International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2015): 78.96 | Impact Factor (2015): 6.391

Radix Entomolaris – A Case Report

Dr Chanchal Goinka, MDS[1], Dr B. Devi Priya, MDS[2], Dr. Bala Raju Korrai, MDS[3], Dr ArunaKumari, MDS[4], Dr VB Srinidhi, MDS[5], Dr Hare Krishna Saladi[6]

[1]Senior Lecturer, Department of Conservative Dentistry & Endodontics, St Joseph Dental College, Eluru, Andhra Pradesh, 534003

[2]Senior Lecturer, Department of Conservative Dentistry & Endodontics, St Joseph Dental College, Eluru, Andhra Pradesh, 534003

[3]Senior lecturer, Department of Conservative Dentistry& Endodontics, Neerukonda Institute of Dental Sciences, Sangivalasa, Visakhapatnam, Andhra Pradesh

[4]Assistant Professor, Department of Pedodontics, Mallareddy College of Women, Hyderabad, Andhra Pradesh

[5]Reader, Department of Conservative Dentistry & Endodontics, St Joseph Dental College, Eluru, Andhra Pradesh 534003

[5]PG Student, Department of Conservative Dentistry & Endodontics, St Joseph Dental College, Eluru, Andhra Pradesh 534003

Abstract: ***During Root canal treatment if the dentist fails to identify any root canal, it leads to endodontic failure,particularly in teeth with anatomical variation in the form of extra roots or canals. Permanent mandibular firs molars usually have 2 roots which are mesial & distal. The mesial root usually has 2 root canals & distal root have 1 root canal. However, radix entomolaris (RE), ananatomical variant of permanent mandibular first molar, is characterized by the presence of additional or extradistolingual root. The prevalence of radix entomolaris in permanent mandibular first molars differssignificantly with race but found to be very low among the Indian population. This case report is about the radiographic identification and endodontic management of radix entomolaris in a mandibular right first molar.***

Keywords: Radix entomolaris, Distolingual root, Anatomic variation, Permanent three-rooted mandibular first molars

1. Introduction

Variations from the normal are very usual with the root canal system. A thorough knowledge and an understanding of the potential for variations are required to achieve success in endodontics. The main reasons for failure of endodontic treatment are incomplete instrumentation and cleaning of the rootcanal space and faulty obturation. In teeth exhibiting anatomic irregularities or accessory or aberrant root canals, the operator fails to recognize their presence which lead to endodontic failure[1,2]

Anatomical variations are very common for mandibular permanent molars. Permanent mandibular firstmolars usually have 2 roots which are mesial & distal. The mesial root usually has 2 root canals & distal root have 1 root canal, but variations in the numberof roots and in canal morphology are not uncommon.Presence of third root is a major variant of permanent first molar[2,3.] One such variant is presence of additional third root (i.e. the supernumerary root or extra distal root), which is typically distributed lingually. This extra distolingual root is generally smaller than the distobuccal root and is usually curved. This was first described by Carabelli as Radix entomolaris (RE). RE hasnot been reported for the mandibular second molar, butit is found (rarely) in the mandibular third molar[2,3].

As reported by Tu et al the prevalence of RE in permanentmandibular first molars differs significantly with race.The prevalence of RE is also found to be high among Taiwanese(Chinese) population and found to be ranging from 21.1% to 33.33%, with a bilateral incidence ranging from 53.65% to 68.57% in them. But gender did not show a significant relationship with this variant prevalence. The incidence of permanent mandibular first molars ranges from 0%- 43.7%, with highest prevalence among the Mongolianand Eskimo traits.[3, 4, 5]

However the incidence of RE among the Indian population is found to be very low and only 0.2%[3].This case report is about the detection and management of radix entomolaris (RE) ina mandibular fi rst molar during its root canal treatment

2. Case report

A 24-year-old male patient reported with pain in right mandibular fi rst molar i.e. 46, since 10 days.On taking history the pain aggravated on taking cold and hot food items and uponmastication. His medical history was non-contributory.On clinical examination, 46 revealed deep distoocclusalcarious lesion and was tender toocclusal percussion. Electric pulp test reveals no response. Thermal test was negative. Periodontal examination was found to be within normal limits. Intraoralperiapical radiographic examination revealed deep distal caries involving the pulp space and slight wideningof the periodontal ligament space around the apical areaof the mesial root.Apart from this, close inspection of the radiograph alsorevealed the presence of an additional periodontalligament space crossing over the distal root leading toan impression of double periodontal ligament space onthe distal aspect. This led to the suspicion of additionalor extra root entity (Fig 1).

Figure 1: Preoperative radiograph of 46 depicting the additionalPDL space crossing over the distal root and possibility ofRE.

