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Endodontics

ENDODONTIC MANAGEMENT OF MAXILLARY THIRD MOLAR WITH SUPERNUMERARY ROOT: A RARE CASE SERIES

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ABSTRACT Thorough knowledge of root and root canal morphology helps to obtain the optimal outcome of root canal treatment. Any missed canal may lead to failure of the properly done root canal treatment. Many variations in the root and root canal morphology of the maxillary molars have been documented. Whereas, third molars present a great challenge for endodontists because of its known inaccessibility and variability. A present paper describes a case series of four rooted maxillary third molars with four canals which is a rare canal configuration. Identification of the supernumerary was made through multiangled pre-operative radiographs, dentine map and also through the cone beam computed tomography for one case.

KEYWORDS : Four rooted molars, maxillary third molar, radix mesiolingualis, supernumerary

INTRODUCTION

Success in endodontic treatment was originally based on the triad of debridement, sterilization and obturation with fluid impervious seal both apically and coronally, with all aspects being equally important.[1] Currently, it is based on more broad principles that include - diagnosis and treatment planning, knowledge of anatomy and morphology and the traditional triad, the coronal restoration and three-dimensional imaging of healing of teeth with pre-existing periapical pathosis.[2] The most frequent causes of failure in root canal treatment are imperfect instrumentation, incomplete filling, coronal microleakage and the presence of a missed canal in the course of root canal treatment. Hence, a thorough knowledge of both root and root canal morphology is a fundamental prerequisite to help ensure optimal outcomes of root canal treatment.[3,4]

The presence of a missed canal is one of the common reasons for failure of therapy.[5] Number of roots and number of canals present in maxillary 3rd molars usually range from 1-6.[6] An accessory root (also known as an extra root, supernumerary root or additional root) is one of the more common developmental radicular morphological variations that occurs. Accessory root formation usually occurs through two means, either by splitting the Hertwig's epithelial root sheath (HERS) to form two similar roots, or by folding of the HERS to form an independent root which may present with various morphological features.[7] Four-rooted maxillary molar teeth can occur with four different morphotypes. They may have an accessory palatal root, an accessory buccal root, an accessory mesial root, or an accessory distal root.[6]

CASE REPORT 1:

A 45 year old male patient reported to the department of conservative dentistry and endodontics at Y.C.M.M. & R.D.F's Dental college and Hospital, Ahmednagar, Maharashtra with the chief complaint of pain on food lodgement and on having cold and hot food. The patient had noncontributory medical history. The patient gave history of night pain. Clinical examination revealed the deep mesio-occlusal caries and an unusual occlusal morphology. Radiograph showed carious lesion involving enamel, dentin and pulp and obscure image of roots. On the basis of radiographic and clinical examination the diagnosis was made of chronic irreversible pulpitis. The endodontic treatment was planned for the same tooth. The tooth was anesthetized using two percent lignocaine with 1:80,000 adrenaline and isolated under rubber dam. After removal of all carious tissue, pre endodontic build up with composite resin was done. Access cavity with a straight line access was prepared using an endodontic access bur (Dentsply Maillefer). A fourth root canal orifice in the mesiopalatal aspect of the pulpal floor was observed on detailed visualization under the dental loopes. Also with the help of Krasner and Rankow's laws for orifice location with the help of dentinal map the fourth canal was located as Radix mesiolingualis (RML).Access design was modified to a trapezoidal shape. A #10K Stainless Steel (SS) file was used to maintain the patency of the canal. The root canals were explored with #15K SS file and the working length was determined initially with an electronic apex locator (J Morita Root Zx) and confirmed with the radiograph. Chemomechanical preparation was done with the Neo Endo rotary system 20/06 in MB, DB and RML. Whereas, in palatal root enlargement was done upto F2 with Protaper Universal Rotary System by crown down technique. Irrigation sequence maintained as 3% sodium hypochlorite followed by normal saline and 17% EDTA for 1 minute again normal saline and at last 2% Chlorhexidine (CHX) was used. Temporization was done. During the second visit the canals were irrigated with normal saline and dried with paper points and master cone radiograph was taken and canals were obturated with the lateral condensation technique. Post endodontic build up was done.

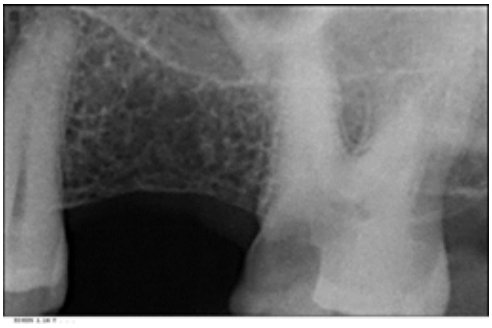


Fig. a). A preoperative radiograph of tooth #28.

