

# Endodontic Treatment of Adjacent Three Rooted Mandibular First Molar and Two Rooted Mandibular Second Premolar: A Clinical Report

Rhythm Bains<sup>1</sup>, Kapil Loomba<sup>2</sup> and Anju Loomba<sup>3</sup>

## ABSTRACT

**Aim:** The present case report discusses treatment of a patient having two rooted mandibular premolars bilaterally and a three rooted mandibular first molar (having radix entomolaris) unilaterally.

**Summary:** Morphological variations frequently affect the human teeth and can affect the treatment outcome if not diagnosed. Mandibular premolars are commonly known for morphological aberrations, though two rooted mandibular second premolars are rare. The supernumerary distolingual root in mandibular first molars, the radix entomolaris is often described as an Asiatic trait owing to its high prevalence in mongoloid races.

**Keywords:** Morphological variations, radix entomolaris, two-rooted premolar

## INTRODUCTION

Deviation from typical is a natural phenomenon affecting various biological systems, and tooth anatomy and morphology is no exception to it. A good clinician should possess thorough knowledge of expected and a readiness for the unexpected.<sup>1</sup> Human teeth present many morphological



Dr. Rhythm Bains completed her graduation (BDS) from Government Dental College & Hospital, Patiala (Pb), in year 2001 and postgraduation (MDS) in Conservative Dentistry & Endodontics from King George's Medical University, Lucknow in 2008. Currently, she is working as Assistant

Professor in Faculty of Dental Sciences, King George's Medical University, Lucknow (UP), India.

Department of Conservative Dentistry & Endodontics, <sup>1</sup>Faculty of Dental Sciences, King George's Medical University, <sup>2</sup>Career Post Graduate Institute of Dental Sciences & Hospital, <sup>3</sup>Dental Care Clinic, Lucknow.

### Address for Correspondence:

Dr. Rhythm Bains, Department of Conservative Dentistry & Endodontics, Faculty of Dental Sciences, King George's Medical University, Lucknow (UP)-226003, India.

Contact: +91 9935033439, E-mail: docrhythm77@gmail.com

Date of Submission: 10-07-2013

Reviews Completed: 10-08-2013

Date of Acceptance: 12-08-2013

and anatomical deviations affecting the number of teeth (anodontia, fusion) cusps (extra cusps, talon's cusp); roots (dilacerated roots, fluted roots, extra roots, fused roots); number of canals (extra canals, fused canals) or shape of pulp canal shape (taurodontism, C-shaped canals) etc.<sup>2,3</sup> Mandibular first premolars are considered notorious for aberrations and may present with extra roots or extra canals in one root, but two rooted second premolars are comparatively rare.<sup>4</sup> Mandibular molars sometimes have an extra mesial or distal root known as *radix paramolaris* and *radix entomolaris* respectively which affects the treatment plan and prognosis of the treatment.<sup>5</sup> This macrostructure was first reported in literature by Carabelli, has a higher prevalence in mongoloid races and reflects a high degree of genetic predominance.<sup>6,7</sup> This case report discusses the treatment of a patient having bilateral two rooted mandibular second premolar and a unilateral three rooted mandibular first molar having radix entomolaris.

## CASE REPORT

A 35 year old, systemically healthy male patient reported to the department of Endodontics with the chief complaint of dull continuous pain in his right lower posterior teeth which increased on mastication. The pain increased on mastication and intake of hot and cold beverages. There was no history of trauma or past dental treatment. Intraoral clinical examination revealed distally carious 45 and mesially

