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ENDODONTIC MANAGEMENT OF TWO ROOTED MAXILLARY 1ST MOLAR

Dental Science

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ABSTRACT

Successful endodontic treatment depends on proper cleaning, shaping, and filling of the root canal system; this implies that inability to detect, debride, and obturate all the existing canals is a major cause of endodontic failure. Maxillary first molars have the most complicated root and canal morphology of the maxillary dentition; therefore, their anatomy has been extensively evaluated. Amongst the Indian population the root configuration for maxillary 1st molar ranges from 1 root (2%) to 4 separate roots (2%). It is now generally accepted that the most common form of maxillary first molar has three roots and four canals.Prognosis for treatment of these four rooted molars, or a four canal molar with two palatal roots, should be similar to any molar endodontic prognosis. However, periodontal considerations would be involved in the prognosis of a type II or a type III maxillary molar with two palatal roots .

KEYWORDS

Maxillary First Molar, Two Roots, Two Canals, CBCT.

INTRODUCTION

An awareness and understanding of the presence of additional roots and unusual root canal morphology is essential as it determines the successful outcome of endodontic treatment. [1] Tooth root internal morphology is often complex and greatly influences endodontic treatment. In fact, successful endodontic treatment depends on proper cleaning, shaping, and filling of the root canal system; this implies that inability to detect, debride, and obturate all the existing canals is a major cause of endodontic failure. [2-4]. Maxillary first molars have the most complicated root and canal morphology of the maxillary dentition; therefore, their anatomy has been extensively evaluated. Amongst the Indian population the root configuration for maxillary 1st molar ranges from 1 root (2%) to 4 separate roots (2%) [5]. It is now generally accepted that the most common form of maxillary first molar has three roots and four canals [6]. Two-rooted maxillary first molar with two canals has rarely been reported. Such an anatomic variation has been reported in a limited number of studies for second maxillary molar.

CASE REPORT

A 26-year-old male patient reported to the department of conservative dentistry and endodontics, Mahatma Gandhi Dental College and Hospital, Jaipur with the chief complaint of spontaneous toothache in his left posterior maxillary region for past one week. The pain was intensified by thermal stimuli and on mastication. History revealed intermittent pain in the same tooth with hot and cold stimuli for the past 1 month. The patient's medical history was non-contributory. A clinical examination revealed a carious maxillary left first molar (26), which was tender to percussion. Palpation of the buccal and palatal aspect of the tooth did not reveal any tenderness. The tooth was non mobile and periodontal probing was within physiological limits. The radiograph revealed an unusual anatomy of the involved tooth with two roots, additional radiographs were taken from 20^0 mesial angulations. From the clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis with symptomatic apical periodontitis was made and endodontic treatment was planned.

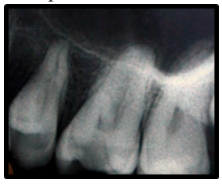

Fig 1: Pre-Operative IOPA

The root canal treatment was initiated after administering 2% lignocaine with 1:80,000 epinephrine (Lignox 2% A, Indoco remedies, Mumbai, India) to achieve local anaesthesia. Access cavity preparation was started after rubber dam isolation, clinical examination of pulp chamber floor with a DG-16 explorer (Hu-Friedy, Chicago, IL, USA) revealed an aberrant dentinal map on the pulpal floor with 2 buccal orifices, and 2 adjacent palatal (one large and one small) orifices. No additional orifices were noted when the chamber was explored with dental loupes under 2.5x magnification with illumination (Unicorn Denmart, New delhi, India). Need was felt to use the CBCT scan to ascertain the aberration in the anatomical architecture of the root canal system and after taking due consent the patient was scheduled for a CBCT scan.

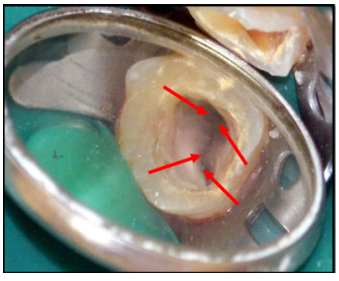

Fig2. Access opening revealing aberrant dentinal map root canal orifices

Fig. 3(a) Fig. 3(b) Fig.3(c)
Fig3(a-c): cbct slices revealing two rooted architecture of the tooth from (a) coronal, (b) middle and (c)apical sections.

