CASE REPORT

Single Rooted Mandibular Second Molars With Single Canal: Rare Occurrence

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Abstract

Successful endodontic treatment can only be achieved with the adequate knowledge of root canal morphology and its variations. In this case report periapical radiograph revealed single root with centrally located single canal in mandibular second molar, which was successfully negotiated, properly cleaned, shaped and obturated. C-shaped single canal and its variation requires a different regimen of treatment as a rare version of the mandibular second molar.


Key words: Mandibular second molar, Single canal, C-shaped canal.

Introduction

The success of endodontic therapy is strictly dependent on the accomplishment of all treatment steps, especially the complete removal of bacteria and bacterial products from the root canal system during the cleaning and shaping procedure. Variations in dental anatomy are found in all groups of teeth, and a knowledge of these variations, particularly in relation to the location and treatment of all canals, is the key to successful endodontic therapy. Routine periapical radiographs helps us to assess the number, length, curvature and aberration of the canal system of the tooth. Radiovisiography (R.V.G.) system is a valuable adjunct for radiographic documentation. The drawbacks of radiographic techniques are they only provide 2-dimensional image of a 3-dimensional image. Other sophisticated techniques such as micro tomography computerized tomography scan etc are not practical for a clinical setup. Slowey emphasized that root canal morphology was limitless in its variability and clinicians must be aware that anatomic variations constitute a formidable challenge to endodontic success.

Generally anatomical configuration of mandibular second molar is that of two roots, mesial and distal & can also be fused to a single conical root with varying internal anatomy and often have c-shaped canal configuration. Using spiral computed tomographic imaging, the prevalence of C-shaped canals in single rooted second molars was found to be 8%. A recent
study conducted on Iranian population reported prevalence of 7.2% of C-shaped canals among second mandibular molars and these configuration were mostly seen among single rooted mandibular\(^5\). A study by Weine et al reported 1.3% of mandibular second molars had single canal configuration\(^6\). The purpose of presentation of these cases is to present unusual occurrence of single canal in single rooted mandibular second molar that required endodontic treatment.

**Case Report**

A 28 years female patient reported to the Department of Conservative Dentistry and Endodontics with complaint of pain in right mandibular second molar, whose medical history was non-contributory. On examination revealed a deep caries. The tooth on examination revealed a deep caries. The patient had pain on percussion. Intra oral periapical radiograph revealed radiolucency in the crown involving the pulp suggestive of a pulpal involvement. The root canal morphology confirmed the presence of a single root with a linear canal, constricting towards the apex.

Access cavity was opened after anesthesia under rubber dam isolation. After pulp extirpation, a single round orifice was located in the middle portion of the floor of the pulp chamber. Working length was determined, cleaning and shaping was completed by HERO shapers (micromega) along with RC Help (Prime Dental Products, Thane, India) using crown down technique. The root canals were copiously irrigated with 3% sodium hypochlorite and saline was done throughout the procedure. A snugly fitting 6% no 25 gutta percha was selected as mastercone (Fig. 2). The canal was obturated with selected master gutta-percha cone along with accessory cones with AH-Plus endodontic sealer (Dentsply Maillefer Company, USA). The coronal gutta-percha cones were sheared off using heated Burnisher & temporary restoration was placed. A post obturation radiograph showed a well obturated canal. The patient was recalled after one week for a post endodontic restoration in the form of a permanent adhesive composite restoration.

**Discussion**

A thorough understanding of root canal anatomy and morphology is essential for achieving high levels of success in endodontic treatment. Failure to recognize variations in root or root canal anatomy can result in unsuccessful endodontic treatment. As with most posterior teeth, the maxillary and mandibular second molars have several variants in its canal configurations. The standard description of the mandibular second molar is of two roots and two, three or four root canals and that of maxillary second molar is three
roots and two, three or four canals. However, maxillary and mandibular second molars with a conical root and wide single root canal are also reported and the occurrence in mandibular molar is described more often than in the corresponding maxillary second molars. Any type of morphological variation is diagnosed by proper pre-operative radiographs, such as fusion, gemination, or anomalies in the roots etc. In case of C-shaped canal, radiograph always reveals a fused root with a longitudinal groove in the middle of the root. The basic feature of C shaped canals is the presence of a fin or web connecting the individual canals.

Weine et al in a study evaluated 75 human extracted second molars and found one tooth (1.3%) with one root canal. Hartwell et al reported that the incidence of single canal in maxillary second molar is 0.6%. More recently, Peikoff et al reported 3.1% of endodontically treated maxillary second molars with one root and canal. Tamse et al reported the occurrence of bilateral symmetry in 89.65% of cases with single conical rooted mandibular second molar. Manning et al in a study reported that Asians have a higher frequency of single rooted mandibular second molars. The morphological variant of single root and single canal is easily detected in routine radiographs. However, care should be taken to assess the correct anatomy on the preoperative radiograph to rule out the clinical condition of two roots, one buccal and one palatal that could be superimposed on the diagnostic radiograph. Careful inspection through angled radiographs (20° mesial or distal shift in horizontal angle) prior to and during endodontic therapy aids in identifying extra roots or canals. The incidence of canal bifurcation is usually identified in radiographs by ‘fast break’ guideline which states that the sudden disappearance or narrowing of the canal infers the presence of canal division. In these cases initial evaluations of the radiographs suggested the presence of single root with a wide canal space suggesting that there may be c-shaped configuration of canals. After access cavity preparation, on observation of the pulpal floor only one canal with a round orifice was located, suggestive of the presence of a single canal. Further exploration of the pulpal floor did not reveal presence of any additional orifice opening. The canals of these teeth were wide and tapering. Biomechanical preparation and copies irrigation was done to ensure complete removal of debris. The canals were obturated using lateral condensation method. The clinician should be aware of all the anatomical variants and aberrant canal configurations. The clinician should then perform a thorough examination of the pulp chamber to insure complete debridement of all canals. This increases the chance for long-term successful endodontic therapy.

Conclusion

Knowledge and recognition of canal configuration can facilitate more effective canal identification and unnecessary removal of healthy tooth structure in an attempt to search for missing canals. Based on the various studies describing the canal anatomy for second mandibular molar it is difficult to determine to which classification of C-shaped canal do these above described canals belong to or can they just be described as Vertucci’s type I canal system.

References


