

## ENDODONTIC MISCELLANY : A MANDIBULAR SECOND BICUSPID WITH THREE ROOT CANALS

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### ABSTRACT

The main objective of endodontic therapy is the restoration of the tooth to its proper form and function. In recent years increasing emphasis is laid on retaining pulpally involved teeth by dentists. To achieve satisfactory root canal therapy, a proper and in-depth knowledge of complex and abnormal root canal morphology is essential. Recognition of abnormal configuration enables the operator to better debride and obturate the root canal space to afford greater success in endodontics. Mandibular second premolar has a number of variations; one among them is having three root canals. This article describes a case of mandibular second bicuspid with unusual canals that is treated successfully.

**KEY WORDS:** Mandibular second premolar, Anatomic variations, Endodontic treatment.

### INTRODUCTION

Endodontics has greatly enhanced its role in modern dentistry regarding the preservation of natural teeth. Endodontic treatment is highly successful in retaining teeth if it is combined with efficient restoration of the involved tooth. The presence of untreated canal may be one of the reasons for failure of endodontic therapy. Therefore, a thorough knowledge of root canal morphology is essential to reduce the chances of failure.

Every tooth in oral cavity may have some variations in relation to the size, number, length and configuration of roots and root canals. Numerous studies of root canal anatomy and configuration have facilitated to recognize teeth with unusual canal shapes. The prevalence of 3 root canals with three orifices was reported to be 0.4% by Zillich and Dowson in 1973<sup>1</sup> and Eldeeb in 1982<sup>2</sup>. Generally Mandibular second premolar is treated to have a single root and canal. Dental literature has documented cases of having three or four root canals in the mandibular second premolar. Among the various configurations having three root canals is rare. Here is a case report describing the endodontic treatment of mandibular second premolar with two roots and three canals.

### Case Report

A 28 year old male with non contributing medical history was referred to the Department of Conservative Dentistry and Endodontics of Chhattisgarh Dental College and Research Institute for evaluation of the mandibular

right bicuspid. Patient complained of pain in lower right back region. Clinical examination revealed those two teeth Mandibular first molar and second premolars were pulpally involved. A deep proximal caries in distal aspect of tooth # 45 was observed clinically which was tender on percussion.

Radiographic evaluation reveals a large distal carious lesion involving pulp (**Fig .1**). Normal periodontal ligament widening was seen. The radiograph showed radiolucent line indicating root canal running from pulp chamber to the middle third of the length of the root and suddenly disappeared, suggesting the presence of two root and canals. Radiograph from different angulations revealed three canals. A diagnosis of acute apical periodontitis was made for #45 & #46.

A two visit endodontic treatment was planned for #45 with calcium hydroxide as intra-canal medicament between two appointments. An inferior alveolar nerve block was administered with 1.8 ml of lignocaine 2%, 1:80000 adrenaline (Indoco, Goa). The pulp chamber was exposed after rubber dam application (Hygenic, Canada). Initial exploration of the pulpal floor with # 10 K - file (Maillefer Ballaigues, Switzerland) revealed all the three canals with three different orifices.

Working length was determined radiographically (**Fig 2**). The pulp was extirpated. The canals were cleaned and shaped by the crown down technique with rotary protapers (Dentsply Maillefer Ballaigues, Switzerland). 3% sodium hypochlorite (I-dent, Rohini, Delhi) was used as an

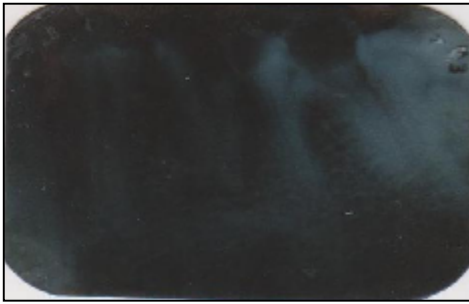


Fig.1 Diagnostic IOPA



Fig.2 working length determination



Fig.3 Master cone placement



Fig.4. Post-obturation

irrigant. Calcium hydroxide (Prime dental Thane,India) was placed in the canal and access cavity was sealed with IRM (Dentsply Detray, Germany).

After two weeks the patient was recalled and IRM was removed. Calcium hydroxide was removed from canals and irrigated. The canals were dried with sterile paper points. Master cones were placed in the canals and IOPA was taken (Fig 3). Canals were coated with root canal sealer(AH-26, Dentsply Milford,DE) and were obturated with Gutta percha. Post obturation radiograph was taken (fig 4). The pulp chamber was closed and the patient was referred to the prosthetic clinic for crown preparation and placement.

**Discussion**

To achieve success of endodontic treatment, proper debridement and obturation of all the canals is essential . Mandibular premolars may be the most difficult teeth in the mouth to treat (slowey 1978) <sup>3</sup>. The anatomy of the root and canals of the mandibular second premolar can be complex and variable <sup>4</sup>. The presence of extra roots or canals is undoubtedly an endodontic challenge. Failure to recognize the variations can often lead to acute flare-ups during treatment and lead to failure.

If the outline of root canal is unclear, unusual, one should be suspicious of extra canal. Thorough

examination of the pulp chamber floor can lead to the location of orifices. The internal anatomy of a root canal may show Isthmus, internal canals, accessory canals and etc. The presence of grooves in the pulpal floor serves as a map for canal location. An extra canal may be detected by thorough clinical and radiographic examination of the pulp floor <sup>5</sup>.

Conventional radiographs have limitations of showing a three dimensional object in two dimension which gives a poor image of the canals. It is possible to overcome this limitation by taking at least two radiographs from different, usually horizontal direction<sup>6</sup>.

Radiographs from several angles should be studied prior to the access preparation. It is usually on these angle radiographs the presence of more than one root canal is apparent. Sudden narrowing or disappearing pulp space may indicate the presence of another canal<sup>3</sup>.

Many authors have studied the canal anatomy and configuration of mandibular premolars .In the literature Mandibular second premolar is reported to have three root canals by various authors<sup>7-13</sup>. Though the occurrence of three canals is a rare entity, one should not neglect to explore these extra canals.

A sound knowledge of the pulp space anatomy is a prerequisite for successful endodontics. Unusual conditions may expose the clinical to a diagnostic problem

before the onset of therapy, but the expert will be able to find the canals during access cavity preparation and treat them successfully.

**CONCLUSION**

Mandibular second premolar having two roots and three root canals is unusual and can lead to difficulties during treatment. The presence of this variation should serve as a reminder to explore the pulp chamber floor thoroughly. It is hoped that this clinical protocol described above will lead to higher success rates in the endodontic treatment of such teeth with unusual morphology.

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