

# Conservative Dentistry and Endodontics

## Mandibular Second Premolar with Trifurcation



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Quick Response Code:



Website:  
[clinicaldentistry.ida.org.in](http://clinicaldentistry.ida.org.in)

DOI:10.33882/ClinicalDent.15.31XXX

How to cite this article: Tomer A.K., Sabharwal G., Saurabh S.  
Mandibular Second Premolar with Trifurcation.  
Clinical Dentistry 2022; XVI; 17-21.  
<https://doi.org/10.33882/ClinicalDent.15.31XXX>

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## Abstract

### || Aim

The purpose of this case report is to describe a nonsurgical endodontic treatment of a mandibular left second premolar with two separate roots and three distinct root canals.

### || Brief Background

Before beginning endodontic therapy, the potential presence of additional canals must be taken into account. It is recognised that there are several morphological variations of the root canal system.

### || Summary and Conclusions

This case report describes the successful nonsurgical endodontic treatment of a mandibular left second premolar with two separate roots and three distinct root canals filled using #0.04/25 gutta percha and AH Plus sealer once the tooth was asymptomatic.

### || Clinical Significance

Conventional endodontic therapy without surgical intervention can produce enough healing without any issues, even in teeth with exceedingly complex root.

### || Key Words

AH Plus Sealer, Endodontic Therapy, Gutta Percha, Mandibular, Root Canals.

## || Introduction

The anatomy and morphology of the root canals must be understood for endodontic treatment to be successful. The root canal system exhibits a significant amount of morphological diversity. The premolars in the mandible have long been thought to have abnormal anatomy. Green found that mandibular second premolars had the highest occurrence (47%) of accessory foramina<sup>[1]</sup>. In addition, Rahimi et al. reported that mandibular second premolars had a significant incidence of lateral canals (38.7%) and apical deltas (4.38%)<sup>[2]</sup>.

According to Ingle, mandibular second premolars only have a 12% chance of having a second canal and a 0.4% chance of having a third canal. Zillich and Dowson observed an incidence of two canals of 11.7% and a 0.4% incidence of three canals<sup>[3]</sup>. According to Vertucci et al., the second mandibular premolar had one root canal at the apex in 97.5% of cases and two canals in only 2.5% of teeth; three root canals were uncommon<sup>[4]</sup>.

The mandible have been known to have difficult root canal procedures<sup>[5]</sup> due to their weak root canal patterns. Second premolars in the mandible are distinguished by having a single root and a single canal. During treatment processes, additional canals may be, unexpectedly discovered, which has been associated with endodontic therapy difficulties<sup>[6]</sup>. Dental clinicians should be aware of such major variances in the canal design of the root canal system in order to prevent such situations.

## || Case Report

A 26-year-old female with a non contributory medical history was referred to our Department of Conservative Dentistry and Endodontics for endodontic treatment on the left mandibular second premolar. The chief complaint of the patient was "pain and sensitivity in the lower left back teeth." Clinical examination revealed distal caries in the left mandibular second premolar tooth 35. Teeth 36 and 38 were missing, whereas 37 was tender on percussion positive.

An intraoral periapical radiograph (IOPA) was advised. Radiographic examination revealed radiolucency involving the pulp with respect to tooth 35. The tooth was diagnosed with irreversible pulpitis based on clinical and radiographic findings and it was decided

to undergo endodontic therapy for the lower left second premolar. IOPA discovered two root canals and a third was suspected due to irregular dimensions in the middle third of the root. Additional IOPA radiographs recorded at various angles were unable to precisely conform to the third root canal's course since they only give a two-dimensional image. The involved tooth was focused and the morphology comes under GULABIVALA TYPE 3.

The patient gave his informed consent to endodontic treatment of the affected teeth. By blocking the inferior nerve on the left side, a local anaesthetic (2% lidocaine with 1:100,000 epinephrine) solution was used to numb the tooth. The access cavity was made using round diamond burs in a high speed airtor hand piece. Two distinct canal orifices were discovered in the pulp chamber but the third orifice was not easy to visualise. A radiograph and an apex finder (Coltene Canal Pro) were used to determine the working length (Fig. 2). With the use of hand K-files (Maillefer Dentsply, Baillaigues, Switzerland), the canals of tooth

