

# Management of Maxillary First Molar with Extra Palatal Canal: A Case Report

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## ABSTRACT

Having knowledge and comprehension of the existence of an extra root and atypical root canal structure is crucial, as it directly impacts the effectiveness of endodontic treatment. Acquiring a comprehensive understanding of the fundamental structure of root canals and their potential deviations is crucial for the successful execution of endodontic procedures. The anatomical features of permanent maxillary molars are often characterized by the presence of three roots, consisting of one palatal root and two buccal roots. The occurrence of two palatal roots is infrequent; yet, there have been a few documented instances of a fourth root canal in the maxillary first molar, indicating the presence of additional canals in the palatal root of maxillary molars. This case report presents the treatment of a maxillary first molar with four root canals, specifically the mesiobuccal, the distobuccal, and two palatal canals. When performing root canal therapy on teeth with anatomical anomalies, it is crucial to develop precise treatment procedures. Understanding the anatomical changes that occur in the palatal roots of maxillary first molars can enhance the efficacy of root canal treatments.

**Keywords:** Anatomical variation, Case report, Extra palatal canal, Maxillary molar, Root canal treatment.

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## INTRODUCTION

The complex structure of the root canal system in maxillary molars presents ongoing challenges, requiring the dentist to have a thorough knowledge of root canal morphology in order to provide successful endodontic treatment.<sup>1</sup> Precise analysis of X-rays taken at an angle, appropriate preparation to gain access, and a comprehensive evaluation of the tooth are essential prior to root canal therapy in order to get a favorable outcome. To reach this objective, it is necessary to utilize assistance such as operating microscope, loupes, magnification, and illumination.<sup>2</sup> Additional canals or roots are observed as anatomical changes in permanent maxillary molars. The mesiobuccal root exhibits the most anatomical variety, with two or more canals present in 56.8% of instances. On the other hand, the palatal root has the least amount of variation, with a single canal present in 99% of instances and one apical foramen found in 98.8% of cases.<sup>3</sup> The occurrence of two canals for palatal root in the maxillary first molar has been documented to range from 2 to 5.1%. According to Christie et al.,<sup>4</sup> there are two possible types of canals that can be found in a single palatal root:

- There are two distinct openings and two distinct openings of foramina.
- Two distinct palatal roots, each with a single opening and canal.
- There is a single opening, a divided channel, and two foramina.

With its illumination and magnification, a dental operating microscope makes it simple to find hidden canals. Using a dental operating microscope, a case report of a calcified maxillary first molar with four root canals—a mesiobuccal, distobuccal, and two palatal is provided here.

## CASE DESCRIPTION

A 17-year-old male patient, visited our office complaining of pain in his upper left jaw that had been there for two to three months. The patient's medical history was not relevant. Clinical exams

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showed that tooth no. #26 was slightly sensitive to vertical percussion and had deep disto-occlusal caries with pulp stone. A radiographic examination revealed heavily calcified canals and deep pulp-related cavities (Fig. 1). Differential diagnosis of symptomatic apical periodontitis was revealed. An informed decision was taken to do a root canal treatment with the patient was duly told about the procedure and provided with an informed consent.

The patient was given a 2% lidocaine:180,000 epinephrine local anesthetic. Following the removal of the tooth's caries, a traditional endodontic access was created. A rubber dam was placed and the pulp chamber was clearly revealed. At first, a conventional triangular approach was constructed and three canals (MB, DB, P) were effectively navigated. Due to the posterior location of the palatal canal and the presence of visible bleeding in the anterior

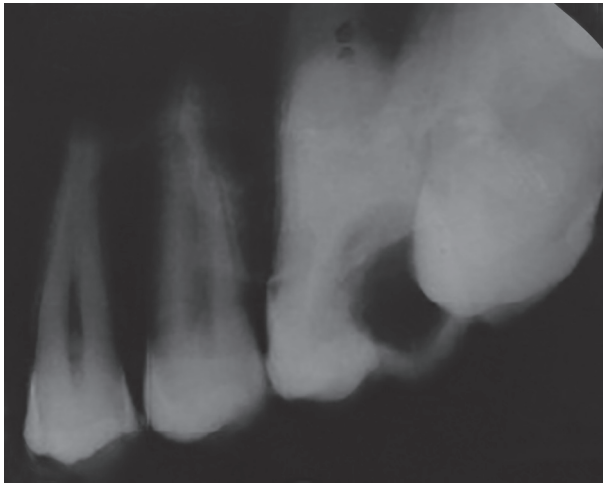


Fig. 1: Preoperative radiograph showing highly calcified canals with 26



Fig. 3: Microscopic view of 26 postobturation



Fig. 2: Working length determination with 26

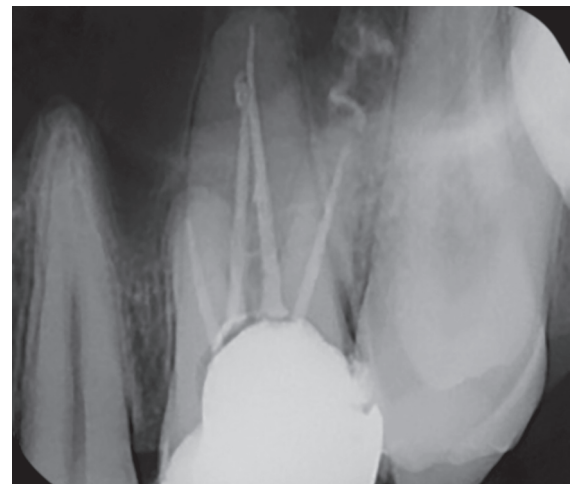


Fig. 4: Immediate postobturation radiograph with 26

region, along with a groove connecting both front and back palatal canals, it confirmed the presence of two palatal canals [MP, DP]. Consequently, the access cavity was adjusted to have a trapezoidal shape.

