

Four pillars of maxillary first molar: A case report of a rare configuration with two palatal roots

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Abstract

The presence of an extra root and atypical root canal morphology must be clearly recognized since it dictates the success of endodontic treatment. Abnormalities in root canal anatomy are a regular occurrence. For successful endodontic therapy, A detailed understanding of basic root canal structure and its variants is essential. This research emphasizes the need of looking for extra roots and canals since identifying their existence would

aid a clinician in successfully treating a case that could otherwise fail.

Keywords: Anatomical variations, maxillary molars, number of canals and roots

Introduction

The existence of several roots and atypical root canal anatomy should always be recognised and understood since it impacts the success of endodontic treatment.¹ Regardless of procedure, if practitioners neglect an extra root or canal, it can offer a significant problem and lead

to endodontic treatment failure. A permanent upper molar tooth commonly consisting of one palatal root with two buccal roots has a second Mesio buccal canal as a common variant. A maxillary first molar having five root canals, three of which were in the mesio buccal root, was recorded by Beatty.² Bond et al., Martinez-Berna, Ruiz-Badanelli examined at 338 maxillary first molars and found three cases with six canals, three in the mesio buccal root, two in the distobuccal root, and one in the palatal root.^{3,4} Christie et al. studied endodontic therapy in 16 maxillary molars and six extracted teeth with two palatal roots, and they divided the 22 molars into three groups based on root separation and divergences.⁵ There are many such case reports of maxillary molars having two palatal canals or roots.^{6,7}

Case Report

A 28-year-old male patient was sent in the Department of Endodontics with pain in respect to 26 tooth. The patient's medical history had no affect on the case. The patient required endodontic treatment after a clinical, radiographic, and pulp testing assessment revealed that the tooth appeared symptomatic. An extra palatal root was seen on the preoperative radiographic. [Figure 1].

The patient was given a local anaesthetic of 2% lidocaine and 1:80,000 epinephrine in preparation for endodontic treatment. An access opening was prepared. After removing the coronal pulp and exploring the root canals with a DG16 endodontic explorer, three major orifices were discovered: Mesio buccal, distobuccal, and palatal, as well as a minor bleeding spot near to the palatal orifice

The conventional triangular access was modified to a trapezoidal shape to improve access to additional palatal canal [Figure 3a, b]. An apex locator (Coltene) was used to measure the working length of each canal, which was then validated using an intraoral periapical radiograph.

[Figure 2a]. The canals were initially instrumented with #15 nickel titanium files (Dentsply Maillefer) under irrigation with 3 percent of sodium hypochlorite. Biomechanical preparation was performed using the crown down technique with nickel-titanium rotary instruments (Rotary Nickel Titanium K3XF Endodontic Files, Sybron, Glendora, USA. All canals (MB, DB, MP, DP) were enlarged to a 20.06 file. Master cone radiograph was taken [Figure 2b]. Final irrigation with 15% EDTA followed by 3% sodium hypochlorite and obturated with gutta-percha using AH plus resin sealer [Figure 2c]. Tooth was restored with a posterior composite filling [Figure 2d].

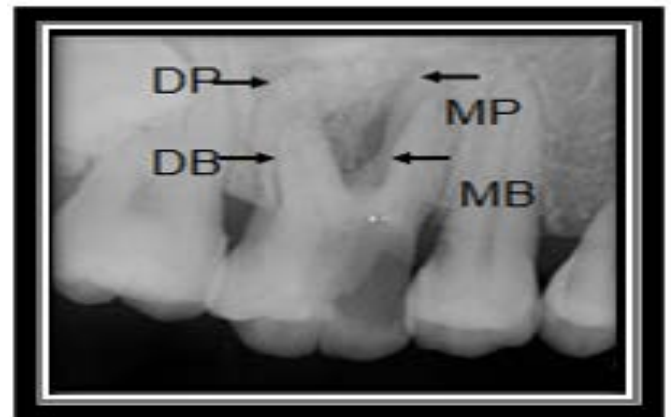


Figure 1: preoperative radiograph of 26.