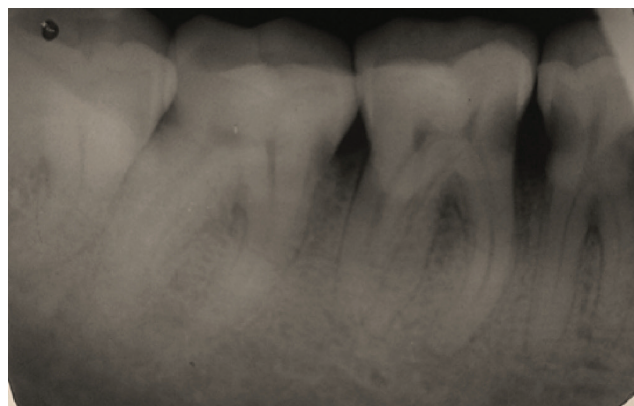


Figure 1: IOPA showing two 45 and three-rooted 46

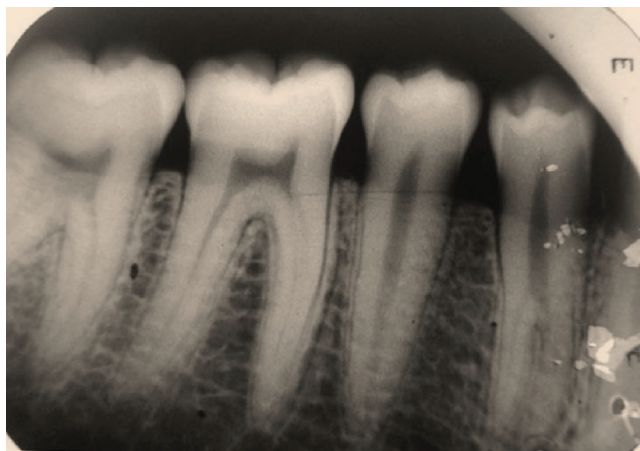


Figure 2: IOPA showing two rooted 34

carious 46. The teeth were tender to vertical percussion. Radiographic examination revealed a two rooted second premolar (45) and a three rooted first molar (46) having a radix entomolaris. The contralateral radiograph showed a two rooted first premolar (34) but a normal first molar (36). The teeth gave a delayed response compared to baseline teeth to thermal and electric pulp sensibility tests. A diagnosis of chronic irreversible pulpitis was made and endodontic therapy was planned for both.

After local anesthesia and rubber dam application, access cavity was made in 45 and 46 with Endoaccess bur (Dentsply, Maillefer). To negotiate the extra root canal in 45, the access was slightly extended mesiodistally, and extended in a distolingual direction to locate the canal of radix entomolaris in 46. Working length was electronically determined and canals were prepared with rotary Protaper system (Dentsply, Maillefer). Sodium hypochlorite was used as an irrigant and a non-setting calcium hydroxide (Metapex, META) was given as an intracanal medicament. On the subsequent appointment after one week, the canals were obturated using gutta-percha cones of corresponding

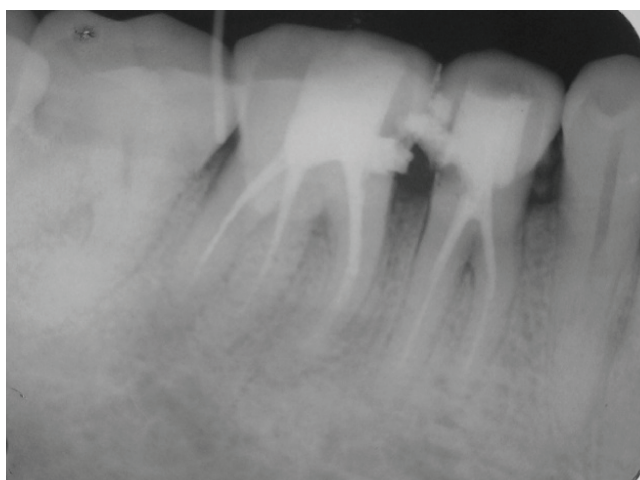


Figure 3: IOPA showing obturated 45 and 46

size and AH-plus sealer (Dentsply) and the access cavity was sealed with a composite resin.

## DISCUSSION

Variations in the tooth anatomy have been studied in much detail by various authors such as Weine and Vertucci.<sup>8,9</sup> Variations in tooth morphology of human teeth may even represent a genetic polymorphism or a dietary adaptation. In a study of primate and human skulls and extracted teeth Kupczic *et al.*<sup>10</sup> evaluated whether increase in premolar root number is an evolutionary change to enlarge root attachment area. They concluded that although increase in root number is not directly to increased surface area but it does denote genetic polymorphism.<sup>10</sup> A racial predilection can be seen in case of radix entomolaris, and it is called an Asiatic trait as three rooted molars have been reported with the prevalence of 5% in Caucasian populations and as high as 40% in Monogoloid races.<sup>11</sup> Among Indian population, in a study by Chandra *et al.*<sup>12</sup> in a south Indian population prevalence of radix entomolaris among patients was 18.6%, and among all teeth examined was 13.3%; and by Garg *et al.*<sup>13</sup> in a sample population of 586 North Indians, the prevalence of three rooted mandibular molars (both entomolaris and paramolaris) was 5.97% of all patients and 4.55% for all teeth examined.

Any change from usual has clinical implications and involve change in the method of diagnosis, treatment plan and outcome of treatment provided. Additional radiographs at two or more horizontal angulations of 20 degrees are of great help in finding otherwise obscure canals and roots.<sup>14</sup> The advent of cone beam computed tomography (CBCT) also has enhanced the clarity by adding a third dimension to the otherwise 2 dimensional images. Use of surgical operating microscope brings the pulpal floor closer to clinician's eye by magnifying the view upto 25x and helps in conservation of tooth structure.<sup>15</sup> Modification in shape of access cavity is required to locate an extra root canal e.g. rhomboidal shape in maxillary first molars to find the MB2 canal, and trapezoidal shape in mandibular first molar to find the second distal canal. Similarly, access cavity is extended slightly towards distolingual to locate the extra distolingual root resulting in a square shaped rather than a triangular access cavity.<sup>16</sup> These extra roots have a greater curvature. De moor proposed a classification based on curvature of the radix entomolaris as Type I (Straight), Type II (curved initially, then straight) and Type III (initial curve and then second curve buccally). Thus, pre-curving of files, use of Ni-Ti files and lubrication of canal should be considered to avoid instrument separation.<sup>17</sup>

