

Endodontic Management of Mandibular Second Molar with Three Roots: A Rare Case Report

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Abstract

A rare case of uncommon root morphology is presented to reveal anatomic variations in mandibular second molars. In general mandibular second molar have two roots with three root canals; however variations do exist in root morphology and mandibular molars are no exception. Because of uncommon root morphology, endodontic treatment of these molars become challenging as compared with treatment of mandibular molars with normal root morphology. Avoiding procedural errors during endodontic therapy in these cases demand an adapted clinical approach to diagnosis and root canal treatment.

Keywords: Anatomical variations; Endodontic treatment; Mandibular second molar; Radix entomolaris

Introduction

The prevention or healing of endodontic pathology depends on a thorough chemo-mechanical cleaning and shaping of the root canals before a dense root canal filling with a hermetic seal. Root canal treatment success depends on the knowledge and interpretation of uncommon root canal morphology. Several variations in root canal morphology exist in deciduous and permanent mandibular molars. Usually a mandibular second molar has two roots with three root canals [1,2]. Manning has studied the root canal anatomy of 149 extracted mandibular second molars using clearing technique. He found that 22% had single roots, 76% had two roots, and 2% had three roots [3]. [4] studied the external and internal anatomy of 628 extracted mandibular first and second molars. Exploration of mandibular second molars root showed that 84.1% presented two separate roots, 15.9% fused roots and 1.5% three roots [4]. The anatomy of mandibular second molar has also racial variations; using periapical radiographs of 328 patients (105, Mongoloid origin; 106, Negro; 117, Caucasian), [5] reported an incidence of three-rooted mandibular second molar in 2.8% of patients of Mongoloid origin, 1.8% of Negro origin and 1.7% Caucasian. The aim of this paper is to report endodontic management of a mandibular second molar with three roots, which is a rare clinical entity.

Case Report

A 24-year-old male patient was referred to the postgraduate de-

partment of conservative dentistry and endodontics, Government dental college and hospital, Srinagar for root canal treatment in the left mandibular second molar after a failed attempt by an undergraduate student. A diagnostic radiograph revealed pulp-tomized mandibular second molar with gouging on mesial side of the pulp chamber floor. Careful examination of the radiograph revealed the possibility of an additional root in mandibular second molar.



Figure 1: A pulp-tomized right mandibular second molar. Careful examination of the radiographs revealed the possibility of more than two roots.

Besides, there was presence of periapical lesion in respect to distal root of mandibular first molar which was later also end-

odontically treated after careful clinical testing procedures. Endodontic treatment in mandibular second molar was planned on the same visit.

After local anesthesia, 2% lignocaine with 1: 80,000 epinephrine (xicaïne, ICPA health products Ltd, Gujarat, India), temporary filling was removed using an endoaccess bur # 2 (Dentsply Maillefer, Switzerland) and access was refined using safe ended diamond burs (Dentsply Maillefer, Switzerland) under proper rubber dam isolation. Clinical evaluation of the internal anatomy with DG16 explorer (Dentsply) confirmed the presence of three root canal orifices, two located mesially and one distally. With the help of electronic apex locator, the working lengths of each canal were projected which was later confirmed by a radiograph using # 15 K file (DENTSPLY Maillefer) which also showed the presence of three independent root canals in three separated roots.

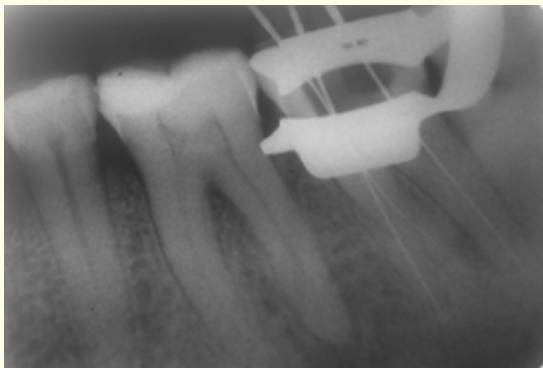


Figure 2: The working length measurement radiograph confirmed the presence of three files in three separated roots.

Canals were cleaned and shaped using crown down approach using gates Glidden drills # 1 and 2 (Mani; Japan) in the coronal part and Protaper rotary files (DENTSPLY Maillefer) in the middle and apical third. Mesial and radix canal were shaped till F2 whereas distal canal was shaped till F3 protaper rotary file. Canals were irrigated with 5.25% NaOCl and normal saline throughout the procedure using EndoVac irrigation system. Smear layer was removed using 17% EDTA and final rinse was done with 5.25% NaOCl and normal saline. Absorbent points were used to dry the canals. Root canal obturation was executed through gutta-percha points and

endodontic sealer (AH Plus, Dentsply Maillefer, Switzerland), by using the cold lateral condensation technique.



Figure 3: Postoperative radiograph with distal angulation showing three endodontically sealed canals in three distinct roots in Mandibular second molar.

Amalgam was used as post endodontic restoration and later patient was referred to Department of prosthodontics for final restoration in respect to mandibular first and second molar.

Studies of the internal and external anatomy of teeth have shown that anatomical variations can occur in all group types, in individuals and in various racial groups. The variations in root canal morphology should be anticipated as a common possibility. Therefore best care to the patient can be provided only when the dentist has through knowledge of root canal morphology [5]. Researchers have shown that the anatomy of mandibular molars requires much attention since the number of roots and canals are quite variable. It has been reported that mandibular second molar can vary from in root morphology (one to three roots) [6]. [7,8] reported that a considerable number of failures could be assigned to anatomical variations, such as the presence of canals not usually found. Thus for good endodontic practice, it is necessary for the clinician to have sound knowledge of dental anatomy and its variations. The dentist must keep in mind that variations in root canal morphology can occur in any tooth and it can be appreciated only by thorough examination of the internal anatomy of the tooth and its radiographs. From a clinical standpoint, when the initial radiograph shows the image of an uncommon root canal morphology, it is recommended to take a second radiograph for additional information particularly with a mesial or distal projection [9].

The presence of additional canal should be suspected whenever an instrument demonstrates an eccentric direction on deeper penetration into the canal, termed directional control, as reported by Green [10], or if the working length file appears off center in the radiograph. Conventional or rotary instrumentation should be used whenever variations in root canal morphology are detected.

Conclusion

Human mandibular second molars show considerable anatomic variation and abnormalities with respect to number of roots and root canals. In-depth information and understanding of mandibular second molar relating to the number of canals, root canal morphology, accurate interpretation of radiograph, and tactile examination of canal walls are significant in identifying the occurrence of multiple canals and ensuring successful completion of the endodontic treatment.

Conflict of Interest

No conflict of interest.

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