Middle Mesial Canals In Mandibular Molars

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INTRODUCTION

Many dental practitioners have the perception that a given tooth will contain a predetermined number of roots and root canals. Careful evaluation of research material has however shown that deviations from the norm are not uncommon in tooth morphology. A group of classical morphological studies have described the mesial root of the mandibular first molar as generally having two root canal systems. However the presence of an independent middle mesial canal with a separate orifice was reported by Vertucci, Williams & Barker et.al in 1974. In 1981, Pomeranz et.al.[6] presented a more comprehensive report in which they discussed the in vivo occurrence, instrumentation and obturation of the middle mesial root canal system of the mandibular I & II molars in 12 cases. They classified 3 separate morphological possibilities in the mesial root :

- 'fin' allows free passage of the instrument between the mesiobuccal and the mesiolingual canals during instrumentation.
- 'confluent' – middle mesial canal originates as a separate canal but joins the mesiobuccal and or the mesiolingual canals apically.
- 'independent' – the middle mesial canal has a separte canal orifice and terminus.

According to some authors, the middle mesial canal does not exist as a separate canal but is rather the sequelae of instrumenting the isthumus between the mesiobuccal and the mesiolingual canals[5]. In 1982, Weine[8] reported a case of a mandibular molar in which a separate middle mesial root canal was located and the case retreated. According to Holtzman[3], the termination of three mesial canals at three distinct apical foramina is rarely encountered and the incidence of third middle mesial root canal in mandibular I molars is higher than the II molars ranging from 12% to 20%.

CASE REPORTS

CASE 1

A 25 yr old patient reported with pain in the mandibular right first permanent molar. On examination the tooth showed a Class II amalgam which had fractured and given rise to secondary caries with pulpal involvement. The IOPA radiograph showed a deep radioopaque amalgam restoration close to the pulp chamber with no PA involvement. The tooth was anesthetized with an inferior alveolar nerve block, the restoration and secondary decay removed and the pulp chamber opened. The mesiobuccal, mesiolingual, distobuccal and distolingual canal orifices were located and the cleaning and shaping begun in a crown down manner after working length determination. GG burs nos 2 & 3 were used in the coronal 1/3rd to ½ of the canal and saline and 2.5% NaOCl were used for irrigation. After instrumentation of these four canals was completed with rotary endodontic instruments, a proper observation of the pulp chamber revealed the presence of an isthumus connecting the mesiobuccal and the mesiolingual canals. Careful instrumentation of the isthumus with no 8 & 10 K files revealed a middle mesial canal measuring 13 mm as given by the apex locator. The other two mesial canals were 19.5 mm in length. The middle mesial canal was then separately instrumented in a crown down manner accompanied with thorough irrigation with 2.5% NaOCl and saline.

The five canals were obturated using lateral compaction of gutta percha at the same appointment. A radiograph taken from a distal angulation revealed five distinct canal obturations.

Fig. 1 Access cavity showing five canal orifices : three mesial & two distal canals.

Fig. 2 Pre-op radiograph.

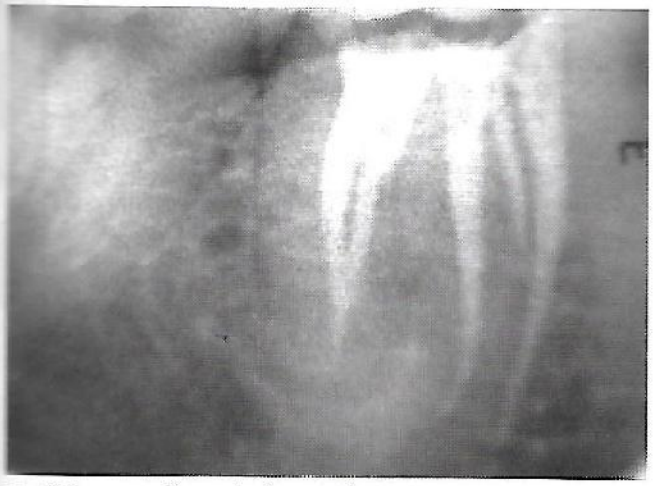

Fig. 3 Post op radiograph showing three distinct mesial canal obturations.