Based on the clinical andradiographic examination, a diagnosis of symptomaticirreversible pulpitis with acute apical periodontitis in 46was made and the patient was suggested to undergoroot canal treatment. Under local anesthesia Caries was excavated and the distal missing wall was built with Type 9Glass Ionomer cement(GC corporation Tokyo, Japan). Root canal treatment in 46 was initiated under rubberDam. Upon careful exploration of the pulp chamber floor, four canal orifices (2 mesial & 2 distal) was detected, confirming thepresence of additional distal canal (Fig 2). The pulpal tissueremnants were extirpated from the canals using Kfile no.10 & no.15 (Dentsply Maillefer, Switzerland). Coronal flaring was accomplished with Gates Gliddendrills (DentsplyMaillefer, Switzerland). Working lengthwas determined using an apex locator (Root ZX, Morita,Tokyo, Japan). The radiograph taken with a mesialangulation to verify the working length confirmed thepresence of extra distolingual root (Fig 3).

Figure 2: Four canal orifices (2 mesial & 2 distal)

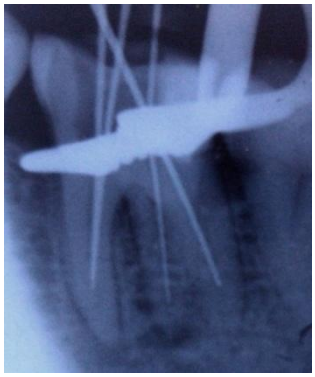

Figure 3: Working length radiograph of 46 revealing the existence of RE.

All the canals were cleaned and shaped using rotary Nickle-Titanium Hero Shaper files (Micro Mega, France)in a crown down manner and irrigated using 3% sodiumhypochlorite and 2% chlorhexidine solutions. Calciumhydroxide (Prime Dent, India) was used as an intracanal medicament and access opening was sealed with Zincoxide- eugenol cement (DPI, India). Two weeks later,when the tooth was asymptomatic, the obturation was carried out by selecting matched gutta-percha (Dentsply Maillefer, Brazil) master cones (Fig 4,5), AH Plus sealer(Dentsply De Trey, Konstanz, Germany) and lateralcompaction method. Following the obturation, the access opening was filled with Zinc oxide eugenol cement (DPI, India) and patient was scheduled for follow-up visits (Fig6).

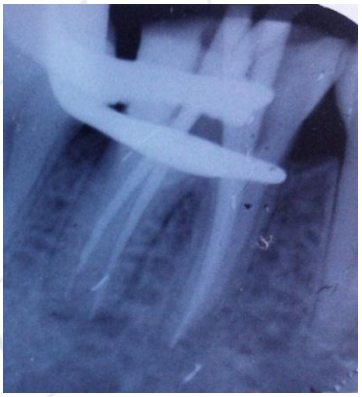

Figure 4: Master cone radiograph of 46

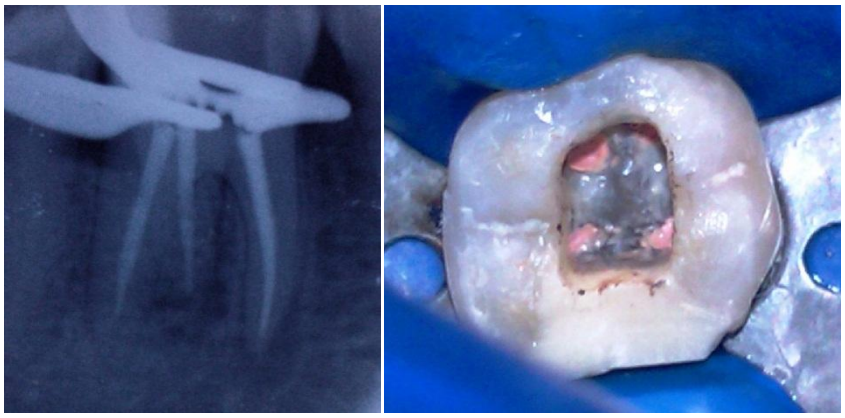

Figure 5: Radiograph showing obturation of 46, Clinical pic showing Obturation

Figure 6: Post obturation radiograph of 46 showing the outline ofRE.

3. Discussion

As in this case the Radix entomolaris (RE), was detected in the preoperative radiograph itself, by the presence of an additional distolingual root. This signifies the importance of preoperative radiograph inthe endodontic treatment [2,6]. The 3-rooted mandibularfi rst molar reported here had 1 mesial root with 2 canalsand 2 distal roots with one canal each which is the same as that of the other 3-rooted mandibular first molars described previously. Studies focusing on canal morphology in mandibular fi rst molar have assessed that the presenceof 2 roots (1 mesial & 1 distal) with 3 canals (2 in mesialroot and 1 in distal root) is the most common finding.Nevertheless, the presence of 2 roots (1 mesial & 1distal) with 4 canals (2 in mesial root and 2 in distalroot) is also relatively frequent, particularly with both thedistal canals terminating in a single foramen. However, RE characterized by the presence of 2 distal roots, thesecond one being the extra distolingual root, is not verycommon as a morphologic variant[1,2,3].

