Scholars Journal of Medical Case Reports **ISSN 2347-6559 (Online)**
Sch J Med Case Rep 2017; 5(8):481-484 **ISSN 2347-9507 (Print)**

(An International Publisher for Academic and Scientific Resources) DOI: 10.36347/sjmcr.2017.v05i08.009

Endodontic Management of Radix Entomolaris: Case Reports

Zakiyeh Donyavi[1], Mohammad Esmaeilzadeh[2], Hossein Davanloo[3]*

[1]Assistant Professor, Department of Endodontics, school of Dentistry, Hamadan University of Medical Sciences, Hamadan, Iran

[2] Assistant Professor, Department of pediatric dentistry, school of Dentistry, Hamadan University of Medical Sciences, Hamadan, Iran

[3] Post-graduate Student, Department of Endodontics, Faculty of Dentistry, Hamadan University of Medical Sciences, Hamadan, Iran

***Corresponding author**
Hossein Davanloo
Email: davanloo.hossein@yahoo.com

Abstract: The root canal treatment of a mandibular molar with additional root can be technically and diagnostically challenging. Mandibualr molars can have an additional root located buccally (radix paramolaris) or lingually (radix entomolaris). If present, knowledge and understanding of this unusual root and it´s root canal morphology can contribute to the successful outcome of root canal treatment. This report discusses endodontic treatment of three mandibular molars with radix entomolaris (RE). The prevalence, the external morphological variations and internal anatomy of the paramolaris and entomolaris are explained. Clinicians must be aware of these unusual root morphological variations of radix entomomolaris (RE) in terms of root inclination and root canal curvature. Preoperative radiological assessment from different angles, clinical evaluation of a root canal number and morphology using various diagnostic methodologies, a proper access preparation, and thorough examination of the pulp chamber to locate and debride all the canals are important.

Keywords: Anatomical variations, endodontic treatment, mandibular molar, radix entomolaris

INTRODUCTION

The prevention or healing of endodontic pathology depends on a thorough chemomechanical cleaning and shaping of the root canals before root canal filling with a hermetic seal. Knowledge about the unusual root canal anatomy can contribute to the successful outcome of root canal treatment [1].

In a mandibular first molar an additional third root, first mentioned in the literature by Carabelli is called the radix entomolaris (RE). This supernumerary root is located distolingually in mandibular molars (mainly first molars) [2]. The presence of a separate RE in the first mandibular molar is associated with certain ethnic groups. Mandibular first molar which has a frequency of less than 5% in whit Caucasian (UK, Dutch, Finnish, German), African (Bantu Bushmen), Eurasian and Indian population [3]. In those with Mongolic traits, such as the Chinese, Eskimos and native American population , it occurs with a frequency of 5 to more than 30% [4,5].

In this report three such cases are presented. The prevalence, external morphological variation and internal anatomy of the radix entomologist and premolars are explained. The clinical approach to diagnosis and endodontic treatment are also discussed.

CASE REPORT-1

A 15 years old female patient reported to the Department of endodontics, Hamedan Dental University with complaint of pain during chewing in right first mandibular molar tooth. There were no particular problems in the patient's medical history and she had gross caries in right first mandibular molar tooth and Poor oral hygiene. On examination, the right first mandibular molar displayed deep dental carious lesion with tenderness on percussion. Thermal and electrical pulp testing of the tooth elicited a negative response. Occlusion was normal sinus tract was detected (Fig 1-f). The pre-treatment radiograph showed Lamina dura break down and Periapical radiolucency and an additional root between the mesial and distal roots (Fig 1-a).The Diagnosis of mandibular right first molar with Necrotic pulp and Chronic Apical abscess was made and endodontic treatment was planned. In the first visit left mandibular first molar was anesthetized using 2 ml of 2% lidocaine containing 1:200,000 epinephrine (LOX 2%, Neon Laboratories Ltd., Mumbai, India) and isolated under rubber dam. The pulp chamber was accessed and two mesial orifices and two distal orifices were located. To obtain a straight line access the preparation was modified to a more trapezoidal form. The root canals were explored with precurved K-file ISO number 15 (Dentsply Maillefer, Ballaigues, Switzerland). Working length was

