Endodontic treatment in a mandibular first molar having Radix Entomolaris- A Case Report

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ABSTRACT

There is currently an increasing pattern of case studies demonstrating the existence of extra outlets, which in turn warn the clinician to be more careful when dealing with mandibular first molars requiring endodontic treatment. Furthermore, radiographic examination should be considered as a diagnostic method and not as an accurate representation of anatomy. Presented below is a case report of endodontic management of a mandibular first molar with a complex root canal system: a total of six root canals, with three canals in the mesial root and three in the distal root. After endodontic treatment, the tooth was restored later with composite resin and subsequently, a full coverage crown. This case emphasizes on the importance of rare morphological deviations that may occur in the mandibular first molars.

Keywords: Molar, Mandibular molar, Endodontic treatment, Root canal, Six canals, Middle mesial, Middle distal.

Introduction

It is important to have appropriate awareness regarding Pathology of the root canal system in endodontic therapy. A big cause of endodontic failure is the lack of ability to grasp the tooth's internal structure and the resulting insufficient endodontic treatments ^[1]. For this reason it is pivotal to understand the anatomical and characteristic features of any particular tooth under treatment. The first molar of the mandibular arch is believed to be the tooth that most frequently requires the endodontic intervention. The reason behind this is that it is the first tooth out of all permanent teeth to erupt in the oral cavity ^[3]. A good pre-operative Radiograph is vital to minimize missing anatomy. It does not generally show the actual number of channels that are there in the roots. Unique laws on symmetry, colour shift law and orifice location laws focused on clear and recognizable pulp chamber anatomical arrangements

introduced by Krasner and Rankow. These laws enable a clinician to routinely classify pulp chamber canal orifices ^[2]. Visual, diagnostic techniques also play an immensely crucial role in diagnosing a different root canal anatomy that what is usually found. This report aims to bring to light an uncommon case of a first mandibular molar having three separate roots and a total of six canals.

There was one mesial root, which had three separate canals, and two different distal roots having two root canals in the distal or the distobuccal root and one individual canal in the other distal or the distolingual root (radix entomolaris). This condition was identified during endodontic routine care and was successfully treated ^[4].

Case report

A 15-year old male patient came to the Endodontic Department with a chief complaint of pain in lower left back tooth region since past 2 months. The past dental and medical history were insignificant. When clinically examined, there was deep occlusal caries in the tooth 36. A diagnostic intra oral periapical radiograph was taken that revealed the deep carious lesion extending to involve the pulp. figure 1

Fig1. Pre-operative radiograph

Clinical procedure

As per intraoral findings, irreversible pulpitis was reached as a diagnosis and endodontic therapy was planned. Inferior alveolar nerve block was administered followed by isolation using rubber dam. Access was made in the tooth through the occlusal surface after caries excavation (figure 2).

Fig 2 Access preparation under Rubber dam

The pulp chamber floor was exposed, three mesial and three distal root canal orifices were identified. (figure 3).

Fig 3. Locating canals under operating

Working-length measurements were estimated for all canals using no.10 K hand file, and a working-length RVG was obtained (figure 4) and later confirmed using apex locator (Woodpeck V Plus, [Woodpecker]).

Filing upto no.15 K- file was done to gain a glide path in the canals. The canals were cleaned and shaped using rotary ProTaper NiTi instruments (Dentsply, Maillefer) with a crown down technique upto size F1. Throughout the Biomechanical Preparation, Irrigation using 5.25% NaOCl (Prime Dental) solution and 17% EDTA (Avueprep) was done. Ca (OH)₂ paste

Fig 4 Determination of working length

(AvueCal) was administered in the canals. This was followed by placing a cotton pellet inside the access preparation and later sealing with temporary restoration. The patient was asked to report after seven days. At the next appointment removal of temporary filling was done followed by copious irrigation of the canals using normal saline.

After drying the canals using paper points, a master cone RVG was taken to confirm the preparation up to the respective working lengths (figure 5).

Fig 5 Master cone placement

The canals were subsequently obturated using Sealapex sealer and protaper Gutta-percha (figure 6). Composite resin restoration was done and finally, a full coverage crown was fabricated and delivered.

Fig 6 Obturation

Discussion

At about 6 years of age, the first molar of the mandibular arch develops. It is the tooth most commonly subjected to restorations and root canal treatments [5] Normally, one mesial and one distal root is present in the tooth. Sixty five percent of molars in the mandible (except the third molar) erupt with two mesial canals and one distal canal and thirty percent molars consist of two distal canals. Many authors have demonstrated the chances of presence of extra roots and/or root canals in first mandibular molars. [6] The literature has reported that the incidence of finding mid mesial canal in the first mandibular molars is about 2.07-13.3% [7]

The incidence of mid mesial (MMC) and the mid distal canals (MDC) respectively in the first mandibular molar is 1-15% and 0.2-3% [8].

This case was unique because there was an accessory distolingual root i.e., there was radix entomolaris. This finding was first highlighted by Carabelli in literature and was known as “the radix entomolaris” [9]. A search of the literature shows that the incidence of radix entomolaris in the first mandibular molar in India accounts to 5.3%, and in South Indian population, to 13.3% (Chourasia et al. and Chandra et al., respectively) [10,11]. Amendments in the access preparation designs are often needed (triangular shape to a more quadrilateral or a rhomboidal shape) to identify and visualize the accessory canals present in mesial and/or the distal roots.

There have been documents in literature that deposition of secondary dentin happens with advancing age as a result of which divisions are formed, leading to gradual separation, which later on, leads to separation of canal/roots and further, the creation of inter-canal communications. Efforts should be directed towards preparation of a decent access opening that follows the 'law of concentricity' [8]. This can help the operator in following tooth outlines as well as to make the access cavity that is adequate in size. Extra canals may initially be hard to visualize because of the triangular internal dentin that usually lies over and hides the

orifices. Moreover, developmental grooves that are found in-between the root canals ought to be troughed and tested for a probable sticking spot. Wherever a sticking point is found, it must be softly 'pecked' for a radical change using the techniques employed for negotiation of fine and/or blocked root canals. [12]

In addition, various techniques can be used to aid in the detection of accessory root canals:

- Taking radiographs at different angulations,
- Appropriate access preparation,
- Proper lighting and additional magnification using a dental operating microscope,
- Appropriate visualization and inspecting the floor of the chamber of pulp using a sharp endodontic explorer,
- Using dyes,
- Transillumination,
- Champagne bubble test,
- Troughing of Chamber floor
- Advanced diagnostic imaging techniques, like Cone Beam Computerized Tomography (CBCT).

Conclusion:

This was a detailed report showing the endodontic therapy in respect to first mandibular molar that included a radix entomolaris and six independent root canals. Such cases may be un-common; however, every case needs to be thoroughly investigated, both clinically as well as radiographically in order not to miss any anomalies in the anatomy. Internal discrepancies of anatomy of teeth are possible and this should be borne in mind while performing endodontic therapies. Moreover, accessory canals, if detected, should be negotiated to gain access to, to irrigate, and obturate the otherwise difficult-to-access isthmus area. The above case also throws light on the certainty that finding accessory canals is not totally dependent on using advanced diagnostic techniques like CBCT. Sound knowledge of the anatomy coupled with adequate magnification using dental microscope and proper lighting conditions can go a long way in locating, preparing and subsequently obturating the complex root canals.

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