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Management of a Morphological Variation (Radix Entomolaris) In Mandibular Molar: A Case Report

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ABSTRACT

The aim of the following case report is to report of endodontic management of mandibular first molars with an RE. A 40 years old femalegave history of sensitivity to cold and hot was examined and on Clinical examination revealed deep proximal carious lesions on left mandibular first molar. The tooth 36 was tender to vertical percussion. The preoperative radiographrevealed radiolucency of carious lesion affecting the pulp along with widening of the PDL space with respect to 36 also, outline of the distal root contour shows double periodontal ligament indicative of RE. Based on the clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis with symptomatic apical periodontitis with respect to 36 was made and treatment of choice was endodontic treatment with respect to 36.A clinical approach to endodontically treat a RE should consist of adopting measures to minimize complications which can be achieved through profound knowledge and proper diagnosis.

Keywords: Radix entomolaris, morphological variation, mandibular molar

INTRODUCTION

Radix entomolaris (RE) is one of the anatomical variant which can be found in a permanent mandibular molar and was first described in literature by Carabelli in 1844. It is characterized by the presence of an additional or extra third root, which is typically found disto-lingually. Radix entomolaris can be found in the first, second, and third mandibular molars, occurring the least frequently in the second molar.

Radix entomolaris (RE) is considered to be an Asiatic trait. However, its prevalence in Indian population is found to be lower than in other Asian races. The occurrence of third root varies in different ethnic groups, with the incidence of less than 5% in Indian population.[1]The bilateral occurrence of RE is reported to vary from 37.14 to 67%. However, some studies have reported only unilateral occurrence of RE, further studies are required to clarify this aspect.[2]

Nevertheless, its awareness and identification is vital to achieve endodontic success. Three rooted mandibular first molars deserve special attention as they are structurally different from that of the other two roots in either size or shape and even sometimes may vary in both. Inability to recognize and negotiate these variants lead to failures.

Various literature suggests that this supernumerary root can be distinct or partly fused to other roots. It is generally smaller, with variable curvature and requires additional consideration in its management.

According to Wang et al. preoperative radiographs in different horizontal angulations were adequate for the detection of multi-rooted teeth.[3] Proper diagnosis and management of these variations will lead to the long-term survival of teeth.

The preliminary diagnosis of these variations is done routinely with radiographic techniques. Radiographic diagnosis plays a pivotal role in successful endodontic treatment, and when taken at different angulations gives information about extra canals or roots and aids in the better understanding of the anatomy of the root canal system and the treatment approach with sufficient knowledge and absolute clinical thoroughness for successful root canal

treatment. In the following case report, the endodontic treatment of mandibular first molars with an RE has been discussed.

CASE REPORT

A 40 years old female reported to the department of conservative dentistry and endodontics with a chief complaint of pain in lower left back tooth region since past 20 days. The pain was mild in intensity and increased on mastication. The patient also gave history of sensitivity to cold and hot and also gave medical history of severe asthma. Clinical examination revealed deep proximal carious lesions on left mandibular first molar. The tooth 36 was tender to vertical percussion. The preoperative radiograph (FIG.1) revealed radiolucency of carious lesion affecting the pulp along with widening of the PDL space with respect to 36 also, outline of the distal root contour shows double periodontal ligament indicative of RE. Based on the clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis with symptomatic apical periodontitis with respect to 36 was made and treatment of choice was endodontic treatment with respect to 36.

Clinical management

The teeth was anesthetized by giving IANB using lignocaine. After caries excavation, access cavity was prepared on tooth 36. On inspection with a DG-16 endodontic explorer initially, the pulp chamber floor revealed four canals – mesiobuccal, mesiolingual, distobaccal and distolingual.

The distolingual canal orifice was more lingually placed so, the access cavity was modified from a triangular form to a trapezoidal shape in order to deroof the complete pulp chamber and to include the distolingual canal.

Negotiation of the canals was carried out with ISO size 10 K files. Working length was determined using the apex locator (pixi, densply) with 15 No. K files and was confirmed using radiograph. The working length radiograph taken with different horizontal angulations revealed the presence of a third root located distolingually.