Upon inspection of the chamber floor using an endodontic DG-16, explorer (Hu-Friedy, Chicago, IL, USA), it was observed that there were four canal orifices present. These orifices were identified as the mesiobuccal canal (MB), mesiopalatal canal (MP), disto-palatal canal (DP), and distobuccal canal. The negotiation of all canals was performed using no. 8 C+ files. The patency of the root canal was checked, and the precise length of the canal was determined using the electronic apex finder Root ZX (J. Morita, MFG. Corp, Kyoto, Japan). This measurement was further validated by taking a radiograph with 15 no. K-files (Fig. 2). The canals were meticulously prepared using manual hand K-files (Dentsply, USA) and RaCe NiTi rotary files up to the size of 20/06, employing a crown-down approach. The root canals were thoroughly flushed with a solution containing 5.2% sodium hypochlorite and normal saline. Following the administration of a calcium hydroxide (CH) paste as an intracanal dressing, the patient's next appointment was arranged 1 week later. During the following session, the root canal was treated using a combination of 5.2% sodium hypochlorite

ultrasound-activated irrigation and negative apical pressure with the assistance of the EndoVac device. This approach was utilized to efficiently eliminate the CH paste. The canal was dried completely using a sterile paper point and then hermetically sealed using suitable Gutta-percha master cones and MTA Fillapex (Angelus, Brazil) sealer (Fig. 3). Postobturation restoration was performed using composite resin (Tetric-N-Ceram, Ivoclar Vivadent) (Fig. 4). Patient was then recalled after 1 week for full coverage restoration. Follow-up was recorded after 6 months (Fig. 5).

## DISCUSSION

The main goal of root canal therapy is to provide a comprehensive disinfection of the root canal system. Due to a deficiency in adequate understanding, canals are frequently left untreated. The changes in the anatomy of the canal are significant factors in endodontic therapy.<sup>4</sup> An accurate understanding of the root canal layout can be achieved by carefully examining the pulp chamber floor through probing and visual inspection, in conjunction with the interpretation of the radiograph. In this particular instance, the initial imaging technique, known as IOPA, did not detect the existence of two canals in the palate. However, following the adjustment of the access cavity during the clinical

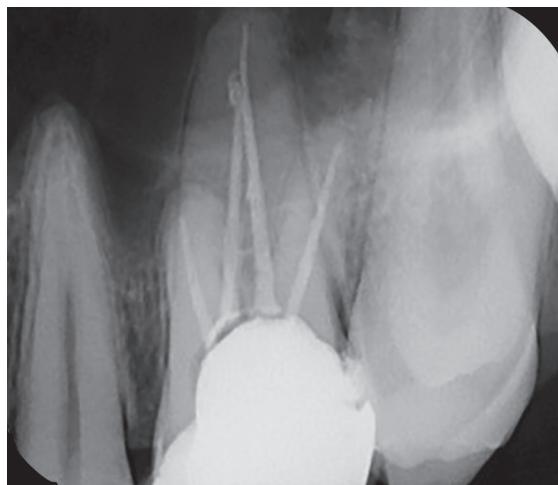


Fig. 5: 6-month follow-up

procedure, there was a suspicion of an extra opening in the palate. The first stage in preparing the canal is to create a well-designed access cavity, which helps prevent various issues that may arise during the process of preparing and filling the canal. The access cavity outline of the maxillary first molar will typically be square or trapezoidal in shape rather than triangular.<sup>5</sup> missing to address an undetected canal is a clear cause of failure in root canal treatment.<sup>6</sup> The DG-16 explorer is a valuable instrument for precisely locating the position of a canal orifice. While dealing with calcified canals can provide challenges, they can be effectively controlled by following a correct regimen.<sup>7</sup> Being aware and appreciating the existence of atypical canal structure while diagnosing and treating teeth, as well as effectively navigating through calcified canals, can greatly enhance the chances of a successful treatment.<sup>8</sup> Therefore, in order to prevent endodontic failure, it is necessary to identify and prepare these additional canals. Despite the rarity of aberrant radicular anatomy, dentists must acknowledge the potential existence of additional root canals or roots in a tooth.<sup>9</sup> The presumption that this tooth had only one palatal canal emphasizes the importance of unexpected morphological variations. When such variations arise, it is imperative that we promptly reassess our approach and address the anomaly as it manifests.<sup>10</sup> Utilizing this anatomical foundation, the utilization of sophisticated supplemental tools such as a dental operating microscope aids in the identification of additional canals.

## CONCLUSION

It is imperative for clinicians to possess sufficient understanding regarding the morphology of root canals and the various ways in

which they can vary. Prior to and during root canal therapy, it is essential to assess the position and structure of root canals using radiography. A thorough analysis of radiographs and the internal structure of teeth is crucial for effective therapy. A comprehensive understanding of the structure and shape of the tooth's root and root canal, along with the ability to anticipate potential alterations in their morphology, is crucial in order to minimize the risk of endodontic failure resulting from insufficient preparation and filling of the root canal. The enhanced magnification of the surgical area offers numerous advantages, benefiting both the operator and the patient, particularly in the field of endodontics. This case report enhances our comprehension of the intricate nature of the root canal morphology observed in maxillary first molars. While these instances are rare, dentists should be mindful of them while contemplating endodontic treatment for a maxillary first molar.

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