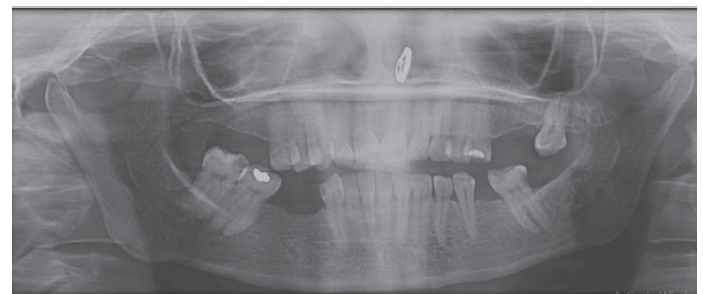


Fig.1: Pre operative OPG

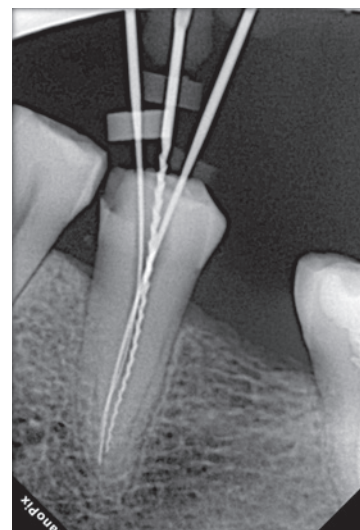


Fig.2: Working Length

#15 were cleaned and shaped and NT Rainbow S NiTi Rotary files (Fig.6) in a crown-down manner up to final canal size of #0.04/25 in lingual canal and #0.04/25 in mesiobuccal and distobuccal canals. Numerous amounts of 2.5% sodium hypochlorite, 17% ethylene diamine tetraacetic acid (EDTA), and saline were used to disinfect the canals. Numerous amounts of 2.5% sodium hypochlorite, 17% ethylene diamine tetraacetic acid (EDTA) and saline were used to disinfect the canals. The composite was used as the permanent coronal seal. The patient was advised crown for the treated tooth (Figs. 4, and 5).

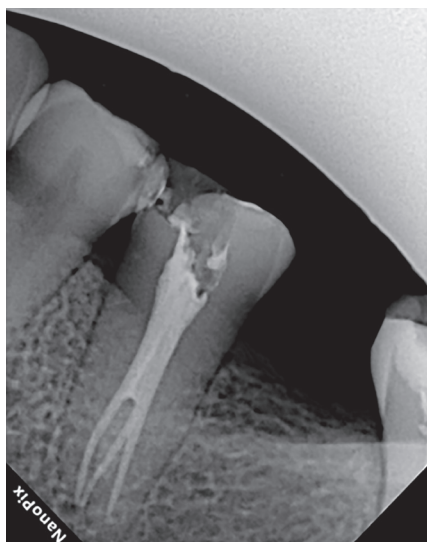


Fig.3: With Master Cone GP

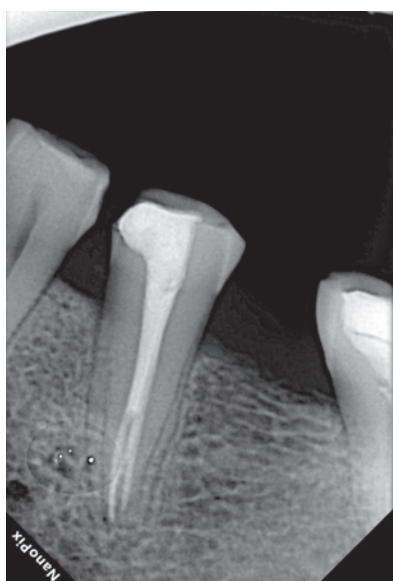


Fig.4: Post Operative



Fig.5: Radiographic image after post endodontic restoration



Fig.6: NT Rainbow S Rotary Files

## || Discussion

Endodontic treatment in the second mandibular premolar with varying morphology is a challenging task. Therefore, the internal morphology must be identified precisely to achieve successful treatment. Conventional intraoral periapical radiographs are routinely employed to evaluate the root canal anatomy, but it inherently represents only a three-dimensional anatomy on a two-dimensional image<sup>[7-9]</sup> hence, at times it does not allow precise assessment of complex endodontic morphology.

Preoperative radiographs taken at an angle and straight using the parallel approach are crucial for determining how many root canals are present<sup>[10]</sup>. The cervical part of the root typically has little to no taper and is wider

than usual in mandibular premolars with three canals<sup>[11]</sup>. Radiographs may not show root canals or may appear strange. An extra canal is typically indicated by a sudden change in radiographic density and a quick narrowing of the root canal space.<sup>[12]</sup> A second root or canal may therefore be present, depending on how the periodontal ligament space is interpreted and how the images are slanted. In the cases discussed, radiographs taken before treatment revealed atypical root shapes that suggested the presence of additional roots and canals.

Locating additional canals can be made easier by using a magnifying loupe, fibre optic lighting for inspection of anatomical landmarks in the pulp chamber, sodium hypochlorite bubbling in the extra canals, and dye<sup>[13]</sup>. Using a surgical operating microscope and methylene blue staining, which can seep into orifices to find developing grooves, will improve visualisation. Then, using a pulpal floor map, we will be able to guess where canal orifices are likely to be located. Numerous writers have noted one opening on the lingual side and two on the buccal side in the pulp chamber floor of mandibular premolars with three canals<sup>[14]</sup>. This pulpal map was seen in the case we have reported.

We employ an apex locator in conjunction with radiographs to determine the working length more accurately.

The more apically the root canal divides, the harder it is to access and effectively obturate, thus, keep that in mind when identifying the root or the canals. Because the main canal can diverge buccally or lingually as it divides, smaller K files are originally employed. Therefore, having a good tactile sense is crucial, and files must be properly precurved before navigating the canals. Due to the anatomical location of the mental foramen, which is proximal to the mandibular premolars, failure in endodontic therapy can result from not recognising these extra canals and carefully obturating them<sup>[15,16]</sup>

### || Conclusion

Understanding normal anatomy and deviations is necessary for effective and predictable endodontic therapy. Magnification tools are advised when radiography pictures are ineffective at illuminating root canal anatomy and aberrations. Additionally, dye that increases colour contrast can help you see deeply positioned orifices and aberrations.

|| Conflict of Interest: None

|| Financial support: Nil

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