Mandibular premolars, especially the first premolars are known to have anatomical aberrations. Mandibular second premolars have been shown to have lesser percentage of

prevalence of a second root, although second canals have been occasionally reported.<sup>4</sup> Access preparation outline needs modification from being wider buccolingually to wider mesiodistally. Adjuncts to chemo-mechanical debridement such as ultrasonics, endo-activator or photoactivated disinfection (PAD) are useful in cases with unusual or complex root canal systems.<sup>16</sup> The postoperative radiograph should also be taken at additional angulations to confirm that no canal is missed during obturation.

## CONCLUSION

Familiarity with the normal structure is important to recognise any change from normal. Thorough knowledge of tooth anatomy, careful diagnosis and use of diagnostic aids and required modifications in the treatment procedures can lead to a successful treatment outcome even in cases with morphological variations.

## REFERENCES

- Bains R, Bains VK, Loomba K, Verma K, Loomba A. Syndesmocoronaradicular tooth: An endo-perio challenge. *J Interdisciplinary Dent* 2013; 3: 114-9.
- Bains R, Jethwani GS, Loomba K, L, Dubey OP, Loomba A, BainsVK. Taurodontism-case report of a morphanatomical variant. *ENDO (Lond Engl)* 2010; 4: 301-8.
- Sachdeva GS, Ballal S, Gopikrishna V, Kandaswamy D. Endodontic management of a mandibular second premolar with four roots and four root canals with the aid of spiral computed tomography: a case report. *J Endod* 2008; 34:104-7.
- Cleghorn BM, Christie WH, Dong CCJ. The root and root canal morphology of the human mandibular second premolar: a literature review. *J Endod* 2007; 33:1031-7.
- Bains R, Loomba K, Chandra A, Loomba A, Bains VK. The Radix entomolaris: a case report. *ENDO (Lond Engl)* 2009; 3: 121-5.
- Karale R, Champa C, Hegde J, Srirekha A, Lekha S, Bshetty K, *et al.* The prevalence of bilateral three-rooted mandibular first molar in Indian population. *Iran Endod J* 2013; 8: 99-102.
- Carlberson FL, Roeland J, DeMoor RJ, Deroose SA. The radix entomolaris and paramolaris: Clinical approach in endodontics. *J Endod* 2007; 33: 58-63.
- Weine FS. *Endodontic Therapy*, 5<sup>th</sup> ed. St. Louis: Mosby– Yearbook Inc. 1996: 243.
- Vertucci FJ. Root canal anatomy of the human permanent teeth. *Oral Surg Oral Med Oral Pathol* 1984; 58: 589-99.
- Kupczik K, Spoor F, Pommert A, Dean C. Premolar root number variation in hominoids: genetic polymorphism vs. functional significance. In: Zadzinska E. (ed). *Current Trends in Dental Morphology Research*, University of Lodz Press, Lodz, 2005, pp. 257-68.
- Gulabivala K, Aung TH, Alavi A, Ng Y-L. Root and canal morphology of Burmese mandibular molars. *Int Endod J* 2001; 34: 359–70.
- Chandra SS, Chandra S, Shankar P, Indira R. Prevalence of radix entomolaris in mandibular permanent first molars: a study in a South Indian population. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2011; 112: e77-82.
- Garg AK, Tewari RK, Kumar A, Hashmi SH, Agrawal N, Mishra SK. Prevalence of three-rooted mandibular permanent first molars among the Indian Population. *J Endod* 2010; 36:1302-6
- White SC, Pharoh MJ. *Oral radiology principles and interpretation*, 4<sup>th</sup> ed4, St. Louis; Mosby 1999, pp. 91.
- Paliwal A, Loomba K, Gaur TK, Jain A, Bains R, Vats A, *et al.* Dental operating microscope (DOM): an adjunct in locating the mesiolingual (MB2) canal orifice in maxillary first molars. *AJOHAS* 2011; 1: 174-9.
- BonaccorsoA, Tripi TR. Root canal treatment of a three rooted mandibular first molar: a case report. *ENDO (Lond Engl)* 2008; 2: 211-17.
- Demoor CA, Calberson FL. The radix entomolaris in mandibular first molars: an endodontic challenge. *Int Endod J* 2004; 37: 789-99.
- Schafer S, Vaeth M, Hørsted-Bindslev P, Frandsen EV. Endodontic photoactivated disinfection using a conventional light source: an in vitro and ex vivo study. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2010; 109: 634-41.