

Aberrant Anatomy of a Maxillary First Molar with Six Canals: Case Report

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ABSTRACT

The first step in a successful endodontic treatment is to gain access to the pulp chamber and find all of the canals. To achieve this goal, practitioners need to be familiar with all possible variations of the root canal and have adequate information of the tooth needing treatment. The present case report describes an anatomical variant of the maxillary second molar with 6 canals, a variation that has not been previously reported. Helpful hints for detection of the unusual canal are presented.

Key words: Maxillary Second Molar, Root Canal, Root Canal Variation

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Conflict of interest - none

INTRODUCTION

The morphology and anatomy of the maxillary first molar has been extensively reviewed in the literature, revealing that this tooth may present a great variety of anatomical configurations. Beatty presented a case of a maxillary first molar with five canals, three of which were located in the mesiobuccal root.¹ Bond et al. reported a case of a maxillary first molar with six canals: two canals with separate foramina in the mesiobuccal root, two canals with separate foramina in the distobuccal root, and two canals joining in the apical third of the palatal root.² Hulsmann presented a maxillary first molar with two distinct canals in the distobuccal root.³ Three cases of maxillary first molars with six canals were reported: three canals in the mesiobuccal

root, two in the distobuccal root and one in the palatal root.⁴ Another case reported a palatal root having a single canal orifice, a trifurcation in the apical third and three separate foramina.⁵

CASE REPORT

The patient was a 61 year old male with the chief complaint of a dislodged filling and dull pain on masticating food. Previous dental history revealed that an unqualified dentist had placed cold cure acrylic filling in the interproximal area of 16 & 17. IOPA revealed periapical radiolucencies with respect to palatal & mesial roots (**Figure 1**) and electric pulp testing gave no response. A diagnosis of chronic apical periodontitis was made.



Figure 1: Pre Operative Radiograph of 16

On removal of faulty restoration and pulpotomy, an unusually large pulp chamber was de-roofed and on examination with dental loupes (Heine X2.3), 6 distinct orifices could be visualized (**Figure 2**). Anatomy of pulp chamber showed 2 canals in mesiobuccal root (2 mm apart), 2 canals in distobuccal root (1mm apart) and 2 canals in palatal root (1.5 mm apart). Working length was obtained using Propex apex locator (Dentsply) & confirmed using a radiograph as follows: MB1: 19 mm, MB2: 19 mm (2 separate foramina), DB1: 19 mm,

DB2: 19 mm (Single foramina) and P1: 21 mm, P2: 21 mm (2 separate foramina) (**Figure 3**). After establishing glide path, all canals were shaped with Protaper Rotary files (Dentsply) to the following sizes: MB1, 2 and DB1, 2 to a F2 size and P1, 2 to a F3 size. Canal preparation was accompanied with 5 % Sodium Hypochlorite & Glide (Dentsply). Obturation was done using gutta percha with lateral condensation technique and AH Plus sealer (DENTSPLY) (**Figure 4**). A follow up radiograph was taken 10 months later (**Figure 5**).



