MANDIBULAR FIRST PREMOLAR WITH THREE ROOTS: A CASE REPORT

Debojyoti Majumdar¹, Priyanjit Saha¹, Soumita Samanta², Dibyendu Majumdar³

¹ Post Graduate Trainee, Department of Conservative Dentistry & Endodontics, Guru Nanak Institute of Dental sciences & Research, Panihati, Kolkata-114, West Bengal, India.
² Post Graduate Trainee, Department of Conservative Dentistry & Endodontics, Ramakrishna Mission Institute of Medical Sciences, Kolkata-700113, West Bengal, India.
³President, Dental Council of India.

ABSTRACT: Mandibular first premolars usually exhibit one root and one root canal related anatomy. The occurrence of three roots (0.2%) in mandibular first premolar has not been commonly reported in literature. This article reports a case of successful endodontic management of mandibular first premolar with three canals and three different apical foramina.

KEYWORDS: Bicuspid, Dental Pulp Cavity, Root Canal.

Introduction
The main objective of endodontic therapy is to achieve a three dimensional fluid proof hermetic obturation and a leakage proof final coronal restoration. A thorough understanding of the root canal anatomy is essential for achieving high level of success in endodontic treatment. Failure to recognize variations in root or root canal anatomy can result in unsuccessful endodontic treatment. Of all the teeth treated with primary endodontic therapy, the mandibular first premolars have the highest failure rates. This is primarily because of their variable and complex root canal morphology. Normally mandibular premolars present with a single root and a single root canal system. The incidence of two roots were seen in 1.8% cases while three roots in only 0.2% of these teeth. Vertucci in his series of studies conducted on extracted teeth, reported an incidence of three canals with three separate apical foramina in 0.5% cases of mandibular first premolars. This report presents a case of successful primary endodontic management of mandibular first premolar with three separate roots using spiral CT.

Case Report
A nineteen year old female patient reported to the Post Graduate Department of Conservative Dentistry and Endodontics, Guru Nanak Institute of Dental Sciences and Research with the chief complaint of intermittent pain over three months in relation to lower left posterior teeth. Pain was spontaneous in nature and aggravated on chewing and lying down. Medical and dental history were noncontributory. On clinical examination, patient’s oral hygiene was moderate. Deep occlusal carious lesion was observed in tooth # 34 and the tooth was tender on percussion. The crown of mandibular first premolar on the contralateral side showed no unusual anatomy in terms of number of cusps and dimension suggestive of any anomaly. Electric pulp test and heat test with a gutta-percha stick gave a lingering response. There was no evidence of swelling or sinus tract.
Preoperative radiographic examination revealed the presence of three roots with a periapical radiolucency in association with the distal root of #34. Based on clinical and radiographic evidences a diagnosis of irreversible pulpitis was made. Access was gained to the pulp chamber after administration of local anesthesia (2% lidocaine with 1:80,000 adrenaline) under rubber dam isolation. To gain sufficient access to the canals, the conventional access opening was modified and was made wider mesiodistally as the roots were mesiodistally oriented. Orifice location were difficult as the coronal pulp chamber was unusually long and the separation of roots was from the middle third of the root. Finally, the three canal orifices were located under magnification using an operating microscope and patency was ascertained with a small size 10 k file. The working length radiograph was taken.

Gates Glidden drills were applied with brushing motion in a crown down fashion to enlarge the orifice to achieve a straight line access. The canals were cleaned and shaped sequentially with ProTaper files (Dentsply), irrigated using 3% sodium hypochlorite and a final rinse was done with normal saline. The canals were dried with paper points, cotton was placed in the pulp chamber and the access cavity was closed temporarily with cavit. At the second appointment the canals were obturated with F1 ProTaper gutta-percha cones using AH Plus sealer.
The access cavity was filled with light cure composite resin. To confirm the complex root canal anatomy of the tooth a spiral CT scan was planned after obturation and informed consent of the patient was obtained. Preoperative CT was not possible as patient was bothered about too much radiation exposure.

Spiral CT after obturation showing three roots and three obturated root canals in mandibular left first premolar.

**Discussion**

Mandibular premolars have been stated to be the most challenging teeth to be treated endodontically, especially when they present with multiple roots or canals. The Washington study which assessed the results of endodontic therapy of mandibular premolars showed that the failure rate in mandibular first premolars were 11.45%. These findings were due to the complex root canal anatomy of mandibular premolars compared with the standard description of one root and one canal and therefore poses an endodontic challenge to the clinician. There have been reports of flare-ups in mandibular premolars with associated paresthesia of the inferior alveolar and mental nerves because of missed root canals. The anatomic position of mental foramen and neurovascular structures that pass through the mandible are in close proximity to the apices of mandibular premolars. Good quality radiographs are of utmost importance in determining the external and internal root morphology. However, radiographs produce only a two dimensional image of a three dimensional object resulting in superimposition of images. Hence they are of limited value in cases with complex root canal anatomy. The advent of 3D imaging such as cone beam tomography (CBCT) and the more recently developed tuned aperture computed tomography (TACT) have been shown to be useful in effective evaluation of root canal morphology and facilitated image manipulation and visualization of the area of interest. Spiral CT was taken after obturation which confirmed the presence of three roots as buccal, mesiobuccal and distobuccal. All the root canals had separate apical foramina. However, in general, due to high cost, limited accessibility and availability to patient and extra radiation as compared to standard radiographic methods the routine use of Spiral CT became limited. Thus a thorough knowledge of the root canal anatomy and its variations, careful interpretation of the radiographs, close clinical inspection of the floor of the chamber.
and proper modification of access opening along with adequate magnification are essential for successful treatment outcome.

**Conclusion**-
Successful endodontic management of mandibular first premolar with three separate roots located buccally, mesiolingually and distolingually, with one canal in each root has been presented. The clinician should be aware of the percentage and position of extra canals for ultimate prognosis of the endodontic treatment.

**References**-
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**BIOGRAPHY**

**Debojoyoti Majumdar**
Post Graduate Trainee, Department of Conservative Dentistry & Endodontics, Guru Nanak Institute of Dental sciences & Research, Panihati, Kolkata-114, West Bengal, India.

**Priyanjit Saha**
Post Graduate Trainee, Department of Conservative Dentistry & Endodontics, Rama Dental College Hospital & Research Centre Kanpur 117/k/137, Sarvodaya Nagar, Kanpur - 208025 ,UP, India.