

Endodontic Treatment of Mandibular Second Premolar with Three Root Canals

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Abstract:

Apart from the usual single root and single canal, mandibular premolars can present a complex pulp anatomy. Hence a thorough knowledge of root canal anatomy and along with anatomical variation that may be present is essential for the success of any endodontic treatment. Good magnification and CBCT scan will definitely be beneficial for successful endodontic treatment. This case report details the treatment of mandibular second premolar with three canals and three orifices.

Key Word: Mandibular second premolar, aberrant canal anatomy

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I. Introduction

Success of endodontic treatment requires understanding of root canal anatomy and morphology. Unusual presentations in the number of the canals or the roots should be anticipated in every tooth. Out of all the teeth, Mandibular premolars are one of the most difficult teeth to treat endodontically because of the variations in their root canal anatomy. This is mainly due to the variations in internal morphology of the pulp cavity considering the number of root canals, apical deltas, and lateral canals.

In addition, the access cavities are relatively small, which reduces the visibility. The prevalence of 3 root canals with 3 orifices was reported to be 0.4% by El Deeb in 1982. The occurrence of 3 canals in mandibular second premolars has been reported as 0-0.4%.^[4] The occurrence of 3 canals with 3 separate roots with 3 separate foramina (type V, Vertucci) is very rare. Dentists have been treating the mandibular second premolar under the assumption that they have only one canal and one root. However, all studies have pointed out that a root with a tapering canal and a single foramen is an exception rather than the rule.^[6]

hoen and Pink found a 42% incidence of missed roots/canals in the teeth that needed re treatment.^[7] The use of magnification and fibre optic illumination offers a tremendous advantage in locating and treating extra canals. This case report details an endodontic management of mandibular second premolar where 3 canals with 3 different roots

II. Case Report

A 26-year-old female with a non-contributory medical history reported to our hospital with a chief complaint of "pain in right lower posterior region", Clinical examination revealed caries in relation to 45. The tooth was tender on percussion.

Radiograph examination revealed a complex root canal system, evidenced by sudden change in the radiographic density of the root canal space at the middle of the root. More than two root canals were suspected. A diagnosis of chronic irreversible pulpitis with apical periodontitis was made.

Non-surgical endodontic treatment was planned for tooth 45 with calcium hydroxide as interappointment, intracanal medicament

The patient was anesthetized with 2% lidocaine and 1:100,000 epinephrine. After rubber dam isolation, access to the pulp chamber was made. Two orifices were immediately found on a line connecting buccal cusp and lingual groove. Gates Glidden drills were used in a crown down method to enlarge the main orifice to the level of trifurcation for a straight-line access to all the three canals.

Irrigation was done using 5.25% sodium hypochlorite. Working length was estimated using an apex locator. Working length confirmed using periapical radiograph. All the canals were cleaned and shaped using K files and rotary protaper files (Dentsply). Calcium hydroxide was used as intracanal medicament for 2 weeks and the access cavity was sealed with IRM.

After 2 weeks the symptoms had subsided. The calcium hydroxide dressing was removed, irrigation was done using 3.25% sodium hypochlorite and 17% EDTA. After drying the canals with paper points the canals were obturated using protaper gutta percha points and AH plus sealer (Dentsply) with warm vertical condensation technique up to the trifurcation level. Backfilling was done using thermoplasticised gutta percha (Dentjoy). Access was sealed with IRM and a radiograph was taken after obturation



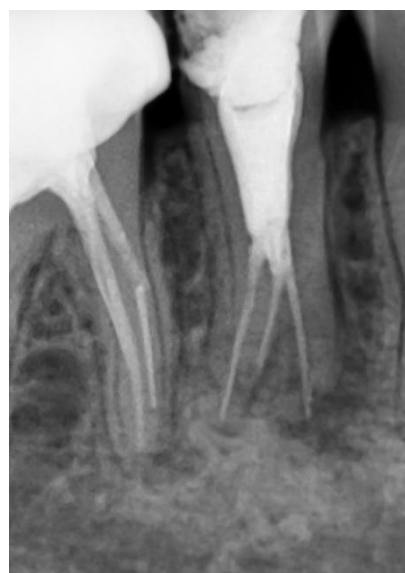
A. Pre-Op



B. Working Length



C. Master Cone



D. Obturation

III. Discussion

Good quality radiographs taken at different horizontal angulations, use of the DG-16 explorer (Hu Friedy, USA), use of champagne bubble test, operating microscope, increased magnification with loupes etc. are various ways of locating the canal orifices. In the pre-operative radiograph, sudden narrowing of the canal space or disappearance of the canal may be visible.^[9] Aberrant root anatomy may also be seen in the pre-operative radiograph.

It has been shown from various *in vitro* studies that a wide morphological variation exists as regards to mandibular premolars. It is essential for the operator to form a mental picture of the pulp in cross-section and from coronal aspect to the apical foramen. Each canal contains irregular and hidden regions that should be taken into account during endodontic treatment. As a group, mandibular premolars are very difficult to treat; they have a high flare up and failure rate. The root canal system is wider buccolingually than mesio distally.

Direct access to the buccal canal is possible, whereas the lingual canal is more difficult to find. The lingual canal tends to diverge from the main canal at a sharp angle. In addition, the lingual inclination of the crown tends to direct files buccally, making location of a lingual canal more difficult. To counter this situation, the clinician may need to extend the lingual wall of the access cavity further lingually.^[10] It is important to use tactile sensitivity and also observe the direction of the instrument during its insertion into the root canal. Preflaring of the root cervical portion allows a correct determination of the initial instrument and consequently a better cleaning of the apical third.^[11] The surgical operating microscope offers excellent visibility and increased illumination from the fibre optic light source. Studies have proved its efficacy in locating additional canal orifices.^[8]

IV. Conclusion

Successful and predictable endodontic treatment requires knowledge of normal anatomy and variations. The clinician must have a thorough knowledge of the number, incidence, location and the variability of the canal systems to increase the chances of finding these additional canals. It is imperative for the clinician to be aware of these additional canals as overlooking them will result in failure.

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