

PERMANENT MAXILLARY PREMOLARS WITH THREE CANALS- A CASE REPORT

Endodontic

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ABSTRACT

Maxillary first premolar is a bi-rooted tooth with several variations in the root canal morphology. Usually it has 2 canals, however at times there could be an additional third canal present which could easily be missed by the clinician owing to lack of awareness and knowledge about the canal variations. Awareness of internal and external anatomy of tooth and also about its variations are essential for successful endodontic therapy. Prevalence of three canals in maxillary premolar is very low. This case report describes the endodontic management of permanent maxillary premolars with three root canals.

KEYWORDS

Maxillary Premolars, Three Canals, Radiographs, Endodontic Treatment.

INTRODUCTION

Adequate knowledge about variation in the anatomy of root canal, radiographs of the periapical region in different angles and thorough clinical examination of pulp chamber are all essential requisites for the diagnosis of additional roots and root canals.^[1] Anatomical variations that go unnoticed may result in failure of the endodontic treatment.

Maxillary premolars have two cusps in which buccal cusp is larger than the palatal cusp. In preoperative radiographs, visualizing or appreciating the presence of three canals in maxillary premolars can be difficult. In straight on radiographs of maxillary premolars, Sieraski et al found that whenever the mesiodistal width of the mid-root image was equal to or greater than mesiodistal width of the crown, the tooth was more likely to have three roots.^[2]

Biomechanical preparation followed by three dimensional obturation are the key factors for successful and effective root canal treatment. Identifying the variations in root canal system is the only way to achieve proper cleaning, disinfection and three dimensional obturation of the canal system. One of the major reasons for failure of endodontic treatment is the clinician's inability to detect an extra root and root canal.

Velmurugan et al (2005) have reported that only three out of 220 maxillary second premolar teeth that were endodontically treated had three roots and three canals.^[3]

Bellizzi and Hartwell (1985) found that out of 630 premolars only 1.1% of teeth were with three canals and did not report any with three roots.^[4] Despite the lower incidence, several studies have determined the existence of three canals in maxillary first and second premolar, which considerably makes endodontic treatment difficult.

The aim of this case report is to describe the endodontic management of maxillary first and second premolar with three root canals.

Case Report

Case - 1

A 37 year old male patient reported to the clinic with a chief complaint of spontaneous pain in the maxillary right first premolar region since 1 week. The pain was sharp, continuous and severe in intensity.

Intraorally deep distoproximal caries with pulp exposure was seen with respect to the maxillary right first premolar. The tooth was symptomatic and tender to percussion but there was no mobility. The tooth gave a delayed response to electric pulp testing thereby indicating an irreversible damage to the pulp.

A final diagnosis of chronic irreversible pulpitis with symptomatic apical periodontitis was made with respect to the right maxillary first

premolar. The patient was explained about the treatment plan and he was willing to undergo a root canal treatment. The tooth was anaesthetized and access cavity was prepared. Three separate root canal orifices were found on the same level of the pulp chamber floor, almost in one straight line drawn buccolingually (fig 2).

The canals were cleaned and shaped initially using hand files (Mani, Japan) upto no. 20 (2% taper) and then with the help of rotary Protaper files (DentsplyMallifer) upto a size of F2 using crown down technique. Irrigation was done with 5.25% sodium hypochlorite and 17% EDTA gel was used as a lubricant. An intracanal dressing of calcium hydroxide was given for one week.

In the next visit the patient was asymptomatic and the tooth was no longer tender on percussion. The canals were irrigated with 17 % EDTA to remove the smear layer and final rinsing was done with normal saline. Obturation was done with guttapercha points F2 (DentsplyMallifer) and AH plus sealer using cold lateral condensation technique. The patient was kept under observation and was asymptomatic with no clinical or radiographic signs of root canal failure after three months.

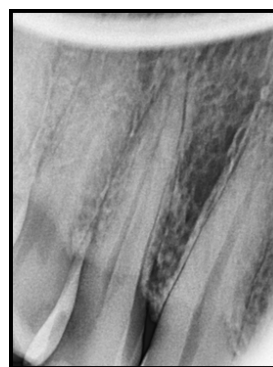


Fig 1 - Preoperative radiograph of tooth no # 14.



Fig 2 - Intraoral photograph of tooth no # 14 showing 3 canal orifices.

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Fig 3 – Post obturation radiograph of tooth no # 14 .

