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Maxillary first molar with two roots and two root canals: A case report

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Abstract

Aim: The aim of present case report is to document the management of rare case of maxillary first molar with two roots and two root canals.

Summary: The present case report documents the successful endodontic management of a maxillary first molar with two roots and two canals with Vertucci's Type I canal configuration which was diagnosed using cone-beam computed tomography (CBCT) as a diagnostic aid. In the present case, the presence of only two roots and two canals was confirmed with CBCT, so no further attempt was made to search for any other canal, which could cause iatrogenic errors.

Although the incidence of presence of two roots and two canals is not high, it is important to take these variations into consideration during root canal treatment of maxillary molars to prevent iatrogenic errors and to ensure success.

Keywords: Maxillary first molar, two roots, two canals, Cone beam computed tomography.

Introduction

For achieving success in root canal treatment, it is important to know about the variations in morphology of tooth and internal anatomy of the root canal system. Vertucci's classification is a standardized method for categorizing known root canal anatomical variations. Variations in root and root canal anatomy can be considered a challenge to endodontic diagnosis and treatment. Maxillary first molars may have complicated root and canal morphology; therefore, their anatomy has been evaluated extensively in various studies. Mostly maxillary first molar exists with three roots and three or four canals.

Literature review shows a wide range of variations in the frequency of occurrence of number of roots, number of canals in each root Various cases of maxillary first molar have been found with more number of roots and root canals in the literature, but only very few cases have been reported with less number of roots and root canals.[2.4.5] Two roots with two canals have been reported in a limited number of studies for maxillary second molar.[2,9,12] Whereas, very few cases having two-rooted maxillary first molar with two canals has rarely been reported.[8] However, diagnosis of such anatomical variation is important for successful treatment. Conventional radiographs are routinely used to assess root canal anatomy, but these radiographs are only a two-dimensional image of a three-dimensional object. Cone-beam computed tomography (CBCT) for the pre-operative assessment and diagnosis of unusual root canal morphology helps in the correct endodontic management of complex and challenging cases. The present case reports about the maxillary first molar with two roots and two canals with Vertucci's Type I canal configuration which was diagnosed using cone-beam computed tomography (CBCT) as a diagnostic aid.

Case report

A 21-year old female patient reported to the department with the chief complaint of pain in her right maxillary first molar for the past 2 days. Clinical examination revealed composite restoration with maxillary right first molar. The tooth was sensitive with early response to temperature variation and electric pulp test and was tender to vertical percussion. Radiographic examination revealed radio-opaque occlusal restoration and previous attempt for pulp capping that coincides with composite restoration clinically (Figure 1).On the basis of clinical and radiographic data a diagnosis of irreversible pulpitis with apical periodontitis was established. Also pre-operative radiograph, radicular pattern shown the presence of two conical overlapping roots only. To confirm the actual morphology of tooth CBCT was done, that revealed the presence of two roots (one buccal and one palatal) and presence of single canal. (Figure 2) Under local anesthesia and rubber dam isolation, access cavity was prepared. On deroofing the pulp chamber dentinal map connecting two orifices was seen. One orifice was present in the buccal aspect, and other orifice was present in the palatal aspect (Figure 3). The shape of access cavity was ovoid. The diameter of the buccal orifice was larger than the typical mesio-buccal or disto-buccal orifices in the maxillary first molar. The canals were negotiate with 10 no K file (MANI, JAPAN) and working length was determined with apex locator (Root ZX, J Morita, Japan) that was confirmed radiographically (Figure 4 and 5). Canals were prepared with rotary endodontic instrument (Protaper, Dentsply Switzerland) upto F2 using crown down technique. Intermittent irrigation with 2.5% sodium hypochlorite and 17% EDTA and then final irrigation was done. After drying the canals with paper points, master cone radiograph taken (Figure 6) the canals were obturated

with F2 Gutta-percha cones (Dentsply, Maillefer, Switzerland) (Figure 7). The access cavity was permanently restored with resin composite (Figure 8). The patient was asymptomatic during the follow-up period 15 days 1 month and 3 months.

