



HIDDEN ROOTS, HIDDEN CHALLENGES: CASE REPORTS ON RADIX ENTOMOLARIS

Endodontics

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ABSTRACT

Radix Entomolaris (RE) represents a rare anatomical variant in mandibular first molars, characterized by the presence of an additional third root, typically located distolingually. Accurate diagnosis and successful management of RE are crucial for ensuring the long-term success of endodontic therapy. This case series highlights the clinical and radiographic identification, morphological considerations, and treatment protocols for two patients presenting with RE. Advanced imaging techniques, such as angled radiographs, and Cone Beam Computed Tomography (CBCT), played pivotal roles in diagnosis. Modifications in access cavity preparation and the use of flexible NiTi rotary instruments facilitated effective cleaning, shaping, and obturation of the complex root canal system. The classification of RE types, along with its clinical implications, is discussed. Both cases achieved successful outcomes, underscoring the importance of recognizing and addressing anatomical variations. This article emphasizes the critical role of detailed examination and innovative techniques in overcoming the challenges posed by Radix Entomolaris.

KEYWORDS

INTRODUCTION

Endodontic success hinges on thorough cleaning, shaping, three-dimensional obturation of the root canal system, and proper coronal sealing. A comprehensive understanding of root canal morphology and its variations is essential for achieving this goal. The mandibular first molar, a commonly treated tooth in endodontics, exhibits a variety of anatomical configurations. Most mandibular first molars typically have two roots with three or four canals. However, a significant variant, known as Radix Entomolaris (RE), introduces an additional third lingual root. This rare anatomical feature, first documented by Carabelli in 1844 [1], is predominantly seen in certain ethnic groups and has a reported prevalence of less than 5% in populations such as Caucasians, Africans, and Indians [2].

This case series discusses two clinical instances of Radix Entomolaris in mandibular first molars, highlighting diagnostic challenges, treatment protocols, and considerations for achieving successful endodontic outcomes.

Case Report 1

A 31-year-old female presented with pain in the lower right back tooth region for three months. Clinical examination revealed a carious lesion on the mesio-occlusal surface of tooth 46, with an associated sinus tract and tenderness on percussion. Thermal testing elicited no response, and radiographs showed periapical radiolucency with distortion of the distal root contour. A secondary radiograph with a 30° mesial angulation confirmed the presence of an additional lingual root, Radix Entomolaris (Fig-1)

Treatment Protocol:

- **Access Opening and Orifice Location:** The pulp chamber was accessed, revealing two mesial and one distal canal orifice.
- **Shaping And Cleaning:** Gates Glidden drills and Ni-Ti rotary instruments (ProTaper Universal) were used to achieve straight-line access and enlarge the canal orifices (Fig-1). Copious irrigation with 2% sodium hypochlorite and Glyde lubrication ensured thorough debridement.
- **Obturation And Restoration:** The canals were obturated with ProTaper gutta-percha cones and AH Plus sealer, followed by post endodontic restoration. Adequate obturation of canals was confirmed using radiographs (Fig-1).

Case Report 2

A 36-year-old male presented with pain in the lower left posterior tooth for three weeks. Clinical examination of tooth 36 revealed caries with pulp exposure and tenderness on percussion. Thermal testing indicated lingering pain, and radiographic evaluation showed coronal

radiolucency extending into the pulp chamber. A secondary radiograph confirmed the presence of RE.

Treatment Protocol:

A similar treatment protocol as Case 1 was followed, with modifications to the access cavity to accommodate the additional root. Flexible NiTi rotary instruments facilitated centered canal preparation, minimizing the risk of procedural errors (Fig-2). The canals were successfully obturated, and the patient remained asymptomatic during a 12-month follow-up.

DISCUSSION

Radix Entomolaris represents a significant anatomical variation that challenges conventional endodontic protocols. Its prevalence varies across ethnic groups, with a higher incidence in populations of Mongoloid origin (>30%) compared to Indian and Eurasian populations (<5%) [3]. The etiology of RE is attributed to developmental aberrations during morpho-differentiation of the tooth bud, involving ectodermal and mesodermal components [4].

Morphological Features: RE typically presents as a distolingual root, ranging from a short extension to a fully developed root. It may exist unilaterally or bilaterally and is often smaller than the other roots. Two classifications are widely used to describe RE morphology:

1. **Carlsen and Alexanderson (1990):** Focuses on the location of the cervical part of the root [5].
2. **De Moor et al. (2004):** Based on root canal curvature [6].

Diagnostic Challenges: Detecting RE requires meticulous radiographic evaluation. Superimposition with the distal root can obscure its presence, necessitating angled radiographs or advanced imaging such as CBCT [7]. Clinically, features such as a prominent distolingual cusp or cervical convexity may suggest its presence.

Clinical Considerations:

- **Access Cavity Modifications:** The triangular access cavity must be extended distolingually to locate the canal orifice.
- **Instrumentation:** Flexible NiTi rotary instruments and careful orifice enlargement reduce procedural complications like coronal perforation or stripping.
- **Visual Aids:** Tools like dental microscopes and intraoral cameras improve detection and treatment accuracy.

In both reported cases, the use of angled radiographs, proper access cavity design, and advanced instrumentation ensured favourable outcomes. CBCT remains the gold standard for definitive diagnosis in complex cases [8].

CONCLUSION

Radix Entomolaris poses a unique challenge in endodontics due to its anatomical variability. Careful radiographic assessment and modification of treatment protocols are essential for successful management. Early detection and appropriate instrumentation prevent complications, ensuring long-term treatment success.



Fig 1 Case -1 Radiograph depicting pre-op, Working length and Obturation of canals clearly showing additional Lingual root (Radix Entomolaris)

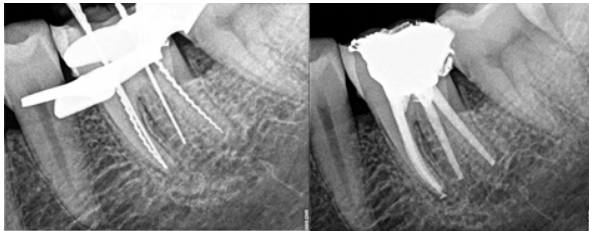


Fig 2 Case-2. Radiographs depicting Working length & Post Obturation of all root canals

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