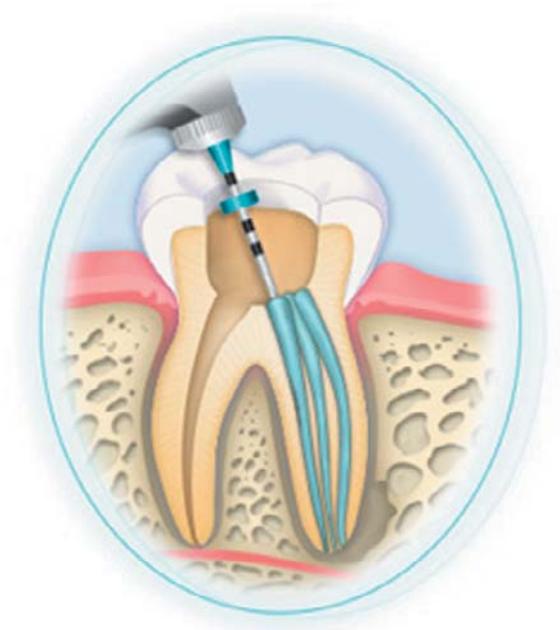


Clinical Management of a Mandibular First Molar with Multiple Mesial Canals: A Case Report

Kyung san Min, DDS, MSD



Abstract

A right mandibular first molar requiring root canal treatment was found to have three separate mesial canals. This case demonstrates an extraordinary anatomical configuration and supplements previous reports of the existence of such configurations in mandibular first molars.

Keywords: Mandibular first molar, mesial canals

Citation: Min KS . Clinical Management of a Mandibular First Molar with Multiple Mesial Canals: A Case Report. J Contemp Dent Pract 2004 August;(5)3:142-149.

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Introduction

The main objective of root canal treatment is the thorough mechanical and chemical cleansing of the entire pulp space followed by complete obturation with an inert filling material.¹ Therefore, it is imperative aberrant anatomy is identified prior to and during root canal treatment of such teeth. Unusual canal anatomy associated with the mandibular first molar has been reported in several studies. In a radiographic study of extracted teeth Goel et al.² reported mandibular first molars had three mesial canals in 13.3% of specimens, four mesial canals in 3.3% of specimens, and three distal canals in 1.7% of specimens. Furthermore, their study showed one apical foramen was present in 30%, two in 60%, three in 6.7%, and four in 3.3% of the cases.

In a clinical evaluation of 145 mandibular first molars Fabra-Campos³ found four molars (2.07%) with five canals – three in the mesial root and two in the distal. In none of these four cases did the middle mesial canal show an independent course and foramen.

The occurrence of three independent canals in the mesial root was reported by Pomeranz et al.⁴, and Beatty and Krell⁵ described a mandibular first and second molar with three independent canals in the mesial root.

The present report describes root canal treatment in a mandibular first molar containing three independent canals in its mesial root.

Case Report

A 17-year old female patient presented with a non-contributory medical history, a chief complaint of gingival soreness in her right mandibular region, and an occasional bad taste in her mouth. Approximately two years ago there had been a crown placed on her right mandibular first molar. There was a history of periodic discomfort to biting on the tooth. Clinical exam revealed pain to palpation and no response to thermal sensitivity tests. The mandibular first molar felt different to percussion, and there was a deep vertical pocket formed on the buccal aspect of the tooth with evidence of purulent drainage (Figure 1).

Radiographic examination revealed a large periradicular radiolucency that extended into the furcation (Figure 2). However, the patient did not have periodontal disease in other areas of the mouth.

Based on the subjective and objective findings, a diagnosis of pulpal necrosis with chronic suppurative periradicular periodontitis was made. Root canal treatment was indicated. After the crown was removed, the tooth was isolated with a rubber dam and access was gained to the pulp chamber. The coronal necrotic pulp tissue was removed and the chamber irrigated with 5% sodium hypochlorite solution. Four root canal orifices were detected, two mesial and two distal.

Exploring the fissure between the main mesial canals, with a sharp endodontic explorer, a “stick” was encountered. A middle mesial canal orifice had been found which was equidistant between the mesiolingual and mesiobuccal canal orifices. A small precurved file (size .08 Flexofile, Dentsply Maillefer, Germany) was inserted into the middle mesial canal orifice. With clockwise and counter-clockwise rotational movements, the instrument



Figure 1. Deep probing in a vertical direction on the buccal of the right mandibular molar.



