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Case Report

ENDODONTIC ENIGMA – MANDIBULAR SECOND PREMOLAR WITH THREE ROOT CANALS: A CASE REPORT

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ABSTRACT

Mandibular premolars are one of the most difficult teeth to treat endodontically because of different variations in root canal morphology. There is limited number of endodontic publications citing an incidence of mandibular second premolar with three root canals. Thorough knowledge of the basic root canal morphology as well as the possible anatomic variations is important for the successful treatment of such cases. This article highlights the successful endodontic treatment of mandibular second premolar with three root canals treated with the help of operating microscope (in a patient with more than two canals also in the contra-lateral side second premolar).

Aim and objective: To describe the unusual pattern in the root morphology and root canal systems of mandibular second premolar.

Keywords: Anomalies, Mandibular Premolars, Orifice, Root Canal.

INTRODUCTION

Knowledge of the root canal morphology and root canal system of teeth and diagnostic imaging techniques are most important for successful root canal treatment, especially in mandibular premolar teeth¹. Cases of mandibular second premolars with three canals have described by many investigators². The prevalence of three root canals with three distinct orifices that end in separate foramina was reported to be 0.4% by El Deeb³. All the cases observed, had three orifices on the floor of the pulp chamber, one of which was located in the lingual and the other two in (Fig-2) the buccal part of the pulp chamber. Most dental textbooks on the anatomy and morphology of teeth describe the human dentition well, but sometimes fail to provide details on the range of variations in external root anatomy and internal root canal systems. Anomalous root and root canal morphology can be found associated with any teeth with varying degrees and incidence.

CASE REPORT

A 46 years old male patient was reported to the Department of Conservative Dentistry and Endodontics, School of Dental Sciences, KIMSU, Karad with chief complaint of severe pain

in right lower back tooth region since 4-5 days. Pain was of intermittent type, aggravated on taking cold. Clinical examination revealed severe attrition with right mandibular #45 tooth region.

Radiographic examination revealed a complex root canal system, demonstrated two roots and two canals with first premolar and two roots and three canals with second premolar were suspected and periodontal ligament widening in the first and second premolars (Fig-1). A diagnosis of acute irreversible pulpitis with acute apical periodontitis was made. A periapical radiograph of contralateral side also showed more than two root canals in # 35 region. A single visit non surgical endodontic treatment was planned. After the administration on local anesthetic (2% lignocaine with 1:100000 epinephrine) under rubber dam isolation access cavity preparation was done and the pulp chamber was observed under microscope (Opto Fine Bliss LED). After careful inspection of the pulpal floor and walls revealed three orifices two on buccal side and one on lingual side of pulp chamber (Fig-2). All the canals were negotiated with no 8 and no 10 K file (Mani, Japan).

Gates glidden drills were used in crown down method to enlarge the main orifices. Irrigation was done using 5.25% sodium hypochlorite. Working length x-ray was established (Fig-3).

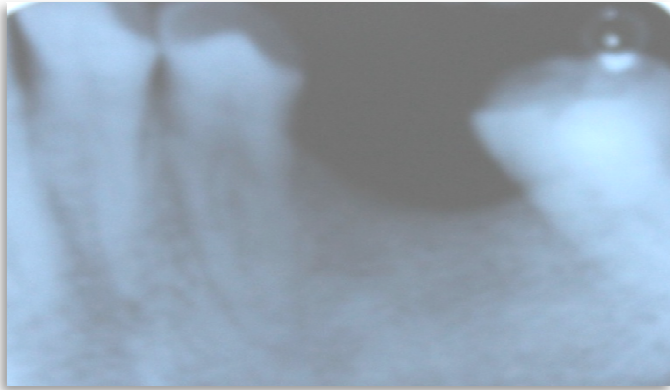


Figure 1: Periapical radiograph of #45 attrition with mild periapical radiolucency

