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Endodontic management of Mandibular Premolar with Two Roots- A Case Report

Abstract : Thorough knowledge about the anatomy and morphology of tooth root canal system is the key for successful outcome of endodontic treatment. False assumptions about the canal anatomy of teeth may lead to misdiagnosis, missed canals, improper debridement and breakage of instruments within the root canal during treatment and moreover the persistent pain to patient. Teeth often shows changes in their anatomy of the pulp chamber and root canal system which brings challenge to clinician. Mandibular first premolar shows very low incidence of variations in its root canal system. But for successful root canal treatment these variations had to be kept in mind and to take in consideration for proper cleaning and shaping.

Key words- Two roots; Mandibular premolar, Endodontic management

Introduction:

The root canal system of teeth often shows unexpected, extremely complex and highly variable morphology[1]. Also shows close proximity with sensitive vital structures like mental foramen and nerves which further thins the line between successful treatment and mishaps. Identification of unique variations in root canal anatomy is an essential step for successful endodontic diagnosis as well as treatment. The presence of aberrant root canal anatomy and the ability to diagnose, cleanse and seal these canals affects the overall prognosis of tooth [2,3].

Mandibular premolars share multiple occasions of being the most challenging teeth to be diagnosed and treated endodontically without encountering any mishaps, especially when they show multiple roots, canals as well as variation in levels of split of roots or canals.

This article reports a case of mandibular first premolar with two roots, which was successfully treated with non-surgical root canal therapy [4,5].

In most of the cases mandibular premolar is usually single rooted in 97.1%, however in literature there are cases reported with two roots in 2.7% of cases as well as three roots in 0.2% cases. The accessory root in premolar was described as “Tome's Root” by Scott & Tuner. The Sub Sahara African population has highest incidence of premolar with additional root with more than 25% population[6].

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Case report:

A 32 years old male patient reported to the department of Conservative Dentistry and Endodontics at Mahatma Gandhi dental college, Jaipur with the chief complaint of pain in lower right back tooth region for the past 2 weeks. Patient's medical history was non-contributory. Clinical examination revealed deep carious lesion i.r.t. 45. The tooth was tender on percussion. Pre-operative radiograph showed radiolucency approaching pulp with an unusual anatomy of two roots, with PDL(periodontal ligament) widening, indicating for root canal therapy.(Fig 1) After clinical, radiographic examination and vitality testing endodontic therapy was initiated under rubber dam isolation. The tooth was anaesthetized by inferior alveolar and mental nerve block using a 2% solution of lignocaine hydrochloride

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containing 1:80000 adrenaline (Lignox 2% A, Warren, Indoco). Endodontic access cavity preparation was made with endo access bur in a high speed airotor handpiece. The pulp chamber was inspected with the help of a magnifying loupe and a DG 16 explorer to locate the canal orifice. After obtaining the canal patency, No. 10 K file (Dentsply, Maillefer) was inserted to confirm the root canal configuration. A working length determined by conventional radiography by applying SLOB rule to confirm the presence of a two separate canals, exited in separate apical foramina located in the respective roots.(Fig-2&3) Cleaning and shaping of the canals was performed using step- back technique with 17% EDTA and copious irrigation with saline and 5.25% sodium hypochlorite solution. (Fig 4) The canals were dried and calcium hydroxide dressing was given for 7 days. After 1week, the canals were obturated with cold, lateral compaction of gutta percha cones (Dentsply) and resin based root canal sealer followed by post root canal filling.(Fig 5)

Fig-1 Pre-Op IOPA - Pulp approaching distoproximal caries # 45

Fig-2 Clinical picture of access opening showing two separate orifice # 45

Fig 3- IOPA- working length determination # 45

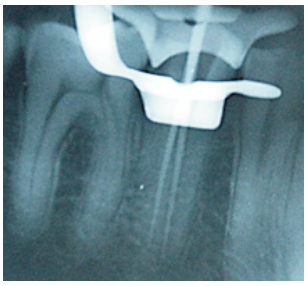

Fig 4- IOPA Master cone # 45

Fig 5- Obturation IOPA # 45

Discussion:

The root canal morphology should be completely understood because the prognosis of endodontic treatment depends upon the correct diagnosis. The complexities showed by mandibular premolars like presence of additional root or root canals if not detected, can be a major reason for flare-ups and treatment failure. Canals if left unidentified may harbour microorganisms, and are the major cause of failure[7]. 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 incidence of failure in the study at 11.45%. The root morphology of mandibular first premolar are unexpected and extra root(s) can be found. Scott and Turner describe the additional root of mandibular first premolar as Tome's root[7].

Mandibular premolars have earned the reputation of showing the most aberrant anatomy. Often considered an enigma to the endodontist. Root as well as canal configurations in mandibular premolars may vary significantly with respect to race, sex, ethnicity. Numerous reports of root and root canal variations in these teeth have been reported in the literature.

Numerous methods have been used to study the complete anatomy of tooth. Technique like canal staining and clearing is accepted the gold standard method of studying root canal anatomy, but the disadvantage is that it cannot be used in vivo. The complex anatomy of mandibular premolars canal system makes it difficult to assess their morphology with conventional radiography[8]. Advanced modes of radiographic imaging and analysis have allowed for in-depth knowledge of pulp space anatomy in three dimensions and

allowed for identification of rare aberrations. These methods include spiral computed tomography (SCT), micro-computed tomography (micro CT), and cone beam computed tomography (CBCT)[9]. In our case discussed above we have used this as diagnostic tool in combination with conventional radiography and tactile sense.

Conclusion:

Mandibular premolar being the most enigmatic tooth as always. It found to be more difficult from aspect of root canal configuration anatomy. The identification of configuration followed by cleaning and shaping of all the canals is the most important step in improving prognosis of the treatment. Use of proper diagnostic aids and technique help in negotiation and management of extra canals as well as the roots.

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