



Endodontic Management of Cases of Bilateral Radix Entomolaris – A Rare Endo Experience: Case Series

1Dr. Deepshikha Mishra, 2Dr. Malwika Sisodiya, 3Dr. Sonal Bansal, 4Dr. Aarya Agarwal, 5Dr. Zalak Jain

1PG student, Department of Conservative Dentistry and Endodontics, Maharana Pratap College of Dentistry and Research Centre, Gwalior, MP, India.

2Head and professor, Department of Conservative Dentistry and Endodontics, Maharana Pratap College of Dentistry and Research Centre, Gwalior, MP, India.

3Reader, Department of Conservative Dentistry and Endodontics, Maharana Pratap College of Dentistry and Research Centre, Gwalior, MP, India

4PG student, Department of Conservative Dentistry and Endodontics, Maharana Pratap College of Dentistry and Research Centre, Gwalior, MP, India.

5PG student, Department of Conservative Dentistry and Endodontics, Maharana Pratap College of Dentistry and Research Centre, Gwalior, MP, India.

Corresponding author

Dr. Deepshikha Mishra

PG student, Department of Conservative Dentistry and Endodontics, Maharana Pratap College of Dentistry and Research Centre, Gwalior, MP, India.

(Received: 16 July 2025)

Revised: 20 August 2025

Accepted: 20 September 2025)

KEYWORDS

Mandibular first molar, Anatomical variations, Endodontic treatment, Radix entomolaris.

ABSTRACT:

Knowledge about the external and internal anatomy of the tooth is essential for successful dental practice. Anomalies in the tooth are often encountered which poses difficulties in dental treatments. As like any other tooth, mandibular first molars are also prone for anatomic malformations. One such anatomic variation is the presence of extra root distolingually or mesiobuccally. Mandibular molars generally present with two roots and three canals; however, variations in the number and configuration of roots and canals are not uncommon. An additional root located lingually is termed radix entomolaris (RE), whereas one located buccally is referred to as radix paramolaris (RP). This report describes the successful endodontic management of bilateral mandibular first molars exhibiting radix entomolaris, a rare anatomical variant.

INTRODUCTION

Comprehensive knowledge of dental anatomy, coupled with an awareness of possible morphological variations, is fundamental for achieving predictable outcomes in endodontic therapy. The primary causes of endodontic failure are inadequate instrumentation, insufficient debridement of the root canal system, and defective obturation. Unrecognized canals—particularly in teeth with anatomical complexities, accessory roots, or aberrant canal configurations—are frequently left untreated, thereby compromising prognosis.^{1,2}

Anatomical variability is well documented in permanent mandibular molars. Typically, the mandibular first molar presents with two roots—one mesial and one distal—harboring three root canals⁶. Nonetheless, deviations in both root number and canal morphology are relatively common, with the presence of a third root being the most notable variant.^{1,2,3}

This supernumerary root, first described by Carabelli in 1844, is designated as the *radix entomolaris* (RE) when located distolingually, most often in mandibular first molars. Conversely, an accessory root positioned



mesiobuccally is termed the *radix paramolaris* (RP). Given that the mandibular first molar is the earliest erupting permanent posterior tooth, integral to occlusal development and masticatory function, it is frequently subjected to endodontic intervention. Therefore, clinicians must be well-versed in the diverse root and canal configurations of this tooth^{1,2}.

The prevalence of radix entomolaris is reported to be less than 5% among Caucasian, African, Eurasian, and Indian populations, with bilateral occurrence observed in fewer than 2.19% of cases. This accessory root is characteristically smaller and exhibits a more pronounced curvature than the distobuccal root, necessitating meticulous attention during root canal therapy.^{1,5}

The prevalence of the extra disto-lingual root for first mandibular molar on right side was more than left side, but this was not statistically significant. We found that the bilateral prevalence of three rooted mandibular molars was 3.72%^{1,4}. The prevalence of bilateral Radix Entomolaris (RE) in India varies by region, but studies show figures ranging from approximately 1.15% to 43%. A study in the South Indian population reported a 43.01% bilateral incidence with symmetric distribution, while a Central Indian study showed a significantly lower 12% prevalence of RE patients, with 25% of those having bilateral presentation. Other studies in Indian populations have also found varying bilateral occurrences, such as 5% and even higher in the Himachal population.⁵

Cone-beam computed tomography (CBCT) has emerged as a valuable, noninvasive modality for detecting distolingual roots. By providing three-dimensional visualization of root morphology, curvature, and angulation, CBCT facilitates accurate identification of anatomical variations and assists in preventing iatrogenic complications such as instrument separation, perforation, or ledge formation associated with complex canal curvature^{2,3}.

