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Endodontic Management of Mandibular Molar With Three Roots And Four Canals (Radix Entomolaris) -A Case Report

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Abstract

Radix Entomolaris is an additional third root that can be found lingually in first mandibular molars.It is of utmost importance that the clinician be familiar with root and root canal anatomy. It allows mechanical and chemical cleaning of the entire pulp cavity and its complete three-dimensional obturation. One of the main reasons for root canal treatment failure in molars is because the clinicians has not removed all the pulp tissue and microorganisms from the root canal system. The knowledge of endodontic anatomy is also important to prevent procedural errors such as instrument separations, zips and root perforations.

Keywords: Radix Entomolaris, Missed anatomy, Distolingual root, Mandibular first molar

Introduction

Success of endodontic treatment depends on the proper identification of all the canals, thorough chemomechanical preparation followed by three-dimensional obturation with hermetic seal. Failure of any of these steps may occur due to unusual tooth morphology. (1) Usually mandibular molars have two roots with three canals but in few teeth, the number of roots and canals vary. (2)The variation in the number of roots, if extra root located lingually called radix entomolaris (RE) or located buccally called radix paramolaris (RP).(3)

Radix entomolaris (RE) is one of the anatomical variant found in a permanent mandibular molar and was first described by Carabelli. It is characterized by the presence of an additional or extra third root, which is typically found disto-lingually.(4) An RE can be found in the first, second, and third mandibular molars, occurring the least frequently in the second molar.(5)

Despite RE consideration as an Asiatic trait with a high prevalence and a eumorphic root morphology in certain races such as Chinese, Taiwanese, and Koreans, the incidence of RE among the Indian population is found to be very low and only 0.2%.(6) However, few studies have reported higher prevalence of RE, with a range from 2.19-13.3%, among the Indian population.(7)

Carlsen and Alexanderson classified RE based on the location of its cervical part into four types.(8)

Type A–Distally located cervical part with two normal distal root components

Type B–Same as Type A; however, only one normal distal root component

Type C–Mesially located cervical part

Type AC–Central location between mesial and distal root components.

De Moor et al. classified RE-based on the curvature in buccolingual orientation into three types.(1)

Type I–Refers to a straight root/root canal

Type II–Refers to an initially curved entrance which continues as a straight root/root canal

Type III–Refers to an initial curve in the coronal third of the root canal, and a second buccally oriented curve starting from the middle to apical third.

Recently, *Wang et al.* gave another classification for RE depending on its radiographic appearance.(9)

Type 1: Presents the most identifiable radiographic image

Type 2: A large beam angulation is necessary mesially or distally for their identification

Type 3: Identification becomes extremely difficult because of the overlap of the adjacent distobuccal root.

Carlsen and Alexanderson classified RP based on the location of its cervical part into two types.(10)

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.

Case Report

A 32-year-old female patient reported with complains of pain in the right lower back tooth region. She gave a history of intermittent pain for the past 1 month, which had increased in intensity since 4 days. On examination, the right mandibular first molar was carious with pulpal involvement and tender on percussion. Thermal and electrical pulp testing of the tooth elicited a negative response. The diagnostic radiograph showed widening of the periodontal ligament space and an additional root between the mesial and distal roots. Two radiographs with different horizontal angulations were made which confirmed that the additional root was located distolingual to the mesial root (Fig. 1A, B). Medical history was non-contributory. A diagnosis of pulpal necrosis of right mandibular first molar with symptomatic apical periodontitis was made and endodontic treatment was planned.

Inferior alveolar nerve block anaesthesia (2% Lignocaine with 1:200000 epinephrine) was given and access cavity preparation was done via endo-access bur (Dentsply, USA) and canal orifices were found with a DG 16 endodontic explorer. The access cavity which was triangular in shape was modified into a more trapezoidal cavity in order to locate the orifice distolingually. Initial negotiation of the root canals was confirmed with ISO size

#10 file. Farther away from distal root canal orifice a fourth disto-lingual canal orifice was found.

The canal lengths were determined radio-graphically with K file ISO size #15 (Fig.1C) and electronically with Root ZX, (J. Morita, Kyoto USA).

