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Incongruity in Human Permanent Molar-Radix Entomolaris

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ABSTRACT

Mandibular molars shows varied anatomy. It can have an additional root located lingually (the radix entomolaris) or buccally (the radix paramolaris). An awareness and understanding of this unusual root and its root canal morphology can contribute to the successful outcome of root canal treatment. This report discusses endodontic treatment of two mandibular molars with a radix entomolaris, which is less common in Indian Population. The incidence of this variation in Indian population is 5.97% only. The prevalence and the external morphological variations and internal anatomy of the radix entomolaris are described..

INTRODUCTION

The healing of endodontic pathology and its prevention depends on a thorough chemomechanical cleansing and shaping of the root canals before proper root canal filling with a hermetic seal. An awareness and understanding of the presence of unusual root canal morphology can thus contribute to the successful outcome of root canal treatment.

It is well known that the mandibular first molar can have several anatomical variations[1,2,A] number of anatomical variations have been described in different studies of the mandibular first molar:Fabra-Campos[4,5] and Bond6reported the presence of three mesial canals. Stroner7 noted the presence of three distal canals. Like the number of root canals, the number of roots may also vary in the mandibular first molar. Incidence of its bilateral occurrence is between 50% and 67%.In spite of its high prevalence in all races, its incidence in Indian population is found to be 5.97% only7.

An additional third root is also found in this tooth. It was first mentioned in the literature by Carabelli8, is called the radix entomolaris9. This supernumerary root is located distolingually in mandibular molars, mainly first molars.An additional root at the mesiobuccal side is called the radix paramolaris10.

In this article, the clinical approach to diagnose and treat it endodontically is appraised.

CASE STUDY

A 50 year old male patient reported to the O.P.D. of Department of Conservative Dentistry and Endodontics with pain in mandibular right first molar region. On clinical examination, tooth was carious with tender on vertical percussion. A provisional diagnosis of acute apical periodontitis was made. On radiographic examination, there was a shadow of lamina dura behind the distal root. Access cavity was made using a round bur (Dentsply Maillefer). After the location of the canal diagnostic K-files of no.10 (DentsplyMaillefer, Ballaigues, Switzer- land) was placed in all canal orifices and a radiograph on 30° mesial angulation was taken. It was found that an additional root with canal was evident. Chemomechanical preparation was done using ProTaper next rotary instruments (Dentsply Maillefer) using crown down technique. The root canal was disinfected usind 3% hypochlorite. Master cone radiograph was taken. Obturation was done with guttapercha and endomethasone N (septodont) root canal sealer with vertical condensation technique and post obturation radiograph was taken. Access cavity was then restored with composite resin (Coltene- whaledent Langenau, USA).

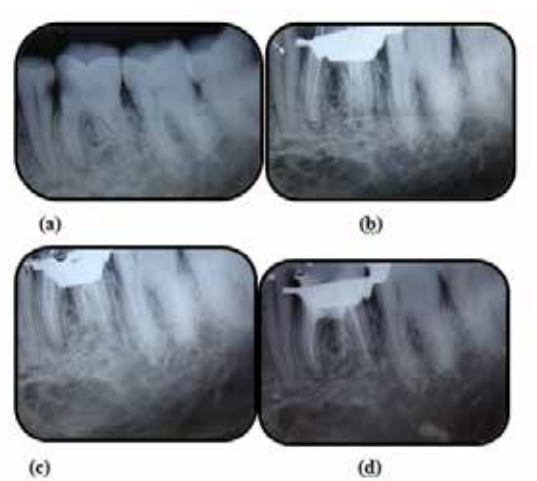

Figure 1: (a) diagnostic radiograph (b) working length determination (c) master cone radiograph (d) Post obturation radiograph.

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DISCUSSION

The presence of separate radix entomolaris in the first mandibular molar is associated with certain ethenic group11. In African population, a maximum frequency of 3% is found12 while in Indian population, the frequency is less than 5%.In population with Mongoloid traits (such as Chinese, Eskimo and American Indians) the radix entomolaris occurs with a frequency that ranges from5 % to more than 30%13. Because of its high frequency the radix entomolaris is considered to be a normal morphological variant.

The radix entomolaris is located distolingually, with its coronal third completely or partially fixed to the distal root. The dimensions of the radix entomolaris can vary from a short conical extension to a 'mature' root with normal length and root canal.A classification by Carlsen and Alexandersen11 describes four different types of Radix Entomolaris according to the location of the cervical part of the radix entomolaris. describe two different types: types A and B. Type A refers to an RP in which the cervical part is located on the mesial root complex; type B refers to an RP in which the cervical part is located centrally, between the mesial and distal root complexes.

An accurate diagnosis of these supernumerary rootcan avoid complications or a 'missed canal' during root canal treatment.In the cases of extra distal root in permanent mandibular molar, a clinician should always read and interpret radiograph correctly for root morphology and canal pattern. An additional radiograph at mesial or distal angulation should be taken to confirm the unusual anatomy. Access preparation should always be modified from triangular to trapezoidal form in order to gain accessibility to distolingual orifice.

To reveal the radix entomolaris, a second radiograph should be taken from a more mesial or distal angle (300).The location of the orifice of the root canal of an radix entomolaris has implications for the access opening.The orifice of the radix entomolaris is locatedistotomesiolingually from the main canal or canals in the distal root.

The presence of RE or RP has clinical implications in endodontic treatment. An accurate diagnosis of these supernumerary roots can avoid complications or a 'missed canal' during root canal treatment. Because the RE is mostly situated in the same bucolingual plane as the distobuccal root, a superimposition of both roots can appear on the preoperative radiograph, resulting inaccurate diagnosis. To reveal the RE, a second radiograph should be taken from a more mesial or distal angle (30 degrees). This way an accurate diagnosis can be made in the majority of cases.

Apart from radiographical diagnosis, clinical inspection of tooth crown and analysis of cervical morphology of the roots by means of periodontal probing can facilitate identification of an additional root. An extra cusp (tuberculum paramolare) or more prominent occlusaldistal or distolingual lobe, in combination with a cervical prominence or convexity, can indicate the presence of an additional root. If an RE or RP is diagnosed before endodontic treatment, one knows what to expect or where to look once the pulp chamber has been opened.

The location of the orifice of the root canal of an RE has implications for the opening cavity. The orifice of the RE is located disto to mesiolingually from the main canal or canals in the distal root. An extension of the triangular opening cavity to the (disto) lingual results in a more rectangular or trapezoidal outline form. Visual aids such as loupe, intra-oral camera or dental microscope can, be useful. A dark line on the pulp chamber floor can indicate the precise location of the RE canal orifice. The calcification, which is often situated above the orifice of the RE, has to be removed for a better view and access to the RE. An initial relocation of the orifice to the lingual is indicated to achieve straight-line access. However, to avoid perforation or stripping in the coronal third of a severe curved root, care should be taken not to remove an excessive amount of dentin on the lingual side of the cavity and orifice of the RE.

A severe root inclination or canal curvature, particularly in the apical third of the root (as in a type III RE), can cause shaping aberrations such as straightening of the root canal or a ledge, with root canal transportation and loss of working length resulting. The use of flexible nickel-titanium rotary files allows a more centered preparation shape with restricted enlargement of the coronal canal third and orifice relocation.

CONCLUSION

Pre-operative periapical radiographs exposed at two different horizontal angles are required to identified these additional roots.

The initial diagnosis of radix entomolaris before root canal treatment is important to facilitate the endodontic procedure and to avoid missed canals.

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