

Maxillary Central Incisor with Two Roots – A case report

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Abstract

Knowledge of the external and internal dental anatomy and its variations is a prime factor of success of endodontic therapy. The maxillary central incisor usually presents with one root canal system within one root. This report portrays an endodontic re-treatment of a maxillary central incisor of a healthy 38-year-old Saudi female patient with two canal systems and two roots presented to the clinic complaining of swelling and pus drainage. The case was initially misdiagnosed and not treated fully, however, correct diagnosis through detailed examination and evaluation, using tracing and imaging. Retreatment was done and the tooth was asymptomatic clinically and radiographically at 6 months follow-up.

Keywords: Anatomic variations, diagnosis, maxillary central incisor, root canal re-treatment, Vertucci classification

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INTRODUCTION

The most important factor in the prevention or healing of endodontic disease is the eradication of most of the bacteria in the root canal system, which can be done through top-quality chemo-mechanical cleaning and shaping of the root canal.^[1-4] Failure of endodontic treatment can occur for several reasons, such as diagnostic errors, errors in debridement and shaping of the root canal systems, persistence of the infection in the root canal system, poor restorations, and instrument fractures.^[5] These errors can manifest if the root canals are not found or debrided completely, as variation in the number of roots or in canal configuration may impact endodontic treatment and affect the prognosis of root canal therapy.^[6] Therefore, it is important that dentists have an extensive knowledge of the internal dental anatomy of the teeth and consider the morphological variations of root canal systems, as well as an arsenal of tools to assist in the discovery of these variations. Most studies indicate that maxillary central

incisors have one root and one canal.^[7,8] Although there have been some reports of additional canals.^[9,10] The present study presents a clinical case depicting endodontic retreatment of a maxillary central incisor with two root canals and two roots, detected through radiographic evaluation and microscopic examination.

CASE REPORT

A 38-year-old Saudi female patient has been reported to our private dental clinic complaining of swelling and pus draining from the right maxillary central incisor (#11). The patient reported that she had spacing between her teeth and went to a dentist 1 year ago to close it. While preparing the crown, her dentist informed her that she needed endodontic therapy, which she had done, and then, a crown was placed on the tooth. Later, she developed swelling and pus drainage. The patient was healthy and did not have any relevant medical history or any allergies. She was not in pain. She was

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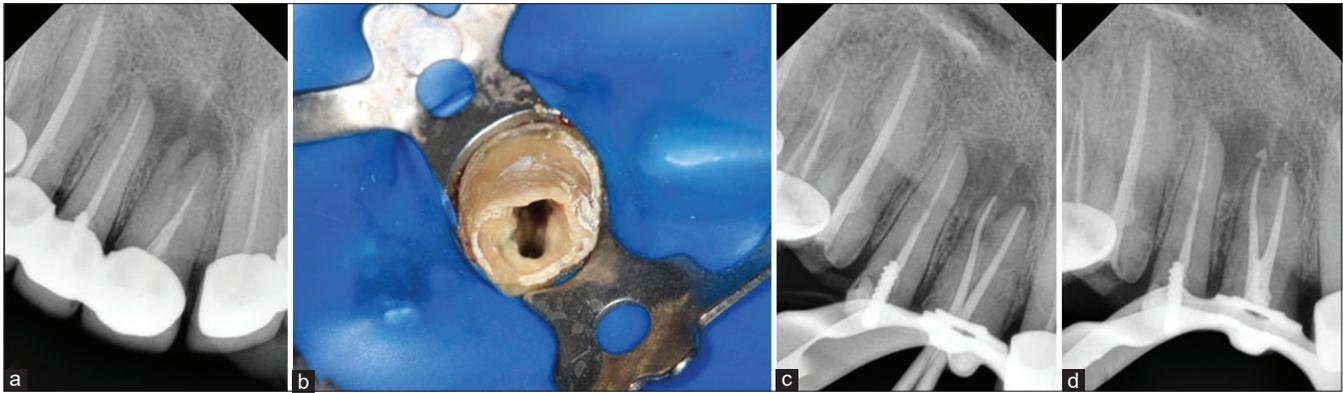


Figure 1: Diagnostic radiograph showing two roots with inadequate root canal treatment and periapical radiolucency (a), access cavity showing two orifices (b), master cone radiograph (c), and obturation (d)

taking an antibiotic (Augmentin 1 g bds) for the past 5 days. The intraoral examination revealed a buccal sinus tract in the attached gingiva between the right maxillary central and lateral incisors. The tooth had a poorly fitting crown which was attached to the adjacent crown. The tooth had no mobility and was not tender to percussion. Radiographic examination revealed two roots with inadequate root canal treatment and periapical radiolucency of #11. An untreated second root was detected [Figure 1a]. Sinus tract tracing was performed through inserting size 30 gutta-percha in the fistulae area, and a radiograph was exposed. The sinus tract pointed to periapical radiolucency at the apex of the tooth #11. Considering the medical history and examination results, the tooth was diagnosed with incomplete endodontic treatment with necrotic pulp and chronic periapical periodontitis. Root canal retreatment was decided.

