



ISSN Print: 2394-7489  
ISSN Online: 2394-7497  
IJADS 2016; 2(4): 72-74  
© 2016 IJADS  
www.oraljournal.com  
Received: 14-08-2016  
Accepted: 15-09-2016

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## Endodontic management of mandibular premolar with two roots

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### Abstract

Mandibular premolars usually have single root with single root canal system. However numerous studies related to anatomic variations of mandibular premolar have been reported. The clinician should be aware of the configuration of the pulp system for the successful endodontic treatment. The incidence of two roots in these teeth are quite rare. This report presents the clinical management of mandibular premolar having two roots bifurcated at the midroot level.

**Keywords:** Mandibular premolar, root canal configuration, anatomic variation

### 1. Introduction

The objective of endodontic treatment is thorough cleaning and shaping of the canal followed by three dimensional obturation of the root canal space along with fluid tight seal of the apical foramen. Therefore, the knowledge of the canal anatomy is essential for successful endodontic management. The clinician should be aware of the complexity of the root canal system and also be capable of identification of these variation.

The mandibular second premolars normally has a single root and a single canal. However it may have more than one canal and two roots. The incidence of two roots and two canals in the mandibular second premolar was 0.0-0.4% & 13.5-20% respectively [1]. The published case reports with two roots and two canals are shown in Table 1.

The literature has been shown mandibular second premolars to have wide variation in their root canal anatomy [1-4]. This case report describes the endodontic management of mandibular second premolar having two roots and two canals.

### 2. Case Report

A 28 year old male patient reported to the department with food lodgement in the lower right back region. The medical history was noncontributory. Clinical examination revealed restoration in mandibular right second premolar. The buccal and lingual mucosa was normal. There was no intra or extraoral swelling/sinus present. The periodontal health was normal. The patient was non responsive to pulp sensibility test. The periapical radiograph revealed restoration on the distal aspect of crown, root bifurcation in the middle third with distinct outline of the mesial and distal root without any periapical pathology (figure 1a). The diagnosis of Pulpal necrosis was made and root canal treatment was initiated. Cone beam computerized tomography was performed for better understanding of the root morphology (Figure 2a, 2b, 2c). Access preparation was made in the right mandibular second premolar and was modified by coronal flaring till the level of bifurcation. The location of the orifices were difficult as the pulp chamber floor was in the middle third. With the help of operating microscope straight line access was established to the mesial and distal canal orifices (Fig1b). Careful manual exploration with 10 K file was done and working length was measured with electronic apex locator and confirmed with radiograph. (Figure 1c). Both the canals were prepared using hand Kfile till no 20 followed by hyflex CM file (Coltene Endo) till 20.04. During preparation, the canals were lubricated with glyde (Dentsply) and irrigated with 2.5% NaOCl. The calcium hydroxide dressing were placed in the canals and were sealed with temporary restoration. After one week, the canals were coated with AH plus sealer and obturated to the level of bifurcation. (fig1d) The rest of the canal was obturated with guttapercha in the lateral Compaction and the tooth was restored with composite resin (Figure 1e).

### Correspondence

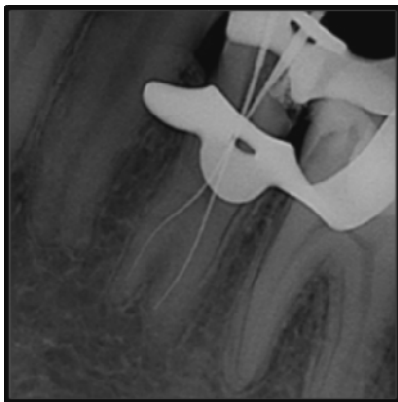
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**Fig 1a:** Showing Preoperative radiograph



