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Endodontic Management of Maxillary Second Molar with Fused Roots: A Case Report

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Abstract:
Background*: Endodontic treatment sometimes might fail due to variation in anatomical features of the tooth. Maxillary second molars present a variety of root canal configuration. The incidence of fused mesiobuccal and palatal root with a secondpalatal root canal in the maxillary second molar is very rare. One such case is presented in this paper describing the endodontic management of a fused -rooted maxillary second molar with two distinct palatal root canals and one mesiobuccal canals and one distinct distal root and canal. Radiographs showed the presence of fused mesiobuccal and palatal roots. The canals were biomechanically prepared with crown-down technique and obturated using lateral condensation technique with AH-Plus sealer.*
Key Word*: maxillary second molar, fused roots, root canal therapy*

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I. Introduction

A clear understanding of the root canal complexities is imperative for a successful post endodontic prognosis. Missed canals are one of the most probable causes of endodontic failures in multirooted teeth. The possibility of aberrations of root canal anatomy is always emphasized and the need for understanding is highlighted. A study by Shalabi et al (2000) demonstrated that 11 % of maxillary first molar and 43 % of maxillary second molar had fused roots. Only 5% of the teeth had fused palatal and distobuccal roots and only 2.5 % palatal fused with mesiobuccal and distobuccal roots in the maxillary second molar.[1] Fusion of mesiobuccal and palatal roots of the upper second molar are rare.

In this case report, we present a case of maxillary right second molar with fused palatal and mesiobuccal root having three canals and a separate distobuccal root with a single canal.

II. Case Report

A 21-year-old female patient came to our department with the chief complaint of pain in the upper right posterior region for 1 week. The pain was sharp, intermittent and aggravated with the use of cold food. On clinical examination, tooth #17 was deeply carious with loss of occlusal as well as palatal tooth structure. Her medical history was non-contributory. Pulp sensibility tests were performed and the results were positive. Radiographic examination revealed coronal radiolucency involving the pulpal space with no widening of lamina dura and the root outline were unclear [Figure 1]. The diagnosis was made as symptomatic irreversible pulpitis and a treatment plan of root canal therapy followed by post endo restoration with PFM crown was designed.

The tooth was anaesthetised using 2 % Lidocaine with 1: 100000 epinephrine and isolated under a rubber dam. Access cavity was made and all the pulpal tissue from the chamber was removed. The three canal orifices were easily located (MB, DB, Palatal). One more point of bleeding was seen at a 2 mm distance mesial to the palatal canal which was explored using DG 16. The working length x-ray was taken which showed a separate distobuccal canal and two canals joining in the palatal and one separate mesiobuccal [Figure 2]. All the canals were prepared using rotary instrumentation with a size 25 (0.06 taper) Neo Endo Flex Rotary File System (Orikam Healthcare India Pvt Ltd, Gurugram, Haryana, India) followed by irrigation with 2.5 % Sodium hypochlorite and EDTA intermittently and a final flush with saline was performed. The canals were dried using absorbent points and obturation was completed using guttapercha and AH Plus sealer [Figure 3 a , b]. The orifices were sealed using light cure GIC and coronal restoration with composite resin was done Following this, a full PFM crown was placed [Figure 4] . CBCT analysis shows two roots one distobuccal and one fused root (mesiobuccal and palatal) with 2 palatal canals, 1 mesiobuccal and 1 distobuccal canal [Figure 5].

