

CASE REPORT

Maxillary second molar with three mesiobuccal canals

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ABSTRACT:

Understanding root canal morphology is one of the most important steps in successful root canal treatment. Thus, during the diagnosis and treatment phases of the maxillary molars, a clinician must be aware that anatomical variations exist. A number of studies, especially in vitro, have investigated various root canal morphologies, including aberrations of maxillary molars. This clinical case report highlights an unusual variant of a maxillary second molar with a third mesiobuccal canal.

Key words: *Maxillary second molar, third mesiobuccal canal, root canal morphology.*

Introduction

The hard tissue repository of the human dental pulp takes on numerous configurations and shapes. A thorough knowledge of tooth morphology, careful interpretation of radiographs, proper access preparation and a detailed exploration of the interior of the tooth are essential prerequisites for a successful treatment outcome.

The main objective of root canal therapy is thorough shaping and cleaning of all pulp spaces and its complete obturation with an inert filling material. The presence of an untreated canal may be a reason

for failure. A canal may be left untreated because the dentist fails to recognize its presence. It is extremely important that clinicians use all the armamentaria at their disposal to locate and treat the entire root canal system

The maxillary molars, especially the second molars, have the most complicated root canal system in permanent dentition. There are many variations in canal number and configuration in maxillary molars. Knowledge of the anatomical aberrations will markedly decrease the failure rate. For this reason, during the diagnosis and treatment phases of the maxillary molars, a clinician must be aware of its anatomical variations.

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A number of studies have investigated the root canal morphology of maxillary second molars.¹⁻⁷ These studies have reported the incidence of a second mesiobuccal (MB) canal and its anatomical aberrations. Peikoff et al have shown six variants which occurred frequently enough to be considered as separate anatomic categories.² Kulild and Peters stated that the existence of a second MB canal in maxillary first and second molars is fairly common.⁷ Some case reports showed anatomical variations of maxillary second molars, such as 4 roots, 3 buccal roots, and a second palatal root canal.⁸⁻¹¹

This case report presents a maxillary second molar with three MB canals and stresses that clinicians should bear in mind that such anatomical differences might be encountered during treatment.

Case report

A 21 years old male patient has reported to the clinic with a chief complaint of severe pain in the right maxillary second molar. The patient had no significant medical history. The subjective symptoms included prolonged sensitivity to hot and cold food. The objective symptoms were observed as tender on percussion and hyperactivity to heat and cold, with absence of periradicular changes radiographically and lack of swelling of the surrounding tissues. Therefore, the patient was diagnosed with irreversible pulpitis.

After the administration of local anesthesia with 2% lignocaine (Lignox, Indico Remedies, Warren, Goa), under rubberdam isolation the access cavity was prepared. The mesiobuccal, distobuccal and palatal canal orifices were visible. After the removal of the pulp tissue, and on careful examination of the floor of the pulp chamber, showed two additional mesiobuccal orifices (fig 1). These three mesiobuccal canal orifices were located in the same line. Working

lengths were determined using an apex locator (Root ZX, J. Morita USA, Irvine, CA), and radiograph was taken to confirm the working length (fig 2). The radiograph demonstrated that while MB1 canal (Vertucci's type I configuration (fig 3) is completely separated from MB2 and MB3 canals. MB2 and MB3 canals were fused in the apical third (Vertucci's Type II canal configuration). Cleaning and shaping was performed using Protaper rotary Ni-Ti files (Dentsply Maillefer, Ballaigues, Switzerland), master cones selected (fig 4) and obturation done with Protaper Universal gutta-percha (Dentsply Maillefer) and AHplus sealer (Dentsply Maillefer) (fig 5) and 1 year follow up was done (fig 6).

Discussion

Maxillary second molar variants have already been reported in many clinical cases and in vitro studies.^{1-4,6,7,12,13} Peikoff et al carried out a retrospective study in 520 completed endodontic treatments of maxillary second molar teeth and classified them into six categories.² But none were associated with this case.

