Radix entomolaris: Clinical approach in endodontics

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ABSTRACT

The expected root canal anatomy dictates the location of the initial entry of access; the size of the first file used, and contributes to a rationale approach for solving the problems that arise during therapy. A major anatomical variant of the two-rooted mandibular first molar is a tooth with an additional distolingual root called the Radix Entomolaris or an additional root at the mesiobuccal side called the Radix Paramolaris.Therefore, a thorough knowledge of the root canal anatomy from access to obturation is essential to give the highest possible chance for success.Clinicians should be aware of this unusual root morphology in mandibular first molars for the success of endodontic treatment. This paper describes case report of mandibular first molar with radix entomolaris.

Introduction

Mandibular first molar is typically a two-rooted tooth, with a mesial and a distal root.[1] But it can display several anatomic variations. One of them is the presence of an additional third root. An additional third root, first mentioned in the literature by Carabelli [2], is called the radix entomolaris located distolingually in mandibular molars, mainly first molars. An additional root at the mesiobuccal side is called the radix paramolaris. The identification of these root complexes and a thorough chemomechanical cleansing and shaping of the root canals followed by three dimensional obturation of pulp space contribute to the successful outcome of root canal treatment.[3] This paper describes 2/3 case reports of mandibular first molar with radix entomolaris.

Case report 1

A 32-year-old female came for endodontic treatment of mandibular right first molar. On clinical examination the tooth showed deep caries on occlusal surface and was tender on percussion. Radiographic examination revealed radiolucent lesion involving pulp space, widening of periapical periodontal ligament space and an extra distal root (Figure 1).

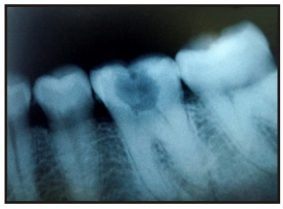

Figure 1. Pre-operative Radiograph

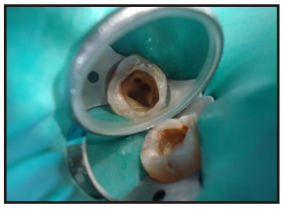

Figure 2. Intra oral view: Four orifices can be seen

The tooth was anesthetised and isolated with rubber dam (Figure 2). Access opening was done using endo access bur and two mesial and two distal canals were located using DG-16 endodontic explorer. The canals were explored with #15 K file (Mani) and working length was determined radiographically and verified with Elements Diagnostic Unit (SybronEndo, Glendora, CA) (Figure3,4). Biomechanical preparation of canals were done with hand files upto #30 K file. Sodium hypochlorite solution and physiological saline were used as irrigants during the preparation. Obturation was performed using corresponding gutta percha points and AH plus sealer.

Access restoration was done with intermediate restorative material (Figure 5).

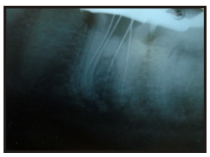

Figure 3.Working length Radiograph

Figure 4.Master cone Radiograph

Figure 5.Post Obturation Radiograph

Discussion

The first consideration a dentist must have in performing endodontic therapy is the knowledge of tooth anatomy. The expected root canal anatomy dictates the location of the initial entry of access; the size of the first file used, and contributes to a rationale approach for solving the problems that arise during therapy. Therefore, a thorough knowledge of the root canal anatomy from access to obturation is essential to give the highest possible chance for success.[4] Before beginning the access preparation, radiographs should be studied from several different angles.

The Radix Entomolaris is located distolingually, with its coronal third completely or partially fixed to the distal root. The dimensions of the Radix Entomolaris can vary from a short conical extension to a mature root with normal length and root canal. Ribeiro & Consolaro [5] classified Radix Entomolaris into three types:

1. Type I refers to a straight root/root canal.
2. Type II refers to an initially curved entrance and the continuation as a straight root/root canals.
3. Type III refers to an initial curve in the coronal third of the root canal and a second buccally orientated curve starting from the middle to apical third.

Carlsen and Alexandersen [6] classified Radix Entomolaris according to the location of the cervical part of the Radix Entomolaris:

Type A: Distally located cervical part of the Radix Entomolaris with two normal distal root components

Type B: Distally located cervical part of the Radix Entomolaris with one normal distal root components

Type C: Mesially located cervical part

Type AC: Refers to a central location, between the distal and mesial root components.

Mongoloid traits show the highest prevalence: 5-30%. In African Population: 3%, Eurasian and Indian populations less than 5%, Caucasians: 3.4 to 4.2%. Radix Entomolaris can be found on the first, second and third mandibular molar, occurring least frequently on the second molar. Bilateral occurrence of the Radix Entomolaris from 50 to 67% has been reported.[3] The occurrence of this macrostructure in the South Indian population was 13.3%, which was lower than that of other patients of Mongoloid origin.[7]

Clinical approach

Clinical inspection of the tooth crown and analysis of the cervical morphology may reveal an extra cusp or more prominent occlusal distal or distolingual lobe, in combination with a cervical prominence or convexity.

Preoperative radiograph shows an unclear view or outline of the distal root contour or the root canal. Angled radiographs {more mesial or distal angle (20 degrees)} [8] may reveal the presence of additional root.

A modification of the classical triangular opening access cavity to a rectangular or trapezoidal form is done in order to better locate and access the root canal for the distolingually located orifice of the Radix Entomolaris.[3] Visual aids such as a loupes, intra-oral camera or dental microscope are very useful in such cases. A dark line (dentinal map) on the pulp chamber floor can indicate the precise location of the extra canal orifice. An angled probe is very helpful in exploring the distolingual pulp chamber wall and to reveal the overlying dentin masking the root canal orifice, which has to be removed for a better view and access to the Radix Entomolaris.

To avoid procedural errors such as straightening of the root canal or a ledge, root canal transportation and instrument separation in case of a severe root inclination or canal curvature, particularly in the apical third of the root (as in a type III Radix Entomolaris) include obtaining straight line access, crown down technique, copious irrigation to prevent blocking the canal with dentinal mud, initial establishment of glide path with hand files before introducing rotaries, frequent re-capitulation & maintaining the apical taper.

Conclusion

The risk of missing anatomy during root canal treatments is high due to the complexity of the root canal system. The anatomy of the root canal system directly affects the success of the root canal treatment. Knowledge of dental anatomy is fundamental for good endodontic practice. Identification of root canal system depends on clinician's ability to visualize internal anatomy of teeth. Several methods like conventional radiography, digital radiography are still the mainstay of general endodontic practice.

Having the information observed from the radiographs and knowing what combinations of internal anatomy are possible, the dentist should be able to determine what type of canal is present. This information gained prior to initiation of therapy, will greatly facilitate subsequent treatment.

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