Discussion

For predictable success in endodontic therapy, the knowledge about the morphology of the teeth and possible variations is very important. The main concern for endodontist remains the number of root and root canals. Sometimes root canal treatment fails because the clinician fails to detect all the canals present in the tooth. It is therefore important that, we should understand the variables that have a direct impact on the detection and treatment of root canals.

Many studies have evaluated the root canal morphology of the maxillary first molar; because this tooth presents a complex morphology that often renders treatment difficult. There are only very few cases of maxillary first molar with less number of roots as compared to presence of extra canal which is more frequent, according to the literature .The fusion of two buccal roots is one of the aberrations of maxillary molars. A total of 0.4 % of first maxillary molars and 2.2% of second maxillary molars have been reported to have this anomaly[9].

The present case is a rare as, two buccal roots have fused together or failed to divide into two separate roots resulting in a single buccal root with large single buccal canal. Radiographs are essential diagnostic aid before initiating endodontic treatment as it is useful in identifying variations from the normal, helping in diagnosis and treatment planning. Multiple pre-operative radiographs or an additional radiograph from a 20° mesial or distal projection may be helpful in detecting unusual root canal morphology[11].

The presence of additional or less root canals has been reported and discussed by several authors using a variety of study methods, including radiography, magnification, clinical evaluation, dye injection, tooth sectioning, and scanning electron microscopy. Cone-beam computed tomography (CBCT) scans are important in the field of dentistry as a diagnostic and treatment planning tool. CBCT is a diagnostic tool which offers a better understanding of root canal in axial, sagittal, and coronal planes.

In the present case the morphology of the two root and two canals in the right maxillary molar was confirmed by CBCT. Sabala et al observed that unusual root morphology was bilateral approximately 60% of the time and stated that rarer the aberration, greater would be the probability of it being bilateral. In the present case, maxillary first molars with two roots and two canals were present bilaterally, this existence in the contra lateral molar was confirmed with radiograph (Figure 9).

Conclusion

A thorough knowledge about the root canal anatomy is very important in order to treat it successfully. A practitioner must be able to identify and evaluate such types of rare cases so that it will avoid the further iatrogenic complications. In search of cases in addition to radiographs, CBCT is an emerging tool which offers better understanding of the canal morphology.

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Legend Figures

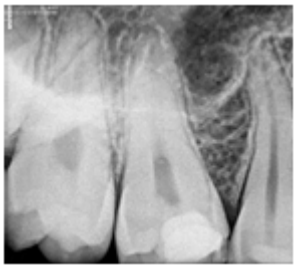

Figure 1

Figure 2

Figure 3

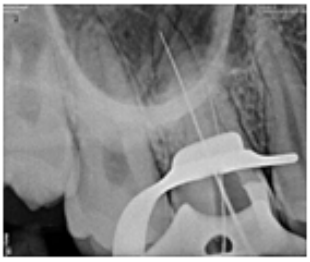

Figure 4

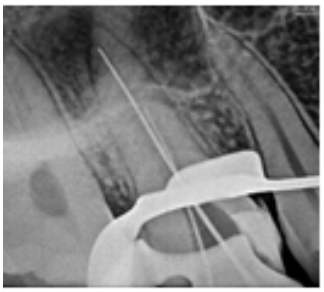

Figure 5

Figure 6

Figure 7

Figure 8

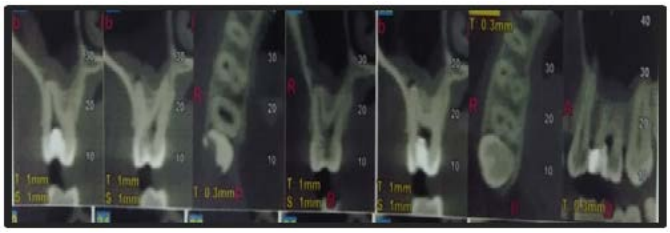

Figure 9