

Endodontic Management of an Maxillary First Molar with Two Palatal Canals: Report of Two Cases

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Abstract

Successful endodontic therapy requires in-depth familiarity with the anatomy and internal morphology of a root canal system. Variation in the structure and form of the first permanent molar in the maxilla has led to a thorough examination of this tooth. Rarely have researchers found evidence of two canals in a two-rooted maxillary first molar in their studies of tooth and root canal anatomy. Here are two examples of maxillary first molars that needed to have both the buccal and palatal canals treated.

Keywords: Dental pulp cavity, Management, Maxillary molar, Tooth abnormalities.

INTRODUCTION

Apical periodontitis is avoided and, if it has already developed, its recovery is aided by endodontic therapy.^[1,2] Failure to successfully navigate, clean, endodontic treatment failure occurs most often when the dentist fails to locate and obturate all prior root canals.^[3] Understanding the intricate anatomy of the root canal system is crucial for effective endodontic treatment. There are one palatal root and two buccal roots in the set of permanent maxillary molars. A second mesiobuccal canal may be present.^[4]

Both the mean number of canals per root and the total number of roots have been observed to vary widely across different sources. Normal maxillary first molars have three roots and four canals;^[4] the mesiobuccal root has two canals because its buccolingual dimension is larger than the buccal and lingual roots and it shares their concavities, while the distobuccal and palatal roots each have one canal.^[5] Two mesiobuccal canals have been found between a prevalence of 18% to a prevalence of 96.1%.^[6] One,^[7] four,^[8] and five^[9] roots, as well as atypical shape of root canal networks inside individual roots, are further variants for maxillary first molars. In the past, there have been reports of cases involving five^[10] or six^[11] root canals, as well as a C-shaped canal design. The calcification and morphological changes that occur with age make it more difficult to determine a maximum number of root canals, which explain why fewer canals are detected in maxillary molars in older people.^[11] The second maxillary molars are reported to have two palatal roots.^[12]

Two individuals each had a maxillary first molar with two palatal canals, as seen in this case report.

CASE REPORT

Case 1

A 26-year-old woman went to the endodontic OPD because she had been experiencing pain in her right maxillary first molar for 2 days. The patient did not have an unusual clinical history. Clinical examination revealed severe mesial caries. There was sensitivity in the tooth when exposed to different temperatures, the electric mash test, and vertical pounding. Researchers discovered irreversible pulpitis and apical periodontitis in the tooth. The intraoral periapical radiograph taken before treatment showed severe caries that had reached the pulp in two palatal roots. Local anesthetic was administered using 1:80,000 adrenaline bitartrate and 2% lignocaine hydrochloride. After the caries were taken out, normal saline was used to thoroughly rinse the pulp chamber. Two mesial (MB1, MB2), one distobuccal, and two palatal (P1, P2) waterways were identified by examination of the root canal access holes.

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The size of the buccal cavity was around average. No further openings were found despite extensive digging. After a K-Flexofile (Dentsply, Maillefer, Switzerland) examination of the root canals revealed that their functionality was still uncertain, an intraoral periapical radiograph taken from the mesial and distal angulations was taken, and NT Rainbow S turning records were used with a crown-down procedure of up to 30/4% for all canals except the MB2 canal, which was set up to 25/4%. Root canals were instrumented while inundated with 2.5% NaOCl and a saline solution. After the root canals were dried, the expert cones were adjusted, gutta-percha sealer was packed into the trenches using the parallel compaction method, the entrance depression was filled with an extremely long-lasting rebuilding, and the tooth was assigned, a post-obturation radiograph was taken.

Case 2

A 19-year-old woman visited the endodontic OPD because her first maxillary tooth on the right side was giving her discomfort. There was nothing relevant in her medical background. Deep occlusal caries, manifested by spontaneous discomfort and sensitivity on percussion, was seen on clinical examination of the right maxillary first molar. Apical periodontitis and irreversible pulpitis were shown to be the causes of the tooth's demise. There were found to be two palatal roots on the pre-operative intraoral periapical radiograph. To get the patient ready for endodontic treatment, a local anesthetic consisting of 2% lignocaine hydrochloride with 1:80,000 adrenaline bitartrate was administered. Six openings were discovered when the standard triangle access cavity was reshaped into a trapezoid. There were six total canals: Two mesial (MB1 and MB2), P1 and P2 are palatal, whereas DB1 and DB2 are distal. After the coronal pulp was removed, a periapical radiograph was taken intraorally to determine the exact length of each canal's usable space. After using a #15 and #20 hand K-file (Dentsply Maillefer, Ballaigues, Switzerland) to guide us through the canals, we finished shaping the canals using a crown-down approach and an NT Rainbow S rotary file as the master apical file for the MB1, DB1, and palatal canals, and the MB2 and DB2 canals, to a maximum of 30/4% and 25/4%, respectively. During root canal instrumentation, a solution of normal saline and 2.5% NaOCl was used to irrigate the canals. The root trenches were washed with regular saline, dried, and then the expert cones were switched out and the channels were obturated with gutta-percha using the parallel compaction method. The tooth was obturated once the permanent restoration was finished, and a radiograph was obtained at that point.

