

CASE REPORT

ENDODONTIC TREATMENT OF MANDIBULAR SECOND PREMOLAR WITH THREE ROOT CANALS- A CASE REPORT

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ABSTRACT:

Before initiating any endodontic therapy, probability of extra canals should be considered. The Incidence of three canals in mandibular second premolar has been reported to be 0.46-0.5%. Mandibular premolars are one of the most difficult teeth to treat endodontically because of the variations in root canal anatomy. The present case report describes nonsurgical endodontic treatment of mandibular second premolars with three canals.

Key words - Mandibular premolars, three canals, root canal anatomy.

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INTRODUCTION

The success of endodontic treatment requires an understanding of root canal anatomy and its morphology. The clinician should always be prepared to identify those teeth that tend to vary from norm. The last decade has witnessed so many newer advents in the field of endodontics. The use of newer radiographic techniques and irrigants has vastly improved the predictability of endodontic treatment. Majority of failure in endodontics may be attributed to operator's inability to understand the morphological variations of a tooth. Presence of extra canals and extra roots possess a big challenge to the endodontist. Mandibular premolars are the most difficult teeth to treat, probably because of the aberrations in their canal morphology.¹

Zillich and Dowson² have reported an incidence of 0.4% of mandibular second premolars with three canals. Vertucci *et al.* reported that the mandibular second premolar had one root canal at the apex in 97.5% and two canals in only 2.5% of the teeth; however, three root canals were scarce.³

The purpose of this case report is to discuss the diagnosis and treatment recommendations of a rare occurrence of three canal mandibular second premolar.

CASE REPORT

A 26-year-old male patient was referred to the Post Graduate Department of Conservative Dentistry and Endodontics with the chief complaint of intermittent pain over two months in relation to lower right posterior teeth region. Patient also had complaint of sensitivity to hot in the involved tooth. Medical and dental history was non-contributory. Preoperative intraoral periapical radiograph revealed a complex root canal system with at least two canals and there was evidence of periapical radiopacity (Figure A).



Figure A: Preoperative radiograph

Based on clinical and radiographic evidences a diagnosis of asymptomatic irreversible pulpitis with condensing osteitis was made.

Non surgical endodontic treatment was planned in tooth #45 over two visits with calcium hydroxide as interappointment, intracanal medicament.

The patient was anesthetized with 2% lidocaine with 1:100,000 epinephrine. After rubber dam isolation, access to the pulp chamber was made with a sterile round bur. For the sufficient access to the canals, the conventional access opening was modified to one which was wider mesiodistally. Tactile examination of the walls of major canals was done with a small precurved pathfinder file (Dentsply, Maillefer, USA) which was advanced slowly down each wall of the major canal, probing for a catch. A slight catch may signify the orifice of an additional canal especially in the case of the buccal and lingual walls because these are the unseen dimensions on the radiograph.

Two orifices were immediately found on a line connecting buccal cusp and lingual groove. The dentinal shelves that overlaid orifices were removed with Gates Glidden #3 and #2 with brushing motion on the mesial aspect of the buccally positioned found canal, a third canal was detected, and determined as the mesiobuccal canal. After determination of working length with an apex locator (Root ZX) and an additional radiograph with K-file #15 to confirm root canal lengths (Figure B).

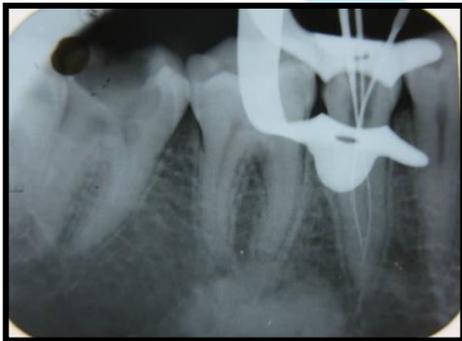


Figure B: Working length determination radiograph

The canals were cleaned and shaped up to ISO #35 master apical file, irrigated using 3% sodium hypochlorite and a final rinse of saline. The canals were dried with paper points (Dentsply, Maillefer, USA) and cotton was placed in the pulp chamber and Cavit (3M ESPE, St. Paul, MN, USA) was used to close the access cavity. At the third appointment the canals were obturated by cold lateral compaction of gutta-percha using Endomethasone

sealer (Figure C). The access cavity was filled with composite restorative material.



Figure C: Master gutta-percha record

At six month follow-up session the tooth was symptom-free with no signs of periapical pathology (Figure D).



Figure D: Post obturation radiograph

DISCUSSION:

Diagnosis and management of extra roots and root canals in mandibular premolars is one of the big challenges in endodontics. Therefore, clinician must have a proper knowledge of normal root canal anatomy and of its variations. Inability to find, debride and obturate a root canal has been reported to be a major reason for failures in endodontic treatment.⁴The Washington study which assessed the results of endodontic therapy of mandibular premolars showed that the failure rate in mandibular first premolar is 11.45%.⁵

Hoehn and Pink also reported an incidence rate of 42% for missed roots or canals in the teeth that needed retreatment.⁴ Hence, it is very important that all the canals must be located and treated during the course of nonsurgical endodontic treatment. Mandibular premolars have a reputation of having an aberrant root canal anatomy.⁶

Various published studies^{3,7-11} citing the anatomy and morphology of mandibular premolars reported that approximately 98% of teeth were single rooted. The incidence of two roots was 1.8%. Three roots when reported were found in 0.2% of the teeth

studied. Four roots were rare and were found in less than 0.1% of the teeth studied.

Successful endodontic treatment requires knowledge of biology, physiology and the root canal anatomy. It also requires proper instruments and the knowledge to use these instruments effectively. The following clues from diagnostic information and techniques can help the clinicians to detect additional root(s) and canal(s). A second radiograph from 15-20 degrees from either mesial or distal from the horizontal long axis of the root is necessary to accurately diagnose the number of roots and canals in premolar teeth. Yoshioka *et al.* have indicated that sudden narrowing of the canal system on a parallel radiograph suggests canal system multiplicity.¹² Martinez-Lozano *et al.* have suggested a 40-degree mesial angulation of the x-ray beam to identify additional canals.¹³

Root canal therapy of these teeth should be carried out by using x-rays from different angulations with efficient explorers, wider access openings, adequate illumination and, whenever possible, image magnification.

CONCLUSION

It is well established that the presence of extra roots and root canals in these teeth may occur far more than one can expect. The clinician should be astute enough to identify the presence of unusual numbers of roots and their morphology. The success of this case might be attributed to accurate diagnosis, complete chemo mechanical debridement, and proper obturation of all the three root canals.

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