determined using apex locator (Root ZX, J.Morita Inc) and confirmed using radiographic method (Fig 1-b). The root canals were instrumented using the Race rotary files (Dentsply Maillefer, Ballaigues, Switzerland) in all the canals. During instrumentation adequate irrigation was performed using 2.5% sodium hypochlorite and lubricated using 17% EDTA (Apadana Tak Co, Tehran, Iran). A temporary calcium hydroxide paste (Apadana Tak Co, Tehran, Iran) and temporary filling (cavit) were put in place. Symptoms of pain disappeared and two weeks later the root canals were filled with gutta percha and AH-Plus sealer with lateral compaction technique and filling with amalgam(Fig 1-c). The patient was then followed in 3 and 6 months later (Fig 1-d-e-g).

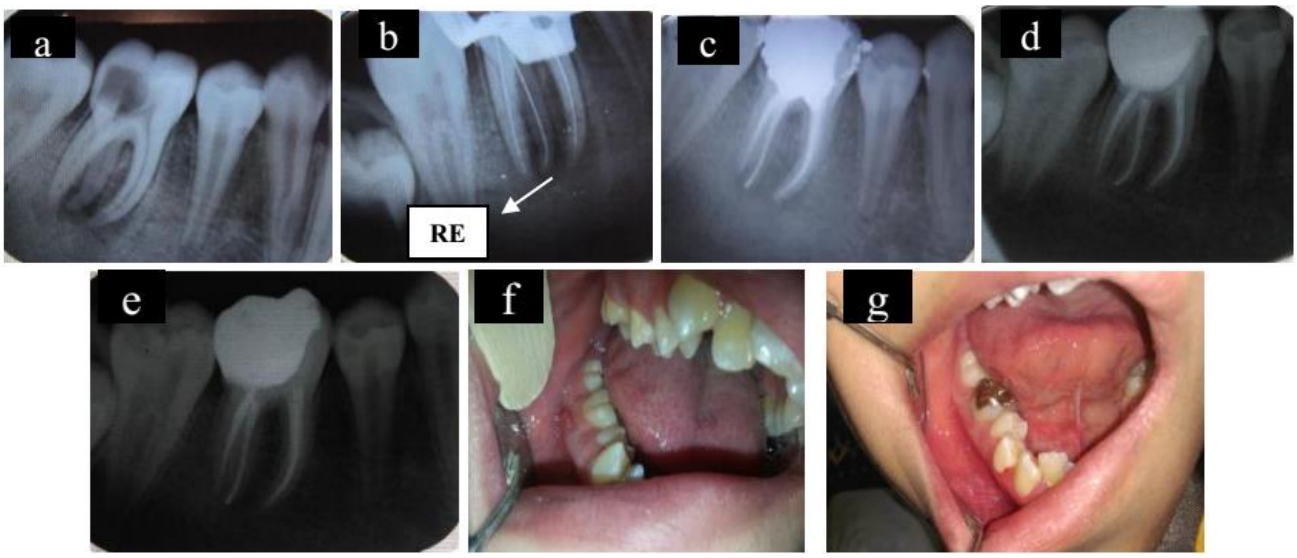

Fig-1: a) Preoperative radiograph. b) Determination of working lengths by radiography. c) Post obturation radiograph. d) Three-month follow-up. e) six- month follow-up f, g) before and after treatment.