CASE PRESENTATION

CASE NO 1.

A 22-year-old female patient reported to the Department of Conservative Dentistry and Endodontics, Maharana Pratap College of Dental Sciences and Research Centre, Gwalior, with the chief complaint of pain in lower right

and left back tooth region for last seven days. The pain was aggravated on mastication.

The clinical examination revealed the carious right and left mandibular first molars. Her medical history was noncontributory. Intraoral periapical radiograph of #46 & #36 (Figure 1) revealed deep carious lesion involving the pulp with periapical radiolucency at the root apices and presence of an extra root in #46 & #36.

Based on clinical and radiographic examination, diagnosis of symptomatic irreversible pulpitis with acute apical periodontitis of #46 and #36 was established.

A cone beam computerized tomography was advised to confirm the diagnosis of distolingual root. CBCT (PlanmecaPromax, Planmeca, Finland) was done and determined the exact position, angle, and curvature of distolingual root of the permanent mandibular first molars.

With informed consent, after adequate anesthesia and isolation with rubber dam, access cavity was prepared using Endo access kit in the mandibular right first molar. Working length was determined radiographically (Figure2).

Cleaning and shaping of canals were performed with Pro taper rotary instruments in a hybrid manner up to F1 (DentsplyMaillefer, Switzerland). Glyde lubricant (DentsplyMaillefer, Switzerland) was used, and the canals were irrigated using sodium hypochlorite solution (PrevestDenpro Limited, India) and normal saline solution (PrevestDenpro Limited, India) and final irrigation was done with chlorhexidine (SeptodontParcan, India). Calcium hydroxide (IvoclarVivadent) was used as an intracanal medicament and closed dressing was given for 1 week.

In second visit, the canals were irrigated and dried. Obturation was done by cold lateral compaction technique using gutta-percha and AH Plus sealer (DentsplyMaillefer, Switzerland). Post obturation restoration was done with composite (Figure 4).

After completion of treatment of #46 root canal treatment was also performed on #36 in the same manner as of #46 done.

Postoperative instructions were given to the patient and then both the molars were prosthetically rehabilitated with porcelain fused metal crowns.



The patient was followed up at 6 months and 1 year. The patient was completely asymptomatic and radiographic

examination showed absence of any periapical lesion, suggestive of favorable treatment outcome.