CBCT scan revealed a two rooted architecture of the tooth with four root canals (distobuccal root fused with palatal root). On subsequent visit, taking into account the available information from the CBCT scan the coronal third of the root canal was enlarged and working length was determined using electronic apex locator (PROPEX II,

Dentsply maillefer, ballaguies, Switzerland) and later confirmed radiographically. The canals were cleaned and shaped using rotary protaper universal nickel titanium instruments (Dentsply maillefer, baalaguies, Switzerland) in crown down fashion under copius irrigation with 3 % sodium hypoclorite (Parcan, septodont,FRANCE) and 17% EDTA(canalarge, Ammdent, INDIA) and saline (Claris, INDIA)

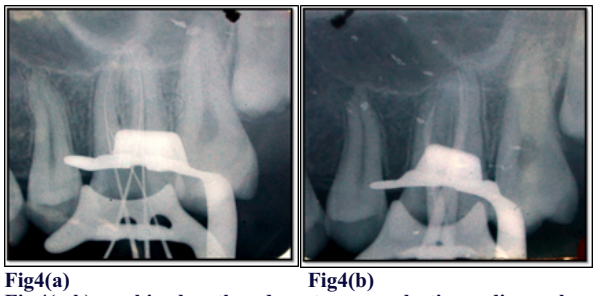

Fig4(a) Fig4(b)

Fig 4(a-b):working length and master cone selection radiographs

The buccal canals were enlarged upto F1while the main palatal canal was enlarged upto size F2 and other palatal to size F1 respectively. After final irrigation with 2% chlorhexidine (Dentochlor) (Ammdent, India) the canal were obturated using cold lateral compaction technique with AH plus as sealer. The tooth was restored permanently with composite core and PFM crown as definitive restoration.

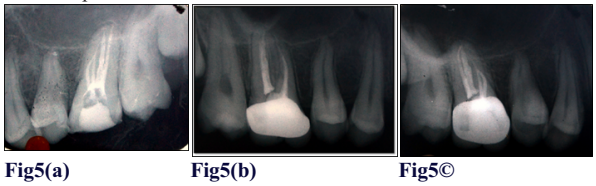

Fig5(a) Fig5(b) Fig5©

Fig 5(a-c): immediate post op, six months recall and one year recall radiographs

DISCUSSION

Needless to say, success in any endodontic treatment relies on a clinician's sound scientific knowledge, accurate diagnosis and precise clinical skills. Maxillary first molars have one of the most complicated root and canal morphology of the maxillary dentition and therefore, their anatomy has been evaluated extensively in various studies. Many studies have evaluated the root canal morphology of the maxillary first molar, because this tooth often renders treatment difficult due to its complex root canal anatomy [7-8]. Several methods are available for detection of the unusual canal anatomy. 41). Robinson et al reported that CT images identified a greater number of morphologic variations than panoramic radiographs [9]. CBCT as a imaging modality has been used in endodontics for the effective evaluation of the root canal morphology[10-13]. Additionally, CBCT helps in the diagnosis of endodontic pathosis, fractures, resorptive lesions, pathosis of nonendodontic origin, and presurgical assessment before root-end surgery [10-12]. Matherne et al concluded that CBCT images always resulted in the identification of greater number of root canal systems than digital images[14]. Magnification is yet another tool that helps us to identify and locate the unusual anatomies of the root canal system[15]. In the present case, CBCT scanning was used for a better understanding of the complex root canal anatomy. The 2-rooted type of the maxillary first molar is rarely reported. Its incidence in the literature is 3.9%[16].The fusion of the two buccal roots has the prevalence of 0.4% in maxillary first molars. Fava (2001) reported a case of maxillary first molar with two roots; two canals in the buccal root (Vertucci type IV) and one palatal root canal[18]. Nevertheless, presence of only one buccal root with one canal is extremely rare[17-18]. Incidence of two palatal canals in maxillary first molars is also low (1%). Prognosis for treatment of these four rooted molars, or a four canal molar with two palatal roots, should be similar to any molar endodontic prognosis. However, periodontal considerations would be involved in the prognosis of a type II or a type III maxillary molar with two palatal roots .

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