

Unusual Presentation of Maxillary First Molar with Two Root Canals

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Abstract: Sound knowledge of the root canal morphology and pulp chamber anatomy is a prerequisite for successful root canal treatment. The morphology of the root and canals of the maxillary first molar can be complex and variable. The morphology of the permanent maxillary first molar has been reviewed extensively; however, the presence of two canals in a two-rooted maxillary first molar has rarely been reported in studies describing tooth and root canal anatomies. This case report presents a patient with a maxillary first molar with two roots and two root canals.

Keywords: two root canals, abnormalities; Maxillary Bone; Root Canal Therapy

I. Introduction

The goal of root canal treatment is to clean the root canal system as thoroughly as possible and to fill it in all its dimensions. In depth knowledge of the root canal anatomy of each tooth is crucial in order to reach this goal. Maxillary first molars have the most complicated root and canal morphology of the maxillary dentition; therefore, their anatomy has been extensively evaluated. The maxillary first molar most commonly has three or four canals, with one canal in both the palatal and distobuccal roots and one or two in the mesiobuccal root. Although extra canals are more of a rule rather than an exception, the clinician should also be aware of the possibility of fewer canals as well. The varying morphology of the root canals is normally ascertained with radiographs of different angulations or careful examination of the floor of the pulp chamber. This gives us a clue to the type of canal configuration present. This case report describes the detection and management of a permanent maxillary first molar with a rare occurrence of two roots and two canals.

II. Case report

A 30-year-old female presented to the Department of Conservative Dentistry and Endodontics, Govt Dental College, Calicut with the chief complaint of spontaneous toothache in her right posterior maxilla for 2 days. The pain intensified by thermal stimuli and on mastication. History revealed intermittent pain in the same tooth with hot and cold stimuli for the past 1 month. The patient's medical history was noncontributory. A clinical examination revealed a carious maxillary left first molar (tooth #14), which was tender to percussion. Palpation of the buccal and palatal aspect of the tooth did not reveal any tenderness. The tooth was not mobile and periodontal probing around the tooth was within physiological limits. Vitality testing of the involved tooth with heated gutta-percha (Dentsply Maillefer, Ballaigues, Switzerland) and dry ice (R C Ice; Prime Dental Products Pvt Ltd, Mumbai, India) caused an intense lingering pain, whereas electronic pulp stimulation (Parkel Electronics Division, Farmingdale, NY) caused a premature response. The radiograph revealed an unusual anatomy of the involved tooth with two root and two canal. From the clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis with symptomatic apical periodontitis was made and endodontic treatment was suggested to the patient.

Local anesthesia was administered using 2% lidocaine with epinephrine (1:70,000). A rubber dam was applied. Upon access opening, two well-defined root canal orifices were located using a DG-16 explorer (Hu-Friedy, Chicago, IL, USA) on the pulpal floor. The buccal orifice was relatively large (Figure 1B). No extra orifice was found by further exploration at $\times 4.5$ magnification of prismatic loupes (Zeiss Eyemag Pro S; Carl Zeiss SpA, Arese, Italy) and under dental operating microscope (DOM) (Seiler Revelation, St Louis, MO). The length was determined by both a radiograph and an electronic apex locator (Root ZX; Morita, Tokyo, Japan). The canals were then further prepared with RaCe rotary files (FKG; Dentaire, La-Chaux-de-Fonds, Switzerland) with 0.04 and 0.06 tapers to 1 mm short of the radiographic apex up to file #35 with 0.06 taper using the 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 obturation was performed using cold lateral compaction of gutta-percha (Dentsply Maillefer) and AH Plus resin sealer (Maillefer, Dentsply, Konstanz, Germany). The tooth was then restored with a posterior composite resin core (P60; 3M Dental Products, St Paul, MN). The patient was advised a full-coverage porcelain crown.

III. Discussion

Maxillary first molars have the most complicated root and canal morphology of the maxillary dentition; therefore, their anatomy has been evaluated extensively in various studies. There is a wide range of variations in the literature with respect to the number of canals in each root and the number of roots. It is now generally accepted that the most common form of maxillary first molar has three roots and four canals [1]; the mesiobuccal root has two root canals due to its wide buccolingual dimension and associated concavities and a single canal for distobuccal and palatal roots [2].

Common iatrogenic access opening errors are caused during the search of missed canals. These errors include perforation and excessive tooth material removal. The varying morphology may be ascertained by radiographs and careful examination of pulp chamber floor using an operating microscope. In this case report we rummaged for missed canals initially but finally ended up with a single large buccal and a palatal canal. Routine preoperative intraoral periapical radiographs are essential before initiating endodontic treatment due to its usefulness in identifying variations from the normal, thereby influencing the treatment plan. In specific instances, it may be helpful to supplement with periapical radiographs taken at varying horizontal angulations. However, because the radiographs have several inherent shortcomings due to it being a two-dimensional image of a three-dimensional object, erroneous interpretations are very much possible due to the superimposition of multiple anatomic structures questioning its reliability. Recent imaging tools like spiral CT and CBCT have emerged as valuable tools in the field of endodontics due to its accuracy, reliability and three-dimensional imaging capabilities. [3]

IV. Conclusion

The present case report discusses the endodontic management of an unusual case of a maxillary first molar with two roots and two canals and also highlights the role of surgical operating microscope as an objective analytic tool to ascertain root canal morphology.

Reference

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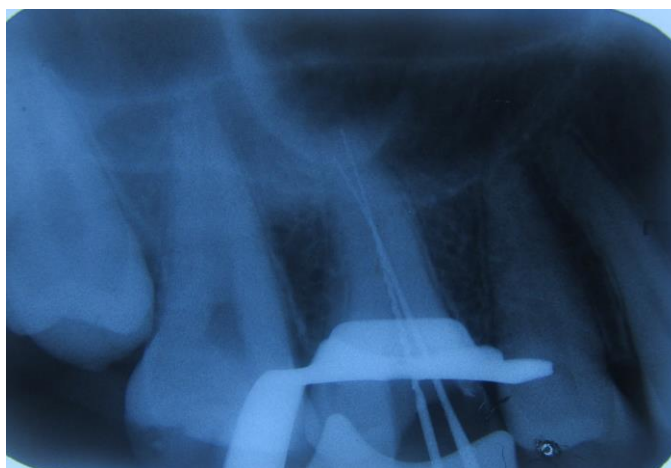


Figure 1. Determination of working length by two 15 size files placed in the buccal and palatal root canals of upper left first molar



Figure 2. Clinical photograph under rubber dam isolation showing two obturated root canal orifices (one buccal and one lingual)



Figure 3. Post obturation intra oral periapical radiograph showing two root canals. (One buccal and one lingual)



Figure 4. Shift X ray confirming the presence of two root canal.