CASE II

A 38 year old patient was referred for the endodontic treatment of his left mandibular first permanent molar. His medical history was non-contributory. Patient gave H/O periodic discomfort to biting on the tooth and an occasional bad taste in the mouth. Clinical examination revealed presence of a draining sinus, pain to palpation and the thermal test did not elicit any response. Radiographic examination revealed a periapical radiolucency around both the roots. Based on the above findings a diagnosis of pulp necrosis with periapical abscess was made. Endodontic treatment was initiated. The old restoration was removed and after removal of secondary decay access was gained to the pulp chamber. The coronal necrotic tissue was removed and the pulp chamber was irrigated using 2.5% NaOCl and Normal saline. The MB, ML, DB & DL canal orifices were located. The isthumus joining both the MB & ML canals was explored using DG 16 explorer. Careful instrumentation using a # 10 K file (MANI, Japan) revealed the presence of a Middle Mesial canal. All the canals were cleaned and shaped using crown down technique and 2.5% NaOCl and saline as irrigants. After canal preparation, dentin walls still remained separating the three mesial canals. The canals were dried and calcium hydroxide was placed as an intracanal medicament. The tooth was sealed with a cotton pellet and a temporary cement. After three weeks the patient reported back for the completion of Root-canal therapy. The intra-canal calcium hydroxide was removed, the canals irrigated alternately with saline and 2.5% NaOCl. The canals were dried and obturated with laterally compacted gutta percha and ZnOE sealer. The access cavity was closed with a temporary cement over a cotton pellet. A radiograph taken with a distal angulation revealed five distinct canal obturations with transverse anastamoses existing between MM and ML canals as per Pomeranz' classification.

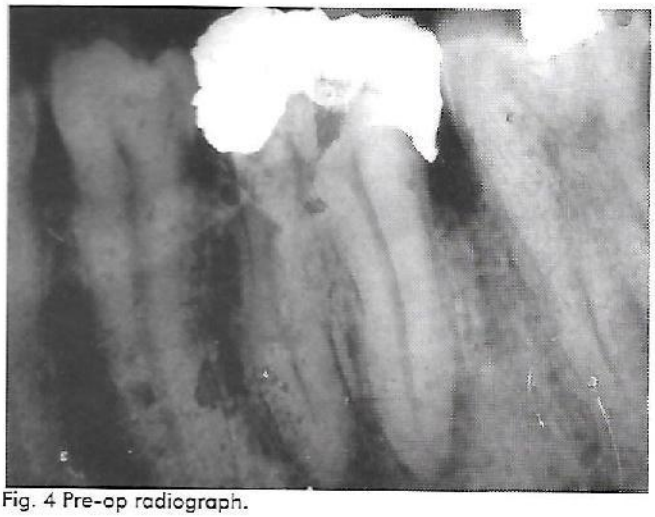

Fig. 4 Pre-op radiograph.

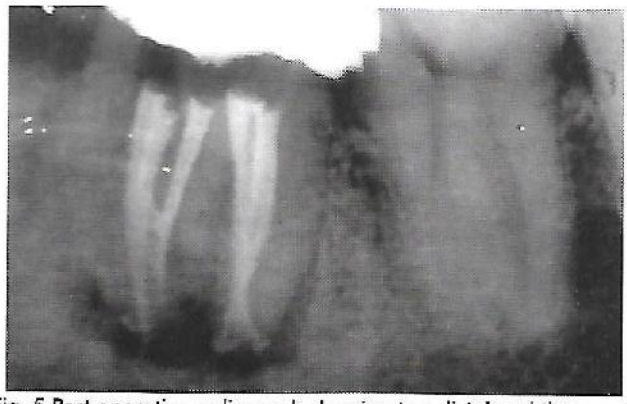

Fig. 5 Post operative radiograph showing two distal and three mesial obturations with the middle mesial canal communicating with the mesiolingual canal.

CONCLUSIONS

The main objective of a successful endodontic treatment prior to obturation, is debridement of the pulp cavity of as much organic tissue as possible, in order to eradicate any irritants from the canal system. Therefore it is imperative that aberrant anatomy is identified prior to and during root canal treatment of such teeth. Since BMP is considered the pillar of success in endodontic treatment, a part of the success must be the thorough search for additional root canals. Searching for root canals is based on a good knowledge of tooth morphology, access to the chamber, visibility which can be improved by loupes or microscopes and most importantly willingness to spend time and effort in searching for accessory canal.

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