



Case Report

Endodontic management of an unusual bi-rooted mandibular canine

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ABSTRACT

A successful outcome of endodontic therapy can be achieved by a thorough knowledge of root canal morphology and its variations. The mandibular canine commonly presents with a single root and a single canal. A few may present with two canals in a single root and even rarer are those with two distinct roots and root canals. The present manuscript describes a case of an atypical bi-rooted mandibular canine. Careful examination of preoperative radiographs revealed a mandibular canine with two distinct roots and two canals. The access cavity was prepared, the working length was determined and the canal was prepared with rotary instrumentation with copious irrigation of sodium hypochlorite and EDTA. This was followed by obturation and post-operative evaluation. Careful assessment of root canal morphology should be done in every case for a successful outcome and to avoid any mishaps.

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1. Introduction

The success of endodontic therapy depends largely on the technique with which the endodontist deals with the complex morphology of the root canals. The anterior teeth are deemed as simplest for root canal treatment owing to the presence of a single root without curvatures. Canines are the largest teeth having a single root and a single root canal situated at the cornerstones of both arches.¹ Seldom may a canine have two root canals present within a single root in about 15% of cases. Even rarer is the occurrence of a bi-rooted canine with a separate root canal in each of its roots.² Such a variation has a prevalence rate as low as 1.7% and endodontic treatment of such a tooth can be extremely challenging.^{2,3}

The present case report describes the endodontic management of a mandibular canine with two separate roots and two canals.

2. Case Report

A healthy 35-year-old male patient complained of pain in the mandibular right anterior region for the past two weeks. Intraoral periapical radiograph revealed an ill-defined radiolucent lesion in the peri-apical region of the right mandibular canine which surprisingly showed the presence of two roots, each with a distinct canal (Figure 1). An endodontic treatment protocol was discerned as most appropriate for the case followed by obturation with a biocompatible material.

Informed consent was obtained from the patient following which the treatment was commenced. Local anaesthesia was administered, and a rubber dam was placed

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Fig. 1: Pre-operative intra-oral periapical radiograph showing an ill-defined radiolucent lesion in the periapical region of the right mandibular canine.

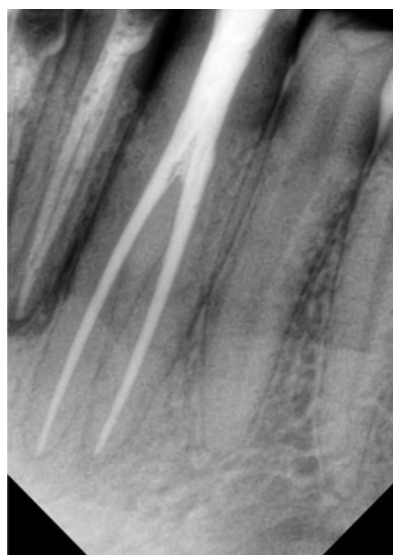


Fig. 4: Intraoralperiapical radiograph indicating successful endodontic therapy at 3 months follow-up

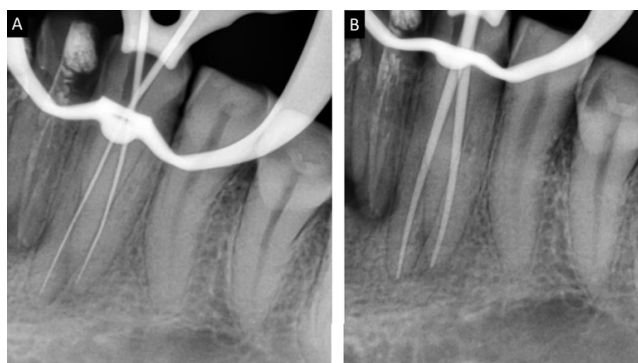


Fig. 2: Intra-operative radiographs of **A:** Working length determination and **B:** Master cone selection



Fig. 3: Post-obturation intraoral periapical radiograph of the treated canine

to isolate the right mandibular canine. Access cavity was prepared using endo-access bur (Dentsply Tulsa, Tulsa, OK). The radicular pulp space was carefully screened with the DG-16 endodontic explorer. The entrances of two root canals were found, one buccal and one lingual respectively. The canals were explored with a size #10K file and cervical flaring was carefully performed with #2 Gates Glidden bur. The working length was determined with a radiograph (Figure 2A) and corroborated with an electronic apex locator (Root ZX mini, J Moritta). Cleaning and shaping of the apical thirds were performed with rotatory Nickel-titanium files (S1, S2, F1 and F2 ProTaper Gold, Dentsply, Tulsa, OK). Copious irrigation was done with 3% sodium hypochlorite, saline and 17% EDTA between every step. Intracanal calcium hydroxide dressing was given and the patient was recalled after a week.

In the second appointment, the dressing was removed from the canal followed by ultrasonic irrigation with 17% EDTA. The master cone was confirmed with a radiograph (Figure 2B). The canal was dried with paper points. Obturation was done with Gutta Percha and AH plus sealer, using cold lateral compaction. Post obturation radiograph was obtained (Figure 3). The 3-month follow-up and evaluation showed no evidence of disease upon clinical and radiographic examination (Figure 4).

3. Discussion

A certain amount of variation in the number and morphology of root canals can be expected for all teeth. These variations make the canal negotiation, biomechanical preparation and obturation more difficult during the root canal treatment of the tooth. Inadequate imaging or

ignorance on the part of the clinician can lead to missing out on the additional canals and consequent failure of endodontic treatment.

What makes the present case interesting is the extremely rare presentation of the mandibular canine with two roots, each with a distinct canal of its own. The first case of a bi-rooted canine was described in 1886 and since then only 25 cases have been reported, most of which were published in the past two decades.^{3,4} About 87.5% of these reported cases were described in female patients which makes the present case occurring in a male even more unusual.²

While the occurrence of such a variation was described as a common trait in the European population a few centuries before, the feature was almost absent in the Asian population.⁵ The fact that Asian populations generally exhibit a higher prevalence of variation in root canal numbers and morphology further highlights the peculiarity of this variation.

Careful inspection of diagnostic radiographs is, therefore, of utmost importance before planning and commencement of endodontic treatment even in single-rooted teeth with simple root canal morphology such as canines. Sudden loss in the continuity of the canal lumen or a radiolucent groove in the lateral segment of the root should raise suspicion of the presence of an additional canal.⁶ In such scenarios, further investigation in the form of multiple radiographs from different angulations or cone-beam computed tomography should be considered to confirm the internal variations in the canal morphology.

When two roots are present in the mandibular canine, one of them is labial while the other is situated lingually.^{5,7} The bifurcation between the two roots may be present at any level and if present cervically increases the chance of perforation.³ An apically present bifurcation would raise the difficulty of localization and mechanical preparation of the root canals.^{3,6} Thus, the rare and peculiar variation in canines has several clinical implications that an endodontist must be aware of.

4. Conclusion

Clinicians should be aware of anatomical variations in the teeth and should never assume that canal systems are simple. Although the literature indicates that the occurrence of mandibular canines with two roots and two canals, is not common, it does exist posing inherent technical challenges. This case report further emphasises

the importance of knowledge of such anatomical aberrations to plan appropriate treatment protocols for successful endodontic therapy.

5. Conflict of Interest

None.

6. Source of Funding

None.

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