

# Permanent Maxillary Molar with Two Palatal Roots: Two Case Reports

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## ABSTRACT

The success of endodontic therapy depends on three dimensional cleaning, shaping and obturation of the entire root canal system. But this is often challenged by variation in internal anatomy of teeth. One of the rare variations is the presence of two palatal roots of maxillary molars. The following case report describes the management of maxillary first and second molar with two separate palatal roots. Although rare, anatomical aberration can occur in every tooth so awareness of their presence would help in successful endodontic therapy.

**Keywords:** maxillary first molar, maxillary second molar, two palatal roots, root canal morphology.

## INTRODUCTION

The success of root canal therapy (RCT) is associated with proper diagnosis and access cavity preparation along with thorough biomechanical preparation followed by three-dimensional obturation. One of the causes of early failure of RCT is incomplete debridement of all the canals due to either ignorance of the internal anatomy or failure of the operator to recognize the presence of accessory canal.<sup>1</sup>

In literature it is found that in almost all teeth accessory roots and/or canals can be found. The only difference is, in some teeth it is more commonly found and in others it is a rare finding.<sup>2</sup> The root canal anatomy of permanent maxillary molar is very complex. Generally in maxillary first and second molars there are three roots and three root canals; two buccal and one palatal. However the most frequent variant in its anatomy is presence of second mesio-buccal canal.<sup>3</sup> Limited number of cases with two separate palatal roots have been reported (Table 1). In a survey of 1200 molars by Libfield and Rotstein,<sup>13</sup> the incidence of maxillary molars with four roots was reported to be 0.4%. There are no

reports in the literature of differences in the incidence of unusual anatomy between first and second maxillary molars.

The aim of the present article is to highlight the endodontic management of maxillary first and second molar with two separate palatal roots.

## CASE REPORT 1

A 58 years old female patient reported to the department of Conservative Dentistry and Endodontics with a chief complaint of pain on biting in upper left back teeth region since past two months. Medical history was non-contributory. On clinical examination, there was a large mesio-occlusal Class II amalgam restoration, with an overhang, on left maxillary first molar (tooth number 26). The tooth was non-responsive to thermal and electric pulp testing and the tooth was slightly tender on percussion test. Radiographic examination revealed the tooth was root canal treated but only the disto-buccal and palatal canals were obturated and there was around 1x1mm<sup>2</sup> radiolucency in relation to mesial root of the tooth. Therefore a re-root canal treatment

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was planned and amalgam restoration was removed. Guttapurcha (GP) from palatal and disto-buccal canals was also removed using Endosolve (Septodont) and Hedstrom files (Mani). On exploring the access cavity, it was observed that the palatal canal was placed more distally than normal so a search in slightly mesial direction, lead to second palatal canal. By evaluating the radiograph from different angulation, it was concluded the tooth had additional palatal root. Furthermore a second mesio-buccal canal was also located 1mm palatal to the first mesio-buccal canal. All the canals were negotiated initially with no 10 # file (Mani). The working length of each canal was estimated using an apex locator (iPex II, NSK) and confirmed with intraoral peri-apical radiograph (IOPA). Coronal flaring was done using Gates Glidden drills number 1 to 4 (Dentsply Maillefer). Cleaning and shaping was done using stainless steel hand file system (Mani) under copious irrigation with 2% sodium hypochlorite. Calcium hydroxide (RC Cal, Apexion) was used as intra canal medicament for 10 days and the canals were then obturated with GP (Gapadent) and AH plus resin sealer (Dentsply Maillefer) using lateral condensation technique. The tooth was then temporarily restored with Cavit (3M ESPE) and the patient was referred to department of prosthodontics for post-core and crown restoration (Figure 1 to Figure 4).



**Figure 1: Pre-operative radiograph**

**Figure 2: Access cavity showing all five canals MB1, MB2, DB, MP and DP**



**Figure 3: Master cone radiograph**

**Figure 4: Post obturation radiograph**

### CASE REPORT 2

A 35 years old female patient came to the department of Conservative Dentistry and Endodontics with the chief complaint of severe radiating pain in upper left back tooth since three days. She also gave the history of spontaneous pain and night pain which had little relieving effect after taking analgesics. On clinical examination, a deep Class I carious lesion was found in left maxillary second molar (tooth number 27). Thermal testing showed exaggerated response and the tooth was tender on percussion test. Intra oral peri-apical radiograph showed slight widening of the periodontal ligament space. The diagnosis was made as chronic irreversible pulpitis and endodontic therapy was planned. Access cavity was prepared after administration of local anaesthesia using 2% lignocaine with 1:100000 adrenaline. On removal of the coronal pulp, four bleeding points; two on buccal and two on palatal aspect were observed. Dentinal mapping on the floor of pulp chamber also showed a furcation on the palatal side. Two palatal orifices were fairly well separated, exiting from the floor of the pulp. The pulp was extirpated from all the four canals no 10 K file was used to negotiate the canals. The working length of each canal was estimated using an apex locator (iPex II, NSK) and confirmed with intraoral peri-apical radiograph (IOPA). Rotary ProTaper file system (Dentsply, Maillefer) was employed to prepare

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the canal under copious irrigation of 2% sodium hypochlorite. The canals were obturated with ProTaper gutta-percha cones and AH-plus sealer (Dentsply, Maillefer) using cold lateral compaction technique. Then the access cavity was restored with light cure composite restorative material (P60, 3M, ESPE). The patient was referred to department of prosthodontics for crown (Figure 5 to Figure 8).

