

## Case Report

### Endodontic retreatment of a maxillary first molar with two palatal roots and three palatal canals

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#### Abstract

**Aim:** To report an unusual anatomy of permanent maxillary first molar. **Summary:** Variations in the dental anatomy are common. A thorough knowledge of these anatomic variations is critical to the success of the endodontic treatment. This article reports a clinical case of a maxillary first molar requiring endodontic re-treatment that had two palatal roots and three palatal canals. This case represents an uncommon anatomical condition and stresses upon the importance of exploring for the presence of extra roots and canals.

#### Key learning points:

- Clinician should be aware of anatomical variations in maxillary molars.
- Maxillary molars may have supplementary palatal roots as well as additional root canals.

**Key words:** Anatomical variations, maxillary molars, number of roots. root anatomv.

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#### Introduction

Variations in the root and canal morphology are a common occurrence. The clinician should have a thorough knowledge of dental anatomy and its variations in order to achieve successful and predictable outcome with root canal treatment. Maxillary first permanent molars are generally considered to be three rooted, one palatal and two buccal. The additional root canal, if present, is typically located in the mesiobuccal root. The frequency of two palatal roots is low

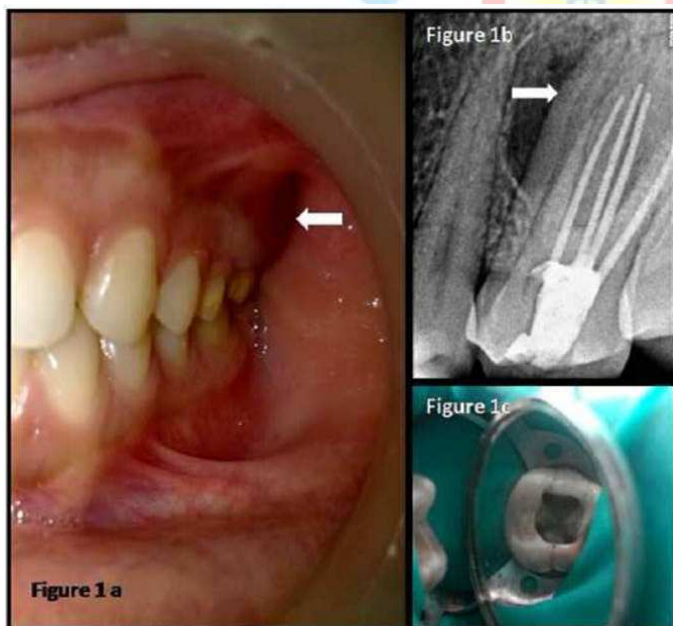
(0.4%-1.4%) and only a few cases have been reported in the literature.<sup>[1,2]</sup> The extra palatal root is a supernumerary structure which can be located either mesiolingually or distolingually. Accordingly, they are designated as Radix Mesiolingualis and Radix Distolingualis respectively, based on their relation with the crown of the tooth.<sup>[3]</sup> Stone and Stroner<sup>[4]</sup> reported variations of the palatal root of maxillary molars, such as a single root with two separate orifices, two

separate canals and two separate foramina, two separate roots each with an orifice, one canal and one foramen, single root with one orifice, a bifurcated canal and two separate foramina. Benenati<sup>[5]</sup> reported a maxillary second molar with two palatal roots and a groove located in this side of the tooth. According to the author, this groove was the result of the formation of two palatal roots. Christie et al<sup>[6]</sup> analysed 22 maxillary molars with two palatal roots and classified them into three types (type I-III) according to their root separation level and their divergences. This article reports a unique case of endodontic re-treatment of a maxillary molar with two palatal roots and three palatal canals.

### Case report

A 20 year old female patient reported to the private practice with the chief complaint of swelling and pain associated with the left upper back tooth. Patient's medical history was non contributory. Oral examination revealed a fluctuant swelling in the buccal vestibule above the maxillary left first molar (figure 1a).

