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CASE REPORT

Maxillary first molar with six root canals- An unusual case report

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***ABSTRACT*:**
Successful root canal therapy requires a thorough knowledge of root and root canal morphology. It is generally accepted that the most common form of the permanent maxillary first molar has three roots and four canals. There is a wide range of variation in the literature with respect to frequency of occurrence of the number of canals in each root, the number of roots and incidence of fusion. In the present case report, we reported the data of a forty two year old male reported with chief complaint of pain in the left upper back tooth region. Final diagnosis of symptomatic irreversible pulpitis was made and root canal therapy was planned. Coronal pulp was removed. Six canals were located in the floor of the pulp chamber, namely three mesiobuccal, two distobuccal and one palatal. Obturation was done followed by restoration of the access cavity was done using composite resin material.
Key words: Molar, Root canal

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INTRODUCTION

Endodontic management of maxillary first molars presents a constant challenge, due to the complex anatomy of their roots and root canals. One of the major causes of root canal failure is the inability to identify, locate, and treat the entire root canal system. Variations in the number and configuration of the roots and their canals have been reported in the literature over the years; the most common variation being the presence of a second mesiobuccal canal with incidence of more than 90%. Even the rarely found two palatal canals have also been reported.[1-3]

One of the biggest mysteries in endodontics is the elusive "mesiolingual" or "mesiopalatal" canal. Prior to an article written by Weine et al in 1969, virtually all dentists thought the mesiobuccal root of the maxillary first molar had only one canal. In his textbook, Weine stated that "MB-2" is a poor and inappropriate name for this canal. Instead, "mesiolingual" (ML) is the term that best describes the canal and its location.[4, 5] Hence; we herein present the case report of Maxillary first molar with six root canals.

CASE REPORT

A forty two year old male reported with chief complaint of pain in the left upper back tooth region. Clinical examination revealed presence of deep carious lesion in the left maxillary first molar. Pain was continuous, dull and radiating. Radiographic examination revealed caries approximating the pulp with periapical radiolucency present along the apex of mesial root. Final diagnosis of symptomatic irreversible pulpitis was made and root canal therapy was planned. Local anesthesia was given and access cavity was prepared. Coronal pulp was removed. Six canals were located in the floor of the pulp chamber, namely three mesiobuccal, two distobuccal and one palatal (**Figure 1**). Obturation was done using 30-4% Gutta-percha points and 30-6% Gutta-percha points, by warm vertical condensation done using hot pluggers. Restoration of the access cavity was done using composite resin material. Follow-up evaluations at 6 months and 1-year were done.

Figure 1: Photograph showing three mesial canals i.e MB 1,MB2, MB3

DISCUSSION

The increasing reports of more than one mesiobuccal canal and additional distobuccal canals in the recent years can be attributed to the increased knowledge of the root canal complex morphology, advanced diagnostic tools such as cone-beam computed tomography (CBCT) and micro-computed tomography and using equipment such as dental operating microscope, ultrasonics, and specialized instruments.[6, 7] Postendodontic disease is not a rare phenomenon and can occur in any tooth irrespective of the fact that the primary treatment is done by an expert. The main cause of such failure is incomplete cleaning and shaping and further inadequate obturation of the root canal system. This can occur if there is any canal missing in the root canal system. Thus, a clinician should be aware of anatomic aberrancies that can occur especially in those teeth that have high frequency of variations.[8] Hence; we herein present the case report of Maxillary first molar with six root canals.

In the present case report, we reported data of a forty two year old male reported with chief complaint of pain in the left upper back tooth region. Final diagnosis of symptomatic irreversible pulpitis was made and root canal therapy was planned. Local anesthesia was given and access cavity was prepared. Coronal pulp was removed. Six canals were located in the floor of the pulp chamber, namely three mesiobuccal, two distobuccal and one palatal. Obturation was done using 30-4% Gutta-percha points and 30-6% Gutta-percha points, by warm vertical condensation done using hot pluggers. Restoration of the access cavity was done using composite resin material. Follow-up evaluations at 6 months and 1-year were done. This case report emphasizes the importance of the use of magnification for exploring the canals and modification of access cavity to ensure the proper endodontic treatment. Weller and Hartwell showed that modification of the access cavity from a conventional triangular to rhomboidal shape, exploration of the groove running from the MB to palatal and removal of any projections that may conceal the canal orifice enhances the chances of locating the additional MB canals.[7-9]

According to the literature, the occurrence of the fourth canal in maxillary first molar ranges greatly. A literature review by Cleghorn et al. on the root and root canal morphology states that incidence of two canals in the MB root was higher in laboratory studies (60.5%) compared to the clinical studies (54.7%). Less variations were reported in distobuccal and palatal roots. In recent years, this percentage has been alarmingly on the rise, mainly due to advanced diagnostic technics with enhanced anatomical knowledge and the operator's keenness in detecting these variations. Clinical studies have always shown a higher prevalence of the second canal in the MB and distobuccal roots.[10-12]

Traditionally, the MB root of the maxillary first molar is most investigated root. In 1984, in his classic paper, Vertucci gave classification of root canal system. He found that maximum variations occurred in MB root of maxillary first molar which had two canals. The third canal in MB root is a rare phenomenon and is not reported much. The third canal in MB root has been found by Prabu et al. in 2009, Ayranci et al. in 2011, Chourasia et al. in 2011, Pais et al. in 2012, and Horatti et al. in 2013 in their respective case studies. In our case, we treated maxillary first molar which had three canals and three orifices in MB root.[13-18]

A study by Davis et al compared the post debridement anatomy of the canals of 217 teeth. Injection of silicone impression material into the instrumented canals revealed that standard instrumentation left a significant portion of the canal walls untouched. Fins, webbing and canals were found sometimes to not be fully instrumented. Clinical instrumentation of this tooth, especially with respect to the mesiobuccal root, can be complicated. Failure to detect and treat the second MB2 canal system will result in a decreased long-term prognosis. Stropko observed that by scheduling adequate clinical time, by using the recent magnification and detection instrumentation aids and by having thorough knowledge of how and where to search for MB2, the rate of location can approach 93% in maxillary first molars.[19-21]

CONCLUSION

This case report contributes to our understanding of root canal morphology found in a maxillary first molar. Hence, dentists performing endodontic treatment in maxillary first molars should always assume more number of canals and complex canal systems unless proven otherwise.

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