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CASE STUDY

MANDIBULAR RIGHT PREMOLAR WITH TYPE IV VERTUCCI CONFIGURATION: A MORPHOLOGICAL ODDITY –CASE REPORT

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ABSTRACT

Abnormalities in the root canal anatomy are a commonly occurring phenomenon. A thorough knowledge of the root canal anatomy and its variations is necessary for successful completion of the endodontic treatment. Mandibular second premolars usually have a single root and a single root canal. The incidence of two separate roots itself in this tooth is quite rare. Mandibular premolars are known for having an aberrant anatomy. Often considered an enigma to the endodontist, the mandibular first premolar with dual canals dividing at various levels of the root can generate complex mechanical problems. Reports about the incidence of extra roots in these teeth are quite rare. This paper attempts at explaining a rare case of successful endodontic management of a two-rooted mandibular second premolar with awareness of data pertaining to the number of canals, knowledge of canal morphology, correct radiographic interpretation, and tactile examination of canal walls which are important in detecting the presence of multiple canals

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INTRODUCTION

A detailed knowledge of morphology of root canal system and its variations, thorough cleaning and shaping followed by 3D obturation of root canal system is required for successful management of infection in root canal system (Endod, 1975). Failure to recognize variations in root or root canal anatomy can result in unsuccessful endodontic treatment (Vaghela and Sinha, 2013). Hoen and Pink reported 42% incidence of missed canals or roots in teeth requiring retreatment (Hoen and Pink, 2002). Slowey has suggested that mandibular premolars, often called as "endodontist's enigma", may present the greatest difficulty of all teeth to perform successful endodontic treatment.A study done in 1995 at the university of Washington showed that mandibular first premolar had the highest failure rate (11.45%) of root canal therapy among all the teeth. Higher incidence of two canals in mandibular first premolars have been reported in several populations.In a study done by Jojo Kottoor *et al,* in 2013 it was found that upto 50% in Indian population showed this morphological variation. The presence of two distinct roots in mandibular first premolars is quite rare and has been reported in only 1.8% of the cases (Ingle and Bakland, 2002). A thorough knowledge of root canal space anatomy is a basic.

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This case report discusses the successful management of a mandibular premolar with an unusual anatomy.

CASE DESRICPTION

A 41 year old man reported to the department with pain in mandibular right posterior region with pus drainage since two months. On intraoral examination tooth no 44 showed proximal caries and cervical caries and tender on percussion, tooth no 45 showed proximal caries (Figure 1). History of chief complaint revealed spontaneous pain and pain aggravated on lying posture. Vitality test showed negative response in 44 and positive response in 45. On preoperative radiographic examination while tracing the outline of periodontal ligament a rare anatomical feature was evident in 44 and hence a second radiograph with a distal angulation was taken for a clear view (Figure2). Additional radiograph taken at different angulations revealed the presences of two distinct roots. Widening of periodontal ligament space seen with bone loss and periapical rarefaction also seen in relation to 44. A diagnosis of periapical abscess with draining sinus following the detailed examination was made. Endodontic treatment was initiated in tooth no 44. Access cavity was made using endo-access bur (DENTSPLY mailefer). Buccal and palatal canal orifices were located with a sharp DG 16 explorer (Figure3). Gates glidden drills was used with an in out motion followed by Sx (DENTSPLY mailefer) hand protaper to enlarge the canal orifices.

Figure 1. Intraoral examination a deep proximal caries and cervical caries in 44

Figure 2. Radiograph two angulations : Straight and Distal

Figure 3. Access opening

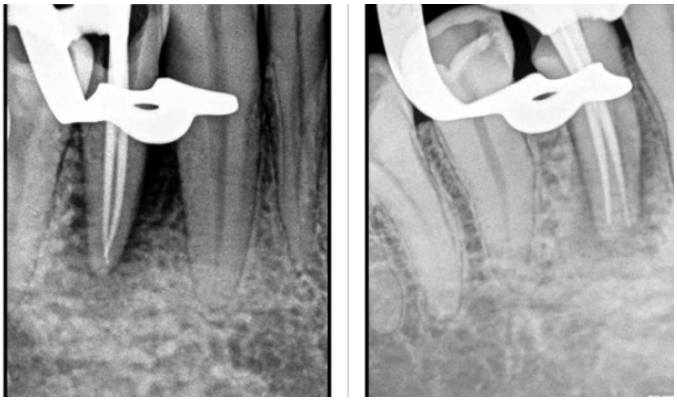

Figure 4. Master cone at two angulations

Figure 5. Obturation

Crown down technique of cleaning and shaping was employed using hand protaper upto size F1(DENTSPLY mailefer). At the second visit after one week tooth was asmptomatic and the sinus had disappeared. Canals were irrigated with saline, dried and mastercone (Figure 4) radiograph was taken. The canals were obturated using gutta percha and zinc oxide sealer by cold lateral condensation (Figure 5).

DISCUSSION

Anatomical variations, especially extra canals and roots, should always be kept in mind and missing during endodontic treatment causes endodontic failure. Presence of extra roots or canals in mandibular premolars is undoubtedly an endodontic challenge (Kararia *et al.,* 2012). Scott and Turner describe the accessory root of mandibular first premolar as "TOME'S ROOT" (Scott and Turner, 2000). They observed ethnic differences in the root morphology and reported the highest incidence (>25%) of accessory roots in Australian and sub Saharan African populations. The lowest incidence (0-10%) of Tomes Root occurred in American, Arctic, New Guinea, Jomon, and Western Eurasian populations. Vertucci in his series of studies conducted on extracted teeth, reported 25.5% incidence of a second canal (Vertucci, 1978). Sert and Bayirli's study of Turkish patients found an incidence of two or more canals in 35% of male and 44% of female (Sert and Bayirili, 2004). As radiographs are a two dimensional representation of three-dimensional objects, at times it is difficult to clearly and completely determine the root canal configuration. The careful tactile exploration of the root canal system with hand files is imperative. In the present case, although the root canal morphology was complex, it was seen in the preoperative radiograph that the outline of the root showed an indication of

formation of two roots most likely buccal and lingual. After identification, proper cleaning and shaping of the root canals was carried out followed by complete obturation of two the canals to achieve a predictable long-term endodontic prognosis. Careful interpretation of the radiograph, close clinical inspection of the floor of the chamber and proper modification of the access opening, the position, angulation of the file in the canal also hints about the presence of extra canal and are essential for a successful treatment outcome

Conclusion

This case report enhances our knowledge in identification of unusual number of roots and their morphology and successful management of these variations in mandibular first premolar.

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