Other studies suggested the prevalence of a third MB canal in the maxillary second molar as in vitro.^{6,14} Caliskan et al, reported in their in vitro study that using clearing technique, 16% of maxillary second molars contained 3 MB canals.¹ These third MB canals in maxillary second molars are quite difficult to discover. Their small size and their superimposition over another root canal often accounted for the difficulty in locating the extra canals.¹⁵ In addition, a preoperative radiograph might not produce clear evidence of their existence. Therefore, before the operation, multiple preoperative radiographs with various angulations are recommended to assist in detecting the extra canals. In addition, careful examination of the floor of pulp chamber is essential to ensure clinical success.

In dental literature, a third mesiobuccal canal was reported clinically by Beatty¹⁶ in the maxillary first molar, but there are no available data that report the existence of a third MB canal in a maxillary second molar. Recently, Erhan Ozcan et al. , have reported a third MB canal in maxillary second molar clinically.¹⁷

The root canal system of maxillary second molars is complex, and treating such teeth is difficult.¹⁸ The prognosis for second molars depends on detection of the extra canals and proper cleaning, shaping and obturating the molar. Failing to detect and treat a canal might cause treatment failure.⁹ The most important factor in detection of extra canals depends on the practitioner's commitment, the knowledge of the root canal morphology and their possible variations. "Of course the fact that latest armamentarium used for the location of extra canals cannot be negated".

Conclusion

Successful endodontic treatment begins with proper clinical and radiographic examinations. A practitioner must be vigilant, as variations of root and canal anatomy might be encountered at any time during treatment. These anatomic variations directly affect the treatment prognosis.

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Fig 1: Floor of the pulp chamber showing 5 canals in maxillary second molar

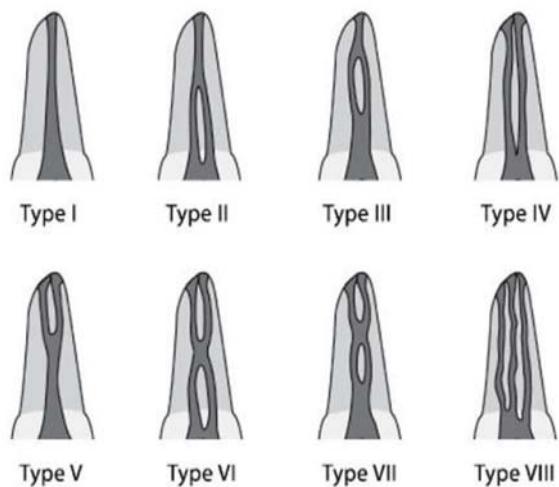


Fig3: Vertucci's classification of canal configurations



Fig 2: Working length radiograph



Fig4: Master cone radiograph

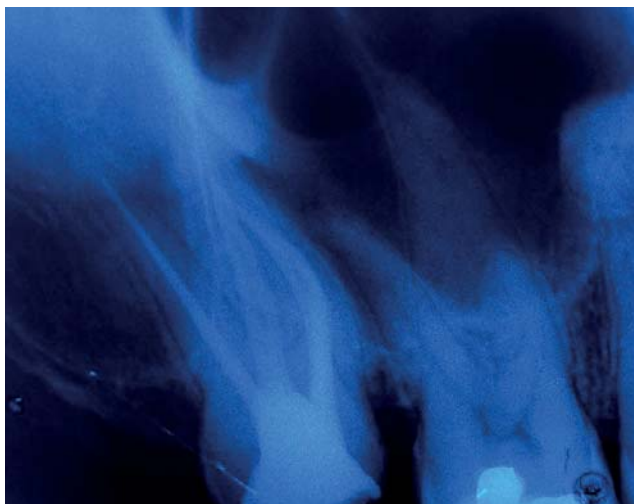


Fig 5: Post operative radiograph



Fig 6: One year follow up radiograph