

# Successful Endodontic Treatment of a Maxillary Permanent First Molar with Two Palatal Roots - A Case Report

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## 1. Introduction

Endodontic therapy or root canal therapy is a sequence of treatment for the infected pulp of a tooth which results in the elimination of infection and the protection of the decontaminated tooth from future microbial invasion(6). The clinician should have a thorough knowledge of both normal and abnormal anatomy of the root canal system of the treatable tooth and its variation in order to achieve successful and predictable outcome with root canal treatment(8). Human molars show considerable anatomic variation and abnormalities with respect to number of roots and root canals. Maxillary first permanent molars are normally considered to be three rooted, one palatal and two buccal. In some cases of maxillary first permanent molar, the supernumerary palatal root, if present, is typically located either mesiobuccally or distolingually. The frequency of two palatal roots is low (0.4%-1.4%) and only a few cases have been reported in the literature(1,2,17). In this regard, an unusual canal anatomy associated with some maxillary first permanent molars have been investigated in several studies(7,10,11,12,13). They reported a variation in the number and morphology of root canal systems of some permanent maxillary first molars in which the palatal canal had a single orifice, but a trifurcation in the apical third with three separate foramina have been confirmed.

This case report describes successful endodontic treatment of a permanent maxillary first molar with two separate palatal roots, diagnosed and confirmed with the help of both preoperative and post operative radiographic images

## 2. Case Report

A 54 year old male patient referred from the Screening clinic to the Endodontic clinic of King Fahad Specialist Hospital, Dental Center, Alqassim, Buraidah, King Saudi Arabia, for root canal treatment of left maxillary first molar (tooth no.26), with a chief complaint of "my tooth had pain". There was no significant finding in his medical history. Clinically the tooth had a deep carious lesion on the distal surface(Figure 1). The tooth was tender to percussion. There was no mobility and periodontal status was reasonable. Pulp

vitality testing of the involved tooth with cold (DENRONIC, Acronova GmbH & Co. KG, Germany) and electric pulp stimulation (Parkel Electronics Division, Farmingdale, NY, USA) were positive, thus the provisional diagnosis was irreversible pulpitis and root canal therapy of left maxillary first molar (tooth no.26) was necessary to save the tooth.

After definite diagnosis and explaining the treatment procedures to the patient, the informed consent was taken from the patient. The tooth patient received local anesthesia of 2% lidocaine with 1:80000 epinephrine. After removing caries of the tooth, a conventional endodontic access cavity was made. Rubber dam was placed. Clinical examination with an endodontic explorer revealed five distinct orifices (in tooth no.26): two mesiobuccal orifices and one distobuccal orifice. Interestingly, two palatal roots, mesiopalatal and distopalatal, with two separate orifices and two separate canals as well as two dentin islands among them were noted. The usual access was modified to a trapezoidal shape in order to improve the access to the two palatal canals. After examination the canals with K-files no. 10 and 15, the coronal flaring with Protaper Universal Shaping file Sx and S1 was done. Working lengths were estimated with an apex locator and it was confirmed with periapical radiography (Figure 2). The canals were initially instrumented to a size no.15 K-file, under irrigation with 2.25% sodium hypochlorite. Canal preparation was performed using the crown-down technique with Protaper Universal Rotarfiles.

Final irrigation was done with 20 ml EDTA 17% then 20 ml sodium hypochlorite 5.25% followed by 20 ml normal saline irrigation. The canals were dried with paper points. Canals were obturated using cold lateral compaction of gutta percha and AH 26 sealer. Figure 4, are final radiography of root canal treatment of tooth no. 26 that revealed two palatal roots, mesiopalatal and distopalatal, with two separate canals and two separate root apices as well as two dentin islands in-between the two palatal roots. Coronal restoration was also performed in the next visit.



Preoperative periapical radiograph

Clinically the tooth had a deep carious lesion on the distal surface (Figure 1).



Initial files;

Working lengths were estimated with an apex locator and it was confirmed with periapical radiography (Figure 2).



Post-obturation periapical radiograph; are final radiography of root canal treatment of (tooth no. 26) Figure 4

### 3. Discussion

A root canal therapy is a treatment to repair and save a badly damaged or infected tooth. For effective endodontic therapy, dentists should offer equal care to all steps of the endodontic treatment. However, ideal endodontic procedure involves removing the damaged tooth pulp, cleaning, shaping and disinfecting the root canal and then filling and sealing it

(5,9,14,19). Noteworthy, there are many causes affecting the successful or failure of root canal therapy, for example the anatomical variation of the diseased tooth. Anatomical variation involving the number of root canals or the number of roots can occur in permanent maxillary molars. A low overall incidence (0.4%-1.4%) of maxillary molars with two palatal roots was reported by some investigators (7,10,11,12,13).

The tooth described in this case report was unique in that it had two fully separated palatal roots, with two separate canals and two separate root apices, as well as two dentin islands in-between the two palatal roots, thus it can be classified as type 1, according to Christie et al. (4). The occurrence of such anatomical variations emphasizes the need for special attention at both the diagnosis and operative procedures of treatment. This includes careful and meticulous assessment of pre-operative radiographs, to look for all the root outlines, changes of the root canals and location of root apices. Horizontally angled radiographs can also be helpful to distinguish the root morphology of molars (3). One of the most definite means for determining root canal morphology is visualizing the pattern of the pulp chamber floor (17). In the present case, the pulp chamber floor had a quadrangular shape with one canal orifice located at each corner. Thus the traditional access preparation for the permanent maxillary first molar which has a triangular outline was modified to a trapezoidal shape. As a result, knowledge of possible variations in the anatomy of human teeth is important for successful endodontic treatment.

### 4. Conclusion

The present case report is about the successful endodontic management of an unusual case of permanent maxillary first molar with two separated palatal roots.

The clinician should be attentive to the signs of anatomical variations, while performing endodontic therapy. Most common causes of treatment failure in permanent maxillary first molars are related to failure in detecting additional canals.

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