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CASE REPORT

IDENTIFICATION AND ENDODONTIC MANAGEMENT OF MIDDLE MESIAL CANAL IN MANDIBULAR FIRST MOLAR - A CASE REPORT

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ABSTRACT

Endodontic success in teeth with the number of canals above that normally found requires a correct diagnosis and careful inspection.The root canal treatment of a mandibular molar with aberrant canal configuration can be diagnostically and technically challenging. A left mandibular first molar requiring root canal treatment was found to have three separate mesial canals. This case demonstrates an extraordinary anatomical configuration in mandibular first molars.

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INTRODUCTION

The main objective of root canal treatment is thorough mechanical and chemical cleansing of the entire pulp cavity and its complete filling with an inert filling material (Ingle *et al*., 2008). Vertucci (1984) proposed a standardized method for categorizing root canal anatomical variations, and Weine (2004) described a more clinically relevant classification of the root canal anatomy (Sundaresh *et al*., 2013). Although all teeth are anatomically complex, mandibular first molars are the first permanent posterior teeth to erupt and are those that most often suffer from caries, so they are highly likely to require endodontic treatment (Cohen and Hargreaves, 2005). The teeth exhibit considerable anatomical variation and abnormalities regarding the number of roots and root canals (Ghoddusi *et al*. 2007; Chandra *et al.*, 2009). Therefore, its 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. With increasing reports of aberrant canal morphology, the clinician needs to be aware of this varied anatomy. The purpose of the present article is to report the successful nonsurgical management of a two-rooted left permanent mandibular first molar having four root canals (three in mesial root and one in distal) having a Type XVIII root canal pattern in the mesial root (Sert & Bayirli, 2004).

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Case Report

A 18-year old female patient presented with a non-contributory medical history, a chief complaint of pain in her left mandibular back tooth region. There was a history of periodic discomfort to biting on the tooth. Clinical exam revealed pain on palpation and no response to thermal sensitivity tests.The mandibular left first molar felt different to percussion, Radiographic examination revealed deep caries involving pulp with periodontal ligament widening and with periapical lesion. However, the patient did not have periodontal disease in her mouth. Diagnoses of irreversible pulpitis without apical periodontitis of the left mandibular first molar was made. After administering 2% Lignocaine with 1:80,000 adrenaline (Lignox, Indoco Remedies Ltd, India) and isolated using rubber dam. Endodontic access cavity was established, all carious tissue were removed, and an adequate endodontic access was made. The pulp chamber floor showed four orifices corresponding to 4 root canals: mesiobuccal, (MB), middle mesial (MM), mesiolingual (ML), distal canal (D) (Fig. 1) Working lengths were estimated by using an electronic apex locator (Root ZX; Morita, Tokyo, Japan) and then confirmed with a radiograph.. Canal patency was checked with number 10 K-file (Mani, Inc; Tochigi, Japan).

Fig. 1. Canal orifices

Fig. 2. Working length

Fig. 3. Master cone selection

Working length radiograph was taken (Fig. 2) and the presence of four canals was confirmed. Cleaning and shaping was performed using a standardised technique with Mtwo files (VDW, Germany) under abundant irrigation with 3% sodium hypochlorite. After preparation, the root canals were inserted with gutta-percha cones (Diadent, Seoul, Korea) to reconfirm working lengths. All three mesial canals including the MM canal were cleaned, shaped, and was then temporised. Patient was then recalled after a week.

Fig. 4. Obturated canals

The root canals were then dried with paper points, appropriate size master-cone was selected (Figure 3). Cleaned canals are obturated with cold, laterally condensed gutta-percha and AH plus resin sealer (Maillefer, Dentsply, Ballaigues, Switzerland) and orifices are sealed. Postobturation radiograph was taken to confirm the full-length canal filling obturated by using gutta-percha and sealer (AH-plus, Dentsply-Maillifer) (Fig. 4).

DISCUSSION

There are numerous cases in the literature concerning the unusual anatomy of the mandibular first molar. Root canal variations occur commonly, and it is imperative that the dentist identifies and manages these variations. The majority of mandibular first molars have two roots, one mesial and one distal, and their usual canal distribution is two in the mesial root and one or two in the distal root (Vertucci *et al*., 2006). The presence of a third canal in the mesial root of mandibular molars is called the middle mesial canal that has been reported to have an incidence rate of 1 to 15%. This additional canal may be independent with a separate foramen, or the additional canal may have a separate foramen and join apically with either the mesiobuccal or mesiolingual canal (Dean Baug *et al*., 2004). Root canal variations occur commonly, and it is imperative that the dentist identifies and manages these variations. The majority of mandibular first molars have two roots, one mesial and one distal, and their usual canal distribution is two in the mesial root and one or two in the distal root (Vertucci *et al*., 2005). The presence of a third canal in the mesial root of mandibular molars is called the middle mesial canal. Many dental clinicians tend to perceive a given tooth will contain a predetermined number of roots and/or canals. However, a careful evaluation of the literature shows deviations from the normal in that tooth morphology is not uncommon. Among these anatomic variances, 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. Although many authors have agreed on the presence of three foramina in the mesial root, only a few

have reported the presence of three independent canals, which presents itself as a rare anatomic variant (Sung –Ho *et al*., 2010). Instrumentation is one of the key factors in the success of endodontic therapy; therefore, the clinician should be aware of the incidence of these extra canals in the mandibular first molar. The clinician can then perform a thorough examination of the pulp chamber to insure complete debridement of all canals. This increases the chance for long-term successful endodontic therapy.

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