

# Mandibular left first premolar with two roots: A morphological oddity

NITIN KARARIA, AJAY CHAUDHARY, VANDANA KARARIA<sup>1</sup>

## Abstract

Thorough knowledge of the root canal morphology, appropriate assessment of the pulp chamber floor, and critical interpretation of radiographs are a prerequisite for successful root canal therapy. The possibility of additional root/canal should be considered even in teeth with a low frequency of abnormal root canal anatomy. This article reports on a case of mandibular first premolar with two roots, which was successfully treated with root canal therapy.

**Keywords:** Abnormal morphology, mandibular first premolar, root canal morphology, root canal therapy

## Introduction

The success of root canal therapy is dependent upon a thorough knowledge of the root and root canal morphology. This helps us to locate all the canals and properly clean, shape, and obturate the canal spaces in all dimensions.<sup>[1-3]</sup> Slowey has suggested that mandibular first premolars, often called as “Endodontist’s enigma,” may present the greatest difficulty of all teeth to perform successful endodontic treatment.<sup>[4]</sup> This is because they are anatomically unpredictable, and often present with a wide variety of morphological rarities. One such morphological oddity is the presence of two roots, with a reported incidence of 1.8%. This article reports on the clinical case of a mandibular first premolar with two roots.

## Case Report

A 32 year old male patient reported to the department of Conservative Dentistry and Endodontics at Rajasthan Dental College and Hospital, with the chief complaint of pain in the posterior right mandibular tooth for the past 1 week. Patient’s medical history was non contributory. Clinical examination revealed a carious and occlusally attrited right mandibular first premolar. The tooth was tender on percussion.

*Department of Conservative Dentistry and Endodontics, Rajasthan Dental College and Hospital, <sup>1</sup>Department of Orthodontics, Government Dental College and Hospital, Jaipur, Rajasthan, India*

**Correspondence:** Dr. Nitin Kararia, 138, Sahyog II Apartments, Sector 6, Vidhyadhar Nagar, Jaipur – 302 023, Rajasthan, India, E-mail: amazingsaggian@yahoo.com

Radiographic examination of the tooth indicated an unusual anatomy of two roots, and also there was widening of the apical periodontium, indicating periapical pathology and the necessity for root canal treatment [Figure 1].

The clinical examination, radiographic examination and vitality tests led to a diagnosis of acute apical periodontitis of the right mandibular first premolar requiring endodontic therapy. The tooth was anaesthetized by way of right inferior alveolar nerve block using a 2% solution of lignocaine hydrochloride containing 1:80000 adrenaline (Lignox 2% A, Warren, Indoco). Subsequently, the tooth was isolated with a rubber dam. Endodontic access was prepared with a round diamond bur in a high speed airtor handpiece. The pulp chamber was inspected with the aid of a magnifying loupe (Seiler loupes) and a sharp DG 16 explorer was used to locate the canal orifice. After obtaining the canal patency, a #10K file (Dentsply, Maillefer) was precurved and inserted in a distolingual direction to traverse the canal bifurcation into the second root [Figure 2]. A working length radiograph confirmed the presence of a single coronal canal bifurcating



**Figure 1:** Pre-operative intra oral periapical radiograph of the mandibular right first premolar in the patient in the case study, showing an unusual anatomy of two roots, and widening of the apical periodontium

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**Figure 2:** Files inserted to traverse and confirm the root canal configuration



**Figure 3:** Working length radiograph of the mandibular right first premolar in the patient in the case study, showing the presence of a single coronal canal bifurcating in the middle one third and coinciding with the separation of the two roots. The canals exited in separate apical foramina in the respective root



**Figure 4:** Post-operative radiograph of the mandibular right first premolar in the patient in the case study

in the middle one third, and coinciding with the separation of the two roots. The two canals exited in separate apical foramina located in the respective roots [Figure 3]. Cleaning and shaping of the canals was performed using crown-down technique under copious irrigation with 5.25% sodium hypochlorite solution. The canals were dried with paper points, and the tooth was temporized. After three days, the canals were obturated with cold, lateral compaction of gutta percha cones (Dentsply) and zinc oxide eugenol sealer. A post obturation radiograph was taken to evaluate the quality of obturation [Figure 4].

## Discussion

Anatomical variations, especially extra canals and roots, should always be kept in mind when treating teeth endodontically. Canals if left unclean may harbour microorganisms, which have been reported to be a major cause for treatment failure.<sup>[5,6]</sup> A study at the University of Washington assessed the failure rate of non surgical root canal therapy in all teeth. The mandibular first premolar had the highest failure rate in the study at 11.45%.<sup>[7]</sup> The root morphology of mandibular first premolar can be highly complex and extra root(s) can be found. Scott and Turner<sup>[8]</sup> describe the accessory root of mandibular first premolar as Tome's root. They observed ethnic differences in the root morphology; and, reported the highest incidence (>25%) of accessory roots in the Australian and sub Saharan African populations. The lowest incidence of Tome's root (0-10%) occurred in the American, Arctic, New Guinea, Jomon and Western Eurasian populations. Sert and Bayrili<sup>[9]</sup> also reported sex differences in canal morphology, reporting higher incidence (44%) of accessory roots and canals in females as compared to males (34%). Thus, a variety of factors contribute to variations in root anatomy of mandibular first premolars. Successful endodontic outcome in such cases is dependent upon careful use of all the available diagnostic aids to locate and treat the entire root canal system. Careful interpretation of angled radiographs, proper access preparation and a detailed exploration of the tooth are essential prerequisites for a successful treatment outcome.

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