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Case Report

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A Case Of Unusual Anatomy In Mandibular First Premolar With Three Canals – A Case Report

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Abstract
Root canal therapy requires a thorough knowledge of root canal morphology to adequately clean and shape the canal system. Frequently root canals are left untreated because the clinicians fail to identify their presence, particularly in teeth that have anatomical variations or additional root canals. Variation in the root canal system of mandibular first premolar has been reported. This case report describes a mandibular first premolar with atypical root canal anatomy

Key Words
Root Canal Morphology, Mandibular Second Premolar, Anatomical Variations

Introduction:

The anatomy of the root canal system determines the parameters under which the endodontic treatment will be accomplished and directly affects the therapy success. Mandibular premolars have great variability on their internal morphology due to the possible presence of more than one root canal[1],[2] Tzanetakis et al. reported that the incidence of two or more canals in the mandibular first premolar can range from 1.2 to 34%. Mandibular second premolars are known to have a single canal. According to El-Deeb (1982) the mandibular premolars may show wide variation in their root canal anatomy Case reports describing four canals in mandibular second premolar have been occasionally published (Yang et al, 1988; Wong, 1991). Thus, the knowledge & recognition of atypical anatomy is Important even though it is not usually encountered. Slowey reported that mandibular premolars are possibly the most difficult teeth to treat endodontically due to wide variation in root canal morphology[3].

Case report

A 17 year old male was referred to the Department of Conservative Dentistry and Endodontics for root canal treatment of right mandibular first premolar with non-contributory medical history.

The patient's chief complaint was pain in relation to his lower right back teeth region. Clinical examination showed a large coronal carious lesion with pulpal involvement. On vitality test, using heated gutta percha stick and electric pulp tester, there was a severe, rapid, lingering painful response from the mandibular first premolar. Preoperative radiograph revealed a coronal radiolucency in relation to mandibular first premolar with periapical changes, widening of periodontal ligament space and unusual anatomy was noted in relation to 44 (bifurcation at the middle third of root &bifurcation at the apical third). This unusual anatomy of the root canal is type III i,e (2-3) according toGulabivala et al 's supplemental canal configuration to those of vertucci.[4]

Based on the clinical and radiographic evidences, it was diagnosed as acute irreversible pulpitis with acute apical periodontitis for mandibular first premolar. **(Fig.1)**

The treatment was started by giving anaesthesia using 2 % lidocaine hydrochloride with 1: 100,000 adrenaline. Access opening was started by removing all the caries. After access opening, the orifices to the two root canals were found and enlarged using protaper rotary system(dentsply Tulsa).with no 10 k-file the canals were negotiated there was one mesial and one distal canal, with a bifurcation at the middle third of the root. The working length was determined using apex locater, cleaning and shaping was done in crown down technique using protaper rotary system till finishing files F2 all throughout the preparation sodium hypochlorite was used as irrigant along with normal saline. The canals were dried using sterilized paper points and the canals were obturated using cold lateral condensation technique using AH plus (dentsply) as sealer.

The morphology of root and canals of mandibular premolars can be complex and variable [5] Inadequate debridement and/or incomplete obturation of the root canal system were found to be commonest of root canal therapy failures.[6] A thorough knowledge of root canal anatomy, careful interpretation of radiographs and proper modification of the conventional access opening seem to be essential for recognition and adequate treatment of teeth with different anatomical variations[7]. The possibility of variations in root canal morphology must be considered before root canal treatment is undertaken[7]

In the case presented here, failure to recognize a second canal might have resulted in incomplete treatment and endodontic failure. Root shape, root position, and relative outline should be carefully examined from the radiographs. In this case, the root canal system was characterized by a complete mid-root separation of the canals into one mesial and distal. In this situation, the separated

Fig 1 : Pre-operative Radiograph

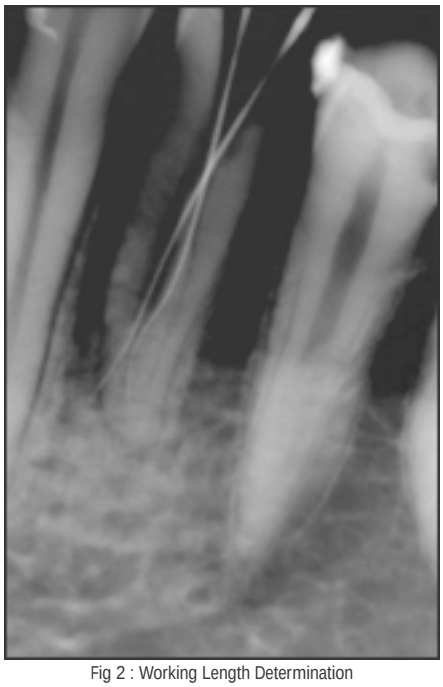

Fig 2 : Working Length Determination

mesial and distal root was easily detected radiographically. There was apical branching of main canal which was difficult to negotiate with k-file therefore thorough cleaning was done with the help of sodium hypochlorite. The use AH plus sealer has helped us to fill the apical branching. The patient was recalled after one week for permanent restoratioin. After six months patient was asymptomatic on clinical examination and follow up x-rays were taken and showed periapical healing.

The following suggestions can help the clinician identify multiple root canal systems in the mandibular premolars.

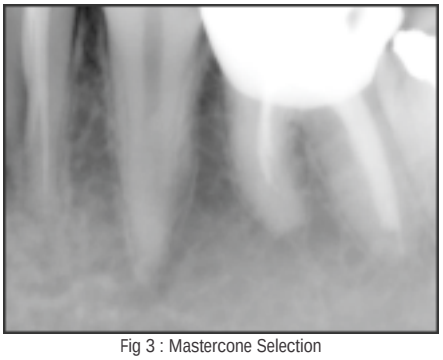

Fig 3 : Mastercone Selection

Fig 4 : Post Obturation

Fig 5 : 6 Months Follow Up

- Multiple preoperative parallel radiographs,as well as a mesial or distal shift radiographs, can help to determine the type of canal system present
- A sudden change in radiographic density of a root canal space may suggest a second canal and the level of canal bifurcation[4],[10]
- If a working length file appears off center on radiograph, the possibility of a second canal exist[10]
- Indistinct definition of root anatomy on several radiographs probably indicates a second root or even possibly a third[10]
- A third canal can also be suspected clinically when the pulp chamber does not appear to be aligned in it is classic buccolingual relationship.

The pulp chamber that appears to be deviated from this normal configuration and seems to be either triangular in shape or too large in mesiodistal plane should be suspected of opening into a system containing three canals (Bellizi and Hartwell – 1981). Although they are difficult to negotiate because of canal curvature and narrowing, most canals in a tooth with three root canals can be located and instrumented using current endodontic technique[11]

Conclusion

In the present case two canals could be found and negotiated. Bifurcation of roots among lower premolars usually occurs buccoligually, in this case, the mesiodistal branching is quite significant and rare. The apical branching of the main canal is very difficult to negotiate and fill.

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