

Endodontic management of maxillary third molar with single root and root canal

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Abstract

Unusual root canal morphology in multi rooted teeth is a constant challenge for diagnosis and successful endodontic treatment. Presence of extra canals, lateral canals, deltas is commonly encountered but the possibility of existence of less number of roots and canals also exists. This clinical report presents a maxillary third molar with an unusual morphology of single root with single canal.

Keywords: Single Root, Maxillary, Third Molar, Single Root Canal.

Introduction

Maxillary third molars show considerable variations in size, contour and relative position to other teeth. The number of roots in maxillary third molar teeth ranges from one to five, and the number of encased root canals have been reported from one to six. However, the single, double and three-rooted variants, either separate or fused, encasing one to four root canals are considered the most common.

The internal anatomy of the mesiobuccal root in three-rooted maxillary first molars has been investigated more than any other root. However, few studies examined the occurrence of second mesiobuccal canals in third molar teeth. Authors have showed that 83.9% of maxillary third molars had three roots and in 75.1% had three canals.⁽¹⁾ Guerisoli DM concluded that the prevalence of a second canal in the mesiobuccal root of maxillary third molars was 37% in which 25% of the Mb2 were type II (2-1) and 12% were type IV (2-2).⁽²⁾ The number of root canals varies from one to six. However, one to three rooted maxillary third molars are more frequent.

In many cases, dentists have to deal with various morphological variations. If the dentist fails to detect the morphological variations, it would be a major cause of failure. When a preoperative radiograph shows an atypical tooth shape, further radiographic examinations should be considered in order to detect unusual anatomical differences. In an in vitro investigation on 50 maxillary third molars, Pécora et al. Revealed that 68% of Mb2 canals have root canal type I (1-1), while root canals types IV (2-2) and V (2-1) were only presented in 14% and 18%, respectively.⁽³⁾ In 1999 Stropko et al. evaluated the endodontic treatment of 20 third molar teeth, and found only 20% of the study subjects having a second mesiobuccal canal in which all of them were joined and ended in a single foramen.⁽⁴⁾ A case of single root and single root canal in maxillary third molar is rare.

Case Report

A 40 year old male reported to the department of dentistry with the chief complaint of spontaneously occurring moderate pain in upper right back teeth region since 4 days. Pain aggravated on taking hot beverages and during night while sleeping. A diagnosis of acute irreversible pulpitis was made. Medical history was noncontributory. Intraoral examination revealed distal carious lesion with 18. Preoperative radiographic examination suggested unusual root canal morphology with the maxillary molar. Hence, multiple radiographs in different angulations were taken, that revealed a single root and a single root canal (Fig. 1) Treatment plan comprised of nonsurgical endodontic treatment with teeth 18.

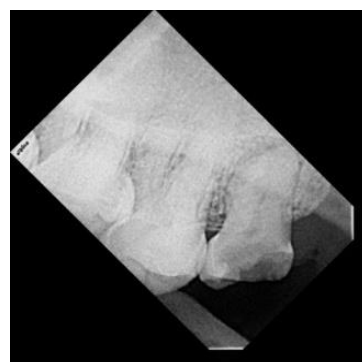


Fig. 1: preoperative radiograph showing proximal caries with 18

Patient's informed consent was obtained. Under local anesthesia and rubber dam isolation, caries were removed from the teeth and standard access opening was done at the center of the pulp chamber. Working length was determined using Electronic apex locator (Root ZX) and confirmed using RVG (Fig. 2).



Fig. 2: working length determined

Cleaning and shaping was done using a step back technique upto ISO master apical #50. Irrigation was performed with 3% sodium hypochlorite solution. Calcium hydroxide paste was used as an intracanal medicament. Canals were then irrigated with 17% aqueous EDTA solution as a final flush. Mastercone radiograph was taken (Fig. 3 & 4) Root canals were obturated with gutta-percha and AH Plus sealer using cold lateral compaction technique (Fig. 4). The tooth was subsequently restored. Follow up was done for 3 months (Fig. 5), for 6 months (Fig. 6) and the patients were found to be clinically asymptomatic.



Fig. 3: Master Cone Radiograph

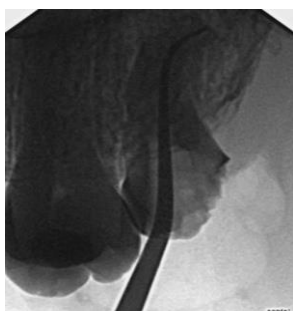


Fig. 4: Inverted image showing Master Cone



Fig. 5: Post Oburation Radiograph



Fig. 6: 3months follow up Radiograph



Fig. 7: 6months follow up radiograph

Discussion

Successful root canal treatment depends on having comprehensive information regarding the root canal anatomy. The external and internal morphological features of third molars scheduled for endodontic treatment should be identified accurately. Two periodontal ligament spaces on one side of a root or crossing of periodontal ligament space over the root usually indicate the existence of an accessory root. Root dilacerations and fusion with other teeth can be detected easily. The appearance of a break point or abrupt diminishing in the root canal indicates the presence of a root canal bifurcation.

Some of the common iatrogenic errors during access opening errors are caused during the search for the missing or extra canals. Such iatrogenic errors can be minimized if the clinician has the knowledge of the general location and dimensions of the pulp chamber. Although extra canals are more common, the clinician should be aware of the fact that in certain cases, there is a possibility of fewer canals than the normally presumed canal morphology. In our case multiple preoperative radiographs were taken and it revealed a single root and a single root canal.

Libfeld and Rotstein reported of the incidence of maxillary second molar with single root and single canal in their *in vivo* study.⁽⁵⁾ They assessed 200 radiographies of patients treated in an endodontic way and reported that this feature was evident in 0.5% of cases. Similar results were also found by Rwenyonyi et al. but in fused roots of maxillary second molar.⁽⁶⁾ Hartwell & bellizi stated that the maxillary second molar with a single root and a single canal is present in 0.6% of cases.⁽⁷⁾ Cobankara et al. reported a case of a 36 year old male and used radiographs to diagnose

unusual morphology of permanent maxillary molar with single root and single canal.⁽⁸⁾

Peikoff et al. in their retrospective study included 520 root canal treated maxillary second molar teeth and using radiograph they found 3.1% of these teeth had a single root and a single canal.⁽⁹⁾ On the other hand, Carlsen et al in their research work included 104 maxillary second molar teeth with single root and single root canal. Their study was conducted using stereomicroscope and concluded that 25.96% of cases had a single canal found on the central portion of the root.⁽¹⁰⁾

Conclusion

The root canal anatomy of the maxillary second molar can be aberrant so clinician should be aware of unusual anatomic variations and should not compromise tooth structure in search of 'other' canals which are usually found in these teeth. Three-dimensional CT examination is an excellent diagnostic tool for evaluation of unclear root canal configurations over radiographs for successful management of such cases.

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