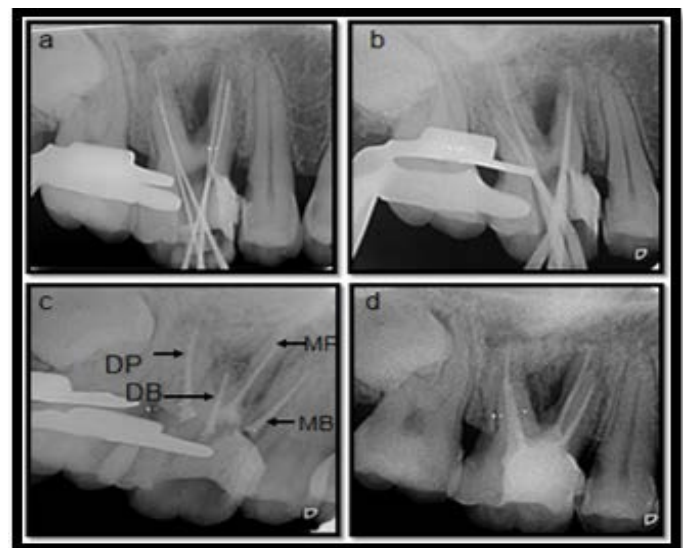


Figure 2: a-working length; b-master cone; c-obturation; d-2 post-operative composite restoration.

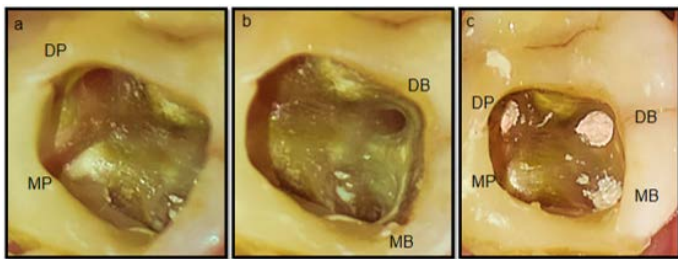


Figure 3: clinical pictures of 26 a-mesiopalatal and distopalatal canals; b-Mesiobuccal and distobuccal canals; c-obturation of 26

Discussion

Several reports of anatomical variations in maxillary permanent molars has been reported in literature.

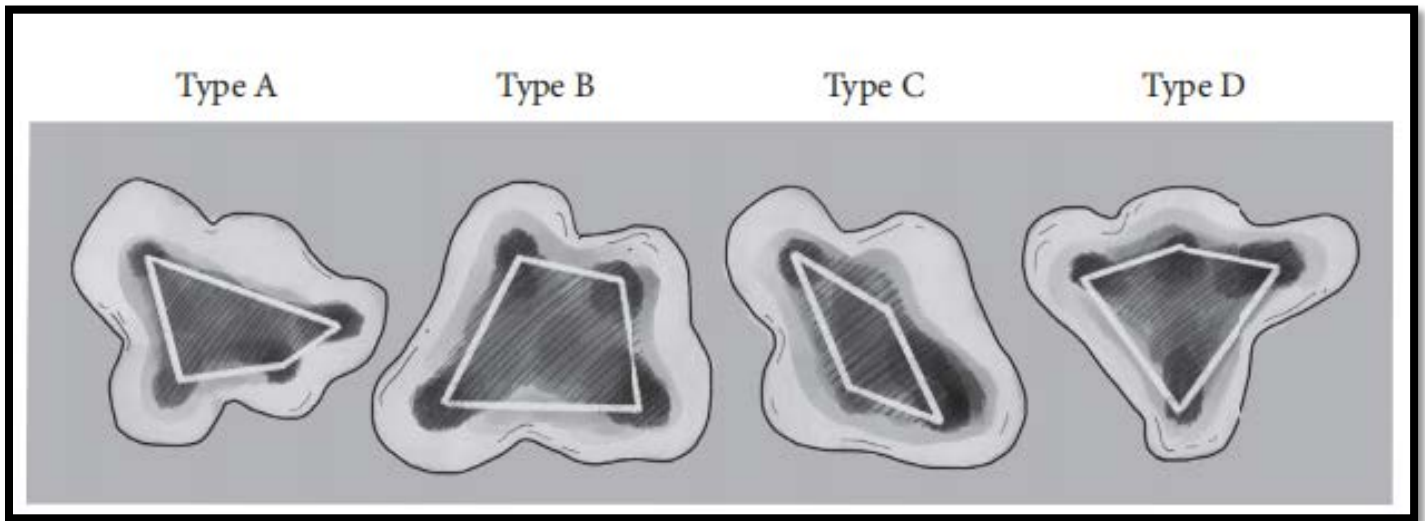
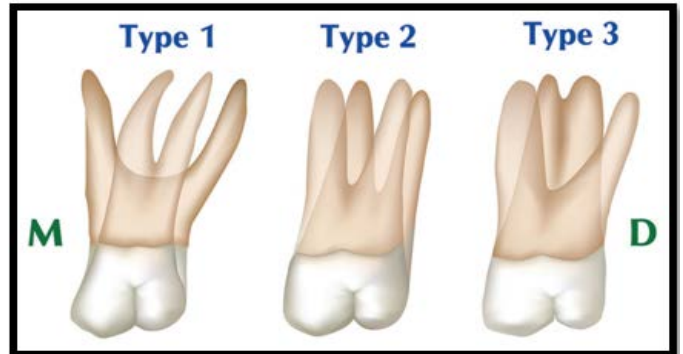
TYPE CLASSIFICATION