CASE REPORT-2

A 30-years-old male patient was referred to the Department of endodontics, Hamadan Dental University, with the complaint of pain in the lower right back tooth region. The patient stated a history of intermittent pain for the past one month, which aggravated with hot drinking and reliving with cold. On clinical examination, there was a carious mandibular right second and third molar. The involved teeth showed a negative response to electric and cold pulp test. The pre-treatment radiograph showed that the periodontal ligament space was normal (Fig 2-a). Based on these findings, the teeth were diagnosed with Necrotic pulp and Periapical was Normal. Endodontic management was planned for the mandibular right second molar and extraction for mandibular third molar. In the first visit profound anesthesia was achieved using 2% lidocaine (LOX 2%, Neon Laboratories Ltd. Mumbai, India) for inferior alveolar nerve block. The tooth was isolated with a rubber dam and access cavity preparation was done using round burs and Endo-Z bur. A clinical examination was carried out with a DG16 endodontic explorer (Hu-Friedy, Chicago, IL, USA). There were four canal orifice (two canal orifice for mesial and two canal orifice for distal). Coronal enlargements of the canals were performed with the Ni-Ti ProTaper orifice shaper (Dentsply Maillefer, Ballaigues, Switzerland). ISO size 6, 8, and 10 files were used to create initial glide path. Working length was determined using an apex locator (ProPex PiXi, Dentsply). Working length radiograph using Buccal object rule (SLOB technique) after radiography found the additional root as mesiolingual root (radix entomolaris) (Fig 2-b). Instrumentation was completed using ProTaper rotary files and 2.5% sodium hypochlorite irrigation. The canals were dried using paper points obturated with ProTaper gutta percha and AH plus sealer with lateral compaction technique and filling with amalgam (Fig 2-c).

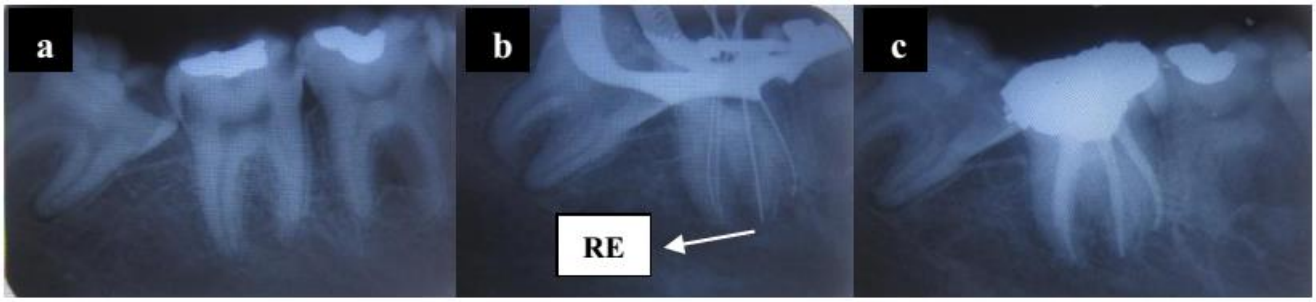

Fig-2: a) Preoperative radiograph. b) Determination of working lengths by radiography. c) Post obturation radiograph.

CASE REPORT-3

A 12-year-old male patient was referred to the Department of endodontics, Hamadan Dental University, with the complaint of gross caries mandibular right first molar. The patient reported a history of bad odor in mouth. The involved tooth showed a negative response to electric and thermal pulp test. The pre-treatment radiograph showed that the periodontal ligament space was normal(Fig 3-a). Based on these findings, the tooth was diagnosed with Necrotic pulp and Periapical was Normal and an additional root between the mesial and distal roots. Endodontic management was planned for the mandibular right first molar.

In the first visit profound anesthesia was achieved using 2% lidocaine (LOX 2%, Neon Laboratories Ltd. Mumbai, India) for inferior alveolar nerve block. The tooth was isolated with a rubber dam and access cavity preparation was done. The pulp chamber was accessed and two mesial orifices and two distal orifices were located. To obtain a straight line access the preparation was modified to a more trapezoidal form. The root canals were explored with precurved K-file ISO number 15 (Dentsply Maillefer, Ballaigues, Switzerland).Working length was determined using apex locator (Root ZX, J. Morita Inc) and confirmed using radiographic method (Fig 3-b). The root canals were instrumented using the Race rotary files (Dentsply Maillefer, Ballaigues, Switzerland) in all the canals. During instrumentation adequate irrigation was performed using 2/5% sodium hypochlorite and canals were dried using paper points and filled with gutta percha and AH-Plus sealer with lateral compaction technique and filling with amalgam (Fig 3-c).