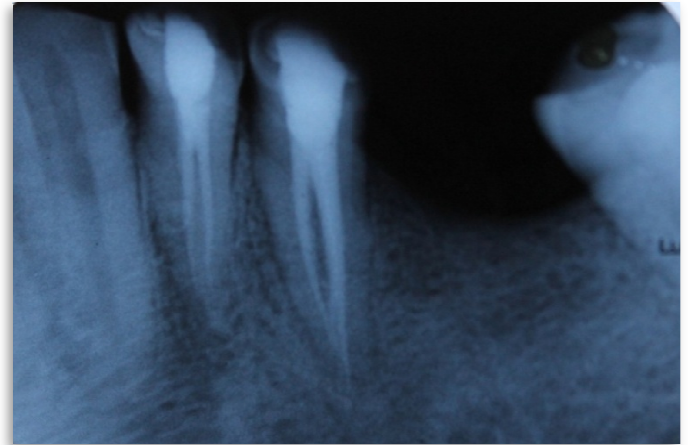


Figure 4: Periapical radiograph after obturation

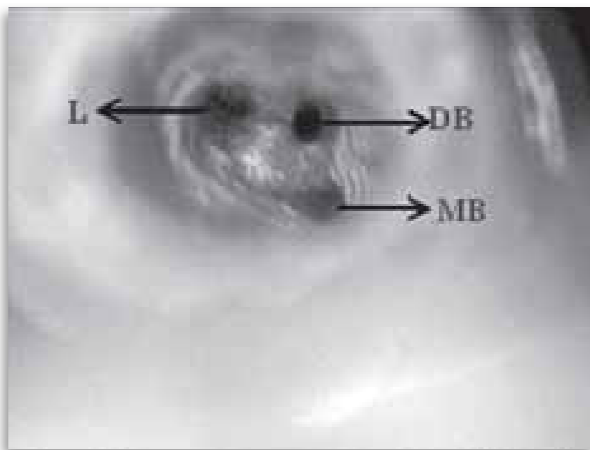


Figure-2: Three root canal orifices as viewed under microscope

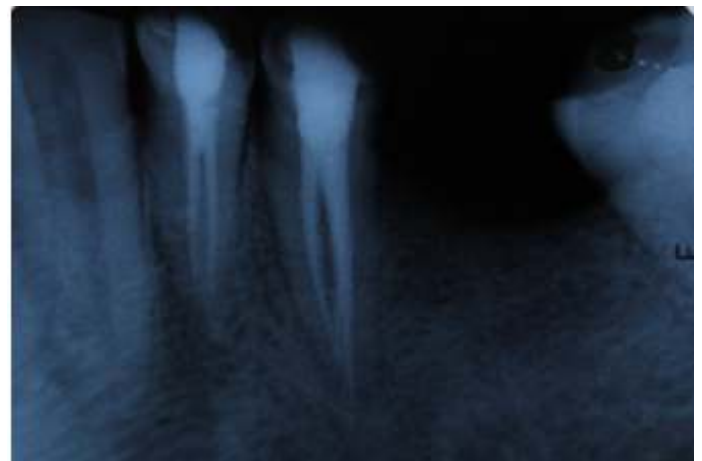


Figure 5 Periapical radiograph after six months.

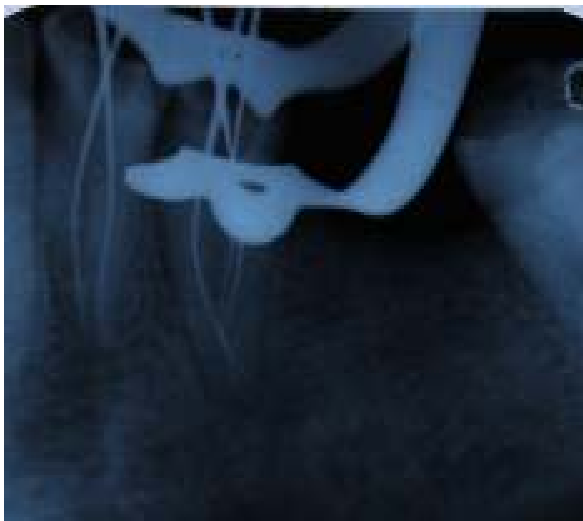


Figure 3: working length x-ray

All canals were instrumented up to protaper file F1 (Dentsply) under copious irrigation with 5.25% sodium hypochlorite during instrumentation. After drying the canals with paper points the canals were obturated using gutta purcha points and endodontic sealer. Access cavity was sealed with and radiograph was taken (fig-4).

The patient was recalled for fallow up and radiograph taken after six months (Fig-5).

DISCUSSION

The morphology of the root and root canals of the mandibular second premolar can be complex and variable⁴. Because of the unusual morphology, endodontic treatment in second mandibular premolar is clinically challenging, the anatomical landmark of the pulp chamber floor may help to identify supplementary root canals or root canal aberrations⁵.

Many authors who located orifices in the pulp chamber of the lower second premolar reported one orifice in the lingual side and two in the buccal side⁶. In the present situation the orifices location was also similar to as previously mentioned and resembles triangular in shape, two orifices on buccal side and one on lingual side.

The root shape, root position and relative outline should be carefully determined from the radiograph. Good quality preoperative radiograph and thorough radiographic examination are essential for the detection of additional root canals^{7, 10}. Sudden narrowing or a disappearing pulp space may indicate the presence of another canal or canals⁸. In the present case, the radiographic features suggested the possibility of three canals. However, because of the superimposition of roots, radiographic diagnosis of three canals is not always possible in all cases.

Several clinical indications may be useful in the detection of a third canal in mandibular second premolars. In some situations, a third canal may exist clinically when the pulp chamber does not appear to be aligned in its usual buccolingual relationship. According to another case report⁵, detecting orifices, especially of the third canal, is a great challenging for the dentist.

The use of dyes, especially methylene blue, was reported to be helpful in finding orifices⁹. However, De Moor and Calberson⁵ did not find methylene blue helpful. In that case report, the third canal orifice was covered by a dentin protuberance. Therefore, even if methylene blue could penetrate into the orifice, the protuberance might hide the orifice from direct visualization.

Microscopes are commonly used to explore the chamber in order to find orifices. The advantages of using microscope include better visualization of the pulp chamber floor and walls that prevents inadvertent missing of orifice. It was assumed that careful observation and inspection of the pulpal floor and also pulpal wall is mandatory to avoid the unexpected missing of orifices that may cause unsuccessful endodontic treatment.

CONCLUSION

Successful and predictable endodontic treatment requires knowledge of biology physiology and root canal anatomy. It also requires proper instrumentation and knowledge to use these instruments effectively.

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