- I** Two widely divergent palatal roots that are often long and tortuous. Buccal roots of the tooth are often cow horned and less divergent. Four separate root apices are seen on the radiograph.
- II** Four separate roots are seen, but are often shorter, run parallel have buccal and lingual root morphology and have blunt apices. Radiograph with buccolingual superimposition may make this appear as having only a mesial and distal root.
- III** Constricted in root morphology with MB, MP, and DP canal encaged in a web of root dentin. The DB root in these cases appears to stand alone and may even diverge.

Figure 5:

Christie et al. reported 16 cases of variants in maxillary molar with two palatal roots and then classified into three types.

Figure 4:



Schematic drawing of Versiani's configuration of canal orifices in relation to the pulpal chamber floor as:-

- Type A (irregular quadrilateral-shaped),
- Type B (trapezoid-shaped),
- Type C (lozenge shaped), and
- Type D (kite-shaped).

The present case come under Type 2 Christie et al.⁵ Classification and type B Versiani's configuration of pulp chamber floor.⁸

Slowey described an upper molar with extra palatal roots.⁹ Libfield and Rostein studied 1200 molars and observed 0.4 percent of maxillary molars with four roots.¹⁰ On this side, Benenati characterised a maxillary second molar having two palatal roots and a groove.¹¹ A literature review by Magnucki G states that the occurrence rate is 0.04% for 4-rooted upper first molars in humans.¹²

The cause of formation is unknown. Its emergence in supernumerary roots could be attributed to extrinsic influences during odontogenesis or penetrance of the atavistic gene. According to Curzon, the additional rooted molar characteristic has a significant degree of genetic penetrance.¹³

1. There may be variance in root morphology in mandibular molars as well. According to Carlsen and Alexandersen, if an extra root is present distolingually, it should be referred to as Radix Entomolaris.¹⁴ Radix Paramolaris is the name given to an extra root found mesiobuccally.¹⁵

2. To determine the presence of an additional root, a perhaps different approach should be taken than usual procedural protocol, and the clinician should search for the following symptoms that may indicate the presence of an extra root -Cervical prominence – it could be identified through periodontal probing

3. Extra cusp – which occurs in conjunction with cervical prominence

4. Radiographic examination – radiographs must be collected at various angles

5. CT scan

Conclusion

The variety in root or root canal form, particularly in multirouted teeth, makes diagnosis and endodontic therapy difficult. It's essential to understand common anatomical features and how they can vary. Unknown variations, such as the one stated, must be understood because failing to treat one more root or root canal can result in endodontic treatment failure. Although the occurrence of an extra palatal root is unusual, it is nonetheless possible and whenever an endodontist encounters unexpected challenges or a patient complains of chronic post-medication pain, the greater chance of an extra canal or root must be considered. The current study highlights the importance of the endodontist's surveillance and awareness of abnormal anatomical conditions.

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