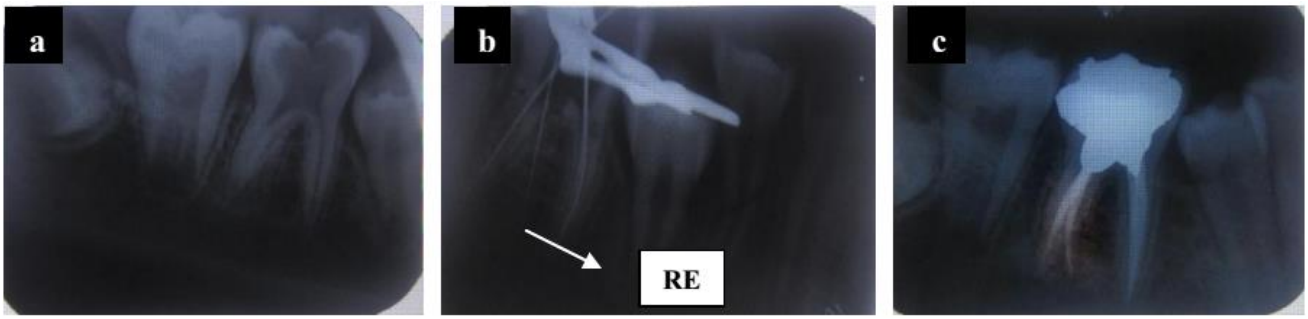

Fig-3: a) Preoperative radiograph. b) Determination of working lengths by radiography. c) Post obturation radiograph.

DISCUSSION

A thorough aware of root canal morphology and the configuration of teeth play an important role in the success of root canal treatment. Radix entomolaris and Radix paramolaris can be found on the first, second and third mandibular, occurring least frequently on the second molar. Bilateral occurrence of the RE ranges from 50 to 67% (1). The etiology behind the formation of the RE is still unclear. In dysmorphic, supernumerary roots formation could be related to external factors during odontogenesis, or to penetrance of an atavistic gene or polygenetic system. In eumorphic roots, racial genetic factors influence the more profound expression of a particular gene that results in the more pronounced phenotypic manifestation [6]. RE can be divided into four different types depending on the location of its cervical part [7]. (a) Type A: the RE is located lingually to distal root complex, which has two cone-shaped Macrostructure. (b) Type B: the RE is located lingually in the distal root complex, which has one cone-shaped Macrostructure. (c) Type C: the RE is located lingually to the mesial root. (d) Type AC: the RE is located lingually between the mesial and distal root complex.

Radiographically a third root should normally be readily evident in about 90% of cases. A careful inspection of the radiograph can sometimes reveal the presence of a “hidden” RE as indicated by an unclear view or outline of the root canal or the distal root

contour. Traditional methods like Bubble test/champagne test, transillumination, White line test and Red line test can also be used. However, it may still be missed due to its slender dimensions occasionally [8]. Some researchers reports the presence of aberrant canals in the mandibular first molar that includes the presence of three canal in the mesial root [9-11]. Based on the literature, the majority of radix entomolaris are curved. However in some cases there is an additional curve starting from the middle of the root or in the apical third. Therefore, using precurved files, adequate coronal enlargement avoids hindrances in the coronal segment of the canals and easy passage of the endodontic file to the apical segment. It would also allow root canal irrigants to pass on to the apical segment in larger volumes [1]. The root length can be confirmed whith the help of electronic apex locators. Vertucci and Williams first reported the presence of a middle mesial canal in a mandibular molar, there have been multiple case reports of aberrant canal morphology in the mesial root. In a clinical evaluation of 100 mandibular molars, Pomeranz *et al*. found that 12 molars had middle mesial (MM) canals in their mesial roots and classified them into three morphologic categories as follows: fin, confluent, and independent [12-18]. Goel *et al*. stated mandibular first molars had MM Cnals in 15.0% of specimens. Among these MM canals, only 6.7% of MM canals were independent [19]. Nonetheless, in spite of using the state-of-art gadgets endodontic mishaps may occur, and thus care has to be taken while negotiating and cleaning these curved canals.

