



MANDIBULAR RIGHT FIRST PREMOLAR WITH TWO ROOTS: A MORPHOLOGICAL ODDITY

Dentistry

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ABSTRACT

Mandibular first premolar is often considered as enigma to endodontist. Though most frequent type of tooth configuration reported is the presence of one root and root canal. This case report enlightens the prime aspects of diagnosis and endodontic management of an aberrant configuration with respect to mandibular first premolar. A variation in number of roots as well as canal morphology is not scarce. According to various studies on anatomic configuration 1.8% of mandibular first premolar showed two roots. Root canal morphology can be unpredictable and requires cautious assessment for root canal therapy. This article reports a clinical case of mandibular first premolar with two roots and root canals treated successfully with endodontic 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.[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]

Slowey in a study reported mandibular premolars as “endodontist's enigma”, may present the utmost difficulty of all teeth to execute successful endodontic treatment.(1) A detailed knowledge of root canal system and its variations, intensive chemo-mechanical planning followed by 3D obturation of root canal system is required for effective treatment.(5) In a study on Indian population a higher occurrence of two canals in mandibular first premolars was accounted in several populations, which when reported was upto 50%.(6) In studies on anatomical and morphological configurations of mandibular first premolars it was reported that 23-30% are more prone to bifurcation of canals and 15-20% terminating in multiple apical foramina.(7)

CASE STUDY

A 35 year old male patient reported to Department of conservative dentistry and endodontics with chief complaint of pain in lower right back region of teeth since 10 days. Clinical examination suggested deep carious lesion with tooth no. 44. Electric pulp testing suggested the tooth to be non-vital. Radiographic assessment revealed carious lesion extending to pulp with an aberrant root anatomy i.e. two roots (mesial and distal) (Fig1)



Fig. 1: Pre-operative diagnostic radiograph

On examination diagnosis of irreversible pulpitis with tooth no. 44 was made necessitating endodontic treatment. Isolation of tooth was done using rubber dam. Endodontic access cavity was prepared using endo access bur. A sharp DG16 explorer was utilized to locate the canal orifices, and the access was modified accordingly. Pulp extirpation was done and canal patency was maintained, size 10k system (Dentsply-Maillefer) files were inserted and working length determined using radiograph and affirmed utilizing I-Root apex locator (Fig. 2).



Fig. 2: Working length determination radiograph

Chemo-mechanical preparation was performed using ProTaper Gold File system (Dentsply-Maillefer). Irrigation was done alternatively after every instrument change using 5% sodium hypochlorite solution and 17% EDTA (Ethylenediaminetetraacetic acid). Apical preparation for both the canals was done till F1 size for, closed dressing was given after completion of chemomechanical preparation and patient was reappointed after three days for obturation. In follow-up appointment as the tooth was completely asymptomatic master cone radiograph was taken. The canals were dried by paper point. Obturation was done using corresponding ProTaper F1 cones; Endomethasone N sealer (Septodont). Radiograph after obturation is taken (Figure 3).



Fig. 3: Radiograph after obturation

Post-obturation restoration was done using amalgam and postoperative radiograph was taken (Fig. 4).



Fig. 4: Radiograph with post-obturation restoration

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. 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%. The root morphology of mandibular first premolar can be highly complex and extra root(s) can be found. Scott and Turner 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 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.

CONCLUSIONS

It is a well established undeniable fact that the presence of additional roots and root canals in these teeth could also be much more than one can expect. Careful elucidation of the radiograph, thorough clinical inspection of the floor of the chamber and proper modification of the access opening, the position, and angulations of the file in the canal in addition hints regarding the presence of extra canal and are essential for a successful treatment outcome. Dental loupes operating microscope and CBCT can also be used as adjunct for identification of additional root and root canal.

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