

Root canal treatment of mandibular canine with two root canals: A case report series

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ABSTRACT

Canine is the cornerstone of the mouth due to its position, which reflects its significance of mastication with incisors and premolars. Anomalous root canal morphology can be found in any tooth with different degrees. The unusual configuration of root canal system may lead to a lot of procedural errors during cleaning and shaping, and this, in turn, may increase the probability of root canal treatment failure. In most cases, mandibular canines have one root of a centrally located root canal and 15% of this type of tooth has two root canals.

Keywords: Canines, configuration, morphology, variations

Introduction

Mandibular canines usually have single root and single canal 87%. In 10% of cases, there are two canals join at the root apex and in 3% have completely separated two canals.^[1] The success of root canal treatment depends on the ability to completely clean and seal the root canal system.^[2,3] The clinician should have a thorough knowledge about root canal morphology; otherwise, the root canal treatment failure has to be expected.^[4] The background knowledge about root canal morphology allows the dentist to build a picture about space to be cleaned and shaped and to achieve the main goal of cleaning and shaping which is removing the infection from the root canal and prevention of reinfection. The aim of this paper was to present three cases of rare morphological variations in mandibular canines that were successfully treated endodontically. In management of

the following cases, we used the same protocol of root canal treatment as in the case report of Habib *et al.*^[5]

Case Report 1

A 33-year-old male patient was referred to Restorative Dental Science Department in Al-Farabi Colleges (Riyadh, KSA) because of the chief complaint of pain in mandibular left canine (#33). The pain was severe, sharp, intermittent, and stimulated by cold. The patient had no history of systemic diseases. Clinical and radiographic examinations revealed mesial and deep distal caries with a shadow of a second root canal [Figure 1a]. Vitality tests were performed, and the patient was diagnosed with irreversible pulpitis. After administration of local anesthesia, tooth was isolated with a rubber dam and an access opening was done. After removing pulp tissue located in the chamber, the orifices were observed buccal and lingual. Working length measured by means of an electronic apex locator (Root ZX; Morita, Japan) was then confirmed by a radiograph; the working length of buccal canal was 21.5 mm, and 20 mm for

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lingual canal. The canals were initially instrumented with #15 stainless steel files (Dentsply Maillefer, Simfra, Switzerland) under irrigation with 5.25% sodium hypochlorite and 17% EDTA. Coronal flaring was carried out by using N°25 – 0.12 Endoflare® file (Micro-mega, Besancon, France). Cleaning and shaping of the canals was done by using manual 25-mm length stainless steel K-file with a crown-down technique till size 40 apically and 70 coronally. The canals were filled with AH plus resin sealer (Dentsply Maillefer, Ballaigues, Switzerland) and gutta-percha points (Diadent Group, Chongju, Korea) using lateral condensation technique [Figure 1b].

Case Report 2

A 50-year-old male patient reported to Restorative Dental Science Department in Al-Farabi Colleges (Riyadh, KSA) with a chief complaint of pain in mandibular left canine (#33) since a week. Clinical and radiographic examinations [Figure 2a] revealed distal caries, bone loss, with a shadow of another root canal. Vitality tests were performed, and the patient was diagnosed with irreversible pulpitis. The same steps as in case 1 was performed in working length determination and root canal preparation; the working length of buccal canal was 24 mm and 23 mm for lingual canal. Cleaning and shaping of the canals was done by using manual 25-mm length stainless steel K-file with a crown-down technique till size 35 apically and 70 coronally. The canals were filled with AH 26 resin sealer (Dentsply Maillefer) and gutta-percha points (Diadent Group) using lateral condensation technique [Figure 2b].

Case Report 3

A 39-year-old female patient visited Restorative Dental Science Department in Al-Farabi Colleges (Riyadh, KSA) suffering from pain in mandibular left canine (#33). Clinical and radiographic examinations [Figure 3a] revealed a huge caries with a sign of two root canals. Vitality tests were performed, and the patient was diagnosed with pulp necrosis. The same steps as in previous cases (1 and 2) was performed in working length determination and root canal preparation, the working length of buccal canal was 21 mm, and 19.5 mm for lingual canal. Vitality tests were performed, and the patient was diagnosed with irreversible pulpitis. The same step as in Case 1 was performed in working length determination and root canal preparation; the working length of buccal canal was 24 mm and 23 mm for lingual canal. Cleaning and shaping of the canals was done by using manual 25-mm length stainless steel K-file with a crown-down technique till size (35 for buccal canal and 40 for lingual canal) apically and 70 coronally [Figure 3b]. The canals were filled with AH 26 resin sealer (Dentsply Maillefer) and gutta-percha points (Diadent Group) using lateral condensation technique [Figure 3c].