The patient gave the history of non-surgical root canal treatment done with that tooth a month before. The swelling was nearly 2 cm in greatest diameter. The tooth was moderately tender on percussion. Intra Oral periapical radiograph of the tooth revealed the previous obturation done with that tooth. The interesting finding was the presence of two palatal roots, the Mesiopalatal root and the Distopalatal root. The Mesiopalatal root was missed by the treating dentist and was left unobturated (Figure 1b). This root was also associated with a periapical radiolucency. A diagnosis of chronic periapical abscess associated with the untreated mesiopalatal root was made and it was decided to carry out non-surgical endodontic re-treatment with the maxillary left first molar. The treatment plan was explained to the patient and her consent was obtained. The tooth was anaesthetized by way of left posterior superior alveolar nerve block and local infiltration in the buccal vestibule using a 2% solution of lidocaine hydrochloride with 1:80000 adrenaline (Lignox 2%A, Warren Indoco).



**Figures: 1(a)** Pre-operative intraoral frontal view. Note the swelling in the buccal vestibule (indicated by arrow). **(1b):** Pre-operative periapical radiograph of tooth #14. Note the untreated mesiopalatal root (indicated by arrow). **1(c):** Access cavity prepared. The four canal orifices are located.

Subsequently the tooth was isolated under rubber dam and endodontic access cavity was prepared with a round diamond point in a high speed air-rotor handpiece. The four canal orifices were located with the help of an endodontic explorer (DG 16, Dentsply, Maillefer) (Figure 1c). The existing obturation was cleaned with the help of a GP solvent (R C Solve, Prime Dental Products) and hand K files. The mesiopalatal canal was located and the working length was established (Figure 2a).



**Figures: 2 (a):** Working length determination radiograph. Note the distopalatal root has two canals. **2 (b):** Post-operative radiograph. All the five canals are well obturated.

The canals were cleaned and shaped using a Crown Down technique. During instrumentation the canals were copiously irrigated with a 5% solution of sodium hypochlorite. An intracanal calcium hydroxide dressing was placed and the patient recalled after one week. On the second visit the vestibular swelling was completely resolved and the tooth was asymptomatic. After thorough cleaning and drying the canals were obturated by cold lateral compaction of gutta percha cones using a resin based sealer (AH plus, Dentsply, Maillefer) (Figure 2 b). Finally, the tooth was closed with a coronal resin based composite restoration.

## Discussion

Anatomical variations involving the number of root canals<sup>[7]</sup> or the number of roots<sup>[8]</sup> can occur in permanent maxillary molars. A low incidence (1.4%) of maxillary molars with two palatal roots was reported by Peikoff et al.<sup>[2]</sup> Libfield and Rotstein<sup>[1]</sup> examined 1200 maxillary molars and reported an overall incidence of 0.4% for two palatal roots.

The tooth described in this case report had fully separated palatal roots. Thus it can be classified as type I, according to Christie et al.<sup>[6]</sup> As the supernumerary palatal root in this case was located mesial to the normal palatal root, it can be designated as Radix Mesiolingualis according to Carlson et al.<sup>[3]</sup> The present tooth was also unique in that it had two root canals in the disto-palatal root. Thus, in all there were five root canals, 2 buccal and 3 palatal.

The occurrence of such anatomic variations emphasizes the need for special attention at both the diagnostic and operative phases of the treatment. This includes careful and meticulous assessment of pre-operative radiographs, to look for all the root outlines, sharp density changes of the root canals and location of root apices. Horizontally angled radiographs can also be helpful to distinguish the multiple root morphology of molars.<sup>[9]</sup> One of the most definitive means for determining root canal morphology is visualizing the pattern of the pulp chamber floor.<sup>[10]</sup> 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 maxillary first molar which has a triangular outline was modified to a trapezoidal shape. Thus, knowledge of possible variations in the anatomy of human teeth is important for successful endodontic treatment.

### Conclusion

1. The possibility of a palatal root with one or more canals, as well as the existence of two palatal roots should be considered when treating maxillary molars.
2. The clinician should be attentive to the signs of anatomical variations while performing endodontic therapy.

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