**Fig 1b:** An occlusal photograph of the access cavity showing pulp chamber floor with canal orifices



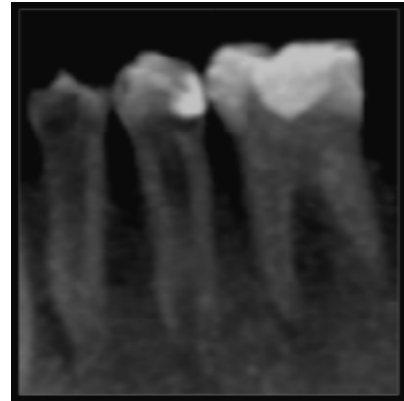
**Fig 1c:** Working length radiograph



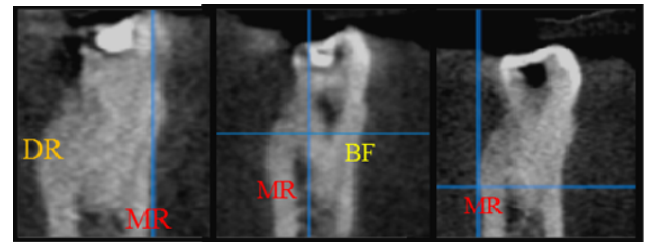
**Fig 1d:** Obturation till bifurcation



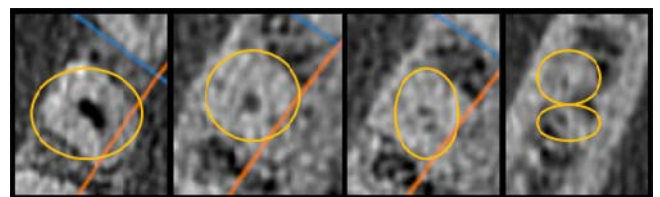
**Fig 1e:** obturation and composite restoration



**Fig 2a;** Buccolingual section



**Fig 2b:** Mesiodistal section showing mesial and distal root



**Fig 2c:** transverse section showing two canals and two root

**Table 1:** Endodontic management of mandibular second premolar with two roots and two canals (Case reports)

Author	Year	Age	Gender	Quadrant	Country
M Lofti	2008	21	Female	35	Iran
R Prakash	2008	45	Female	45	India
SR Lee	2010	27	Male	35	korea
Shenoy P	2011	35	Female	35	India
S Jayaprada Reddy	2012	38	Female	45	India
		36	Male	45	
T Borisova-Papancheva	2015	43	Male	35	Bulgaria

### 3. Discussion

Recognition of the aberrant anatomy requires thorough knowledge of the root canal morphology, critical interpretation of the diagnostic aids, appropriate assessment of the pulp chamber floor and operative skills of the clinician. The case report presented here refers to the management of endodontic challenge of mandibular second premolar having two roots which are bifurcated at the midroot level.

Mandibular premolar may have more than one canal in a single root or it may have two roots. Slowey<sup>[5]</sup> has shown that when the root canal shadow suddenly stops in the radicular region on radiograph, bifurcation or trifurcation of the canal at that point should be suspected. Also an additional root canal can be identified when the root outline is unclear or has an unusual contour, or deviates from the normal appearance on radiograph.

For the management of branched canal configuration wherein the clinician encounters difficulty in locating and preparing the canal, the use of magnification was necessary. One of the common reasons for having difficulty in identifying the second canal was inadequate access which leaves a shelf of dentine over the second canal<sup>[6]</sup>. The second canal generally leaves the main canal at a sharp angle nearly at a right angle. Slowey<sup>[7]</sup> recommends the visualization of such canal configuration as a lower case letter 'h' where the main canal would be the straight line portion of the 'h' and the second canal exists about midroot at a sharp angle from the straight canal. Also an important step needed in such canal was a modification in access which required an adequate flaring of the canal coronal to the bifurcation for unobstructed passage of instruments into the second canal.

Careful manual exploration of the bifurcated canal should be done with a pre curved 10K file which will provide a tactile sensation as the instrument moves in an eccentric direction on deeper penetration into the canal<sup>[8, 9]</sup> and also prevents the instrument separation.

The obturation of the branched canal configurations are challenging tasks. These can be obturated by two step technique<sup>10</sup> either by using the thermoplasticized gutta-percha techniques<sup>[9, 11]</sup> or by the use of single cone obturation till the level of bifurcation<sup>[12]</sup>. The single cone two step technique was used in the present case report.

### 4. Conclusion

This case report emphasizes on the importance of thorough knowledge of the internal root canal anatomy and implementation of the modified techniques by the clinician before and during treatment to prevent their subsequent flare up. Mandibular premolar typically has a single root and a single canal showing Type I configuration but may show numerous anatomic variations.

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