Discussion

Identification of root canal anatomy and root morphology is the key factor for root canal treatment.^[6] Multiangulated radiographs are helpful in locating and finding extra canals, especially when a file is

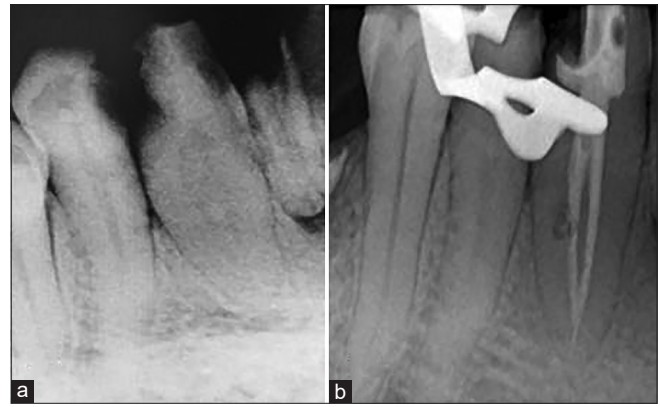


Figure 1: (a) Mesial and deep distal caries. (b) Obturation of the two root canals in the mandibular left canine

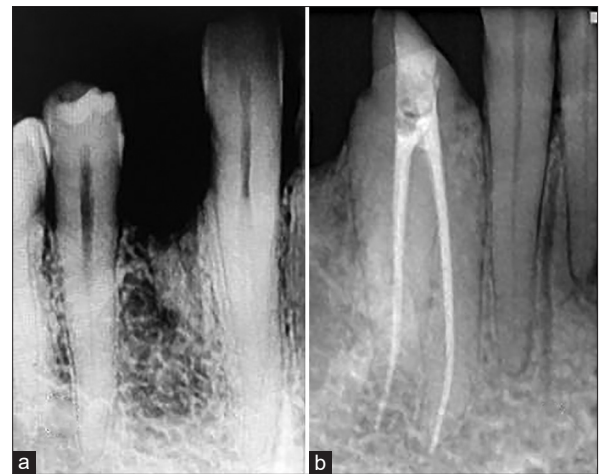


Figure 2: (a) Distal caries, bone loss, and radiographic fast break. (b) Obturation of the two root canals in the mandibular left canine

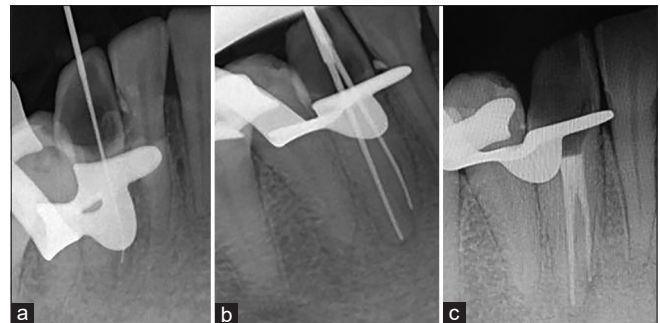


Figure 3: (a) Huge caries and shadow of another root canal. (b) The master apical. (c) The obturation of the two root canals in the mandibular left canine

in the main canal.^[7] It is very important not to miss any canal in the root otherwise endodontic treatment failure should be expected.^[8] Allen *et al.* reported that the untreated canals are responsible for root canal treatment failure of 114 cases of his study with 8.8% prevalence.^[9] Bakiania *et al.* detected the presence of two root canals in mandibular canine in 12% of the sample.^[10] While Pineda and Kuttler reported the presence of two canals in 18.5% of cases.^[11] Bhardwaj mentioned that the bifurcation of root canals was found

to be in floor of pulp chamber or in coronal third in 43% of cases similar to our three case reports.^[12] As it is in two cases of our three cases, a previous study found that we can find mandibular canines with two root canals in two separated roots.^[9] No one can ignore the important role of CBCT in finding the extra canals when compared with conventional radiographs.^[13,14] Also, dental operating microscope DOM increased the percentage of finding the extra canals to 93%.^[15] Similar case reports on mandibular canines with two root canals were published before.^[16] Some important helping methods in locating the orifices of all root canals can be used like transillumination, champagne bubbles, and blue dye.^[10]

Conclusion

In spite of its rarity, the presence of extra canals in mandibular canine should be excluded before starting the root canal treatment of this tooth type; otherwise, the dentist must clean, shape and obturate it to prevent a future root canal treatment failure. This approach has to be applied to all types of teeth depending on the new technology in the field of endodontics.

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.

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Conflicts of interest

There are no conflicts of interest.

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