Maxillary molar with two palatal canal: Case Report

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Abstract:

Endodontic treatment of maxillary molars with aberrant root canal morphology can present significant diagnostic and technical challenges. Unusual canal configurations in multirooted teeth, such as the presence of additional canals, lateral canals, or apical deltas, are relatively common and require careful assessment for successful treatment outcomes. This case report describes the endodontic management of a maxillary first molar exhibiting an uncommon morphological variation in the palatal root. Specifically, the palatal root contained two canals that appeared to merge in the apical third. The case highlights the importance of recognizing and addressing anatomical variations to ensure effective endodontic therapy.

Keywords: Maxillary first molar, Dental anatomy, Anatomical variations,Root canal

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INTRODUCTION:

Successful root canal therapy depends on the thorough treatment of the entire root canal system. Therefore, a comprehensive understanding of dental anatomy and its possible variations is essential for clinicians.[1]

Several reports in the literature have documented variations in the number of palatal roots and canals in maxillary first molars. These include cases with a single palatal root containing two canals, as well as cases with two distinct palatal roots, each housing its own canal.[2]

Thews.et.al (1997)3, in his description of the lingual root of the maxillary first molar, noted that "in rare examples, this root bifurcates." Similarly, Wheeler emphasized the importance of reviewing dental anatomy from a macroscopic diagnostic perspective and considering the potential variations in root and pulp cavity morphology during endodontic treatment. While the mesiobuccal root often presents with variability in canal configuration, macroscopic variations are less commonly seen in the lingual or distobuccal roots.[3]

The prevalence of additional canals in the palatal root of maxillary molars is estimated between 2% and 5.1%. Christie et.al.(1991)[4] speculated that maxillary molars with two palatal roots may be encountered once every three years in a busy endodontic practice. Stephen documented a case where two palatal canals converged in the apical third. While such occurrences are uncommon, recognizing and treating these anatomical variations is critical to the success of endodontic therapy [5]

Undetected extra canals can lead to treatment failure if not properly identified, cleaned, and obturated.[6]

Anatomical variations can occur in maxillary permanent molars. Christie et al.(1991)[4] reported 16 cases of maxillary molar with two palatal roots and classified them into three types –

Type 1 – Buccal roots are often cow-horn shaped and less divergent. It has two widely divergent palatal roots, often long and tortuous.
Type 2 – Roots are shorter run parallel and have blunt root apices.
Type 3 – Root morphology is constricted with mesiobuccal, mesiopalatal, distopalatal canal engaged in one web of root dentin. The distobuccal root seems to stand alone and may diverge to distobuccal.

This clinical case report presents a maxillary first molar with two palatal canals that appeared to converge in the apical third, emphasizing the importance of recognizing anatomical anomalies during root canal treatment.

CASE REPORT

A 20-year-old male patient reported to the department of Conservative Dentistry and Endodontics with the chief complaint of pain in the right upper back region of the mouth since 15 days. Medical history was non-contributory. The clinical diagnosis was Acute Irreversible Pulpitis.

A pretreatment radiograph was taken (Fig. 1). Local anesthesia was administered. After placing a rubber dam, a conventional access opening was performed show in (Fig 2) . After removing tissues located in the pulp chamber, two orifices were observed in the palatal root. K-file was inserted into the orifices and radiograph was taken which revealed two canals in the palatal root which join at the apical third (Fig. 3). Working length was determined using apex locator (Root ZX, J. Morita, USA).

Root canal was prepared using crown down technique with rotary NeoEndo file system and then mesiobuccal canal and distobuccal canal were enlarged till 25.04% and two palatal canal were enlarged till 25.06% The canals were irrigated with 1% sodium hypochlorite solution, flushed with sterile saline solution and completely dried with absorbent paper points. Periapical radiograph showing Master cone selection (Fig 4) The canals were obturated using standardized gutta-percha points and Bioceramic root canal sealer and tooth was restored with a composite filling (Fig 5).

Fig. 1: Preoperative periapical radiograph

Fig. 2: Access opening showing mesiobuccal canal, distobuccal canal and two palatal canal

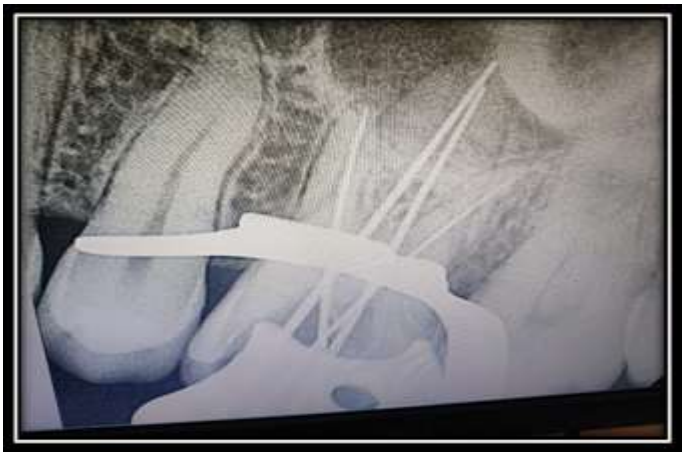

Fig. 3: Periapical radiograph showing working length

Fig. 4: Periapical radiograph showing Master cone selection

Fig. 5: Periapical radiograph showing obturation and post obturation restoration

DISCUSSION

In retrospect, the indistinct appearance of the palatal root on the preoperative radiograph should have raised suspicion regarding the possibility of a second canal. Furthermore, the initial working length radiograph showed the file within the palatal root to be off-centered , A finding that should prompt further investigation. Slowey et.al.(1974)[7] emphasized the importance of exploring anatomical anomalies when such radiographic indicators are present. In this case, the second palatal canal was eventually located with the help of a serendipitous radiographic finding that clearly revealed a two-canal system. This case highlights the potential for misdiagnosis when anatomical variations are not anticipated. The initial assumption that the tooth contained only one palatal canal underscores the importance of remaining vigilant. Clinicians must be prepared to reassess and adapt their approach when unexpected morphology is encountered during treatment.[7]

CONCLUSION

The root canal anatomy of each tooth in the human dentition exhibits certain common characteristics, along with numerous anatomical variations that can serve as a roadmap for successful endodontic treatment. Awareness of these variations is crucial from both diagnostic and therapeutic perspectives. Therefore, it is essential to emphasize the importance of identifying unusual morphologies and additional root canals to ensure a successful endodontic outcome.

CLINICAL SIGNIFICANCE

Anatomical variations can occur in all teeth, and recognizing these differences is essential for the success of endodontic therapy. In particular, accurate identification and thorough treatment of all root canals are critical, as failure to locate or properly manage any canal may lead to treatment failure[8]. A comprehensive clinical and radiographic examination, combined with in-depth knowledge of tooth morphology, is therefore crucial to achieving successful endodontic outcomes[9]

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