



MANDIBULAR PREMOLAR WITH TWO ROOTS AND TWO ROOT CANALS: A CASE REPORT.

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ABSTRACT For the success of a root canal treatment, an in-depth knowledge of pulpal anatomy and its variations are essential. Failure to perform thorough debridement and improper obturation will lead to reinfection of the root canal, which will adversely affect the treatment outcome. Mandibular premolars usually have single root with single root canal system. However, anatomic variations of mandibular premolar have been reported. The clinician should be aware of the configuration of the pulp system for the successful endodontic treatment. The incidence of two roots in these teeth is quite rare. This report presents the clinical management of mandibular premolar having two roots bifurcated at the mid-root level.

KEYWORDS : Mandibular first premolar, Two roots, Abnormal morphology, Anatomic configuration, Root canal configuration.

INTRODUCTION

The objective of endodontic treatment is thorough cleaning and shaping of the canal followed by three dimensional obturation of the root canal space along with fluid tight seal of the apical foramen. Therefore, the knowledge of the canal anatomy is essential for successful endodontic management. The clinician should be aware of the complexity of the root canal system and also be capable of identification of these variations. This is followed by negotiation, cleaning and shaping, and obturation of the entire canal system^[1]. Ingle has reported that the most significant cause for an endodontic failure is an incomplete canal instrumentation, followed by incorrect canal obturation^[2]. Another reason for failure could be untreated root canal system^[3].

Mandibular premolars may show wide variations in root canal anatomy and morphology (ElDeeb 1982). Studies reported by Green (1973), Hess (1925), Kerekes & Tronstad (1977), Mueller (1933), Pineda & Kuttler (1972), and Vertucci (1978), dealing with the number and form of roots and root canals of mandibular premolars have revealed that in most instances they have only one root canal, although teeth with two or more root canals do exist. Vertucci in his series of studies conducted on extracted teeth, reported 2.5% incidence of a second canal. Zilich and Dawson reported 11.7% occurrence of two canals and 0.4% of three canals^[4-5]. Consequently, awareness of the possible existence of these anatomical variations would be important during endodontic treatment of mandibular premolars^[4]. This case report describes the endodontic management of mandibular first premolar having two roots and two canals.

CASE REPORT

A 35 year old male patient reported to our department of conservative dentistry and endodontics with the chief complaint of pain in the lower left back region of jaw since one week (Fig. 1). The medical history was noncontributory. The pain was spontaneous, moderate to severe and throbbing in nature for longer duration which lasted even after removal of stimulus. The patient also gave a history of aggravation of pain on consumption of hot food and relief on cold water. On clinical examination the face was symmetrical and TMJ was normal with absence of tenderness and clicking sound. Intraorally there was caries involving distal surface of left mandibular first premolar. The periodontal health was normal. The periapical radiograph revealed distal caries approaching to pulp and there was root bifurcation in the middle third with distinct outline of the mesial and distal root without any periapical pathology (Fig. 2). On vitality testing patient gave painful response even after removal of stimulus. Thus, we came to a diagnosis of acute irreversible pulpitis and routine root canal treatment

was advised to the patient. Informed consent was obtained from the patient.

Local anesthesia was administered by inferior alveolar nerve block using 2% solution of lignocaine hydrochloride with 1:80000 adrenaline. After achieving complete anesthesia tooth was marked and isolated with rubber dam. Endodontic access was prepared with a round diamond bur in a high speed airtor handpiece. Dentina map connecting two orifices was seen after deroofting. Sharp DG 16 explorer was used to locate the canal orifices (Fig. 3). After obtaining the canal patency, a #15K file was precurved and inserted. Working length was determined with apex locator and confirmed radiographically (Fig. 4). The two canals exits in separate apical foramina located in the respective roots. Cleaning and shaping of the canals was performed using crown-down technique by Protaper upto F1 (DENTSPLY) under copious irrigation with saline and 5.25% sodium hypochlorite solution. At the second appointment as the tooth was asymptomatic the canals were cleaned and dried. Master cone selection was done (Fig. 5) and confirmed with radiograph. Obturation was done with Gutta Percha and AH plus Sealer (Fig. 6).



Fig. 1

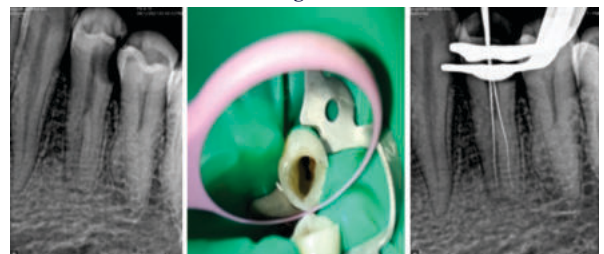


Fig. 2

Fig. 3

Fig. 4



Fig. 5

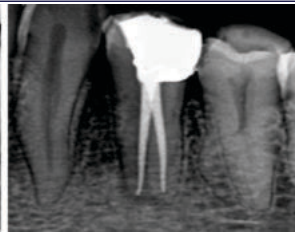


Fig. 6

DISCUSSION

The presence of extra roots or canals in mandibular premolars is undoubtedly an endodontic challenge. Recognition of the aberrant anatomy requires thorough knowledge of the root canal morphology, critical interpretation of the diagnostic aids, appropriate assessment of the pulp chamber floor and operative skills of the clinician. The case report presented here refers to the management of endodontic challenge of mandibular first premolars having two roots which are bifurcated at the mid-root level^[5]. Slowey has suggested that mandibular first premolar is an “Enigma to endodontists” may present the greatest difficulty of all teeth to perform successful endodontic treatment^[6]. Recognition of the aberrant anatomy requires thorough knowledge of the root canal morphology, critical interpretation of the diagnostic aids, appropriate assessment of the pulp chamber floor and operative skills of the clinician. One of the common reasons for having difficulty in identifying the second canal was inadequate access which leaves a shelf of dentine over the second canal^[7]. Slowey^[6] recommends the visualization of such canal configuration as a lowercase letter 'h' where the main canal would be the straightline portion of the 'h' and the second canal exists about mid-root at a sharp angle from the straight canal. Also an important step needed in such canal was a modification in access which required an adequate flaring of the canal coronal to the bifurcation for unobstructed passage of instruments into the second canal. Careful manual exploration of the bifurcated canal should be done with a pre curved 10K file which will provide a tactile sensation as the instrument moves in an eccentric direction on deeper penetration into the canal and also prevents the instrument separation. The single cone two step technique was used in the present case report.

CONCLUSION

This case report emphasizes on the importance of thorough knowledge of the internal root canal anatomy and implementation of the modified techniques by the clinician before and during treatment to prevent their subsequent flare up. The clinician should be astute enough to identify the presence of unusual numbers of roots and their morphology. A thorough knowledge of root canal anatomy and its variations, careful interpretation of the radiograph, close clinical inspection of the floor of the chamber and proper modification of access opening are essential for a successful treatment outcome.

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