Figure 1: - IOPA of # 46 & #36

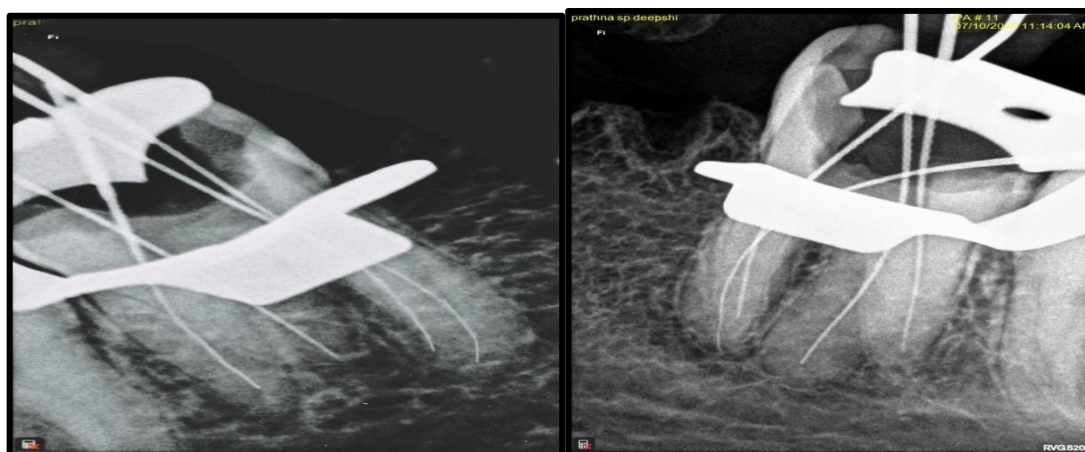


Figure 2: - Working length of #46 & # 36

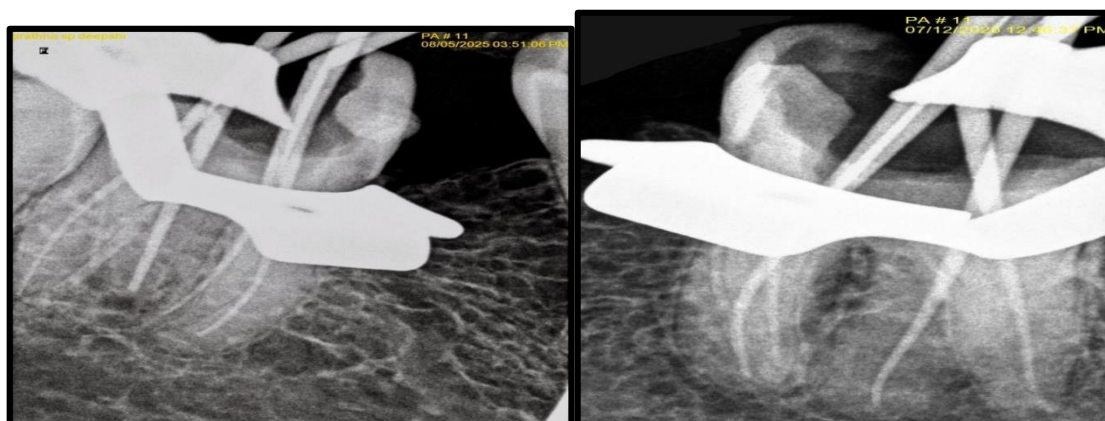


Figure 3: - Master cone of #46 & #36



Figure 4: - Post obturation of #46 & #36

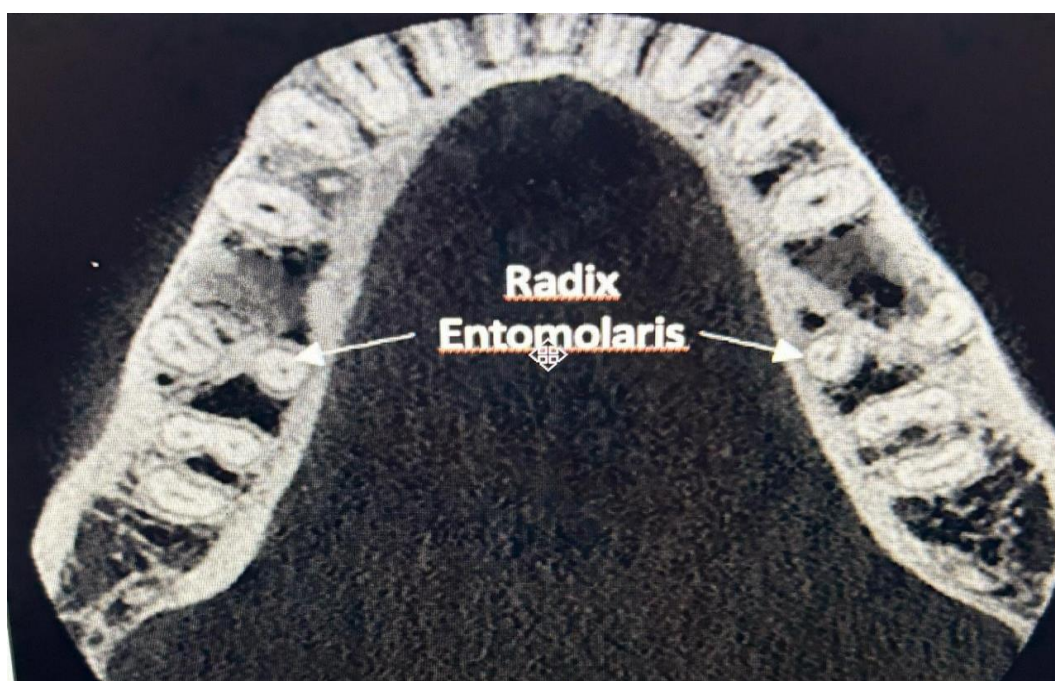


Figure 5: - Axial cross section of # 46 & #36

CASE NO 2.

An 18-year-old male patient reported to the Department of Conservative Dentistry and Endodontics, Maharana Pratap College of Dental Sciences and Research Centre, Gwalior, with the chief complaint of pain in lower right and left back tooth region for last seven days. The pain was aggravated on mastication.

The clinical examination revealed the carious right and left mandibular first molars. Her medical history was noncontributory. Intraoral periapical radiograph of #46 & #36 (Figure 1) revealed deep carious lesion involving

the pulp with periapical radiolucency at the root apices and presence of an extra root in #46 & #36.