Cleaning and shaping was done using hyflex EDM(COLTENE) rotary files. All the canals were irrigated using 3% sodium hypochlorite solution and 17% EDTA solution. The canals were finally flushed with sterile saline. Master cones were inserted to the working length and were confirmed radiographically. The canals were dried with paper points and obturation was performed followed by post-obturation restoration.

Fig 1. Preoperative Radiograph

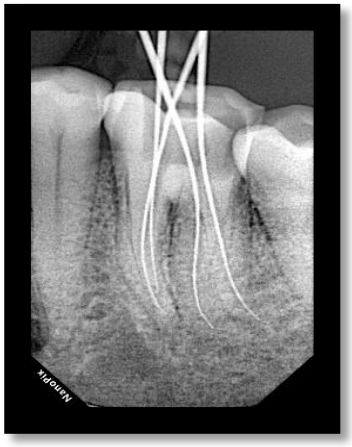

Fig 2. Working Length Determination

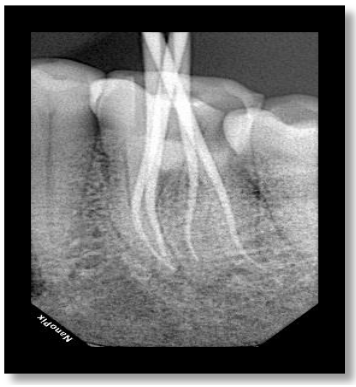

Fig 3. Master Cone

Fig 4. Obturation

DISCUSSION

In cases of radix entomolaris accurate diagnosis along with dentist's knowledge about anatomy and morphology of root canals plays an important role for the success of endodontic treatment. Diagnosing the RE accurately can avoid post operative complications like missed canal which is a common reason for endodontic failure.

Detection of RE can be based on clinical examination, radiographic and imaging techniques and other accessories.A thorough inspection of the preoperative radiograph and interpretation of particular marks or characteristics, such asan unclear view or outline of the distal root contour like double periodontal ligament, can indicate the presence of a "hidden" RE.

It is mentioned that the radiographs were successful in over 90% of the cases while identifying additional roots but superimposition of the distal roots can be limiting factor. To reveal the RE, a second radiograph should be taken from a more mesial or distal angle (25°-30°).

The location of the orifice of the root canal of an RE also has implications for the opening cavity. The orifice of the RE is located distolingually to mesiolingually from the main canal or canals in the distal root. An extension of the triangular opening cavity to the distolingual results in a more rectangular or trapezoidal outline form.[4,5]

Radix entomolaris, due to variations and complexities in its anatomy coupled with its variable furcation levels, can pose multiple and significant endodontic problems in the form of furcal or strip perforation, weakening of root, vertical root fracture, straightening of the root canal, ledge formation, loss of working length, root canal transportation and instrument separation[5].These morphological variations of the RE in terms of root inclination and root canal curvature demand a careful and adapted clinical approach to avoid or overcome procedural errorsduring endodontic therapy.

A clinical approach to endodontically treat a RE should consist of adopting measures to minimize above mentioned complications.

In the present case, radiographs alone, including preoperative ones, clearly showed the presence of RE signifying the importance of radiographs in the detection of RE.

An initial relocation of the orifice to the lingual without excessive removal of dentin helps to achieve straight-line access and avoid perforations. Manual preflaring is recommended to prevent instrument separation.initial root canal exploration with small files (size 10 or less), creation of a glide path along with the proper determination of the canal curvature and working length would reduce the procedural errors such as ledging and transportation.Finally, use of nickel-titanium rotary files having a taper of not more than 0.04 taper and crown down technique is said to allow a more centered, rounder and conservative canal preparation than the use of stainless steel instruments in RE.[7,8]

CONCLUSION

The initial diagnosis is of utmost importance to facilitate the endodontic procedure and to avoid treatment failures. Proper interpretation of radiographs taken at different horizontal angulations may help to identify a number of roots and their morphology. Once diagnosed, the conventional triangular cavity should be modified to a trapezoidal form distolingually to locate the orifice of the additional root.

A successful endodontic treatment in cases of RE starts right from initial diagnosis. Proper radiographic interpretations using different horizontal angulations aids in diagnosis which should be followed by appropriate clinical modifications in the routine endodontic treatment procedure.

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