

Case Report

Mandibular First Premolar with Two Root Canals: A Case ReportDr. Ritu Meel¹, Dr. Neetu Meel², Dr. Pratibha Chaudhary¹¹Mahatma Gandhi University of Medical Sciences And Technology, Jaipur (302022), India²Rajasthan University of Health Science, Jaipur(302033), India***Corresponding author**

Dr. Ritu Meel

Email: ritumeel@yahoo.in

Abstract: Mandibular premolars have been reported with complex anatomical aberrations, making them one of the most difficult teeth to manage endodontically. This paper reports the endodontic management of a mandibular first premolar with two root canals. However, the root and root canal morphology of the mandibular premolars can be extremely complex and requires careful assessment.

Keywords: Mandibular first premolar, endodontic treatment, two canals

INTRODUCTION

Knowledge of the morphology of the root and root canal systems of teeth and diagnostic imaging techniques are required for successful root canal treatment, especially in mandibular premolar teeth [1]. Ingle has reported that the most significant cause for endodontic failures was incomplete canal instrumentation, followed by incorrect canal obturation [2].

Complete cleaning and shaping is the key to successful endodontic treatment. A thorough understanding of the internal anatomy and morphology of the root canal system is an important consideration when performing cleaning and shaping procedures. Variation in the root canal system of mandibular first premolar has been reported [3].

Vertucci found that the mandibular first premolar has one canal in 74.0% of teeth, two canals in 25.5%, and three canals in 0.5% of teeth. The mandibular second premolar has one canal in 97.5% and two canals in 2.5% of teeth [4]. 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 [5].

Our report addresses a case of nonsurgical endodontic management of mandibular first premolar with two separate root canals with two foramina.

CASE REPORT

A -40 year old female patient came to the Department of Conservative dentistry and endodontics with the chief complaint of decayed tooth in the lower left back tooth region. Patient's medical history was non-contributory. Clinical examination revealed -tenderness on percussion in the left mandibular first premolar. Intra -oral periapical radiograph # 34-coronal radiolucency approaching pulp. No peri-apical pathology found. A diagnosis of Acute Apical Periodontitis for which non surgical endodontic therapy was attempted. A pre-operative intra oral peri apical radiograph suggested the presence of a one canal (figure 1). Local anesthesia was obtained by using 2% lidocaine hydrochloride with 1:200000 adrenaline. Subsequently, the tooth was isolated with a rubber dam. All caries was removed prior to accessing the pulp chamber. After access opening, two orifices were located one placed buccally and other lingually. The orifices were enlarged with hand Sx Protaper. The pulpal tissue was removed and the working length was determined using no.10 K file (figure 2). The canals were instrumented using Protaper files (Dentsply). Intermittent irrigation was done with 5.25% sodium hypochlorite and 17% EDTA was used as a chelating agent.. The tooth was dried with sterilized paper points,the root canals were obturated with ZnO sealer and laterally condensed gutta percha (figure 3). A final radiograph was then taken to confirm the quality of obturation (figure 4). Patient was recalled after a week for check up; he reported complete alleviation of his symptoms.



Fig-1: Pre-operative image

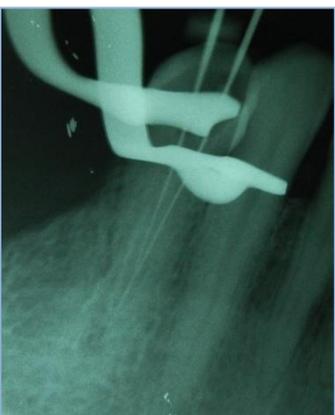


Fig-2: Working length image



Fig-3: Master-cone image



Fig-4: Obturation image

DISCUSSION

Anatomical variations, especially extra canals and roots, should always be kept in mind when treating teeth endodontically [6]. Numerous methods have been used for studying root canal anatomy, including replication techniques, ground sections, clearing techniques and radiography [7]. Accurate pre-operative radiographs and their careful examination are essential to detect root canal morphology and anatomy. The clinician should carefully trace the exterior and interior outlines of the tooth in radiograph with adequate magnification [8].

Martinez-lozano *et al.* recommend upto 40° mesial angulation from horizontal more reliable in identifying the extra canals. Deviation of the x-ray angle from the vertical axis of 15°-30° was effective only in the mandibular first premolar in helping to visualize canal anatomy of premolar teeth. A study of Yoshioka *et al.* showed that sudden narrowing of the main canal on the parallel radiograph was a good criterion to judge root canal multiplicity [9].

Special attention must be given to the preparation of a access cavity that is the key to find all orifices under successful treatment. Because of absence of direct access, cleaning, shaping and filling of these teeth can be extremely difficult. Failure to recognize the presence of extra root or canals can often lead to acute flare ups during treatment and subsequent failure of endodontic therapy. Proper access into pulp chamber is necessary as it is relatively small with reduced visualization in premolars [10].

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

The complex nature of root and root canal morphology of mandibular premolars has been underestimated, which resulted in unknown endodontic failures in many clinical cases. Proper diagnosis and orientation with the root canal anatomy is mandatory for successful treatment.

REFERENCES

1. England MC Jr, Hartwell GR, Lance JR. Detection and treatment of multiple canals in mandibular premolars. *Journal of Endodontics*. 1991;17:174-8.
2. Ingle JJ. A standardized endodontic technique utilizing newly designed instruments and filling materials. *Oral Surg Oral Med Oral Pathol*. 1961;14:83-91.

3. Zillich R, Dowson J. Root canal morphology of mandibular first and second premolars. *Oral Surg Oral Med Oral Pathol.* 1973;36:738–44.
4. Vertucci FJ. Root canal morphology of mandibular premolars. *J Am Dent Assoc.* 1978;97:47e50.
5. Slowey RR. Root canal anatomy. Road map to successful endodontics. *Dent clin North Am.* 1979;23:555–73.
6. Goswami M, Chandra S, Chandra S, Singh S. Mandibular premolar with two roots. *Endod J.* 1997; 23(3):187.
7. Kottoor J, Albuquerque D, Velmurugan N, Kuruvilla J. Root Anatomy and Root Canal Configuration of Human Permanent Mandibular Premolars: A Systematic Review. *Anatomy research international.* 01/2013;2013:254250.
8. Rödiger T, Hülsmann M. Diagnosis and root canal treatment of a mandibular second premolar with three root canals. *Int Endod J.* 2003;36(12):912-9.
9. Cleghorn BM, Christie WH, Dong CC. The root and root canal morphology of the human mandibular first premolar: a literature review. *Endod J. Epub.* 2007; 33(5):509-16.
10. Endod J. Three canal mandibular first and second premolars: a treatment approach. Nallapati S. 2005;31(6):474-6.