Based on clinical and radiographic examination, diagnosis of acute apical abscess with #46 and symptomatic irreversible pulpitis with acute apical periodontitis of #36 was established.

The endodontic treatment was carried out like Case 1 with radiographic confirmation of working length (Figure 2), obturation (Figure 4).

Post obturation restoration was done with composite (Figure 4).



Figure 1: -IOPA of # 46 and #36



Figure 2: - Working length of # 46 and # 36



Figure 3: - Master cone of #46 and #36



Figure 4: Post obturation of #46 and #36

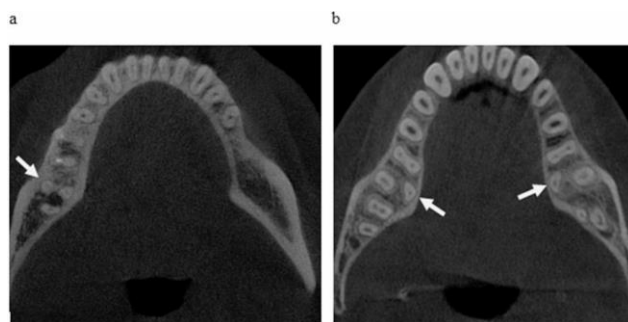


Figure 6: - Axial cross section of #46 and #36

DISCUSSION

The success of root canal therapy depends on accurate diagnosis, adequate chemo-mechanical preparation, and three-dimensional obturation. Among these, correct diagnosis is paramount, as incomplete removal of pulpal tissue and microorganisms remains a leading cause of treatment failure.

Radix entomolaris (RE), though uncommon with a prevalence of less than 5% in the Indian population, poses diagnostic and clinical challenges. Its etiology is uncertain but may be linked to disturbances in odontogenesis or genetic factors. Early identification of RE through multiple angulated radiographs and careful clinical examination is essential to avoid iatrogenic errors.

Modified access cavity designs and adjunctive methods such as the law of symmetry, dentinal mapping, magnification, ultrasonic tips, methylene blue staining, champagne bubble test, and CBCT imaging improve canal detection. Since RE canals are often curved, initial exploration with small files, determination of working length, and glide path preparation are critical to minimize procedural complications.

CONCLUSION

The complexity of the root canal system often presents significant challenges to clinicians. Failure to detect the presence of a radix entomolaris (RE) may compromise the prognosis of endodontic treatment. Hence, obtaining preoperative radiographs at 30° mesial and distal angulations, along with their accurate interpretation, is essential to ensure precise diagnosis. A thorough understanding of the variations in root canal morphology, prevalence, and canal configuration of the radix

entomolaris is, therefore, indispensable for achieving endodontic success.

REFERENCES

1. Karale R, Chikkamallaiiah C, Hegde J, Aswathanarayana S, Santhosh L, Bashetty K, RajannaSusheela S, Panchajanya S. The prevalence of bilateral three-rooted mandibular first molar in Indian population. *Iran Endod J*. 2013 Summer;8(3):99-102. Epub 2013 Aug 1. PMID: 23922569; PMCID: PMC3734523.
2. <https://www.guident.net/articles/endodontics/endodontic-management-of-bilateral-radix-entomolaris-third-root--a-rare-endoexperience--a-case-report.html>
3. Beyraghshamshir R, Zarei M, Sekandari S. A Mandibular First Molar with Three Distal Canals: A Case Report and Literature Review. *Iran Endod J*. 2019 Summer;14(3):216-219. doi: 10.22037/iej.v14i3.24400. PMID: 36814943; PMCID: PMC9940021.
4. Shorey P, Sidhu K. Endodontic management of a case of radix entomolaris: A case report [Internet]. *IP Indian J ConservEndod*. 2022 [cited 2025 Sep 14];7(1):39-42. Available from: <https://doi.org/10.18231/j.ijce.2022.008>.
5. 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 RadiolEndod*. 2011 Sep;112(3):e77-82. doi: 10.1016/j.tripleo.2011.02.016. Epub 2011 May 6. PMID: 21550269.
6. Thomas BJ, Nishad A, Paulaian B, Sam JE. Case reports and clinical guidelines for managing radix entomolaris. *J Pharm Bioallied Sci*. 2016 Oct;8(Suppl 1):S160-S163. doi: 10.4103/0975-7406.191949. PMID: 27829770; PMCID: PMC5074022.