Single Rooted Maxillary First Molar: A Rare Case
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Abstract:
Adequate knowledge of the root canal morphology and its variations is essential for successful endodontic treatment. Of all the permanent teeth, maxillary first molar has a wide variety of variations in the root canal morphology. One among the rarest variation is to have a single root with a single canal. This case report presents one such unusual variation in maxillary first molar.

Key Words: Maxillary first molar, single root, canal configuration.

Introduction:
The main objectives of root canal treatment are thorough shaping and cleaning of all the canals and its obturation with an inert filling material. Practitioners must have a thorough knowledge of the internal anatomic relationships of teeth and must be able to visualize these relationships before undertaking endodontic therapy. Together with diagnosis and treatment, knowledge of common root canal morphology and its frequent variations is a basic requirement for endodontic success (Burns & Herbranson, 2002).

Within permanent teeth maxillary first molar has wide variations in its root canal morphology. The literature describes complex root canal systems in maxillary molars that may be difficult to manage. Variations often occur in the mesiobuccal root (Gopikrishna et al, 2008; Kulid & Peters, 1990), the most common finding being the occurrence of two canals. In maxillary first molar cases of morphologic variations, abnormal number of roots or existence of C-shaped canals have been reported previously (De Moor, 2002). Case reports with four and five roots (Christie et al, 1991; Fahid & Taintor, 1998) and four to six root canals (Benenati, 1985; Bond et al, 1988; Jacobsen, 1994; Martinez-Berna & Ruiz Badanelli, 1983) have also been reported.

However, the configuration of one canal in one rooted maxillary first molar has rarely been described in studies either in-vitro or in-vivo (Gopikrishna et al, 2008). The present case report describes one such rarest variation in maxillary first molar.

Case Report:
A 22 year old girl with noncontributory medical history was referred to the Department of Conservative Dentistry and Endodontics for evaluation of root canal therapy of a right maxillary first molar. Clinical examination revealed that the tooth responded positively to percussion but not on palpation. Radiographic examination revealed a single root and canal. After adequate anesthesia and isolation with rubber dam, an endodontic access cavity was established. A single orifice with single canal was located. The working length was checked radiographically placing the files in the canal (Fig. I).

Fig. I: Showing intra oral periapical radiograph (IOPA).

The canal was instrumented using crown-down pressure less technique with rotary protaper files and later large sized hand files were used and enlarged upto #120. Irrigation was done with 5.25% sodium hypochlorite. After root canal cleaning and shaping, the canal was dried and filled with Grossmann’s sealer and gutta percha. Cavit was used to seal the access. Postoperative radiograph was taken to confirm the quality of the filling (Fig. II). Patient was recalled for permanent restoration and referred to the prosthetic clinic for crown construction.
Discussion:

Sound knowledge of the root canal morphology and pulp chamber anatomy is a prerequisite for successful root canal treatment. The morphology of the root and canals of the maxillary first molar can be complex and variable. An examination of the floor of the pulp chamber offers clues to the type of canal configuration present. Due to varied morphology, endodontic treatment in a multirooted teeth is a challenging task.

Generally maxillary first molar presents three roots and canals. But deviations are always present. Normally, development of roots begins after enamel and dentin formation has reached the future cementoenamel junction. Prior to root formation the root sheath forms the epithelial diaphragm. The epithelial diaphragm will grow horizontally and convert the wide cervical opening into narrow apical foramen. In multirooted tooth the epithelial diaphragm undergoes differential growth which causes the division of the root trunk into two or three roots. Depending upon the number of divisions, number of roots will be formed. Two divisions will form two roots, three divisions will form three roots and so on (Bhaskar, 2003; Fig.III). The proof is in various documented literatures where maxillary first molar with four or five root canals were shown. In multirooted tooth the epithelial diaphragm is genetically programmed to undergo differential growth but under rarest condition this differential growth may fail to take place. And this may give rise to the formation of single root in maxillary first molar.

Access preparation was made as described in standard literature and the pulp roof was removed. Orifice appeared to be larger than normal. A conventional intra oral periapical radiograph from different angulations was taken placing two files in the canal. Both the files seemed to be in a single canal.

Though we suspected two canals, we ended up in single root and canal. When there is only one canal, it is usually located rather easily in the center of access preparation. A radiograph taken from different angulations revealed unusual variations. Documented literature shows evidence regarding the occurrence of four to six canals. But very few or rather two to three cases have been published regarding single root and canal (Gopikrishna et al, 2008).

To achieve satisfactory root canal therapy, a proper and in-depth knowledge of complex and abnormal root canal morphology is more than essential. The use of multi angled diagnostic radiographs may be very useful in diagnosis of typical cases. Although the incidence of single canal is not high, it is important to take these variations into consideration during root canal treatment of maxillary molar in order to ensure success.

Bibliography:


