

Endodontic Management of Radix in Mandibular First Molars: Three Case Reports

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Abstract

Aberrant anatomy in terms of number of roots and canals were seen in mandibular first molars. The presence of supernumerary root distolingual or mesiobuccal is referred to as radix entomolaris and radix paramolaris respectively. These complexities require adequate knowledge in diagnosis and clinical management for the better treatment outcome. This case report discusses the pre operative identification and endodontic management of mandibular first molars with supernumerary root.

Keywords: Supernumerary Root; Radix Entomolaris; Radix Paramolaris; Mandibular First Molar

Introduction

Root canal anatomy and the confounding nature of the human pulp system pose significant challenges in rendering successful endodontic treatment. Therefore, it is imperative that the aberrant anatomy is identified before and during the root canal treatment.

It is known that mandibular first molars might display several anatomical variations in number of roots and root canals. The presence of supernumerary root distolingual or additional root mesiobuccal were referred to as Radix Entomolaris (RE) and Radix Paramolaris (RP) respectively [1].

In this report two cases of RE and one case of RP are presented along with clinical approach in diagnosis and endodontic treatment are discussed.

Case 1

A 36 year old female patient reported with a chief complaint of pain in lower left back tooth region for 2 months which increased in intensity for the past 2 weeks. The pain was spontaneous and aggravated particularly at night. Clinical examination revealed deep mesio occlusal carious lesion on mandibular first molar 36. [Figures 1a]. and was tender to vertical percussion. The preoperative radiograph revealed radiolucency involving the pulp space with respect to 36. Based on the clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis with symptomatic apical periodontitis with respect to 36 was made.

Case 2

A 23 year old male patient reported with chief complaint of swelling in lower left back tooth region for past 1 month along with mild intermittent pain which increased in intensity during the past

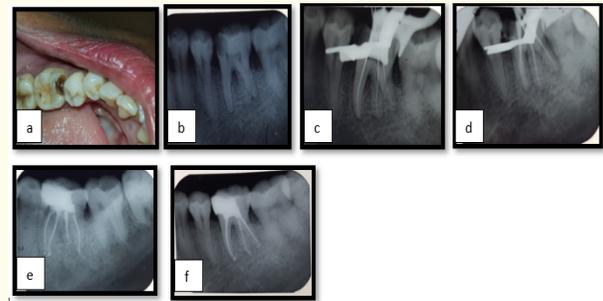


Figure 1: (a) Pre Operative occlusal view of 36. (b) Pre Operative radiographic view of 36. (c) Working Length Radiograph of 36. (d) Master Cone Radiograph of 36. (e&f) Postoperative Radiograph of 36.

1 week. Clinical examination revealed deep mesioocclusal carious lesions on mandibular first molar 36. [Figures 2a] and a sinus tract lingual to the tooth [Figures 2c and d]. The tooth 36 was tender to vertical percussion. The preoperative radiograph revealed radiolucency involving the pulp space with respect to 36. Based on the clinical and radiographic feature diagnosis of symptomatic irreversible pulpitis with symptomatic apical periodontitis with respect to 36 was made.

Case 3

A 17 year old male patient reported with chief complaint of pain in lower left back tooth region for past 1 month which had increased in intensity during the past 1 week. Clinical examination revealed deep occlusal carious lesion on mandibular first molar 36 [Figures 3a]. The preoperative radiograph revealed radiolucency involving the pulp space with respect to 36. Based on the clinical

and radiographic feature diagnosis of symptomatic irreversible pulpitis with respect to 36 was made.

Informed consent was obtained, and endodontic treatment was initiated in all the patients.

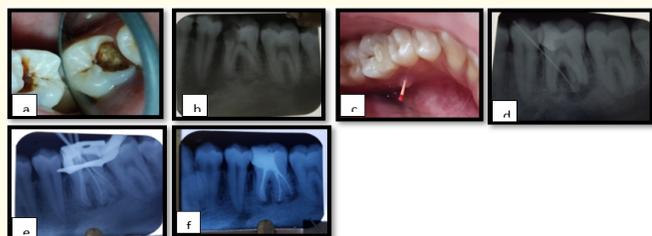


Figure 2: (a) Pre Operative occlusal view of 36. (b) Pre Operative radiographic view of 36. (c and d) sinus tract tracing extra root of 36. (e) Master Cone Radiograph of 36. (f) Postoperative Radiograph of 36.

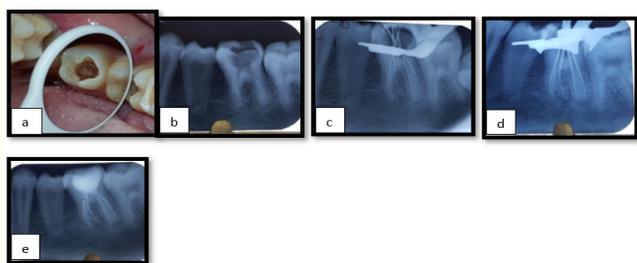


Figure 3: (a) Pre Operative occlusal view of 36. (b) Pre Operative radiographic view of 36. (c) Working Length Radiograph of 36. (d) Master Cone Radiograph of 36. (e) Postoperative Radiograph of 36.

Clinical management

Radiographic evaluation of all the involved teeth revealed the presence of extra roots in relation to 36 (case - 1 and 2 distal, case - 3 mesial) [Figures 1b, 2b and 3b]. The teeth were anesthetized using lignocaine. Under rubber dam isolation, access cavity was prepared and modified from initial triangular to trapezoidal after detection of extra canal using DG16 explorer.

Negotiation of the canals was carried out with ISO size 10 and 15 K files. Working length was determined using the Root zx mini (J morita) apex locator with 15 No. K files and verified using periapical radiograph. Cleaning and shaping was done using hyflex (coltene) rotary files using triauto zx endomotor. All the canals were irrigated using 5.25% sodium hypochlorite solution and 17% EDTA solution. The canals were finally flushed with sterile saline. Master cones were confirmed radiographically. [Figures 1d, 2e and 3d]. The canals were dried with paper points and obturation was performed using warm vertical compaction followed by post obturation restoration. Final radiographs were taken to evaluate the obturation [Figures 1e, f, 2f and 3e].

Discussion

The occurrence of third root varies in different ethnic groups, with the incidence of < 5% in Indian population [2]. Preoperative radiographic evaluation with additional 25° mesial or distal angulation helps to rule out extra root [3]. Apart from a radiographical diagnosis, clinical inspection of the tooth crown having an extra cusp (tuberculum paramolare) or more prominent occlusal distal or distolingual lobe, in combination with a cervical prominence or convexity, can indicate the presence of an additional root [4]. If an RE or RP is diagnosed before endodontic treatment, apart from extra canal, complexity faced will be the presence of curvature buccolingually. These curvatures in the above mentioned cases are successfully managed by proper glidepath followed by heat treated nitifiles which have higher cyclic fatigue and combined function of endomotor with apex locator to compensate for torsional fatigue.

Classification

Carlsen and Alexandersen (1990) [5] classified RE based on the location of its cervical part:

- Type A: RE - located lingually to the distal root complex with two cone shaped macrostructures.
- Type B: RE - located lingually to the distal root complex with one cone shaped macrostructure.
- Type C: RE - located lingually to the mesial root complex.
- Type AC: RE - located lingually between the mesial and distal root complex.

De Moor, *et al.* (2004) [6] classified RE based on the curvature of the root or root canal:

- Type 1: straight root or root canal
- Type 2: curved coronal third which becomes straighter in the middle and apical third
- Type 3: An initial curve in the coronal third with a second buccally oriented curve which begins in the middle or apical third.

Song, *et al.* (2010) [7] defined variants of RE:

- Small type: Length shorter than half of the length of the distobuccal root
- Conical type: Smaller than the small type and having no root canal within it.

Carlsen and Alexandersen (1991) [8] described variants of RP:

- Type A - RP in which the cervical part is located on the mesial root complex;
- Type B - RP in which the cervical part is located centrally, between the mesial and distal root complexes.

Conclusion

Clinicians should be aware of these unusual root morphologies in the mandibular first molars. The morphological variations of the RE and RP in terms of extra canal, root inclination and root canal curvature demand a careful and adapted clinical approach to avoid or overcome procedural errors during endodontic therapy.

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