

ENDODONTIC TREATMENT OF PERMANENT MAXILLARY SECOND MOLAR WITH TWO SEPERATE PALATAL ROOTS: A CASE REPORT

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ABSTRACT

The success of endodontic therapy relies on thorough cleaning and shaping of entire root canal system. The clinician must be aware of anatomical variations of the root canal system for the success of therapy. This case report deals and discusses the endodontic treatment of maxillary permanent second molar with two divergent palatal roots in adjunct with cone beam computed tomography

KEYWORDS: Anatomic variations; CBCT; Maxillary permanent first molar

INTRODUCTION

Successful endodontic therapy relies on accomplishment of the objectives of endodontic therapy i.e. thorough cleaning, shaping and obturation of root canal system.^[1] One of the main attributes to the failure of the therapy is the presence of untreated canals.^[1] Hence, thorough knowledge of both normal and unusual anatomy of the root canal system is essential for identification and treatment of extra canals and roots. Most studies on maxillary permanent first molar emphasize on the importance of locating and treating an extra canals in mesiobuccal root, but extra canals can also be seen in palatal and distal roots. The least frequently found anomaly is that of the two palatal roots. This case report describes the endodontic therapy of the permanent maxillary first molar with two separate divergent palatal roots with the adjunct of CBCT.

CASE REPORT

A 30 year old Indian female patient complaining of pain in upper left back region of jaw was referred for endodontic treatment of left maxillary permanent second molar. Clinically, deep proximal caries was seen with tender on percussion. Various tests and radiographic evaluation concluded the diagnosis of symptomatic irreversible pulpitis with apical periodontitis and the decision was taken to initiate

endodontic treatment. Local anaesthesia was administered with 2% lidocaine containing 1:80,000 epinephrine (Warren, India). A rubber dam was applied and coronal access was made with Endo Access bur and Endo-Z bur (Dentsply Tulsa Dental, Tulsa, OK, USA). The access was made resulting in trapezoidal shaped access opening. Four separate orifices of the canals were evident with two separate palatal canals; mesiobuccal, distobuccal, mesiopalatal and distopalatal. The mesiopalatal canals and distopalatal canal were located at the mesiopalatal and distopalatal line angle. Both palatal canals were negotiated beginning with K file #15. Both buccal canals were negotiated beginning with K file #10 followed by K file #15. Working length was determined using Dent port ZX (J-Morita) and confirmed using intra oral periapical radiograph. Temporary restoration (Cavit) was placed and patient was referred for cone beam computed tomography (CBCT) (digital volume tomography) for evaluation of morphology and three dimensional evaluations of the roots. Cleaning and shaping was done by crown down technique using Protaper rotary system (Dentsply) using Dentaport Root ZX (J-Morita). 3% sodium hypochlorite and saline were used as irrigants. Final irrigation was done with 17% EDTA solution followed by drying with sterile

paper points. Obturation was carried out at same appointment using gutta-percha points and sealer (RC Fill) by lateral compaction method. Post obturation radiograph was taken. The tooth was restored with silver amalgam permanent restoration.

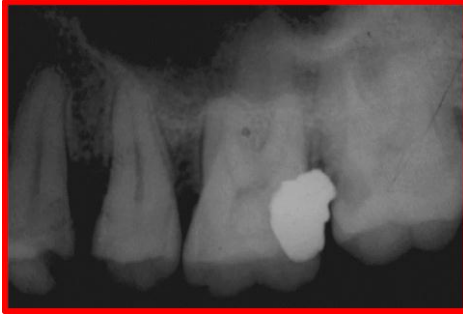


Fig. 1: Pre-Operative IOPA



Fig. 2: Case Working Length

CASE

Maxillary second molar with two divergent palatal roots were evident from preoperative radiograph and accordingly the access cavity was prepared and two palatal orifices were located at mesiopalatal and distopalatal line angle of the pulp chamber. Kittappa and Sekar classified extra canal in palatal root as mesiopalatal and distopalatal canal.^[2] Majority of the literature on maxillary molars has been focused on the complexities in morphology of the mesiobuccal root. Bratto Filho et al., reported that the frequency of extra roots and root canals in palatal roots are 2.05% (ex-vivo results), 0.62% (clinical results) and 4.55% (CBCT results).^[3] The palatal root anomalies even though are rare and less frequent should not be overlooked. Slowey, in 1974, first reported on treatment of maxillary molars with two palatal roots as well as showing another second molar with four separate roots.^[4] Stone and Stroner examined more than 500 extracted molars and found less than 2% incidence of multiple systems in which a single palatal root contains two separate orifices, canals and foramina.^[1]



