

Management of Mandibular First Molar with a Radix Entomolaris

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ABSTRACT

Mandibular first molar typically is two rooted, 3 canal tooth. However, it may show anatomical variation presenting with additional root located lingually (Radix Entomolaris) or Buccally (Radix Paramolaris). This case report discusses endodontic treatment of a mandibular First Molar with a Radix Entomolaris.

INTRODUCTION

The treatment of entire root canal system is essential to maximize the possibility of obtaining success in the endodontic therapy. It is necessary for the clinician to have a thorough knowledge of the dental anatomy as well as of its variations. The majority of mandibular first molars have two roots, mesial and distal with two mesial and one distal canal. Many variations in root canal systems have been described.

Carabelli¹ in 1844 first mentioned a major anatomical variant of the two rooted mandibular first molar; a tooth with a third root that is a distolingual root named as the Radix Entomolaris (RE). If this root is placed buccally²³ then it is called Radix Paramolaris which is even a rarer entity described by Bolk⁴.

In African populations⁵ a maximum of 3% is found. In Eurasian and Indian populations⁵ the frequency is less than 5%. In populations with Mongoloid traits, such as Chinese, Eskimo and American Indians, the RE occurs with a frequency of 5% to more than 40%⁵

CASE REPORT 1

A 22-year-old male patient was referred to the department of Conservative dentistry and Endodontics with a chief complaint of pain in the lower right posterior region of the jaw since 3 months.

Clinical examination revealed fair oral hygiene and deep occlusal caries with 46. Radiological examination showed caries involving enamel, dentin and pulp. (FIG 1). Vitality testing was done using Endoice, which showed positive response, indicating a vital tooth. A diagnosis of chronic irreversible pulpitis was made and treatment plan included root canal treatment followed by placement of suitable prosthesis.

FIG-1 Pre-operative Radiograph



In the first visit , Inferior alveolar nerve block anesthesia was given and isolation was done with rubber dam. Access cavity preparation was done with round bur and canal orifices were found with a DG 16 endodontic explorer. Two mesial canal orifices (mesiobuccal and mesiolingual) and one distal canal orifice (distobuccal) were initially located. The access cavity which was triangular in shape was modified into a more trapezoidal cavity in order to locate the orifice distolingually.(FIG 2).



FIG 2- Access Cavity Preparation

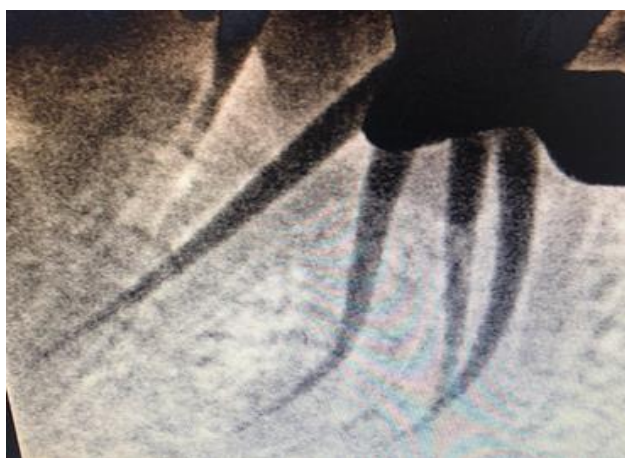
Working length determination was done with #10k files with an apex locator and confirmed on the RVG. (FIG 3)

FIG 3 - Working length radiograph



Cleaning and shaping was done using the ProTaper gold files in all the canals with intermittent irrigation using 5% sodium hypochlorite and saline and EDTA. (MB, ML upto #25 4% and DB and DL upto #25 6%). (FIG 4)After cleaning and shaping, a closed dressing with calcium hydroxide was given.

FIG 4- Mastercone selection Radiograph



On recall after a week, the patient was asymptomatic. The canals were irrigated with 5% sodium hypochlorite and saline and dried with paper points of corresponding size. Obturation was done with corresponding protaper gutta-percha cones and AH plus sealer.(FIG 5)

FIG 5 – Obturation Radiograph



The patient was recalled after a week for post obturation restoration.

