

ONE, TWO, THREE, FOUR AND FIVE CANALS IN MANDIBULAR SECOND MOLAR: A CASE SERIES

Pradeep Gade¹, Hanuman Sudhakar gade², Navata Gade³

¹Sr lecturer & MDS in the Department Conservative dentistry and Endodontics, GITAM dental college, India.

²DDS, Adjunct faculty in JSS dental college, Mysore.

³MDS in Prosthodontics & clinical director in Root canal dental clinic, India.

ABSTRACT:

Consistently high levels of success in endodontic treatment require an understanding of root canal anatomy and morphology. To achieve endodontic success, the entire root canal system must be three dimensionally cleaned, shaped and obturated. The clinician must have a thorough understanding of normal anatomy and of its variations from the norm. As with most of posterior teeth, the mandibular second molar has several variants in its canal configuration. This includes single canal, two canals, three canals, four canals and five canals and; C-shaped canal system. All these variations represent a challenge to its thorough debridement and obturation. This has led to the proposal of many modified techniques to optimize the technical quality and hence the prognosis of endodontic therapy.

Key words: root canal morphology, diagnosis, radiography, endodontic treatment

INTRODUCTION:

The result of successful endodontics revolves around knowledge, respect, and appreciation for root canal anatomy and careful, thoughtful, meticulously performed cleaning and shaping procedures. Knowledge of pulpal anatomy, its usual and unusual configurations and possible variations is critical for success in endodontics and lack of such knowledge may lead to treatment failure.^[1] A clinician is required to have an insight of the morphology of tooth related to its shape, form and structure before commencing treatment. This can be achieved by routine periapical radiographs to assess the number, length, curvature and aberrations of the canal system of the tooth. Mandibular second molars usually have two roots and three

root canals but variations in the number of roots as well as canal morphology are not uncommon. Which includes single canal, two canals, three and four canals, five canals and the Cshaped canal system.^[2,3] Because proper cleaning, shaping, and three dimensional obturation of the entire root canal system is regarded as an important determinant to good prognosis, the variations in root canal system, thus, represents a challenge to its proper diagnosis, debridement and obturation.^[4]

CASE DETAIL:

Although, root canal therapy has been a practice trend to save teeth since ages, nature till date does not stop mystifying the dentist with the various root canal morphologies. In all the presented cases,

teeth had been planned for routine root canal treatment followed by full coverage restoration after their detailed history and clinical as well as radiographic examination. The access cavity preparation had been done under 2.5x magnification loupes and with rubber dam isolation.

Case 1: SINGLE CANAL After thorough debridement of the pulp tissue from the pulp chamber, a single but considerably large opening was found in the center of the pulp chamber floor, which was confirming the presence of a single root and single canal which was suspected from the radiograph (Fig.1a). Working length was measured and cleaning and shaping of the canal was done with K- file of No. 45-80 followed by obturation with corresponding gutta purcha cones in sectional obturation manner (Fig.1).

Case 2: TWO CANALS While getting access to the pulp chamber, two canal orifices representing one mesial and one distal canal connected by a developmental fusion line at the chamber floor was found (Fig.1band their presence were confirmed with radiograph. After determination of correct working length, cleaning and shaping was done with the help of K-files followed by obturation in lateral condensation manner. (Fig.2)

Case 3, Case 4: THREE CANALS and FOUR CANALS Of all the above mentioned variations; Mandibular 2nd molar with 3 canals and 4 canals has got the maximum share (Fig.1c & Fig.1d). After the access cavity preparation and determination of correct working length, cleaning and shaping was done with the help of Rotary ProTaper files, followed by obturation with corresponding gutta purcha cones (Fig.3 and 4)



Fig 1:Single canal



Fig 2:Two canals



Fig 3:Three canals



Fig 4:Four canals



Fig 5: five canals

Case 5: FIVE CANALS While gaining access to the canal system, mesiobuccal and mesiolingual canal were found to be located very far from each other. While examination of access cavity using magnification loupes a third tiny orifice was located in between mesiobuccal and mesiolingual canals (Fig.5). 6 No. C+ file along with EDTA was used to negotiate the canal initially. Two other canals were located distobuccally and distolingually. The presence of five canals was then confirmed with angulated radiography. Cleaning and shaping of the middle mesial canal was performed with hand K file and rest of the canals was prepared using Rotary ProTaper files followed by obturation with gutta purcha cone

DISCUSSION:

When anatomic variations are detected clinically, treatment can be performed with conventional or rotary instrumentation and obturation techniques respecting technical and biological principles. Endodontic success in teeth with variations in the number and morphology of canals requires a correct diagnosis and careful clinical and radiographic inspection. [5,6]

While preparation of access cavity, dental operating microscope and dental loupes, offer magnification and illumination of the operating field and substantially improve the visualization of root canal orifices which enhance the quality of vision and make the correct identification of the root canal system easier. The use of apex locator can be important to determine the

working length. Additional anatomic information about the root canals can be obtained by angulated radiography, R.V.G, CT-scan and 3D reconstruction.^[7] Mandibular second molars usually have two roots and three root canals. Two root canals are located in mesial root and another one in distal root. Hess reported that the prevalence of three root canals in mandibular molars was 78%.^[8,9,10] There is an abundant amount of reports that relate the anatomic variations of mandibular second molars, which includes presence of single canal- ~2 to7%, two canal- ~30%, four canals- ~20%, five canals- ~2% and C shaped system - ~8.3 to 8.5%.^[9,11] All these variations represent a challenge to its thorough debridement and obturation. This has led to the proposal of many modified techniques to optimize the technical quality and hence the prognosis of endodontic therapy.

CONCLUSIONS:

When root canal treatment is to be performed the clinician should be aware that both external and internal anatomy may be abnormal. Knowledge of possible variations in internal anatomy of human teeth is important for successful endodontic treatment. The early recognition of these configurations facilitates cleaning, shaping, and obturation of the root-canal system. Every attempt should be made to find and treat all root canals to ensure successful endodontic treatment. The importance of an accurate clinical evaluation of root canal number and morphology in mandibular second molars cannot be overemphasized.

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