Case – 2

A 27 year old female patient with non-contributory medical history reported to our clinic, having pain in the right maxillary second premolar. On clinical examination, large carious lesion with pulp exposure was seen with respect to tooth no #15. The patient was sensitive to percussion and palpation and showed delayed response to electric pulp testing which indicated that irreversible pulpitis had occurred. Preoperative radiograph was taken which revealed deep carious lesion in tooth no #15 involving the pulp (fig 4).

Nonsurgical endodontic treatment was planned over two visits with the use of calcium hydroxide as inter-appointment, intra-canal medicament. After the administration of the local anesthetic, access cavity was prepared in tooth no # 15 and all the three root canal orifices were located, again in a straight line drawn buccolingually through the chamber floor (fig 5).

The cleaning and shaping followed by obturation of all the three canals were done in a similar manner as described in Case – 1. Post obturation restoration was done using composite and patient was kept under observation. Patient was asymptomatic and the follow up x-ray after 6 months revealed no signs of root canal failure (fig 8).



Fig 4 - Preoperative radiograph of tooth no # 15.



Fig 5 – Intraoral photograph of tooth no # 15 showing 3 canal orifices .

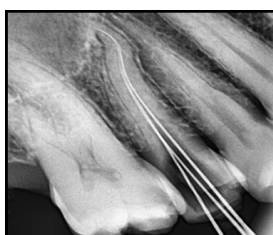


Fig 6 - Working length radiograph of tooth no # 15.



Fig 7 – Post obturation radiograph of tooth no # 15 .



Fig 8 – Six months follow up radiograph of tooth no # 15 .

DISCUSSION

The presence of an untreated or missed canal, inadequate debridement and incomplete obturation of the canal system are few of the most common reasons for failure of endodontic therapy.^[5] One of the most important prerequisites for successful endodontic treatment is preoperative radiographic interpretation of the tooth to be treated. Morphological variations in pulpal anatomy must always be considered before beginning the treatment.

A general guideline for the identification of a three-rooted maxillary premolar on a straight on preoperative radiograph is if the mesio-distal width of the mid-root image appears equal to or greater than the mesio-distal width of the crown image, then the tooth most likely has three canals. Slight modification of the access cavity is mandatory to locate the extra canal orifice in teeth with complex root anatomy.^[6] In both the cases mentioned in this report, one among the two buccal canals united with the other at the middle third and continued as one single canal till the apex and the third palatal canal had a separate individual exit.

Properly exploring and locating all of the root canals, cleaning and shaping, followed by three dimensional hermetic filling, are necessary for successful root canal treatment.^[7-8] Premolars with three root canals are rarely seen and reported. If complex root anatomy is seen, it should be documented and checked for extra root and canal by taking at least three radiographs from different angulations.

CONCLUSION:

Knowledge of the basic root canal anatomy and its variations from the normal is required for the success of non surgical root canal treatment. Careful interpretation of preoperative radiographs coupled with access refinement and inspection of the pulpal floor under magnification can play a very important role for successful root canal treatment of teeth with aberrant root anatomy.

REFERENCES:

1. Soares J. A., Leonardo R.T. Root canal treatment of three- rooted maxillary first and second premolars-a case report. *Int.End J.* 2003; 36: 705-10.
2. Sieraski SM, Taylor GT, Kohn RA. Identification and endodontic management of three canal maxillary premolars. *J Endod.* 1985; 15: 29-32.
3. Velmurugan N, Parameswaran A, Kandaswamy D, Smitha A, Vijayalakshmi D, Sowmya N. Maxillary second premolar with three roots and three separate root canals- case reports. *AustEndod J.* 2005; 31: 73-5.
4. Bellizzi R, Hartwell G. Radiographic evaluation of root canal anatomy of in vivo endodontically treated maxillary premolars. *J Endod.* 1985; 11: 37-9.
5. Javidi M, Zarei M, Vatanpour M. Endodontic treatment of a radicular maxillary premolar: a case report. *J Oral Sci.* 2008;50: 99-102.
6. Arishu HD, Alacam T. Diagnosis and treatment of three-rooted maxillary premolars. *Eur J Dent.* 2009;3: 62-6.
7. Karumaran CS, Gunaseelan R, Krithikadatta J. Microscope-aided endodontic treatment of maxillary first premolars with three roots: A case series. *Indian J Dent Res* 2011;22(5):706-8.
8. Peters OA. Accessing root canal systems: knowledge base and clinical techniques. *Endod Practice Today* 2008;2(2):87-104.