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ENDODONTIC MANAGEMENT OF RADIX ENTOMOLARIS IN MANDIBULAR FIRST MOLAR - TWO CASE REPORTS.

Endodontology

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ABSTRACT

Mandibular molars can have an additional root located distolingually (the radix entomolaris) or mesiobuccally (the radix paramolaris). If present, an awareness and understanding of this unusual root and its root canal morphology can contribute to the successful outcome of root canal treatment. This paper describes two case reports on the presence of radix entomolaris in mandibular first molar which focus on its clinical approach for identification, detection and endodontic management.

KEYWORDS

Endodontic treatment, mandibular molars, radix entomolaris, radix paramolaris

Root canal anatomy is highly complex and unpredictable. Aberrations are found commonly, it is thus essential to know the anatomy and variations from normal.(Hashem & Ahmed, 2017) A majority of mandibular first molars have two roots - one mesial and one distal and three root canals - two mesial and one distal. The presence of a third root is a major variation seen here.(Agarwal et al., 2014)

This macrostructure was first mentioned in literature by Carabelli in 1844. (Carabelli, 1844) When located distolingually, it is known as Radix Entomolaris (RE); whereas when located mesiobuccally, it is known as Radix Paramolaris (RP).(Bolk, 1915)

This supernumerary root is smaller, and may be separate or fused with other roots.(Movassagh et al., 2016) DeMoor et al. in 2004 suggested a classification with three different types of RE; Type I refers to a straight root, Type II to an initially curved entrance that continues as a straight root and Type III to an initial curve in the coronal third of the root canal and a second curve beginning in the middle and continuing to the apical third.(Moor et al., 2004)

External factors such as those involved in odontogenesis or genetics are said to be responsible for its formation.(Calberson et al., 2007) It has a racial prevalence varying from 0.2% to 30%.(Karunakar et al., 2018) RE can be found on all mandibular molar teeth, with least frequency on second molar.(Garg et al., 2013) It can also have a bilateral occurrence of 50% to 67.(Hitij et al., 2017)

This article aims to present cases on clinical approach for identification, detection and endodontic management of two RE in the mandibular first molar.

Case Report 1

A 35 year old female patient reported with a complaint of pain in the lower left back region since one week. Pain was spontaneous, sharp, continuous, aggravated while eating and at night and was relieved by medication. Clinical examination revealed a deep occlusal carious lesion with 36. Tooth was tender on vertical percussion and showed a positive response on vitality testing. Intra oral periapical (IOPA) radiograph examination of 36 revealed radiolucency involving enamel, dentin and pulp coronally, presence of an additional distolingual root and periodontal space widening with all three roots. De Moor et al.'s classification suggested a Type II canal configuration. No significant medical and family history was noted.

Diagnosis of acute irreversible pulpitis with apical periodontitis was made and root canal treatment (RCT) was recommended.

Case Report 2

A 40 year old male reported with a complaint of pain and food lodgement in the lower right back region since 6 months. Pain was mild and intermittent but had increased in intensity since past 2 days. The patient had prolonged sensitivity to hot and cold substances and aggravated particularly at night. Clinical examination revealed a deep occlusal carious lesion with 46. Tooth was tender on vertical percussion and showed a prolonged response on vitality testing. IOPA radiograph of 46 revealed radiolucency involving enamel, dentin and pulp coronally, presence of an additional distolingual root and periodontal space widening. De Moor et al.'s classification suggested a Type III canal configuration. No significant medical and family history was noted.

Diagnosis of acute irreversible pulpitis with apical periodontitis was made and RCT was recommended.

Clinical Management

After patient's consent, local anesthesia was administered with 1:80,000 epinephrine (Lignox; Indoco Remedies, Mumbai, India). Access opening was done under rubber dam isolation (Hygenic Dental Dam, Colténe Whaledent, Germany). It was modified to provide proper access to distolingual canal. (Figure 1a and 2a) Canal orifices were located and all the canals were negotiated with #15 K file (Mani, Tochigi, Japan). Working length was determined using an electronic apex locator (Root ZX-mini; J. Morita, Tokyo, Japan) and subsequently verified on a radiograph with two instruments each in mesial root and distal root. (Figure 1b and 2b)

Cleaning and shaping was performed using rotary EdgeFile- X3 (EdgeEndo) in crown down manner to achieve a size C2 apical preparation. Lubrication was done using 17% EDTA (RC HELP). Intermittent irrigation was with 3% sodium hypochlorite (Hyposol, Prevest DenPro Limited, Jammu, Jammu and Kashmir, India), 0.2% chlorhexidine gluconate (Hexidine, ICPA Health Products Ltd., India) and finally with normal saline. Canals were dried with sterile absorbent paper points (Dentsply Maillefer) and disinfected with calcium hydroxide.

