



Astounding Root Canal Anatomy of A Mandibular Second Molar – A Case Report

KEYWORDS

Mandibular second molars, Single canal

Dr Veerendra M Uppin

Professor, Dept of Conservative Dentistry & Endodontics KLE V K institute of dental sciences, Nehru nagar, belgum, Karnataka

Dr Priyanka Sarangi

Senior Resident, AIIMS Bhubneswar, Odisha

Dr Sukanta Kumar Satapathy

Maxillofacial Prosthodontics, Private Practioner, Bhubneswar , Odisha

ABSTRACT

It is known that the mandibular second molar can display significant anatomical variations. Like the number of root canals, the number of roots may also differ. Mandibular second molars sometimes may have only a single root or may also have two or three roots. If seen, an awareness and understanding of this unusual root and its root canal morphology can contribute to the successful outcome of root canal treatment. This case report presents an aberrant root canal anatomy in mandibular second molar that is a single root having a single canal. The access cavity displayed only one oval canal orifice which is a rarity. The successful management of the case is discussed. Adequate knowledge about root morphology and its variation are of utmost importance to a clinician. Clinicians should be aware of these unusual root morphologies in the mandibular second molars.

INTRODUCTION

“We see what we want to see”

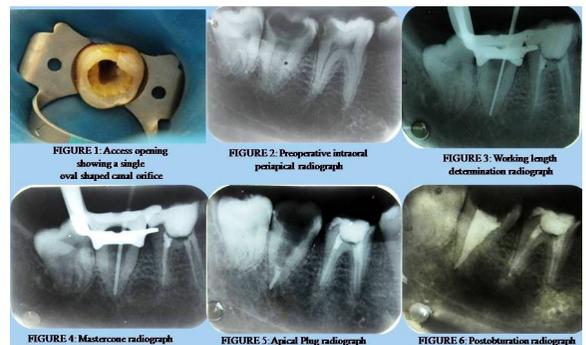
Knowledge of dental anatomy is of paramount importance for the success of endodontic treatment. The main goal of endodontic therapy is to clean, shape, and fill the root canal system in three dimensions. Complex root canal anatomy is often the culprit that results in endodontic failures¹. Usually all dentists have mental maps of access cavity and root canal morphology which are standard for that particular tooth. The problem is this mental map may be wrong, as we tend to neglect any deviation from routine and see what we want to see. This results in the most common problems of endodontic failure like missed canals. A clinician must to an insight of the morphology of tooth related to its shape, form and structure before commencing treatment. Routine periapical radiographs helps us to assess the number, length, curvature and aberration of the canal system of the tooth.

Generally anatomical configuration of mandibular second molar is that of two roots, mesial and distal. They are closer together than the first mandibular molar. It can also be fused to a single conical root with varying internal anatomy and often have c-shaped canal configuration². C-shaped canal system is commonly seen in mandibular molars especially in Asian population. Cimilli et al using spiral computed tomographic imaging concluded that the prevalence of C-shaped canals in single rooted second molars was 8%. Vertucci type I canals were most frequently seen in these C-shaped molars.³ A study by Weine et al reported 1.3% of mandibular second molars had single canal configuration⁴. The purpose of this case is to report the occurrence of single canal in a single rooted mandibular second molar and its successful endodontic management.

CASE REPORT

A 27-yr-old female was referred for root canal treatment. Patient complained of pain with respect to the right mandibular posterior region, especially after consumption of hot drinks. Medical history was noncontributory. Intraoral examination revealed deep caries in 47. The teeth was also tender on percussion. Intraoral periapical radiograph of the teeth revealed deep caries approximating the pulp without any associated periapical changes. Vitality test for heat and cold was positive. Based on these finding a diagnosis of irreversible pulpitis was made. A detailed examination of the radiograph revealed the presence of a single root with a wide canal. Therefore c-shaped canal configuration was

anticipated. After adequate anesthesia under rubber dam isolation an access cavity was prepared [fig-1]. Only a single round orifice was located in the middle portion of the floor of the pulp chamber [fig-2]. After pulp extirpation, working length determined using a 20 no. K-file [fig-3]. Cleaning and shaping was by step back technique. A thorough irrigation with sodium hypochlorite and saline was done throughout the procedure. A 70 no GP was selected as a master apical cone to obtain an apical tug back [fig-4]. The GP was then sheared about 3mm from the apex without any movement of the cone, which was confirmed with a radiograph [fig-5]. The remaining portion of the canal was then obturated with thermo plasticized GP using Obtura II and warm vertical condensation technique. A post obturation radiograph showed a well obturated canal [fig-6]. A radiograph of the contralateral tooth showed similar root morphology



DISCUSSION

Anatomical variation such as fusion, germination, or anomalies in the roots may often be diagnosed based on preoperative radiographs. Radiographically, a tooth with a C-shaped canal system may always have a fused root with a longitudinal groove in the middle of the root⁵. The basic feature of c-shaped canals is the presence of fin or web connecting the individual canals. Wein Fan et al described a type I (Merging type) where canal images merged into 1 major canal before exiting from the apical foreman. Partial dentin fusion area might appear in the coronal and or middle portion of the canal system⁶. In this case 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 observa-

tion of the pulpal floor only one canal with a oval 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. In this case the anatomical resemblance with the contralateral tooth was demonstrated both radiographically and clinically.

Biomechanical preparation and copious irrigation was done to ensure complete removal of debris. The canals were obturated using Thermo plasticized injectable gutta-percha along with a apical gutta-percha plug to prevent extrusion of gutta percha beyond the apex. The advantage of using a thermo-plastized injectable obturating technique is it ensures compact obturation of the wide canals without voids. Any aberrations present in these canal systems can be well obturated by thermoplastized obturating systems along with warm vertical compaction which helps in better flow of gutta percha. Endodontic surgical microscopes are helpful adjuncts which may reveal and help to manage c-shaped canal complexity.

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 or can they just be described as Vertucci's type I canal system. Mandibular second molars with C-shaped canals vary in canal configuration. The early recognition of these configurations facilitates cleaning, shaping, and obturation of the root-canal system. The possibility of C Shaped canals has to be considered during the clinical and radiographic examination of the patient.

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