Endodontic retreatment of a mandibular canine with two roots and two canals: a case report

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ABSTRACT

Background: The knowledge of root canal anatomy is considered essential in the diagnoses and treatment of endodontic cases to assure successful outcomes. Although the mandibular canine is known to be a single-rooted tooth with a single canal, variations can be seen. However, the incidence of a mandibular canine having two roots and two canals is extremely rare.

Case Presentation: This article reports a case of non-surgical retreatment of mandibular canine, with two roots and two canals, presented to the clinic with a periapical lesion. Chloroform and H-files were used to remove previous gutta percha, canals were shaped with a profile rotary system, and irrigated with 2.5% sodium hypochlorite. The canals were then obturated with gutta percha and AH Plus sealer.

Conclusion: Clinicians must use all the available tools to help them detect anatomical variations to manage their cases successfully.

Keywords: Anatomical variations, mandibular canine, two roots, non-surgical retreatment.

Introduction

The internal morphology of the root canal is more complicated than the external morphology of the tooth [1-4]; therefore, one of the most common reasons for the failure of endodontic treatment is missing one or more canals [5,6]. This issue might arise due to the lack of knowledge of anatomical variations [7,8]. Failure to treat a few millimeters of the pulp tissue could result in unsuccessful endodontic treatment [1,3]. Likewise, missing one or more canals could have detrimental effects on the outcome of the endodontic treatment [1,2,4]. Thus, to ensure effective endodontic treatment, the dentist must pay attention to proper diagnosis, meticulous cleaning and shaping, and good obturation, which are essential factors of good endodontic treatment [5,8]. The mandibular canine often contains a single root and canal [5,9]. However, with the introduction of new technology, such as magnification and advanced radiological imaging systems, there has been an increase in the reported cases of morphological variations of teeth [10]. The reported incidence of having two canals and one root in a mandibular canine is 6.1%-24%. According to Vertucci’s [11] classification, type I incidence is 78.8%-92.2%, type II is 2%-14%, type III is 2%-13.7%, and type IV is 0%-14%. Moreover, the incidence of a mandibular canine having two roots ranges from 0% to 5% [11,12,13]. This article aimed to report a rare case of non-surgical endodontic retreatment of a mandibular canine with two roots and two canals.

Case Presentation

A 23-year-old Saudi female patient was referred to a comprehensive treatment course at the College of Dentistry, King Saud University (Riyadh, Saudi Arabia), as she needed a comprehensive treatment plan. The patient reported no history of the systematic disease. Past dental history showed multiple endodontic treatments and restorations. Clinical and radiographical examination showed tooth #43 with two roots, two canals, and only the lingual canal was endodontically treated. The tooth showed underfilled endodontic treatment, missed canal, and periapical lesion, as seen in Figure 1. The history of treatment was made 5 years ago. The patient did not complain of any pain related to that tooth and was
negative to palpation. However, the tooth was sensitive to percussion. Thermal testing was done, and the tooth showed a negative response. No deep pockets or mobility were found, and the access cavity was closed with composite. The partially treated tooth was previously diagnosed with symptomatic apical periodontitis. After administering local anesthesia (2% Xylocaine with 1:80,000 epinephrine), the tooth was isolated by using a rubber dam and Ivory 9 clamp. The composite from previous restorations was removed using a long shank round bur. After successfully locating the orifices, the previous gutta percha was removed by carefully using chloroform and stainless steel H files.

The working length was measured by an electronic apex locator Root ZX II (J. Morita, Tokyo, Japan), then confirmed by taking an intraoral radiograph (Figure 2). A glide path was created by hand instrumentation using stainless steel K files in sizes 15, 20, 25 under the irrigation of 5.25% sodium hypochlorite and 17% Ethylenediamine tetraacetic acid (EDTA). Cleaning and shaping were then carried out by X-SMART Endo motor (Dentsply Maillefer, Ballaigues, Switzerland) with ProFile 0.04 files, using the crown down technique till size 35 apically, and size 70 coronally. After drying the canals with paper points, they were filled with AH plus resin sealer (Dentsply Maillefer, Ballaigues, Switzerland) and matching gutta percha points using the lateral condensation technique. The access cavity was sealed using Coltosol temporary filling material (Coltosol, Coltene, Switzerland), as shown in Figure 2. A prosthodontist then evaluated the tooth for further treatment.

**Discussion**

Factors found to be responsible for endodontic failure were underfilled canals (33.3%) and unfilled and missed canals (17.7%) [14]; both were seen in this case report. A study conducted by Hoen and Pink [15] found that among 1,100 endodontically failed teeth, 42% of them failed due to missed canals. Every tooth in the dental arch is subjected to variation as displayed in the literature [16] for mandibular canine, Pécora et al. [17] conducted a study on the internal anatomy, the direction, and the number of roots of the mandibular canines. The study was carried out on 830 mandibular canines. The analysis showed that the prevalence of one root is 98.3%. However, the prevalence of one canal and orifice is 97.2%.

On the other hand, the study showed that there is a 4.9% chance of two canals and one orifice, and a 1.7% chance
of two canals and two orifices [17]. As reported in the literature, female patients are more subjected to having two canals than male patients [19]. Mandibular canines with two roots are easy to detect and difficult to clean with an instrument as compared to single-rooted teeth [16]. According to Versiani et al. [3], in all double-rooted mandibular canines, the main apical foramen tends to be located eccentrically, which might result in over instrumentation. Radiography is a helpful tool that can aid in the diagnosis of different pathoses [16]. Furthermore, it helps in providing information about tooth morphology, including the number and location of the canals [16], the size and degree of calcification of pulp chamber, root direction, and curvature, and helps to detect any fractures. Intraoral radiographs provide a two-dimensional image of a three-dimensional object. Therefore, it is recommended to take a Cone Beam Computed Tomography (CBCT) in case of uncommon or complex anatomy [16].

**Conclusion**

The presence of anatomical variations in mandibular canine should be excluded before proceeding with root canal treatment. Meticulous cleaning, shaping, and proper obturation must be done to prevent root canal treatment failure. Also, all teeth need to be treated with this approach to prevent any failure.

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**List of Abbreviations**

- CBCT: Cone Beam Computed Tomography
- EDTA: Ethylenediamine tetraacetic acid

**Conflict of interests**

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**Consent for publication**

Informed consent was obtained from the patient.

**Ethical approval**

Ethical approval is not required in our institution for an anonymous case report.

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**References**