Figure 2: Access opening showing 6 orifices

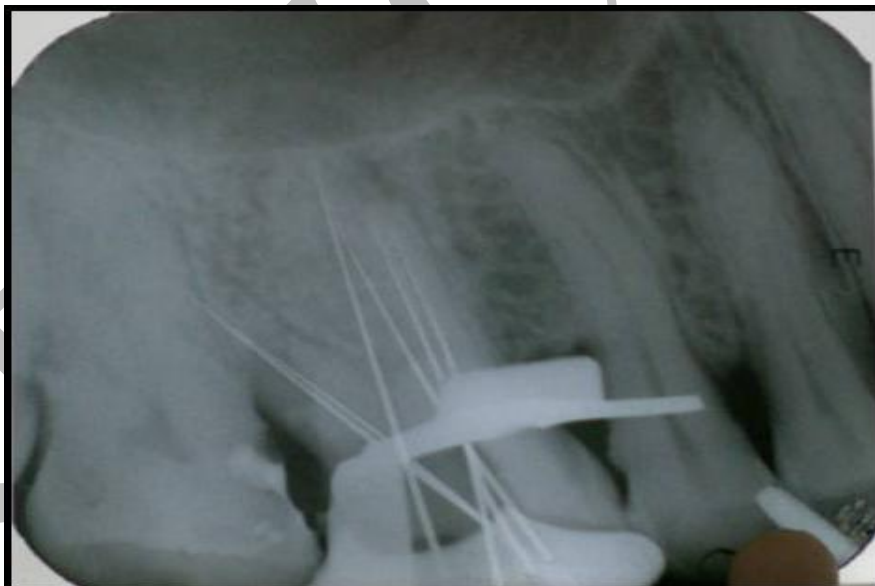


Figure 3: Working length determination radiograph

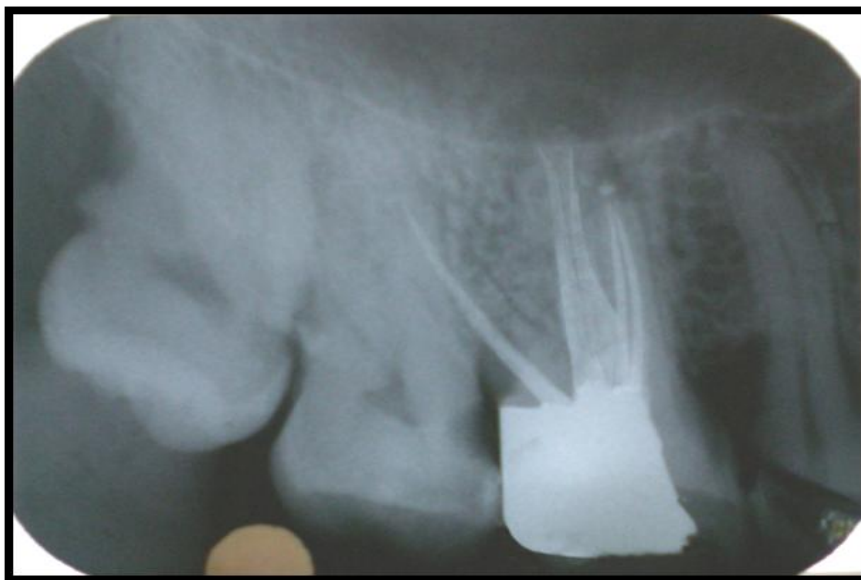


Figure 4: Obturation radiograph showing four separate canals with four separate foramina and both distobuccal canals merging into a single foramina



Figure 5: 10 month follow up radiograph with a normal peri-apex

DISCUSSION

The prognosis for endodontic treatment in teeth exhibiting morphological aberrations is unfavorable if the clinician fails to recognize extra root canals, incompletely debride the pulp canal space or is unable to accomplish proper obturation. Anatomical aberrations frequently occur bilaterally. Unusual root morphology is bilateral approximately 60% of the time. As reported by Sabala, bilateral incidence can be as low as 38% in mandibular canines to 100% in maxillary molars.⁶ Interpretation of the radiograph, careful inspection of the pulp chamber floor by probing, proper illumination and use of magnification equipment such as loupes & microscopes allows the operator to understand the root canal configuration. According to a study, the MB2 canal was found in 71.1% cases using operating microscope, 62.5% using loupes and a mere 17.2% cases with naked eye.⁷ Variations involving the number of roots and canals of maxillary molars suggests that the incidence of a second root canal in the mesiobuccal root (MB2) is 56.8%, distobuccal root (DB2) is 1.7% and in the palatal root (P2) is less than 1% as suggested in a study by Cleghorn.⁸

CONCLUSION

An astute practitioner needs to be familiar with all possible variations of the root canal anatomy in order to render successful endodontic treatment.

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