



A RARE PHENOMENON OF FOUR ROOTED FIVE CANAL MAXILLARY SECOND MOLAR: A CASE REPORT

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ABSTRACT

Root anatomy can vary in the number of roots and root canals. Anomalies such as extra roots and canals can be challenging to detect, leading to unsuccessful root canal treatment. The use of advanced imaging techniques such as CBCT, along with thorough examination and exploration of the pulp chamber during endodontic treatment, careful instrumentation, and irrigation, can lead to successful outcomes in cases with missed canals. In this case report, we present a case of re-treatment of a maxillary second molar with four roots and five canals with successful retreatment of a missed mesiobuccal canal and mesiopalatal root in a maxillary second molar.

KEYWORDS: Missed canal, Four rooted maxillary second molar, CBCT

INTRODUCTION

Successful root canal therapy requires a thorough knowledge of root canal and root morphology.^[1] The hard tissue covering of the dental pulp takes various configurations. A thorough knowledge of tooth morphology and careful interpretation of radiographic images are essential prerequisites for a successful treatment outcome.^[2] The common root canal anatomy of maxillary second molars has been described as 3 roots with 3 canals. Studies have reported single palatal root with single canal, root with additional palatal canals being rare. Libfield and Rostein the prevalence studied of maxillary second molars with 2 palatal roots, and the percentage was only 0.4%.^[3] Inadequate knowledge of the root canal morphology is directly proportional to the most of the challenges faced during execution of endodontic therapy. Anomalies such as extra roots and canals can be challenging to detect, leading to unsuccessful root canal treatment.^[4] In this case report, we present a case of re-treatment of a maxillary second molar with four roots and five canals.

Case report

A 37-year-old male patient presented to our Department of Conservative Dentistry and Endodontics, Pacific Dental College and Research Centre, Udaipur with a complaint of pain in the left upper jaw. The patient had a history of root canal treatment in the left upper back tooth two months ago, which had provided temporary relief. On clinical examination, an amalgam restoration, a tenderness to percussion and no reaction to cold test in left maxillary second molar. A periapical radiograph revealed a root canal treated tooth with three radiopaque root fillings that is mesiobuccal, distobuccal and one distopalatal and an untreated mesiopalatal root in the tooth with periapical radiolucency as shown in Figure 1.

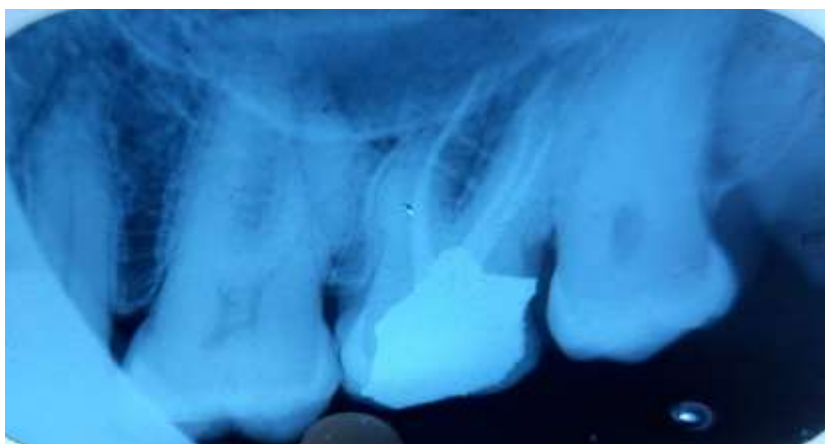


Figure 1

For further investigation CBCT imaging was performed which confirmed missed mesiopalatal root and mesiobuccal2 canal was also present as shown in figure 2.