On the next visit after a week, master cone selection radiograph was

taken. (Figure 1c and 2c) Canals were obturated with laterally condensed gutta percha (Sure-endo, Sure Dent Corporation, Korea) and AH plus resin sealer (Dentsply, Maillefer, Ballaigues, Switzerland). Access cavity was restored with composite resin followed by a post obturation radiograph. (Figure 1d and 2d).

Figure 1 ***Clinical Management of Case 1***

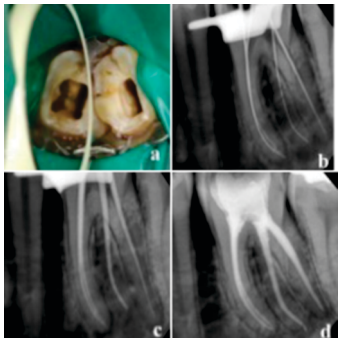
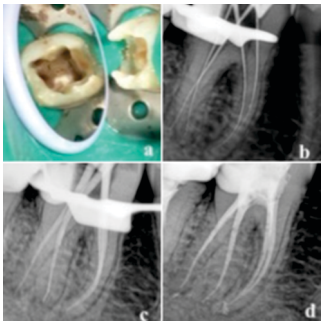


Figure 2 ***Clinical Management of Case 2***



DISCUSSION

The presence of RE can often go missed which is one of the critical reasons for its failure.(Patil et al., 2014) Recent concepts in access preparation and newer technologies have made it easy to locate the variations.

Clinically, an accessory cusp (tuberculum paramolare) or more prominent occlusal, distal or distolingual lobe may be present. Periodontal probing may disclose a cervical prominence or convexity. (Gupta, 2015)

Radiographically, an additional root appears as a shadow or a thin radiolucent line.(Sarangi & Uppin, 2014) In such instances, angled IOPA radiographs with a mesial shift of 20° using SLOB technique should be taken.(Souza-Flamini et al., 2014) Wang et al. demonstrated that 25°mesial radiographs were significantly better than 25° distal radiographs for RE visibility and diagnosis.(Wang et al., 2011)

Access opening of mandibular first molar typically shows one kidney-shaped canal in the distal root. A narrow and round orifice may suggest a second distal canal.(Różyło et al., 2014) The conventional triangular access cavity should be modified into a trapezoidal shape in order to expose the orifice.(Mahendra et al., 2013),(Hannah et al., 2014)

Additional canals can be located using law of symmetry and orifice location, visualizing the dentinal map, looking for bleeding points, 1% methylene blue dye staining and 'champagne bubble test'.(Hannah et al., 2014)

Further exploration using tactile sensation can be done with DG-16 endodontic explorer, Pathfinder and Micro-openers. Troughing of the grooves can be done with ultrasonic tips.(Chandra et al., 2011)

Magnification and illumination using loupes, intra-oral camera, operating microscope, fiber- optic transillumination, dental endoscopy and orascopy improve the visualisation of root canal orifices.(Stamfelj et al., 2016),(Sajad et al., 2018),(Shikha Gupta, 2015),(Pai et al., 2014) Advanced imaging techniques such as digital radiography, radiovisiography, cone beam computed tomography (CBCT), micro-computed tomography (CT), spiral CT, etc can confirm presence of additional canals.(Sarfi & Bali, 2017),(Gu et al., 2010)

A canal curvature in radix can cause iatrogenic errors such as ledge formation or root canal transportation resulting in loss of working length. Hence aim for straight-line access with an initial glide path preparation using precurved small files, followed by adequate coronal enlargement for passage of larger volumes of irrigants.(Abella et al., 2011),(Kokate et al., 2013)

Instrument separation in narrow, severely curved RE can complicate the treatment plan. This can be overcome by using nickel-titanium (NiTi) rotary files with superelasticity property. EdgeFile (EdgeEndo, Albuquerque, NM, USA) is made of annealed heat treated nickel-titanium alloy brand named Fire-Wire which increases flexibility, cyclic fatigue resistance and torque strength. This allows a more centered preparation shape.(EdgeFile X3, 2015)

Evidence suggests that the presence of the RE can lead to periodontal destruction due to the formation of distal furcation and increased pocket depth. Huang et al. found a higher magnitude of periodontal and clinical attachment loss at the distolingual site of molars that presented with the RE than in molars without the root in molars with advanced periodontitis.(R-Y Huang et al., 2010),(Ren-Yeong Huang et al., 2007)

CONCLUSION

Thus, it can be concluded that teeth are never alike and can pose as an endodontic challenge. Best effort should be made for treatment of radix to achieve a successful outcome and a long term retention of the tooth.(R-Y Huang et al., 2010)

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