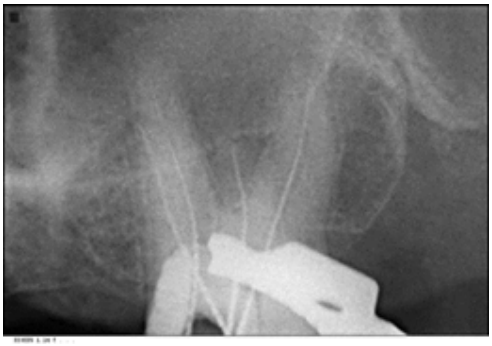


Fig. b) working length radiograph of tooth #28.

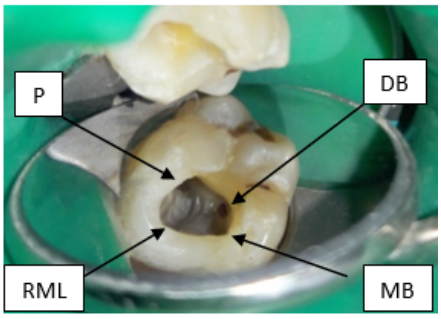


Fig.c). Intraoral picture showing orifices of tooth #28.

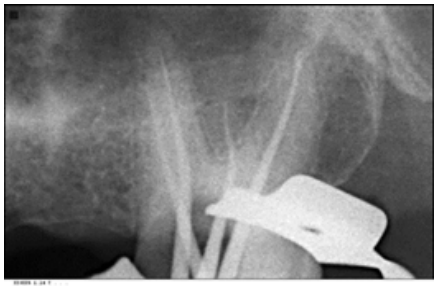


Fig.d). Master cone radiograph of tooth #28

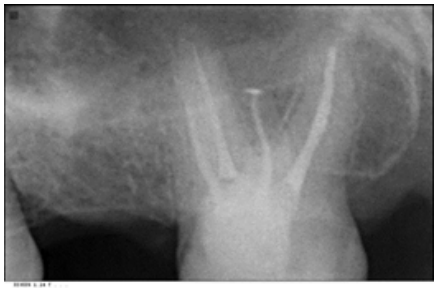


Fig.e) Post obturation radiograph of tooth #28

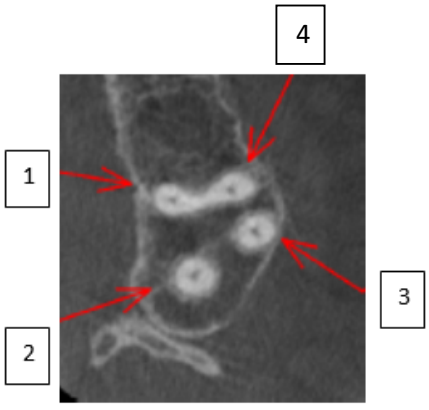


Fig. f) CBCT Images: axial section showing four rooted molar.
1 Mesiobuccal root
2 Distobuccal root
3 Palatal root
4 Supernumerary root/ RML

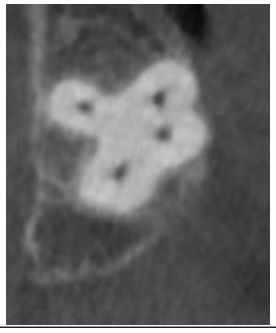
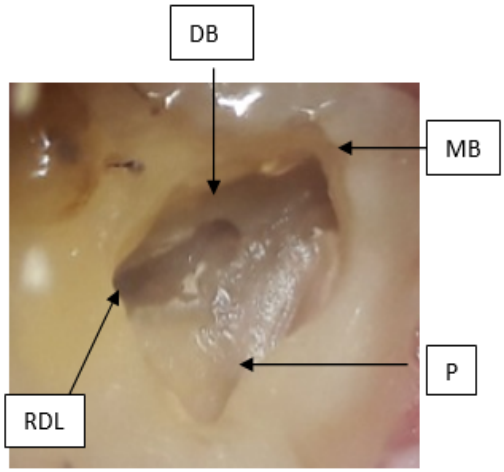


Fig. g) 3-dimensional image of maxillary second quadrant of tooth #28 showing two buccal and two palatal roots.