Sodium hypochlorite 3% (Vista Dental Product, India) along with EDTA (Glide, Dentsply, USA) was used to clean the canals; shaping was done with ProTaper (Dentsply, USA) rotary system until a size of F2 after which a dressing of calcium hydroxide paste was placed and the patient was recalled 7 days later. At the subsequent appointment, the patient was totally relieved from pain. Proper fitting of cones was evaluated by the master cone radiograph (Fig.1D)

Canals were thoroughly dried with paper points (DiaDent, BC, Canada) and obturation (using single cone technique) was done by using zinc oxide eugenol based sealer (Kerr, Orange, CA, USA)(Fig.1E)

Fig 1A: Pre-operative radiograph where radix is not visible

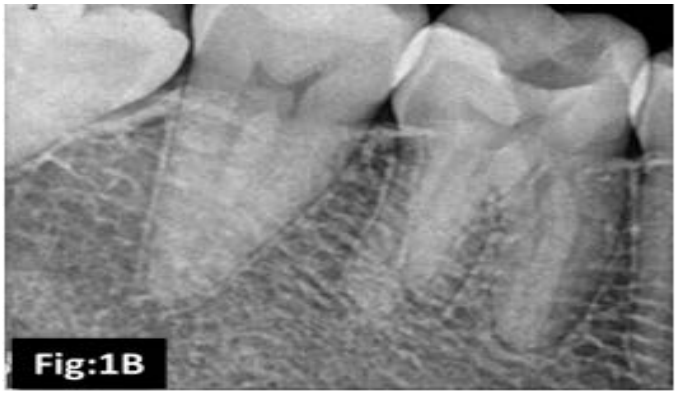

Fig 1B: second preoperative radiograph of tooth 46 taken with a more mesial angulation and revealing the presence of lingually located additional distal root.

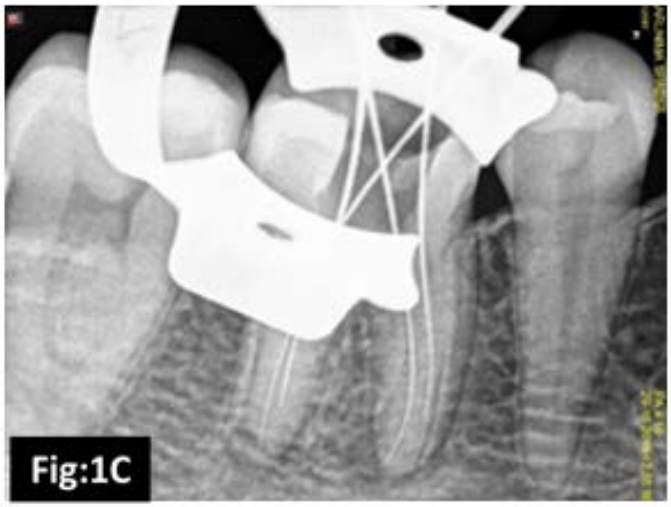

Fig1C : Working-length radiograph

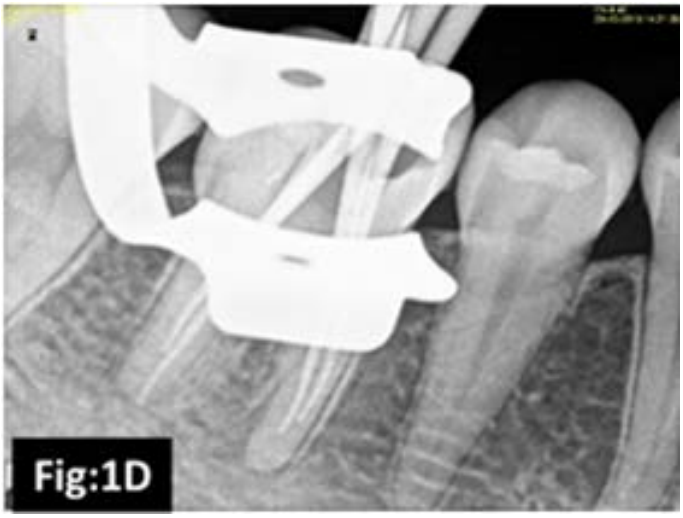

Fig 1D: Master-cone radiograph

Fig 1E: Post-obturation radiograph

Discussion

Success in the endodontic management of radix entomolaris depends primarily on the diagnosis, treatment plan, and morphological assessment of anatomy, canal configuration and approaching the tooth clinically. Identification of this radix entomolaris is based on clinical, radio graphical, imaging techniques and armamentarium. One of the common reason for failure of endodontic treatment is missed canal so accurate diagnosis of radix entomolaris can avoid complication(11) .

