

Endodontic Management of Radix Entomolaris in Mandibular First Molar - Case Series

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Abstract

The presence of radix entomolaris (RE) in a mandibular first molar is a rare occurrence in Indian ethnic group. This presence of additional root can lead to difficulties during endodontic treatment. A thorough knowledge of anatomy is necessary for the success of endodontic treatment. This article presents a review on clinical approach and a case series on the detection and management of radix entomolaris on mandibular first molar. RE was identified using SLOB technique with preoperative radiograph, modifying the access cavity preparation, locating the canals followed by cleaning and shaping of canals with nickel titanium instruments. Obturation done with respective master cones and AH+ resin sealer.

Keywords: Anatomical Variation; Disto-Lingual Root; Mandibular First Molar; Radix Entomolaris

Abbreviations

CBCT: Cone Beam Computed Tomography; DG16: David Green 16; RE: Radix Entomolaris; SLOB: Same Lingual Opposite Buccal

Introduction

The aim of endodontic therapy is to effectively remove the bacteria from the canals which has been infected by micro-organisms and to avoid recontamination of the canals is mainly attained by proper cleaning and shaping protocols of root canals followed by three dimensional fluid tight seal both coronally and apically. Clinician should have a proper knowledge on the root canal anatomy and variations such as extra roots, fins, webs and isthmuses in the root canals which make the treatment complicate [1]. Lack of understanding the root canal morphology and improper shaping and cleaning can lead to the flare-ups generally [2] several authors have reported about the morphology of mandibular molars [3] and the articles shown that mandibular first molars have three or four canals and the number of root canals and number of roots may also vary.

The most common variation among mandibular first molars are three roots which was first documented by carabelli known as radix entomolaris i.e. Presence of distolingual supernumerary root or mesiobuccal root which is known as radix paramolaris [4,5]. This has a frequency of 5-30% among the mongoloids like Chinese, Eskimos and Native Americans populations. And frequency of less than 5%

in white Caucasians, Africans, Eurasians and Indian populations [3]. The external anatomy of the extra roots on mesial and distal was described by Carlson and Alexandersen [6-8]. Radiographic diagnosis plays a vital role in successful endodontic treatment of tooth. So, radiographs taken at different angulations give information about extra canals or roots [9].

Radix entomolaris has an occurrence of less than 5% in the Indian population such cases are not routinely observed during dental procedures. This paper deals with two case reports of RE of mandibular first molars confirmed by SLOB technique.

Case Report 1

A 65-year-old female reported with a chief complaint of swelling on left mandibular side of the face since 2 days. Upon clinical examination it has shown that teeth were attrited with deep dental caries lesion occlusally (tooth 36).

The tooth was tender on percussion and palpation apically. On radiographic examination the tooth was having a radio-opacity in pulp chamber and peri-apical radiolucency which was indistinct around mesial root of tooth and presence of extra root outline can be noticed and confirmed with SLOB technique in below radiograph (Figure 1a), after a thorough radiographic examination tooth subjected to pulp sensibility test which includes cold test and electric pulp test, shown a negative response which indicates a pulp necrosis and diagnosed as acute peri-apical abscess. Endodontic treatment was planned out.

After a consent from the patient local anesthesia was administered and isolation done with rubber dam. An emergency access opening was done using endo access bur number 2 (DENTSPLY Switzerland) in order to establish drainage, upon close examination found two mesial and two distal canals, first distal was found away from center (buccally) and other distal found lingually so access cavity shape modified from triangular to trapezoidal form and presence of all the canals was confirmed and located with DG 16 endodontic explorer (Adler Company) and surgical loupes 2.5x (Heine, Herrsching, Germany).

Pulp stone was removed using ultra-Sonics and endodontic spoon excavator. Working length was measured with root ZX mini (J Morita, Osaka, Japan) and confirmed with radiograph (RVG KODAK carestream 5100) (Figure 1B). All the canals were cleaned and shaped using Ni-Ti rotary system i.e. REVO-S (Micro-Mega, France) and crown down technique flooded with 5.25% of sodium hypochlorite solution and smear layer removed using EDTA 17% solution. Disinfection carried out using calcium hydroxide (Apex Cal, Ivoclar Vivadent, Liechtenstein).

In the next visit after a week the canals were dried using paper points and master cone radiograph was taken (Figure 1C) and obturation was done using master cone with AH+ resin sealer (De Trey DENTSPLY Konstanz, Germany). The access cavity was restored with CAVIT-G and post-obturation radiograph was taken (Figure 1D), after a week the tooth was restored using silver amalgam. Patient was scheduled for full coverage restoration. The patient was asymptomatic during the follow-up period of six months (Figure 1E).