DISCUSSION

There is more variation in the quantity and form of the roots of the maxillary second molars among ethnic groups^[13] than there is in the first molars. The mesiobuccal root of the maxillary molar has been the primary focus of previous research of anatomical differences in this tooth. Two or more root canals have been documented in 40.3%–87.2% of maxillary first

molars and 15.1%–57.94% of maxillary second molars.^[14] However, palatal root anatomy, which is less variable, has been the subject of fewer studies. Excluding the third molars, Stone and Stroner analyzed 500 removed maxillary molars and found that 2% of them had extra root canals in the palatal root.^[15]

When looking at maxillary first molars, Mohara *et al.* found that 64.22% of those teeth had additional root canals in the mesiobuccal and palatal roots, while only 3.35% of those teeth had mesiobuccal and 0.34% of those teeth had palatal roots.^[16] Mandibular molars are known for their distinctive C-shaped root canal arrangement, an anatomical abnormality induced by the fusion of the roots. C-shaped root canals, which occur when roots fuse together, are unusual in the maxillary molars. It has been shown that the number of canals identified and filled during an endodontic procedure does not always match the true number of canals present in a tooth. Due to the complexity of the situation, finding all of the root canals might be challenging. Therefore, it is essential to learn about the factors that influence root canal detection and care. Radiographs, magnification, clinical assessments, dye injection, tooth sectioning, and scanning electron microscopy are just some of the many research techniques that have been utilized to report and debate the presence of additional root canals.^[17]

In each of the reported instances here, pre-treatment radiographs hinted to the existence of a second palatal root. If two palatal roots might be present, the access cavity must be adjusted. Particularly if the entry of the palatal root canal is not at the geometric center of the tooth, but rather mesially or distally, a second root canal may be considered. The access cavity was widened distally using a circular bur since the initial palatal root canal's opening was situated medially. It may be possible to locate the root canal opening by checking the color of the pulpal floor when the access cavity is being prepared. During the course of treatment, to gain a complete view of the root canal's morphology, it is necessary to assess radiographs collected from a variety of horizontal angles. Pre-operative radiographs and supplementary radiographic images at 20° of mesial or distal angulation may be used to assess root canal form and structure.^[18]

Before performing root canal therapy on maxillary molars with complex anatomy, clinicians can use cone beam computed tomography (CBCT) for treatment planning. Root canal treatment on teeth with complex anatomical features requires the use of the dental operating microscope, the second tool. A dental operating microscope allows dentists to more accurately examine problem areas and perform intricate procedures. The success rate of endodontic therapy may be improved if the practitioner is aware of the palatal root variations that occur and makes the necessary adjustments.

CONCLUSION

The shape of root canals and their variations must be understood well by clinicians. Before beginning root canal therapy, radiographs should be taken to assess the canals'