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. (12)

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 ultrasonic to remove the pulp stones from the chamber. (12)(13)

Three dimensional imaging technique based computer tomography (CT) and cone beam computer tomography (CBCT) are useful in identifying the RE in non-invasive manner with lesser radiation. However cost and availability to them is said to be limiting factors (12)(14).

In the present case, radiograph alone, including preoperative one, clearly showed the presence of RE in the case 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 . (15)(1)(11)

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.

REFERENCES

1. De Moor RJG, Deroose CAJG, Calberson FLG. The radix entomolaris in mandibular first molars: An endodontic challenge. Int Endod J. 2004;37(11):789–99.
2. Mills PR, Williams GL. mandibular molars. 1974;327:408–13.
3. Segura-Egea JJ, Jiménez-Pinzón A, Ríos-Santos J V. Endodontic therapy in a 3-rooted mandibular first molar: importance of a thorough radiographic examination. J Can Dent Assoc. 2002 Oct;68(9):541–4.
4. Bolk L. Bemerkungen über Wurzelvariationen am menschlichen unteren Molaren. Zeiting fur Morphol und Anthropol. 1915;17:605–10.
5. Visser JB. Beitrag zur Kenntnis der menschlichen ZahnwurzelformenNo Title. Hilversum, Netherlands: Rotting. 1948;49–72.
6. Tu M, Huang H, Hsue S. Detection of Permanent Three-rooted Mandibular First Molars by Cone-Beam Computed Tomography Imaging in Taiwanese Individuals. J Endod [Internet]. 2009;35(4):503–7. Available from: http://dx.doi.org/10.1016/j.joen.2008.12.013
7. Chandra SS, Chandra S. Prevalence of radix entomolaris in mandibular permanent first molars : a study in a South Indian population. YMOE [Internet]. 2011;112(3):e77–82. Available from: http://dx.doi.org/10.1016/j.tripleo.2011.02.016
8. CARLSEN O, ALEXANDERSEN V. Radix entomolaris: identification and morphology. Eur J Oral Sci. 1990;98(5):363–73.
9. Wang Q, Yu G, Zhou XD, Peters OA, Zheng QH, Huang DM. Evaluation of X-ray projection angulation for successful radix entomolaris diagnosis in mandibular first molars in vitro. J Endod [Internet]. 2011;37(8):1063–8. Available from: http://dx.doi.org/10.1016/j.joen.2011.05.017
10. CARLSEN O, ALEXANDERSEN V. Radix paramolaris in permanent mandibular molars: identification and morphology. Eur J Oral Sci. 1991;99(3):189–95.
11. Calberson FL, De Moor RJ, Deroose CA. The Radix Entomolaris and Paramolaris: Clinical Approach in Endodontics. J Endod. 2007;33(1):58–63.
12. Ribeiro FC and Consolaro A. No Title. . "Importancia Clin y Antropol la raiz distolingual en los molares Infer permamentes"Endodoncia. 1997;15.2:72–8.
13. Parthasarathy B. et al. "Four canalled and three rooted mandibular first molar (Radix Entomolaris) - Report of 2 Cases". J Dent Sci Res. (2.2):1-5.
14. . Song JS. et al. No Title"The prevalence and morphologic classification of distolingual roots in the mandibular molars in a Korean population". J Endod. 2010;36.4:653–7.

15. Schafer E and Lohmann D. Efficiency of rotary nickel-titanium FlexMaster instruments compared with stainless steel hand K-Flexofile-Part I. Shaping ability in simulated curved canals. Int Endod J. 2002;35(6):505–21.