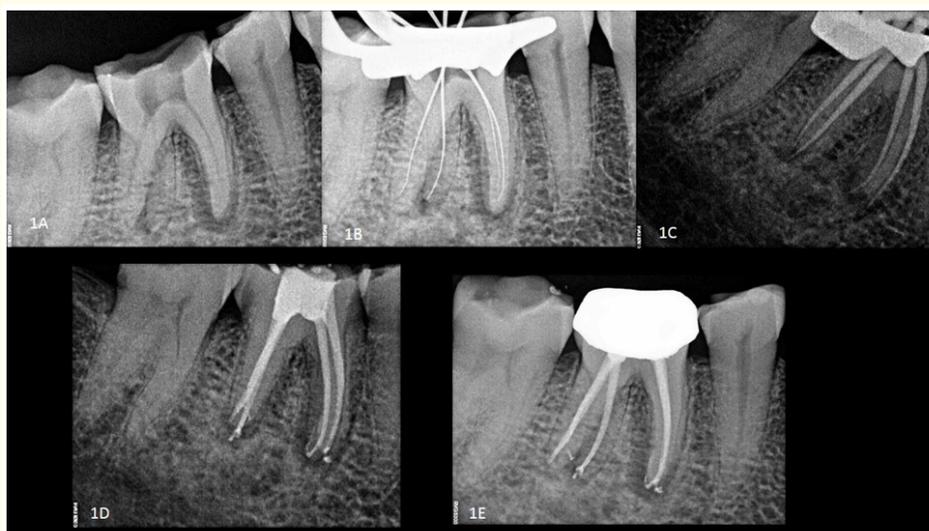


Figure 1: 1A) preoperative radiograph, 1B) working length determination, 1C) master cone, 1D) Immediate postoperative, 1E) 6 months post-operative follow up.

Case Report 2

A 20-year-old female reported with a chief complaint of pain in right mandibular region of jaw since 1 week. Pain was intermittent, aggravates on taking hot food and sleep, relived on taking cold water, persisted even after removal of stimulus. Upon clinical examination it has shown that teeth was having deep dental caries lesion occlusally (tooth 46) with tender on percussion.

On radiographic examination the tooth was having old composite restoration occlusally and periodontal ligament widening in mesial root of tooth and presence of extra root outline which overlapping can be indicated as RE and confirmed with SLOB technique in below radiograph (Figure 2A), after a thorough radiographic examination tooth subjected to pulp sensibility test which includes cold test and electric pulp test, shown a mild and delayed response which diagnosed as chronic apical periodontitis. Endodontic treatment was planned out.

After a consent from the patient Local anesthesia was administered and isolation done with rubber dam. An access opening was done using endo access bur number 2, upon close examination found two mesial and two distal canals, first distal was found away from center (buccally) and other distal found lingually so access cavity shape modified from triangular to trapezoidal form and presence of all the canals was confirmed and located with DG 16 endodontic explorer and surgical loupes 2.5x. Working length was measured with I ROOT SP (S Denti, Korea) and confirmed with radiograph (Figure 2B). Canals where cleaned, shaped and disinfection carried out using calcium hydroxide.

In the next visit after a week the canals were dried using paper points and master cone radiograph was taken (Figure 2C) and obturation was done. The access cavity was restored with temporary and post obturation radiograph was taken (Figure 2D), after a week the tooth was restored using silver amalgam. The patient was asymptomatic during the follow up period of six months (Figure 2E).



Figure 2: 2A) preoperative radiograph, 2B) working length determination, 2C) master cone, 2D) Immediate postoperative, 2E) 6 months post-operative follow up.

Discussion

Endodontic therapy success in the presence of radix entomolaris primarily depends upon its diagnosis, treatment plan, anatomy of morphology assessment, canal configuration and approaching the tooth clinically. Common failure of endodontic treatment is missed canal so by accurate diagnosis of radix entomolaris can avoid complication. Identification of this radix entomolaris is based on clinical, radiographical, imaging techniques and armamentarium [5].

RE is most commonly situated in same plane and is overlapped by distobuccal root in bucco-lingual plane which give superimposition of both the roots which tend to give inaccurate diagnosis. A thorough radiograph interpretation is necessary to identify the RE to rule out the outline of the disto-buccal root. To reveal the RE second radiograph has to be taken in distal angle (30 degree). This way accurate diagnosis of the RE can be made in many of the cases [11].

Other than radiograph diagnosis, one has to give importance to the clinical view by observing the outline of the crown morphology and additional cusp. Presence of extra cusp or more prominent disto-lingual lobe in combination with cervical prominence can indicate the presence of RE. The orifice of the RE is located mesio-lingually from the main distal canal, thus requiring a more rectangular or trapezoidal outline form of the access cavity. A dark developmental line on the pulp chamber floor, carefully explored with an endodontic probe, can indicate the precise location of RE canal orifice. An operating loupes or microscopes are also useful in locating RE and ultrasonics to remove the pulp stones from the chamber [11,14].

Three dimensional imaging technique based computer tomography (CT) and cone beam computer tomography (CBCT) are useful in identifying the RE in noninvasive manner with lesser radiation. However cost and availability to them is said to be limiting factors [10,11,12].

In the present case series, radiograph alone, including preoperative ones, clearly showed the presence of RE in all the cases was able to detect the RE and from the patient point of view, prevented the need of expensive investigations like CT, CBCT.

A clinical approach to endodontically treat an RE should consist 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. It is said that RE exhibits the greatest degrees of curvature with its canal having relatively longer length and smaller radius of curvature. As the risk of instrument fracture significantly increases with the decrease in the radius of curvature, canal preflaring with manual use of stainless steel files is suggested to overcome instrument fracture. 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 0.06 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 [1,5,12,13].

Conclusion

Radix entomolaris has been reported to occur with a frequency of 0.2-32% in different populations. Initial diagnosis and implementing the treatment plan with appropriate techniques and instruments facilitates the endodontic outcome and avoid possible errors. Proper interpretation of radiograph in different angulations may help to identify the morphology of the tooth. Once diagnosed, the outline form should be modified from conventional triangular to trapezoidal to locate and management of these extra canals, root can be done using equipment's such as magnification aids, orifice locators, flexible files.

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Conflict of Interest

Nil.

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