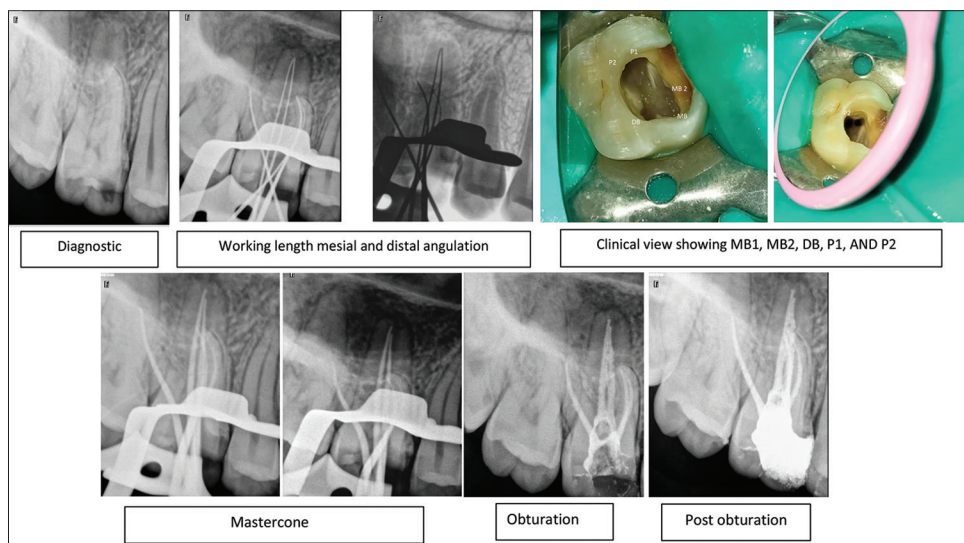
placement and shape. The outcome of dental treatment depends on a thorough analysis of radiographs and the inner structure of teeth.

In certain instances, the geometry of the access cavity may need to be adjusted to accommodate a different orifice placement or to make the cavity more easily accessible.

REFERENCES

- Schilder H. Filling root canals in three dimensions. *Dent Clin North Am* 1967;32:723-44.
- Schilder H. Cleaning and shaping the root canal. *Dent Clin North Am* 1974;18:269-96.
- Caliskan MK, Pehlivan Y, Sepetcioglu F, Turkun M, Tuncer SS. Root canal morphology of human permanent teeth in a Turkish population. *J Endod* 1995;21:200-4.
- Pecora JD, Woelfel JB, Neto MD, Issa EP. Morphologic study of the maxillary molars. Part II: Internal anatomy. *Braz Dent J* 1992;3:53-7.
- Walton R, Torabinejad M. *Principles and Practice of Endodontics*. 2nd ed. Philadelphia, PA: W.B. Saunders Co.; 1996.
- Kulild JC, Peters DD. Incidence and configuration of canal systems in the mesiobuccal root of maxillary first and second molars. *J Endod* 1990;16:311-7.
- Gopikrishna V, Bhargavi N, Kandaswamy D. Endodontic management of a maxillary first molar with a single root and a single canal diagnosed with the aid of spiral CT: A case report. *J Endod* 2006;32:687-91.
- Christie WH, Peikoff MD, Fogel HM. Maxillary molars with two palatal roots: A retrospective clinical study. *J Endod* 1991;17:80-4.
- Barbizam JV, Ribeiro RG, Filho MT. Unusual anatomy of permanent maxillary molars. *J Endod* 2004;30:668-71.
- Ferguson DB, Kjar KS, Hartwell GR. Three canals in the mesiobuccal root of a maxillary first molar: A case report. *J Endod* 2005;31:400-2.
- de Almeida-Gomes F, Maniglia-Ferreira C, de Sousa BC, dos Santos RA. Six root canals in maxillary first molar. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009;108:e157-9.
- Deveaux E. Maxillary second molar with two palatal roots. *J Endod* 1999;25:571-3.
- Kim Y, Lee SJ, Woo J. Morphology of maxillary first and second molars analyzed by cone-beam computed tomography in a Korean population: Variations in the number of roots and canals and the incidence of fusion. *J Endod* 2012;38:1063-8.
- Ghobashy AM, Nagy MM, Bayoumi AA. Evaluation of root and canal morphology of maxillary permanent molars in an Egyptian population by cone-beam computed tomography. *J Endod* 2017;43:1089-92.
- Stone LH, Stroner WF. Maxillary molars demonstrating more than one palatal root canal. *Oral Surg Oral Med Oral Pathol* 1981;51:649-52.
- Mohara NT, Coelho MS, de Queiroz NV, Borreau ML, Nishioka MM, de Jesus Soares A, *et al.* Root anatomy and canal configuration of maxillary molars in a Brazilian subpopulation: A 125- μ m cone-beam computed tomographic study. *Eur J Dent* 2019;13:82-7.
- Cleghorn BM, Christie WH, Dong CC. Root and root canal morphology of the human permanent maxillary first molar: A literature review. *J Endod* 2006;32:813-21.
- Jo HH, Min JB, Hwang HK. Analysis of C-shaped root canal configuration in maxillary molars in a Korean population using cone-beam computed tomography. *Restor Dent Endod* 2016;41:55-62.

CASE DURGA



CASE NIKITA

