

# Bifid Root with Mandibular First Premolar- A Case Report

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## Abstract:

Understanding the root and canal anatomy is crucial before initiating endodontic procedures. A common cause for non-surgical endodontic treatment failure in mandibular premolars is missed roots or canals, as the root canal morphologies of these teeth can sometimes be atypical. Mandibular premolars have earned the reputation for having an aberrant anatomy. Literature is filled with reports of extra canals in mandibular second premolars, but reports about the incidence of extra roots in these teeth are quite rare. This paper attempts at explaining a rare case of successful endodontic management of a two-rooted mandibular first premolar with diagnostic, inter-operative and postoperative radiographic records along with a substantial data on the incidence of extra roots in these teeth.

**Keywords:** Endodontics, root canal therapy, two roots, lower first premolar

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## 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.[1-3] 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.

[4] 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%.

Failure to recognize variations in root or root canal anatomy can result in unsuccessful endodontic treatment. Hence, it is imperative that the clinician be

well informed and alerted to the commonest possible variations.

## CASE REPORT

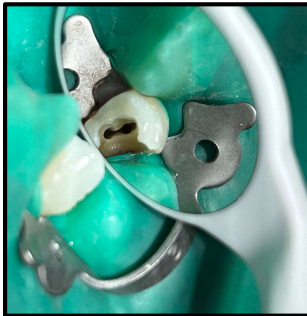
A 25 year old female patient reported to the department of Conservative Dentistry and Endodontics at MIDSr Dental College and Hospital, with the chief complaint of pain in the posterior left mandibular tooth for the past

1 week. Patient's medical history was non-contributory. Clinical examination revealed a carious left mandibular first premolar. The tooth was tender on percussion. 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. (fig.1)



**Fig.1 Preoperative radiograph**

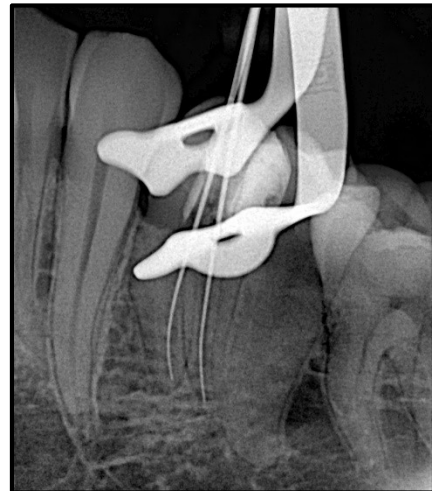
The clinical examination, radiographic examination and vitality tests led to a diagnosis of acute apical periodontitis of the left mandibular first premolar requiring endodontic therapy. The tooth was anaesthetized by way of left inferior alveolar nerve block using a 2% solution of lignocaine hydrochloride 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 (Zumax loupes) and a sharp DG 16 explorer was used to locate the canal orifice. After obtaining the canal patency, a #10 K file (Dentsply, Maillefer) was precurved and inserted in a distolingual direction to traverse the canal bifurcation into the second root. A working length radiograph confirmed the presence of a two canals bifurcating in the coronal one third, and coinciding with the separation of the two roots. (fig.2)



**Fig. 1.1 Post carries excavation & access opening**



**Fig. 1.2 after pre endo buildup**



**Figure 2. Working length determination**

The two canals exited in separate apical foramina located in the respective roots. 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 resin based sealer after master cone selection. A post obturation radiograph was taken to evaluate the quality of obturation. (Fig. 3 and fig. 4)

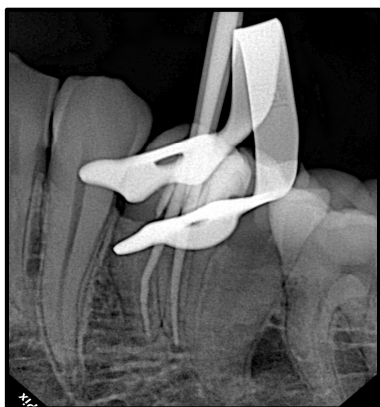


Figure.3 Mater cone selection



Figure.4 post obturation

## 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. [5, 6] 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%. [7] The root morphology of mandibular first premolar can be highly complex and extra root(s) can be found. Scott and Turner [8] 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[9] 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.

## CONCLUSION

This case report emphasizes on the importance of thorough knowledge of the internal root canal anatomy and execution of the modified techniques by the clinician before and during treatment to prevent their subsequent flare up. Advanced equipment, for example, dental operating microscope, NiTi file systems, ultrasonics, newer obturating system, etc., contribute to successful endodontic treatment. Aberrant anatomical variation if misdiagnosed leads to failure and if diagnosed correctly leads to successful treatment.

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