Case Report 2:

A 35-year-old male patient with a noncontributory medical history was referred to the Department of Conservative Dentistry and Endodontics for endodontic management of the left maxillary third molar (tooth no 28). The patient gave a history of continuous pain for the past two weeks. The pain aggravated particularly on consuming anything hot or cold, on biting, or upon lying down. Pain on percussion was positive. Clinical examination revealed the deep disto- occlusal caries and also some large crown size compared to other teeth in the arch. Preoperative radiograph revealed carious lesion involving enamel, dentin and approaching pulp and an obscure radiographic image of the roots. On the basis of radiographic and clinical examination the diagnosis was made of chronic irreversible pulpitis with symptomatic apical periodontitis indicating the need of endodontic treatment. The tooth was anesthetized using two percent lignocaine with 1:80,000 adrenaline and isolated under rubber dam. After removal of all carious tissue, pre endodontic build up with composite resin was done. Access cavity with a straight line access was prepared using an endodontic access bur (Dentsply Maillefer). A fourth root canal distopalatal to distobuccal root was observed on detailed visualization and access design was modified accordingly. 3% sodium hypochlorite was used to remove debris. A #10K Stainless Steel (SS) file was used to maintain the patency of the canal. The root canals were explored with #15K SS file and the working length was determined initially with an electronic apex locator(J Morita Root Zx)and confirmed radiographically. Chemo-mechanical preparation was done with the Neo Endo rotary system 20/06 in MB, DB and RDL. Whereas, in palatal root enlargement was done upto F2 with Protaper Universal Rotary System with the crown down technique. Irrigation sequence maintained as 3% sodium hypochlorite followed by normal saline and 17% EDTA for 1 minute again normal saline and at last 2% CHX was used. Temporization was done. During the second visit the canals were irrigated with normal saline and dried with paper points and master cone radiograph was taken and canals were obturated with the lateral condensation technique. Post endodontic build up was done.



MB- Mesio buccal, DB- Disto buccal, P-Palatal, RDL- Radix Disto lingualis

Fig. a) Intra-oral picture showing orifices of tooth #28

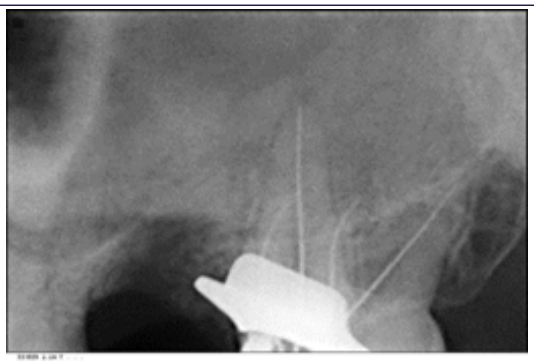


Fig.b) Working length radiograph of tooth#28.

Fig.c). Master cone radiograph of tooth #28.

Fig.d). Post obturation radiograph of tooth #28.

Discussion:

A thorough knowledge of root canal morphology, both internal as well as external and configuration of maxillary molar teeth plays an important role in the success of endodontic therapy. Vertucci FJ et al.,[4] and Cantatore G et al.,[3] stated that undetected extra roots or canals are recognized as a major reason for failure of root canal treatment. Extra canals are often left untreated as they are not located as stated by Cohen S and Burns RC[8]. Libfeld and Rostein[9] also examined 1200 molars and found a 0.4 per cent incidence of maxillary second molars with four roots. In this case, there were four separate roots located in both the cases. Hence, adequate knowledge, precision of work and patience to find the canals are all important in this respect. In 2000 Sidow *et al*.[10] evaluated 150 maxillary third molar roots and reported the prevalence of one root was 15%, two roots 32%, three roots 45% and four roots was 7% of maxillary third molars. In 1998, Guerisoli *et al*.[11] examined 155 maxillary third molars and found only 5 (3.2%) were four-rooted. In 2002 Alavi *et al*.[12] examined 151 maxillary third molars and found only 3 (2%) were four-rooted (fused) and 3 (2%) were four-rooted (other types). In 2008 Cosic *et al*.[13] reviewed 56 maxillary third molars and reported 1.8% were four-rooted. Carlsen and Alexandersen have coined the term radix mesiolingualis and/or radix distolingualis to refer to the extra palatal root. They reported that if two palatal roots exists, 1 is the normal whereas other could be the supernumerary.[14] Thus, as per the above mentioned studies, occurrence of four roots in maxillary third molar is a rare clinical scenario and is least documented in the literature. In the first case to confirm the supernumerary palatal structure, CBCT was done to evaluate accurate morphology of canals. Whereas, in both the cases, location of the extra root and root canal was made by pre-operative radiographs and dentin map. Thus, this case series highlights the importance of looking for additional roots and root canals so as to enable endodontist to treat the case successfully, which might have otherwise ended in treatment failure.

Conclusion:

Third molars always shows variable morphology and its limited accessibility and most distant position always make its root canal treatment a challenging task. Although, the incidence of extra roots or supernumerary structure is rare, the dentist must make every effort to find and treat all the canals for successful clinical results. Thorough clinical and radiographic evaluation plays a crucial role in identification of extra roots and thus leads the clinician towards a successful endodontic therapy.

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