Fig. 3: Clinical Pic

Variations in the palatal root were well established by Christie et al., who reported the endodontic treatment of maxillary molars with two palatal roots and classified them as Type I, II, III depending on the degree of root separation and divergence with some overlaps between groups.^[3] Christie et al., (1991) classified them as follows:

- Type 1: Two widely divergent palatal roots that are often long and tortuous.
- Type 2: Four separate roots that are often shorter and run parallel and have blunt apices.
- Type 3: Constricted root morphology with the mesiobuccal, mesiopalatal and distopalatal canal encaged in a web of root dentine. The distobuccal root appears to stand alone.

The cases discussed in this report were typical type 1 cases. Di Fiore also reported a type 2 case in maxillary first molar. Baratto Filho et al., reported three maxillary molars with type 1 classification in which one was case report and two were cleared teeth.^[5,6]

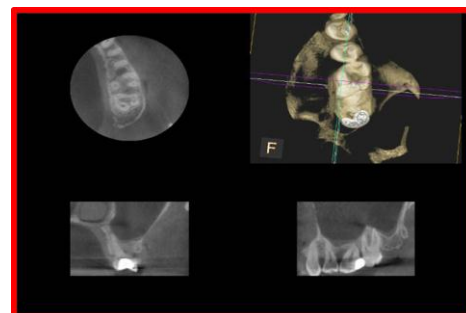


Fig. 4: DVT

Christie et al., suggested that maxillary molars with two palatal roots may be encountered once in three years in a busy endodontic practice.^[3] Peikoff et al., indicated in their study that the frequency of this variation of two separate palatal roots was nearly 1.4%. Tomazinho et al., (2010) reported a case with two palatal canals with separate roots along with two mesial and two distal canals.^[7] Sanghvi and Mistry (2012) reported maxillary second molar with two palatal

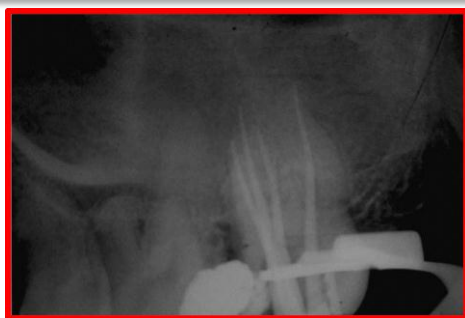


Fig. 5: Mastercone

canal in a case report.^[8] CBCT is considered by some to be the standard of care where 3D imaging is necessary in dentistry.^[9] CBCT scanning is a relatively newer diagnostic imaging modality that has been used in endodontics for effective evaluation of the root canal morphology.^[10] CBCT is done by using a rotating gantry to which an X-ray source and detector are fixed. The X-ray source and detector rotate around a fixed fulcrum within the region of interest (ROI). During the exposure sequence hundreds of planar projection images are acquired of the field of view (FOV) in an arc of at least 180°. This single rotation essentially provides immediate and accurate 3D radiographic images. CBCT also has limitations like, despite the provision of the third dimension, the spatial resolution of CBCT images (0.4mm to 0.076mm or equivalent to 1.25 to 6.5 line pairs permm-1 [l/mm-1]) is inferior to conventional film-based (approx. 20 l/mm-1) or digital (ranging from 8–20 l/mm-1) intraoral radiography, hence CBCT should be used only as a complementary modality for specific applications rather than a replacement for 2D imaging modalities.^[9,10] Jojo et al., used CBCT for better understanding of the root canal anatomy and confirmed the presence of the extra roots and canals.^[10]



Fig. 6: Obturation

CBCT was carried out in this case to determine in 3D topography of the root and any other missed canals with respect to other roots. CBCT

confirmed the presence of the extra separate palatal root in this case.

DISCUSSION

The least frequent anomaly in maxillary permanent molars is said to be that of two palatal roots. There are very few clinical reports in the literature on the management of maxillary permanent first molar with two separate and divergent palatal roots.

CONCLUSION

Anatomic variations do occur in all teeth including maxillary permanent second molars. The clinician should interpret the preoperative radiograph appropriately and critically and not only look for mesio-lingual canals. These extra roots or extra canals when left untreated can harbour microorganisms and lead to failure of treatment. Hence the clinician should be well versed with all possible variations in root canal anatomy for subsequent cleaning, shaping and obturation of root canal system for successful endodontic therapy.

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