


Endodontic management of maxillary first molar with two palatal canals - A case report

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Received - 10-03-2024

Accepted - 07-06-2024

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Abstract

An awareness and understanding of unusual root canal morphology is essential as it determines the successful outcome of endodontic treatment. Aberrations in root canal anatomy are commonly occurring phenomena. I report a clinical case of a maxillary left first molar with two palatal root canals. The morphology is atypical because it has two palatal canals with separated orifices, running parallelly but joined at the apex. Modifications to the usual access opening and examination of the pulpal floor for additional canals are essential in such atypical cases for the success of endodontic treatment

Keywords: Maxillary first molar, root canal morphology, two palatal canals

How to cite: Kaur K. Endodontic management of maxillary first molar with two palatal canals - A case report. *Ind J Clin Res Dent* 2024; Jan-Jun:5(1):7-9

Introduction

Endodontic treatment aims at eliminating bacteria from the whole root canal system and preventing re-infection. However, because of the morphological abnormalities of human teeth, this may not be always possible.

A thorough knowledge of tooth morphology, careful interpretation of angled radiographs, proper access preparation, and a detailed exploration of the interior of the tooth are essential prerequisites for a successful treatment outcome. Despite all procedural protocols if clinicians miss an additional root or canal it could pose a great challenge and lead to failure of endodontic treatment.

The literature demonstrates extensive anatomical variations in the number of roots and canal morphology of maxillary first molars [1,2,3]. The incidence of a maxillary first molar with two separate canals in the palatal root is less than 1% [2,4]. Stone and Stroner 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 one orifice, one canal, and one foramen; and a single root with one orifice, a bifurcated canal, and two separate foramen [5].

This case report describes the treatment of a 3-rooted maxillary first molar with 2 distinct palatal root canals which are joined at the apex

Case Report

A 24-year-old male patient presented to the Department of conservative dentistry and endodontics with a chief complaint of sensitivity to hot and cold in the upper left back region in the last 2 months. He had also complained of dull, intermittent

pain in the same region for the past 6 weeks. The patient's medical history was non-contributory. A clinical examination revealed a carious maxillary left first molar (tooth #26). The tooth was non-mobile and periodontal probing around the tooth was within the physiological limits. Vitality testing of the involved tooth with heated gutta-percha (Dentsply Maillefer, Ballaigues, Switzerland) and electronic pulp stimulation (Parkel Electronics division, Farmingdale, New York) elicited a delayed response. The tooth was tender to percussion.

Preoperative radiograph revealed distoocclusal radiolucency, approaching the pulp with periodontal ligament space widening concerning tooth #26. The radiographic evaluation did not indicate any variation in the root canal anatomy. Based on clinical and radiographic findings, a diagnosis of chronic irreversible pulpitis with apical periodontitis was made and endodontic treatment was suggested to the patient. (Figure 1)

Local anesthesia was given followed by rubber dam isolation. An endodontic access cavity was established. Clinical examination revealed the presence of three principle root canal systems: MB, DB, and Palatal canals. After probing with a DG 16 endodontic explorer (Hu-friedy, Chicago, IL) revealed a small hemorrhagic point was noted near the main palatal orifice, a small dentin occluding the canals was removed another accessory palatal canal distal to the main palatal canal was found. The conventional triangular endodontic access was modified to a rectangular shape to improve the access to the additional canals. Examination of the chamber floor revealed the presence of four canal orifices with 2 distinct canal orifices in the Palatal root. The working lengths of each canal were estimated utilizing an electronic apex locator (Root ZX; Morita, Tokyo, Japan) and then confirmed by a radiograph. (Figures 2 & 3)

Cleaning and shaping were performed under rubber dam isolation using Protaper nickel-titanium rotary instruments (Dentsply Maillefer) with a crown-down technique. Irrigation was performed using normal saline, 2.5% sodium hypochlorite solution, and 17%

EDTA; 2% chlorhexidine digluconate was used as the final irrigant. The canals were dried with absorbent points (Dentsply Maillefer) and calcium hydroxide closed dressing; the tooth was sealed with IRM cement (Dentsply Maillefer). One week later, all canals were dried with absorbent points (Dentsply Maillefer), and obturation was performed after master cone evaluation. (Figure 4)

By using gutta-percha (Dentsply Maillefer) and endomethasone sealer (SeptodontU.K). Here, endomethasone is used as a sealer due to its good sedating and antimicrobial properties which are effective and persistent over time. Later, The tooth was then restored with a screw post system. (Figure 5)

Figure-1: Preoperative

Figure-2: Working Length

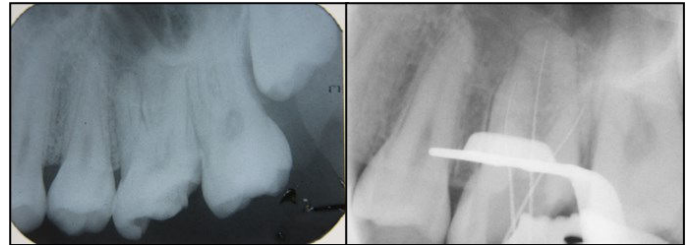
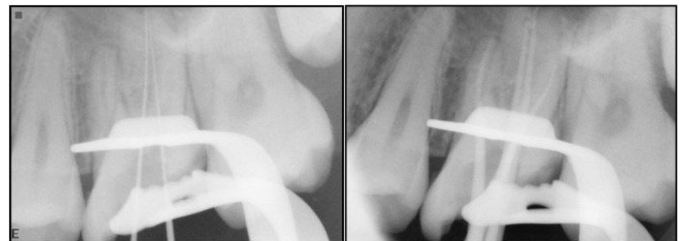


Figure-3: Working Length 2 Palatal Canals

Figure 4: Master Cone



Obturation

Figure 5: Post

Discussion

Endodontic success in teeth with multiple canals above that normally found requires a correct diagnosis and careful clinical radiographic inspection. To detect additional roots or canals different methods should be used besides

normal procedural protocols that include the evaluation of multiple radiographs in different angulations, Coronal flaring, Champagne bubbling test with sodium hypochlorite, Troughing, Dyes, Armed eyes or loupes, CBCT, etc [6].

The majority of endodontic literature describes the maxillary first molar as having 3 roots with 3 or 4 root canals [7] OR having 2 palatal roots [6,8,9]. The prevalence of maxillary first molars with 2 palatal canals is rare. Also, literature is scarce regarding the presence of 2 separate palatal canals with separate orifices/separate exits or single exits [2,8]. In the present case, 2 separate palatal canals can be seen in the radiograph which runs separately in the palatal root but joined at the apex.

The conservation of tooth structure must be kept in mind when establishing endodontic access to allow for successful restoration of the tooth after root canal therapy.

Christie and Thompson have recommended modifying the outline to an ovoid shape so that the roof of the chamber, when opened up, is more parallel to the mesial marginal ridge. They believe that this outline provides better access during the search for additional canals, therefore improving endodontic success [10]. Maxillary first molars with two palatal canals often seem to have wider mesiodistal dimensions over the palatal cusps. Hence, a trapezoidal access opening would be more desirable than a triangular opening to identify two palatal canals to achieve success [11].

Conclusion

The present case confirms the necessity of a meticulous reading of the pulp chamber floor. Although the incidence is low, possible variations in the most common anatomic configurations may be present and should be explored carefully.

Acknowledgements: None

Source of funding: None

Conflict of interest: The authors declare that they have nothing to disclose and there is no conflict of interest.

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