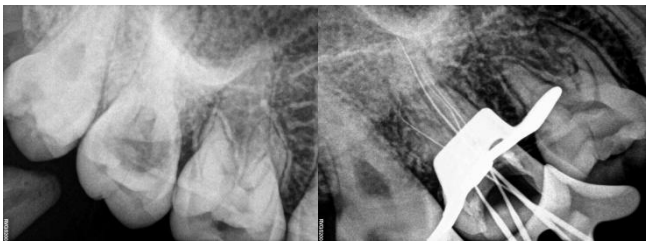

Figure 1: pre- operative radiograph. Figure 2: working length radiograph

Figure 3: (a) master cone radiograph, (b) post obturation radiograph

Figure 4: post operavtive radiograph after crown placement

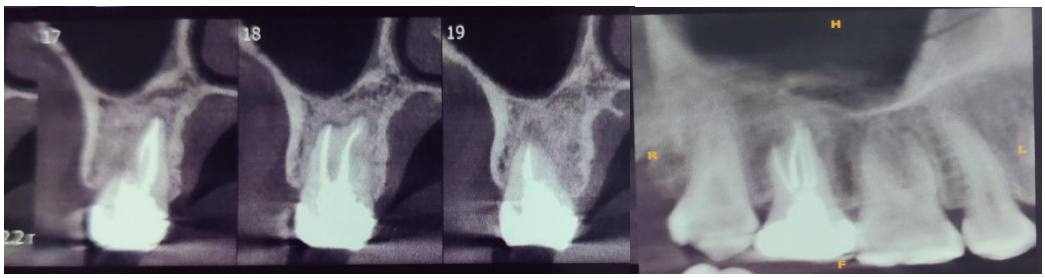

Figure 5: post- operative CBCT images

III. Discussion

The most common cause of endodontic failure is inadequate biomechanical preparation and subsequently inadequate obturation of the root canal system. This might happen because of anatomic aberrations or missed canals which can lead to failure. Hence, a thorough knowledge of the anatomic variations is necessary for a better treatment outcome.

According to Ingle, the incidence in the maxillary second molar was found to be 63 % one canal -one foramen, 13% of two canals- one foramen and 24 % two canals - 2 foramina. Peikoff et al (1996) have given a classification of maxillary second molar where they have reported 6 variants, in which variant 4 has two roots - one palatal and one buccal having one canal each.[2] Shalabi et al (2000) reported the occurrence of fused roots in 43 % of cases where the percentage of teeth showing fusion of mesiobuccal and palatal roots is very minimal.[1] Hartwell and Bellizzi showed that 9.6% of the 176 maxillary second molars had four canals.[3] However, the presence of two palatal root canals has not been mentioned. Alani described the endodontic treatment of bilateral maxillary second molars with 2 palatal roots.[4] Christie et al. proposed a classification system for four-rooted maxillary second molar abnormalities depending on root separation level and divergence.[5]

In this case report, we presented a maxillary right second molar having fused roots (Palatal and mesiobuccal) with two palatal canals joining at the apex and one separate mesiobuccal canal in the fused root and a separate distal canal, which is uncommon. Baratto-Filho et al suggested this type of canal anatomy as Type IV.[6]

The unusual anatomy of the maxillary second molar is generally difficult to appreciate in a normal periapical radiograph because of its posterior location. Exposing several radiographs from different angulations might help to overcome the superimpositions and enable the clinician to identify this rare abnormality.

Sufficient canal preparation with adequate irrigation and final obturation is the key to successful endodontic therapy. Nonetheless, the importance of access cavity preparation can't be underestimated. A properly designed and prepared access cavity will help us locate extra canals. The two palatal canal orifices were more nearly placed as compared to the two buccal orifices. Thus the access cavity was more triangular formed by joining the imaginary lines connecting the four orifices was wider on the buccal side.

Although magnification aids like loupes and operating microscope should be used for better visualization and location of anatomic aberrations.[7] To negotiate the unusual canals without the magnification aids is possible only if a proper knowledge of anatomical aberrations is there.

When indistinct images of roots are presented in preoperative X-ray images, the clinician must consider the possibility of fused roots.[7] CBCT also helps in reevaluating such kind of cases. Location and management of all anatomy are central to endodontic success.

IV. Conclusion

Thorough knowledge of the root canal anatomy is important for the successful outcome of endodontic treatment. A careful clinical and correct radiographic interpretation are necessary for correct diagnosis and for endodontic success in teeth with a number of canals above that are normally found. In situations where conventional radiography can't delineate the aberrations, CBCT should be sought.

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