

ENDODONTIC MANAGEMENT OF C SHAPED CANAL IN MANDIBULAR THIRD MOLAR: A CASE REPORT

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ABSTRACT:

Root canal treatment is usually difficult in C-shaped canals due to complex configuration. The C-shaped root canal system is an anatomical variant of the root canal structure in which a continuous slit or web connects individual root canals. They present a challenge to the clinician, both at the diagnostic and treatment level. Failure to recognize and manage the variation leads to endodontic failure. Only few experimental studies have demonstrated prevalence of C shaped canal in mandibular 3rd molar. The present case report highlights the modifications essential during root canal treatment for successful management of C- shaped canals in mandibular 3rd molar.

Key Words: C-shaped canal, Mandibular 3rd Molar, Root canal treatment.



INTRODUCTION

Recognition of unusual canal configurations and variations is imperative for successful debridement and obturation of the root canal system. In C-shaped canals presence of a thin fin connecting the root canals is the main anatomical feature [1].

Cooke and Cox first described the clinical significance of C-shaped canals, which present major challenges with respect to their debridement and obturation. The C-shaped configuration refers to a continuous slit between all the canals so that a horizontal section through the roots yields a space in the shape of letter C. This canal shape results from the fusion of the mesial and distal roots on either the buccal or the lingual root surface. The C-shaped root may also be formed by

coalescence because of deposition of cementum with time [2].

Irregular areas in a C-shaped canal that may house soft-tissue remnants or infected debris may escape thorough cleaning or filling and may be a source of bleeding and severe pain [3]. The C-shaped canals possess many challenges for the clinician which requires good knowledge, proper identification and various modifications in the root canal procedures for the management of such canal systems. Only few experimental studies have demonstrated prevalence of C shaped canal in mandibular 3rd molar [4,5].

This case report highlights the successful endodontic management of C- shaped canal in mandibular 3rd molar.

CASE REPORT

A 25 year old female reported with chief complaint of severe pain in lower right posterior region for 2 days. The pain was sharp and piercing in nature. Medical history was insignificant. Clinical examination revealed grossly carious right mandibular third molar. The tooth was tender on percussion. IOPA revealed the presence of deep caries approximating pulp but no periapical pathology was present. It also revealed fused roots (Figure 1). No intraoral swelling was seen. Extraoral examination was insignificant. Diagnosis of acute irreversible pulpitis with apical periodontitis was established. Treatment planning was done for root canal treatment of mandibular third molar.

During 1st appointment the patient received local anesthesia of 2% lidocaine with 1:100,000 epinephrine. Access cavity was prepared (Figure 2). Extirpation of pulp was done with Hedstrom file. Pulpal floor revealed the fusion of distal and mesiobuccal orifices while the mesiolingual orifice was separate. The working length was determined by radiographic method as well as using third generation electronic apex locators. The canal was cleaned and prepared by hand nickel titanium file and rotary ProTaper files (Dentsply Maillefer, Ballaigues, Switzerland). Sodium hypochlorite was used as an irrigant after each instrumentation along with ultrasonic activation. The canals were dried with paper points and calcium hydroxide was

placed in the canal as an intracanal medicament.

At the next appointment, the medicament was flushed. The canal was dried with paper point. Tooth was completely asymptomatic. The canal was obturated with thermoplasticized gutta-percha technique (Obtura II, Obtura Spartan, Fenton, Missouri, USA) and AH-Plus sealer (Dentsply DeTrey GmbH, Konstanz, Germany). Post operative IOPA X ray was taken to ascertain the quality of obturation (Figure 3). The tooth was restored with a posterior composite restorative material.

DISCUSSION:

This case report highlights the unusual anatomy of a mandibular third molar with C-shaped canal configuration. The complex configuration of C-shaped canals make root canal treatment challenging.

This variation is most commonly found in mandibular second molars (2.5-8%). It may occur in mandibular first molars, maxillary molars, mandibular first Premolars and even in maxillary lateral incisors. Few experimental studies have demonstrated prevalence of C shaped canal in mandibular 3rd molar. Sidow et al reported the presence of C-shaped canals in 4% of mandibular third molar teeth [4].

According to Melton's original classification, the canal orifices of C-shaped canals has 3 appearances based on their cross-sectional shape [6].

C1: A continuous C-shaped canal from the pulp chamber to apex.

C2: A semicolon where one canal was separated by dentin from the C-shaped canal.

C3: A C-shaped orifice with two or more distinct and separate canals.

In this case report C2 type C-shaped canal configuration was present. It is essential to use advanced and latest endodontic treatment modalities for success. In this case report dental operating microscope was used for magnification. It is a great aid in interpretation of anatomy of floor of pulp chamber and for facilitating effective access to the canal system.

Working length determination in teeth with C-shaped canals can be highly variable, as the canals exit in multiple areas at any level in the root. If one file is placed in the mesial and one in the distal, the radiograph may reveal that both the files are in the same canal or the more mesial file has, perhaps, caused a perforation. The use of both radiographs and apex locators are recommended for working length determination [7].

Debridement of pulp chamber is best accomplished through the use of stainless

steel K-files, orifice shapers and the shaping and finishing files of Protaper system [8].

C-shaped canal has large volumetric capacity housing transverse anastomoses and irregularities.

Copious irrigation was done with sodium hypochlorite. Passive ultrasonic activation of the irrigating solution was done to allow the irrigant to flow in the complex canal anatomy [9].

Calcium Hydroxide was used between appointments to enhance tissue removal and control haemorrhage.

Thermoplasticized gutta percha technique was used for obturation as it allows three dimensional filling of the entire root canal system and flow of gutta percha in the canal irregularities [10].

CONCLUSION

The complex configuration of C-shaped canals make root canal treatment unusually difficult. Therefore careful location and negotiation of canals, meticulous mechanical and chemical debridement of the pulp chamber and three dimensional obturation should be carried out in order to successfully treat a C-shaped canal.

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FIGURES:



Figure 1: Pre Op IOPA



Figure 2: Access cavity



Figure 3: Post Op IOPA