In this patient, the additional fourth canal orifice led intothe extra distolingual root which displayed Vertucci type 1canal configuration. This is in accordance to the generalfinding related to the canal configuration in RE[2].Calberson et al described 4 types of RE, and De Mooret al classified REs evaluated from extracted teeth intotypes I–III. RE or extra distolingual root of permanent mandibular fi rst molars is curved buccolingually and typically smaller than the distobuccal root which could be confirmed in this patient during working lengthdetermination[3,5,7,8].

It has been reported that RCT in mandibular first molars have a significantly lower success rate than the otherteeth. Persistent infection caused by a missingcanal and failure to remove all microorganisms andpulp remnants in the root canal system are some of the reasons for non healed root canaltreatment. Therefore abetter awareness of root canal anatomy is essential forimproving the healing rate of root canal treatment of mandibular first molars[6].

Intra-oralperiapical radiographs may serve as an important aidin identifying RE. Apart from the awareness about the possible existenceand the racial prevalence of RE,thorough inspection of pretreatment radiographs,especially those taken from different angles aids in detection of RE.It is suggested that the radiographswere successful in over 90% of the cases whileidentifying additional roots[9]. Radiographic features likedouble periodontal ligament images or unclear viewof distal root/canal indicate the possibility of RE[6]. Inthe present case, all the radiographs taken during theroot canal procedure were clearly suggestive of REand prevented the need for further investigations likecone-beam computed tomography and 3-dimensionalreconstruction which are useful to study the morphologyof RE in a noninvasive manner[3].Clinically, the possibilities of detecting and managing REcan be enhanced by obtaining straight line access andmodifying typical triangular shape of access preparationto a trapezoidal form. The values based on the meaninterorifice distance between extra distolingual canaland remaining canals, as found in a study by Tu etal, may also serve as a useful guideline to locate andtreat RE[3,10]. Further, good illumination and the use ofaccessories like magnifying loupes, microscopes etc are also valuable in locating and managing RE[11].

4. Conclusion

Radix entomolaris (RE) in mandibular first molar is not a frequent finding in theIndian population. However, Dental clinician should beaware of the occurrence of RE as an anatomical variant.The detection of RE and its thorough cleaning, shapingand obturation would contribute significantly towardsthe success of primary endodontic treatment. Further, mandibular first molars have lower success rate followingroot canal treatment due to factors like missed canal etc,and awareness about RE helps in the diagnosis and tobetter the overall prognosis for endodontic retreatment.For the above reasons, molars also have high rate of extraction and early identification of extra distolingualroot will minimize complications related to exodontialike root breakage. This case report also highlights therole of radiographs alone in the early identification andendodontic management of RE.

References

[1] Prabhu NT, Munshi AK. Additional distal root in permanentmandibular first molars: report of a case. QuintessenceInternational 1995; 26(8): 567-9.
[2] Segura-Egea JJ, Jimenez-Pinzon A, Rios-Santos JV.Endodontic therapy in a 3-rooted mandibular first molar:Importance of a thorough radiographic examination. JCan Dent Assoc 2002; 68(9): 541-4.
[3] Tu MG, Huang HL, Hsue SS, Hsu JT, Chen SY, Jou MJ, etal. Detection of permanent three-rooted mandibular fi rst
[4] molar by cone-beam computed tomography imaging inTaiwanese individuals. J Endod 2009; 35: 503–7.
[5] Tu MG, Tsai CC, Jou MJ, et al. Prevalence of three-rootedmandibular first molars among Taiwanese individuals. J
[6] Endod 2007; 33: 1163–6.
[7] 165 *J. Nepal Dent.Assoc. (2010), Vol. 11, No. 2*5.Carlsen O, Alexandersen V. Radix entomolarisidentification and morphology. Scan J Dent Res 1990; 98:363–73.

[8] Chen YC, Lee YY, Pai SF, Yang SF. The morphologiccharacteristics of distolingual roots of mandibular firstmolars in Taiwanese population. J Endod 2009; 35: 643–5.
[9] Calberson FL, De Moor RJ, Deroose CA. The radixentomolaris and paramolaris: clinical approach inendodontics. J Endod 2007; 33: 58–63.
[10] De Moor RJ, Deroose CA, Calberson FL. The radixentomolaris in mandibular first molars: an endodonticchallenge. IntEndod J 2004; 37: 789–99.
[11] Walker RT, Quackenbush LE. Three-rooted lower fi rstpermanent molars in hongkong Chinese. Br Dent J 1985;9: 298-99.
[12] Yew S, Chan K. A retrospective study of endodonticallytreated mandibular first molars in a Chinese population. J Endod 1993; 19: 471-73.
[13] James K, Bahcall. Visual enhancement. In: Ingle JI,Bakland LK, Baumgartner JC, editors. Ingle's Endodontics.6th ed. Hamilton: BC Decker Inc; 2008. p. 870-6.