

CASE REPORT

Management of Mandibular Second Premolar With Two Roots And Three Canals - A Case Report

Shailendra S. Sonawane¹, Anamika C. Borkar², Swapnil Bhosale³, Piyush Oswal⁴

ABSTRACT

Introduction: Mandibular second Premolar shows least root canal variations. But for successful root canal treatment these variation has to take into consideration for proper cleaning and shaping. This article explains about the management of mandibular second premolar with two roots and three canals.

Case report: Two different patients reported to clinic with pain in lower right back region of jaw. On examination of preoperative IOPA it was found that both teeth had two separate roots. Modification in access opening was done as the anatomy of the pulp chamber floor was different in both the cases. In one case, three orifices were located in areas approximating mesiobuccal, distobuccal and distolingual line angles. Whilst in the other case one orifice in the distal area divided into one distobuccal and one distolingual canal and one orifice was on the mesial wall. The cleaning, shaping and obturation was done accordingly.

Conclusion: Objective of this paper is to share the knowledge about the unusual root canal anatomy in mandibular second premolar. Very careful examination of the preoperative IOPA and pulpal space is recommended to locate any unusual orifices.

Keywords: Additional root canal, Endodontic treatment, Mandibular second premolar

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¹Private Practitioner as consulting Endodontist, Pune, Maharashtra India. ²Professor, ³Reader, ⁴Senior Lecturer, Department of Conservative Dentistry and Endodontist, Dr. D.Y. Patil Dental College and Hospital Pimpri, Pune, Maharashtra India.

Corresponding author: Dr. Shailendra S. Sonawane, Private Practitioner as consulting Endodontist, Pune, Maharashtra India

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INTRODUCTION

Complete knowledge of the root canal anatomy is a basic requirement for successful endodontic treatment.^{1,2} Thorough mechanical and chemical debridement of the root canal is the main objective of endodontic therapy which is followed by a three-dimensional obturation and a final coronal restoration, thus preventing access to microorganisms.² Understanding of the presence of unusual external and internal canal morphology mostly contributes to the positive outcome of the root canal treatment. Studies show wide variations in root canal anatomy of mandibular premolars. 97.5% of second premolars studied by Vertucci et al(1978) showed that there was one root canal till the apex and two canals in only 2.5%; incidence of three root canals was scarce.³

Cases of mandibular second premolar with three canals have been described by many investigators. All these cases, except for one observed three orifices on the floor of the pulp chamber, one of which was located in lingual and other two in the buccal part of pulp chamber (mesiobuccal and distobuccal). De Moor et al (2005) were the only one who reported the atypical occurrence in the distal half of the furcation area and one orifice on the mesial wall of pulp chamber.³

CASE REPORT:

Case 1:

A 27 years old male patient reported with a chief complaint of pain in lower right back region of jaw to the Department of Conservative Dentistry & Endodontics of Dr. D.Y. Patil Dental College & Hospital Pimpri, Pune.

History revealed that the patient had experienced pain for the past two weeks. Pain was spontaneous in nature and aggravated on chewing and lying down. On intraoral clinical examination there was a carious exposure of the pulp and the tooth was tender to percussion. The tooth was subjected to routine clinical tests and a provisional diagnosis of acute periodontitis with 45 was made. On preoperative radiographic examination two roots were found, one each on the mesial and distal sides of the first and second premolar (Figure-1). Contralateral side premolar also showed two roots. Access was gained to the pulp chamber after administration of local anesthesia (2% lidocaine and 1:100,000 epinephrine) under rubber dam isolation. To gain full access to the canals, the conventional access opening was modified into one that was wider mesiodistally as the roots were mesiodistally oriented. Orifice location was not easy as the coronal pulp chamber was unusually long and the separation of roots was from the cervical one third of the roots.

Two canal orifices were located and patency was ascertained using a small size K-file and on further exploration an additional distal canal was located. Confirmation of additional root canal was done by taking radiographs with different angulation using SLOB rule.

Working length was established with the use of an apex locator (I Root) and confirmed with a radiograph. Canals were cleaned and shaped with hand K-files and Protaper NiTi hand file (Maillefer Dentsply, Baillagues, Switzerland) with RC Prep (Premier, Norristown, PA, USA) in a crown down manner up to final canal size of # 25. Use of copious irrigation of 3% sodium Hypochlorite, 17% liquid EDTA and final rinse with saline was done during and after instrumentation.