CASE REPORT 2

A 18 year old male patient was referred to the department of Conservative dentistry and Endodontics with a chief complaint of pain in the lower right posterior region of the jaw since 6 months.

Clinical examination revealed fair oral hygiene and deep occlusal caries with 46. Radiological examination showed caries involving enamel, dentin and pulp. (FIG 6). Vitality testing was done using Endoice, which showed positive response indicating a vital tooth. A diagnosis of chronic irreversible pulpitis was made and treatment plan included root canal treatment followed by placement of suitable prosthesis.(FIG 6)

FIG-6 Pre-operative radiograph



In the first visit , Inferior alveolar nerve block anesthesia was given and isolation was done with rubber dam. Access cavity preparation was done with round bur and canal orifices were found with a DG 16 endodontic explorer. Two mesial canal orifices (mesiobuccal and mesiolingual) and one distal canal orifice (distobuccal) were initially located. The access cavity which was triangular in shape was modified into a more trapezoidal cavity in order to locate the orifice distolingually. (FIG 7)

FIG 7- Access Cavity Preparation



FIG 8 - Working length radiograph



Working length determination was done with #10k files with an apex locator and confirmed on the RVG. (FIG 8)

Cleaning and shaping was done using the ProTaper gold files in all the canals with intermittent irrigation using 5% sodium hypochlorite and saline and EDTA. (MB, ML upto #25 4% and DB and DL upto #25 4%). (FIG 9). After cleaning and shaping, a closed dressing with calcium hydroxide was given. (FIG 9)

FIG 9- Mastercone selection Radiograph



On recall after a week, the patient was asymptomatic. The canals were irrigated with 5% sodium hypochlorite and saline and dried with paper points of corresponding size. Obturation was done with corresponding protaper gutta-percha cones and AH plus sealer.(FIG 10)



FIG 10 – Obturation Radiograph

The patient was recalled after a week for post obturation restoration.

FIG 11 – Post Endodontic Restoration



DISCUSSION

DIAGNOSIS

The variations in distal root anatomy may be identified through careful reading of angled radiographs. A thorough radiographic study of the involved tooth with exposure from three different horizontal projections; the standard buccal-to-lingual projection, 20° from the mesial, and 20 ° from the distal reveals the basic information regarding the anatomy of the tooth in order to perform endodontic treatment (Ingle et al. 2002). However, using the buccal object rule with two radiographs with different horizontal angulations may suffice to determine the position of a lingual root (Walton 1973, Goerig&Neaverth 1987). One of these radiographs is taken in the orthoradial position and the other taken either 30°mesially or distally. This buccal object rule has also been called Clark’s rule, the same lingual, opposite buccal (SLOB rule) and Walton’s projection (Ingle 2002).

The other aids for detection of an extra canal are use of proper magnification ; loupes or microscope , good source of illumination , Champagne bubble test and dyes.

MORPHOLOGY

A classification by Carlsen and Alexandersen⁶ describes four different types of RE according to the location of the cervical part of the RE: types A, B, C and AC. Types A and B refer to a distally located cervical part of the RE with two normal and one normal distal root components, respectively. Type C refers to a mesially located cervical part, while type AC refers to a central location, between the distal and mesial root components.

Another Classification by Moore et al,⁷ is based on the curvature of the separate RE variants in bucco-lingual orientation, Three types can be identified: type I refers to a straight root/root canal, type II to an initially curved entrance and the continuation as a straight root/root canals, type III to an initial curve in the coronal third of the root canal and a second buccally orientated curve starting from the middle to apical third.

CONCLUSION

The high frequency of a fourth canal in mandibular first molars makes it essential to anticipate and find all canals during molar root canal treatment. The possibility of an extra root should also be considered and looked for carefully. Knowledge of the location of the additional root and its root canal orifice will result in a modified opening cavity with extension to the distolingual side.

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