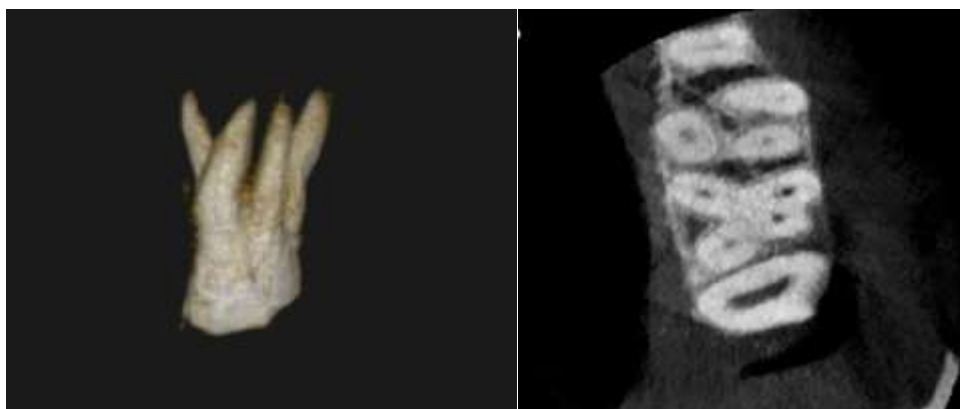


Figure 2

The treatment plan involved a retreatment of the root canal.

Local anesthesia was administered, and the occlusal filling was removed under the rubber dam isolation. A thorough exploration of the canals with K-files revealed the presence of five canals, two in the mesiobuccal, one in the distobuccal, one in the mesiopalatal and one in distopalatal root. The gutta-percha was removed, and the canals were negotiated. Working length was determined with tactile sensation and was confirmed with IOPA X-ray shown in Figure 3.



Figure 3

The canals were instrumented using a crown-down technique with rotary nickel-titanium (NiTi) instruments (ProTaper Gold, Dentsply Sirona) till F1 in MB2 canal and F2 in all 4 canals. Figure 4 represent orifices of all 5 prepared canals.



Figure 4

After shaping and cleaning the canals, they were irrigated with 5.25% sodium hypochlorite, saline and 17% EDTA to remove any debris and smear layer. 2% of chlorhexidine was used as final irrigant. The access cavity was sealed using a temporary filling.

After a week, the patient returned for the second visit. The canals were irrigated with 5.25% sodium hypochlorite, saline and 2% of chlorhexidine, and the canals were dried with paper points. Master cone was confirmed with IOPAR before obturation as shown in figure 5.



Figure 5

The canals were obturated with gutta-percha and Endomethasone N (Septodont) sealer using a warm vertical condensation technique. Figure 6 represent a post-operative radiograph that shows satisfactory obturation of all five canals followed by post endodontic restoration with amalgam.



Figure 6

Discussion

Retreatment of missed canals can be challenging, but it is essential for the success of endodontic treatment. The major factors responsible for endodontic treatment failure are the persistent microbial infection in the root canal system and peri-radicular tissue.^[5] The present case report describes a successful retreatment of a missed mesiobuccal canal and mesiopalatal root in a maxillary second molar.

Root anatomy can vary in the number of roots and root canal. Radiographs are one of the important tools for detecting any anatomic variations. Advanced imaging techniques such as cone-beam computed tomography (CBCT) can aid in the identification of root canal anatomy. Also, the use of an operating microscope can aid in the visualization of number of canals.^[6]

CBCT imaging has been shown to be a valuable tool for identifying missed canals, particularly in teeth with complex root canal systems such as molars. A study by Song et al. (2014) found that CBCT imaging identified missed canals in 55% of endodontically treated teeth, with the highest incidence in molars.^[7] Another study by Patel et al. (2015) demonstrated that the use of CBCT imaging increased the detection rate of missed canals in molars by 27%.^[8]

In addition to CBCT, conventional radiographic techniques such as periapical radiographs and dental operating microscopes have also been used to identify missed canals. A study by Neaverth et al. (1987) found that the use of a dental operating microscope increased the detection rate of missed canals by 32% compared to conventional radiographs alone.^[9]

Based on their root configuration a four rooted maxillary second molar classification by Christie et al., according to which Type I condition presented with two widely splayed palatal roots that are lengthy and complex. Their buccal roots are often short and convergent. Radiographic interpretation shows four separate root apices. Type II condition showed four short, parallel distinct roots. Type III condition showed a web of root dentin engaging the mesiobuccal, mesiopalatal, and distopalatal root canal.^[10] According to this classification present case falls under type I condition.

CONCLUSION

In conclusion, the identification and treatment of all canals is critical for the success of root canal treatment. The use of advanced imaging techniques such as CBCT, along with thorough examination and exploration of the pulp chamber during endodontic treatment, careful instrumentation, and irrigation, can lead to successful outcomes in cases with missed canals.

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