Figure 2. Preoperative radiograph.

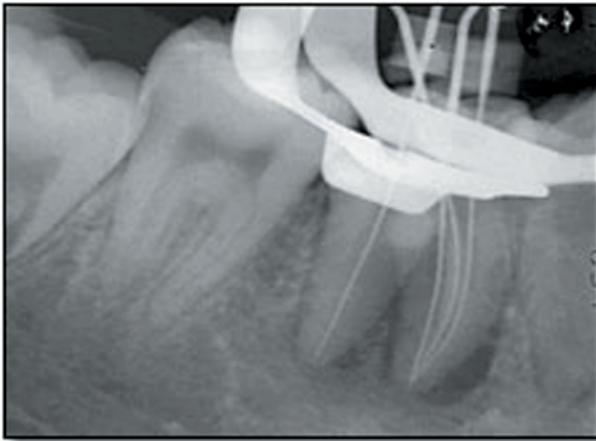


Figure 3. Working length determination radiograph showing three distinct and independent canals.

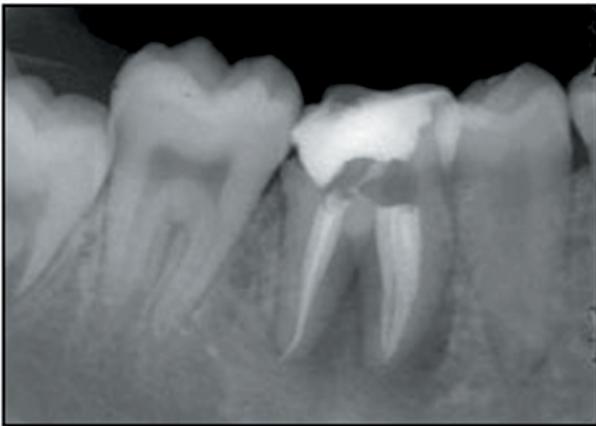


Figure 4. Postoperative radiograph.



Figure 5. At a 5-month follow-up visit, the radiograph shows almost complete osseous repair and reformation of normal anatomical landmarks.

was advanced until working length was achieved. The working lengths were estimated using an apex locator (Root ZX, Morita, Tokyo, Japan) and then confirmed with a radiograph.

Three separate mesial root canals were confirmed with a radiograph (Figure 3).

During instrumentation all the mesial canals presented separately. At the third visit, all canals were dried and filled by cold lateral condensation of gutta-percha with a calcium hydroxide-based sealer (Sealapex, Sybronendo, USA) (Figure 4).

Five months later the patient was recalled for a follow-up examination. The tooth was asymptomatic, and the radiographic examination revealed normal periapical tissue (Figure 5). The tooth will require a full coverage restoration to prevent future fracture of the crown.

Discussion

Many dental clinicians have the perception a given tooth will contain a predetermined number of roots and/or canals. Careful evaluation of research material has, however, shown deviations from the norm in tooth morphology are not uncommon.⁶ Therefore, when root canal treatment is to be performed, the clinician should be aware root canal anatomy may be abnormal.

Middle mesial or multiple canals in the mesial root of mandibular molars have been reported in the literature as having an incidence of 2.07% up to 13.3% of the examined cases.^{2,3} The canals may be independent throughout their course in the root with an apical opening of their own, or they may join either of the two more common main canals.

Conclusion

This case describes a mandibular first molar with an unusual number and arrangement of canals. It is characterized by the presence of three canals in the mesial root with all canals having separate orifices in the pulp chamber floor. Each canal has its own independent course but terminates in a common apical foramen.

Usually, a prudent inspection of the pulp chamber floor by proper visualization allows the clinician to search the additional canals. Dental clinicians should keep this possibility in mind whenever they perform root canal treatment.

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About the Author

Kyung san Min, DDS, MSD



Dr. Min is an instructor in the Department of Endodontics at the Wonkwang University, College of Dentistry, in Iksan, Choenbuk, South Korea.

e-mail: mksdd@wonkwang.ac.kr

Acknowledgements

This paper was supported by Wonkwang University, in Iksan, Choenbuk, South Korea in 2003.