Calcium hydroxide (RC Cal Prime Dent) was used as intra-canal medicament and access cavity was sealed with ZOE temporary restoration. The root canals were obturated with AH plus (De Trey, Dentsply) root canal sealer and a gutta-percha master cone size # 25, using cold lateral condensation with accessory cones. Calcium hydroxide (RC Cal Prime Dent) was used as intra-canal medicament and access cavity was sealed with ZOE temporary restoration. The root canals

were obturated with AH plus (De Trey, Dentsply) root canal sealer and a gutta-percha master cone size # 25, using cold lateral condensation with accessory cones (Fig-2).

Case II :

A 50 yrs male patient with a chief complaint of pain in lower right back region of jaw reported to the Department of Conservative Dentistry & Endodontics of Dr. D.Y. Patil Dental College & Hospital Pimpri, Pune.

History revealed that the patient had experienced pain for the past two weeks. Pain was spontaneous in nature and aggravated on chewing. On intraoral clinical examination, there was a carious exposure of the pulp and the tooth was tender to percussion. The tooth was subjected to routine clinical tests and a provisional diagnosis of acute apical periodontitis with 45 was made (Fig-3). The patient was anesthetized with 2% lidocaine and 1:100,000 epinephrine. After rubber isolation, access to the pulp chamber was made. Two orifices were immediately found on a line connecting buccal cusp and lingual groove. After careful examination dentinal shelves that overlaid orifices were removed with Gates Glidden #3 and #2 with brushing motion on the mesial aspect of the buccal wall, a third canal was located and determined as the mesiobuccal canal (Fig-4). After determination of working length with an apex locator (I Root) and an additional radiograph with K-file #15 to confirm root canal lengths. Cleaning, shaping and obturation of the canals were performed similar to case 1 (Fig-5).

DISCUSSION

Root canal treatment of mandibular second premolar is difficult as it shows extra root canal, variation in root canal anatomy, lateral canal and apical delta.^{3,5}

Preoperative radiograph with different angulations helps in finding extra root canal.⁶ Generally, in mandibular premolars with three canals, the cervical half of the root is wider than usual, with little or no taper.⁵ Root canals may not be evident in radiographs and may look unusual. Sudden change in radiographic density and sudden narrowing of root canal space usually indicates an additional canal called as "Fast Break

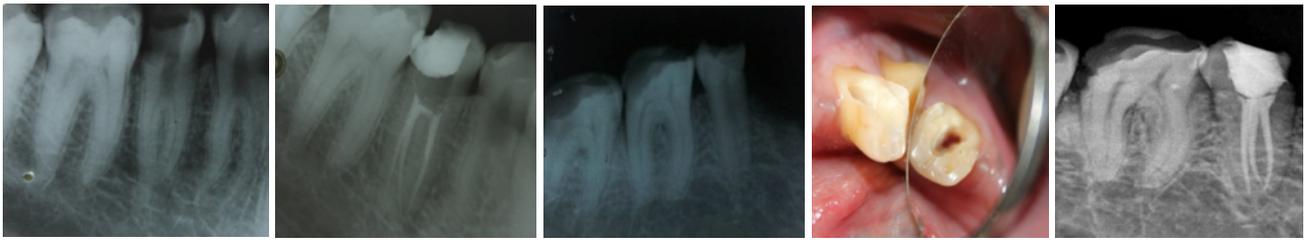


Figure-1: Pre-Operative IOPA Case I, **Figure-2:** Obturation Case I, **Figure-3:** Pre-Operative IOPA Case II, **Figure-4:** Access opening Case II, **Figure-5:** Obturation Case II

Guide".⁷ Therefore, careful interpretation of preoperative IOPA helps in finding extra root canal. Using magnifying loupe, fiber optic illumination for observation of anatomical landmarks in the pulp chamber, sodium hypochlorite bubbling in the extra canals and radiopaque dyes and dentinal map may be helpful in locating additional canals.^{8,9} In first case we noticed bifurcation deep in distal canal. Many authors have reported one orifice in the lingual side and two in the buccal.^{10,11} In our second case such a dentinal map was observed.

For more reliable working length determination, we use apex locator in combination with radiographs.¹² We obturated all three canals with lateral compaction technique. Studies shows that mandibular second premolar has very low incidence of having three canals, but to find all root canal careful clinical and radiograph examination is necessary.^{13,15}

CONCLUSION

Successful and predictable endodontic treatment requires knowledge of normal anatomy and variations. In cases where radiographic images are not helpful to clarify root canal anatomy and aberrations, magnification devices are recommended. Also enhancement of color contrast by means of radiopaque dye may be helpful to visualize deeply situated orifice and aberration.

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