CONCLUSION

Clinicians must be aware of these unusual root morphological variation of the radix entomolaris in terms of root inclination and root canal curvature. Preoperative radiological assessment from different angles, clinical evaluation of a root canal number and morphology using various diagnostic methodologies, a proper access preparation, and thorough examination of the pulp chamber to locate and debride all the canals are important. Aware of the location of the additional root and it´s root canal orifice will result in a modified opening cavity with extension to the distolingual. The initial diagnosis of radix entomolaris is important to facilitate the procedures during treatment and avoid the dislocation of any canal. Root inclination and root canal curvature demand careful, adapted clinical approach to avoid procedural errors during root canal therapy.

REFERENCES

1. Calberson FL, De Moor RJ, Deroose CA. The radix entomolaris and paramolaris: clinical approach in endodontics. Journal of Endodontics. 2007; 33(1):58-63.
2. Davini F, Cunha RS, Fontana CE, Silveira CFdM, Bueno CEdS. Radix entomolaris-A case report. RSBO (Online). 2012;9(3):340-4.
3. Tratman E. Three-rooted lower molars in man and their racial distribution. Br Dent J. 1938;64:264-74.
4. Curzon M, Curzon J. Three-rooted mandibular molars in the Keewatin Eskimo. Journal of the Canadian Dental Association. 1971;37(2):71.
5. Yew S-c, Chan K. A retrospective study of endodontically treated mandibular first molars in a Chinese population. Journal of endodontics. 1993;19(9):471-3.
6. Reichart P, Metah D. Three-rooted permanent mandibular first molars in the Thai. Community dentistry and oral epidemiology. 1981;9(4):191-2.
7. Carlsen o, alexandersen v. Radix entomolaris: identification and morphology. European Journal of Oral Sciences. 1990;98(5):363-73.
8. Walker R, Quackenbush L. Three-rooted lower first permanent molars in Hong Kong Chinese. British Dental Journal. 1985;159(9):298-9.
9. Baugh D, Wallace J. Middle mesial canal of the mandibular first molar: a case report and literature review. Journal of endodontics. 2004;30(3):185-6.
10. Holtzmann L. Root canal treatment of a mandibular first molar with three mesial root canals. International Endodontic Journal. 1997; 30(6):422-3.
11. Forner Navarro L, Luzi A, Almenar García A, Hervás García A. Third canal in the mesial root of permanent mandibular first molars: review of the literature and presentation of 3 clinical reports and 2 in vitro studies. Medicina Oral, Patología Oral y Cirugía Bucal (Internet). 2007;12(8):605-9.
12. Vertucci F, Williams R. Root canal anatomy of the mandibular first molar. Journal of the New Jersey Dental Association. 1973;45(3):27-8 passim.
13. Weine FS. Case report: three canals in the mesial root of a mandibular first molar (?). Journal of endodontics. 1982;8(11):517-20.
14. Bond JL, Hartwell GR, Donnelly JC, Portell FR. Clinical management of middle mesial root canals in mandibular molars. Journal of endodontics. 1988;14(6):312-4.
15. Fabra-Campos H. Unusual root anatomy of mandibular first molars. Journal of endodontics. 1985;11(12):568-72.
16. Pomeranz HH, Eidelman DL, Goldberg MG. Treatment considerations of the middle mesial canal of mandibular first and second molars. Journal of endodontics. 1981;7(12):565-8.
17. Min K. Clinical management of a mandibular first molar with multiple mesial canals: a case report. J Contemp Dent Pract. 2004;5(3):142-9.
18. Ricucci D. Three independent canals in the mesial root of a mandibular first molar. Dental Traumatology. 1997;13(1):47-9.
19. Goel N, Gill K, Taneja J. Study of root canals configuration in mandibular first permanent molar. Journal of the Indian Society of Pedodontics and Preventive Dentistry. 1991;8(1):12-4.