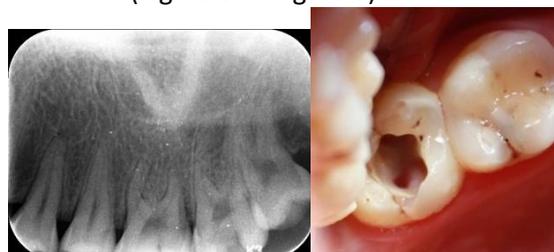


Figure 5: Pre-operative radiograph

Figure 6: Access cavity showing all four canals MB, DB, MP and DP



Figure 7: Master cone radiograph

Figure 8: Post obturation radiograph

Table 1: Review of case reports of two palatal roots in maxillary molars.

Reference	Tooth type	No of teeth	Key information
Deveaux E 1999(4)	Maxillary second molar	1	1 MB, 1 DB, 1MP, 1DP
Di Fiore PM 1999 (5)	Maxillary first molar	1	1 MB, 1 DB, 1MP, 1DP
Baratto-Filho F Fariniuk LF et al. 2002(6)	Maxillary first molar	1	1 MB, 1 DB, 1MP, 1DP
Barbizam JV, Ribeiro RG, et al. 2004 (7)	Maxillary first molar Maxillary second molar	1 1	1 MB, 1 DB, 1MP, 1DP
Adanir N 2007(8)	Maxillary first molar	1	1 MB, 2 DB, 2MP, 1DP
Chakradhar Raju RV, Chandrasekhar V et al. 2010 (9)	Maxillary first molar	2	1 MB, 1 DB, 1MP, 1DP
Prashanth MB, Jain P, et al. 2010(10)	Maxillary second molar	1	1 MB, 1 DB, 1MP, 1DP
Fakhari E, Shokraneh A 2013 (11)	Maxillary second molar	1	1 MB, 1 DB, 1MP, 1DP
Nabavizadeh M, Abbaszadegan A, et al. 2015 (12)	Maxillary second molar	1	1 MB, 1 DB, 1MP, 1DP

MB: Mesiobuccal, DB: Distobuccal, MP: Mesiopalatal, DP: Distopalatal.

## DISCUSSION

The present paper describes a rare anatomical variation of permanent maxillary molars with two distinct separate palatal roots. Cristie et al.<sup>14</sup> in a clinical retrospective review of the endodontic treatment of 16 maxillary molars

and six extracted maxillary molar all with two palatal roots, classified these teeth into three types according to the degree of root separation and divergence; Type I with two widely divergent long and tortuous palatal roots, Type II with short, parallel roots with blunt apices, Type

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III with convergent roots and a distinctly divergent fourth disto-buccal root. Both the teeth treated in this case could be considered as Type II molar.

Interpretation of intra-oral peri-apical radiographs of maxillary molars is difficult due to superimposition of structures like zygomatic arch prominence and maxillary sinus. However, if the outline of the roots is unclear, if the root canals show sharp density changes or if the apices cannot be well defined, then extra roots and/or canals can be suspected. Taking multiple radiographs with change in horizontal angulation can help to distinguish the multiple roots of molars.<sup>15</sup> Furthermore, various articles described the use of cone beam or spiral computed tomography scans as a valuable method for initial identification of the morphology of the teeth.<sup>16</sup>

An examination of the floor of the pulp chamber also offers clues to the type of canal configuration present. Dentinal mapping at the floor of the pulp chamber are often valuable for detection of extra root canals. Additionally, when there is only one canal, it is usually located rather easily in the centre of the access preparation. If only one orifice is found and it is not in the centre of the tooth, it is probable that another canal is present and the operator should search for it on the opposite side as was with our first case. Other clinical method for determination of presence of additional roots include examination of cervical prominence through periodontal probing and also detection of palatogingival groove on the lingual surface of the crown and the root.<sup>11</sup>

Although the incidence of maxillary molar with two palatal canals is not common, it is important for clinicians to be aware of unusual canal configurations. Knowledge of possible variations in internal anatomy of teeth, careful examination of the pre-operative radiographs and access cavity is essential for a successful endodontic therapy.

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