

# Endodontic Retreatment of a Maxillary Central Incisor with Two Roots – A Case Report

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## Introduction

One of the main objectives of endodontic treatment is to prevent or treat apical periodontitis by removing bacterial colonies and necrotic pulpal remnants from the root canal system and sealing this space with a biocompatible material against any bacterial ingress. However endodontic treatment can fail for many reasons, such as diagnostic errors, persistence of infection in the root canal system, errors in debridement and shaping of the root canal systems, instrument fractures, poor restorations and extra roots or canals, if not detected. Thus, a broad knowledge of both the external and internal anatomy of teeth is of great importance for adequate endodontic treatment. Many anatomical studies have declared that maxillary incisors are always comprised of a single root, while variations in the number of lateral canals and/or position of apical foramen are reported. As indicated in the studies of canal anatomy, multiple canals and roots in maxillary incisors are rare and are more often seen in lateral incisors than in central incisors. The incidence of an additional canal in the maxillary central incisor is extremely rare and is reported to be 0.6%. A brief review in literature revealed that only a few cases of maxillary central incisors with two roots and root canals have been reported. The aim of the present study is to show a clinical case of endodontic retreatment of a maxillary central incisor with two roots.

**Case Report :** A 38 year old male patient with the chief complaint of pus discharge in relation to maxillary left central incisor reported to our OPD. The patient gave a history of root canal treatment performed on the same tooth 2 years back. On examination intra-oral sinus and grade I mobility were observed in relation to maxillary left central incisor which was crowned. The tooth was tender on percussion. RVG revealed maxillary left central incisor with two roots, mesial and distal associated with periapical radiolucency. There was no evidence of gemination or fusion. Contralateral incisor was normal in morphology.

The cause of persistent periapical infection was determined as inadequate obturation in the distal canal about 3-4 mm short of the radiographic apex and over-obturation in mesial canal.

In view of the clinical symptoms, periapical pathology and faulty obturation, a non-surgical endodontic retreatment was planned.

The PFM crown was retained in view of the esthetics of the patient and access was made through it. After administration of local anaesthesia and application of rubber dam, access cavity was made through the porcelain with a round diamond and through metal with a trans-metal bur. Gutta-percha was removed using Gates-Glidden drills and peeso reamers. Purulent discharge through the root canals was apparent, therefore inter-appointment calcium hydroxide dressing was given for 10 days. Calcium hydroxide dressings were repeated for another two appointments.

Working length was determined using size 30 and size 40 K-files. Preparation was completed in mesial canal with size 55 K-file and distal canal with size 70 K-file, alongwith 0.2% chlorhexidine and 2.5% sodium hypochlorite irrigation. Circumferential filing with corresponding sized H-files was done and smear layer was removed using 17% EDTA.

Treatment was completed in four appointments making sure there was no pus discharge from the canal. Following obturation with AH-Plus sealer and Gutta-percha using lateral condensation technique access cavity was restored with composite.

Upon recall after 2 weeks post-obturation, the tooth did not present with any tenderness or mobility. There was no pus discharge and the sinus tract was not apparent. Recall after six months showed resolution of clinical symptoms and periapical lesion.

## Discussion

This was a rare case of maxillary central incisor with two roots and root canals, without morphological anomaly of the crown. The two roots possibly had a common orifice and bifurcated in the middle third to form two separate roots with separate apical foramina. The two roots were unequal in length and width. The distal root was longer and wider than the mesial root.

According to the literature, there are no limits for the morphological variability of the root canal. This emphasizes the need for practitioners to take into consideration anatomical variations in number and architecture of the root canal systems.

According to the literature available in text books, 100% of these teeth show single canals, but studies over 30 years have reported that 3% of maxillary lateral incisors and 0.6% maxillary central incisors may have two canals. The description of multiple canals in these teeth is limited to case reports of anomalies known as fusion, gemination or dens invaginatus. There are few cases of maxillary central incisors with two canals reported in the literature and most of them present morphological alteration, such as Macrodontia and fusion.

Diagnostic measures are important aids in the location of additional root canal orifices. These measures include obtaining multiple preoperative radiographs, examination of the pulp chamber floor with a sharp explorer, troughing grooves with ultrasonic tips, staining the chamber with dye, performing champagne bubble test and visualisation of bleeding points. Careful examination of preoperative radiographs can aid in locating additional canals or roots. This might necessitate taking radiographs from different angulations. In cases with complex root canal anatomy, cone beam or spiral computed tomography can be used as an additional diagnostic tool. An endodontic microscope may be useful to locate the additional canal orifices. The experience from the present case demonstrates the variability of root canal morphology of maxillary central incisor. The clinician should be careful that even the most routine of cases might deviate from the usual. The success of endodontic treatment depends on thorough debridement and a fluid tight seal of the obturation material. Additional root canals or other parts of an infected root canal system that are not cleaned and obturated might provide a source of persistent irritation, compromising the long term success of the root canal therapy. Although both the canals were located and filled in the previous root canal treatment, incomplete preparation in the apical third of the root canal did not resolve the periradicular lesion. Thus, rendering the canal free of disease-causing micro-organisms should be ensured at every step of the treatment.

## Conclusion

In conclusion, the clinician should be careful about the possible anatomical variations in the root canal configuration.

Careful preoperative evaluation with different diagnostic resources available should be carried out to detect any possible variations in root canal anatomy. The entire volume of the root canal space including accessory root canals and foramina should be thoroughly cleaned and filled so that a fluid tight apical seal is obtained.

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Legands

- Fig 1: Pre-operative radiograph showing root canal treated left central incisor with associated periapical lesion
- Fig 2: Gutta-percha removed
- Fig 3: Working length
- Fig 4: Master cone
- Fig 5: Obturation