A rubber dam was used to isolate the tooth and then disinfected with 5% sodium hypochlorite (NaOCl) before access opening. The crown was removed, and the access cavity was made with high-speed round diamond burs under water spray and continuous irrigation. Further enlargement of the access cavity was performed under microscope visualization (OPMI Pico, Carl Zeiss Meditec AG, Jena, Germany) and two orifices were identified [Figure 1b]. The old gutta-percha filling was removed with d-Limonene based gutta-percha solvent (Carvene, Prevest Denpro Limited, Jammu, India) by soaking a cotton pellet with the solvent and placing it on the root canal filling material and leaving it for a several minutes. The working length was determined with an electronic apex locator (RPEX6 apex locator, Novo Dental Export, Guangdong, China).

Instrumentation was done using ProTaper Next files (DENTSPLY, Maillefer) and irrigation with an irrigating regimen of NaOCl (2.5%), followed by saline, and finally chlorhexidine (2%). The canals were still wet after

instrumentation; however, the canals were dried as best as possible and CaOH (Multi-Cal, Pulpdent Corporation, USA) was placed. The patient was seen 5 days later, and there were obvious signs of initial healing of the fistulae. During the second visit, the irrigation protocol was repeated, and the canals were dried and obturated using continuous wave vertical obturation using AH26 Plus sealer (Dentsply DeTrey GmbH, Konstanz, Germany) and ISO 35 taper 0.06 gutta-percha cones for both the canals with warm vertical condensation technique [Figure 1c]. A postoperative obturation radiograph was taken [Figure 1d]. The patient was kept under observation for 6 months with radiographic and clinical examination. The tooth continued to be asymptomatic and was referred to the prosthodontic clinic for crown fabrication.

DISCUSSION

The current report demonstrates a case of a two-rooted maxillary central incisor with two root canal systems, with no aberrant anomaly of the crown. Classically, the maxillary central incisors present with Vertucci Class I, with one canal and one apex in 100% of cases.^[7] In addition, the root and root canal morphology of the Saudi Arabian population is in general, comparable to that of other populations.^[11] However, some cases have been reported of one root with two canals^[12-14] and four canals within one root,^[15] two roots,^[9,10,16-18] and multiple three roots.^[19] Discovering more than one root and additional canals in maxillary central and lateral incisors is not common. Multiple canals in these teeth are usually associated with reports of known anomalies such as gemination, dens invaginatus, or fusion.^[12] This highlights the need for dentists to consider variations in the number and configurations of root canal systems.

In the present clinical report, morphological abnormality of the root was evident by the assessment of the initial X-ray. The meticulous evaluation and assessment of

the initial radiograph is of paramount importance in endodontic diagnosis to determine the configuration of the roots and root canal systems.^[20] Although the second root was evident in the radiograph, the previous root canal treatment only included one canal. This might have been due to the lack of knowledge of the initial practitioner or lack of examination of the radiograph. Additional tools, such as the use of a microscope during access cavity preparation^[21] to visualize access extension mesiodistally and to enhance the access and visibility of endodontic instrumentation, greatly improved the ability to adequately retreat the tooth. Removal of gutta-percha can be done with solvents, heat, or by endodontic instruments.^[22] In this case, d-Limonene based gutta-percha solvent was used to assist removing the gutta-percha. This has the benefit that it is less volatile, nonhazardous, and noncarcinogenic unlike chloroform or trichloroethylene solvents since it is based on natural substances (d-Limonene), it does not cause irritation to oral mucosa and periapical tissue.^[23] The canals were obturated with a warm thermomechanical technique as it has been proven to be superior to standard cold lateral compaction.^[24]

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

CONCLUSION

This case stresses the importance of utilization of contemporary diagnostic resources and diligence in evaluation to identify the abnormalities and acknowledge all anatomical configurations of teeth.

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Conflicts of interest

There are no conflicts of interest.

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