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Case Report

PERMANENT MANDIBULAR CANINE WITH TWO ROOTS AND TWO CANALS

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Abstract: *Mandibular canines are documented as frequently having one root and one canal in most cases, although around 15% may have two canals and two roots. Thus, anatomic variation exists therefore knowledge and keen observation during root canal can help to identify the less frequent variation morphology of tooth and play a pivotal role in the success of root canal treatment. This case report discusses a mandibular canine with two roots and two canals.*

Keywords: Mandibular Canine, Internal Anatomy, Tooth Root

Introduction

Root canal morphology plays a basic role in defining the conditions under which the endodontic treatment can be performed effectively ([1]). The goal of endodontic treatment is to eradicate microorganism infection from the root canal and inhibit reinfection. Failure of root canal treatment (RCT) may cause postoperative disease, pain, and complications (2). Understanding the anatomy of dental structures is crucial for clinicians performing root canal treatment, as it's a complex procedure with numerous morphological variations to consider (3).

Regarding anatomical variations linked with mandibular canines, around 15% contain two canals with one or two foramina. A study of the internal anatomy of 830 extracted human mandibular canines showed that 98.3% of these teeth contain a single root, 92.2% consist of one canal and one foramen, and 4.9% have two canals and one foramen, and 1.2% contain two canals and two foramina. The incidence of two-rooted canines was as low as 1.7% (4). Many investigators have reported anatomical variations associated with mandibular canines ([5]). This subsequent case report details the endodontic treatment of a mandibular canine with two roots and two canals (6).

Case Presentation

A 66-year-old female presented to Islamabad Dental Hospital, complaining of pain in the right mandibular area for the past two weeks. Clinical examination revealed that tooth 43 had deep occlusal caries. Thermal testing with ethyl chloride resulted in a lingering response and the tooth was tender to percussion. Radiographic examination showed caries approaching the pulp, slight thickening of the PDL space, and two roots. Based on the history, clinical and radiographic findings a diagnosis of irreversible pulpitis with symptomatic apical periodontitis was established. After informed consent, endodontic treatment was initiated. The tooth was anesthetized (2% lidocaine) and isolation was achieved with a rubber dam. Access was achieved using a round diamond bur as shown in Figure 1a. The pulp chamber was opened extensively to facilitate the location of the buccal and lingual canals. Working length was established by radiographic method using paralleling technique followed by manual chemomechanical preparation (figure 1b, 1c). During preparation, canals were irrigated with 3% Sodium Hypochlorite (NaOCl) to remove the smear layer. The canals were obturated with cold lateral condensation and the tooth was restored with composite as shown in Figure 1d, 1e, 1f.

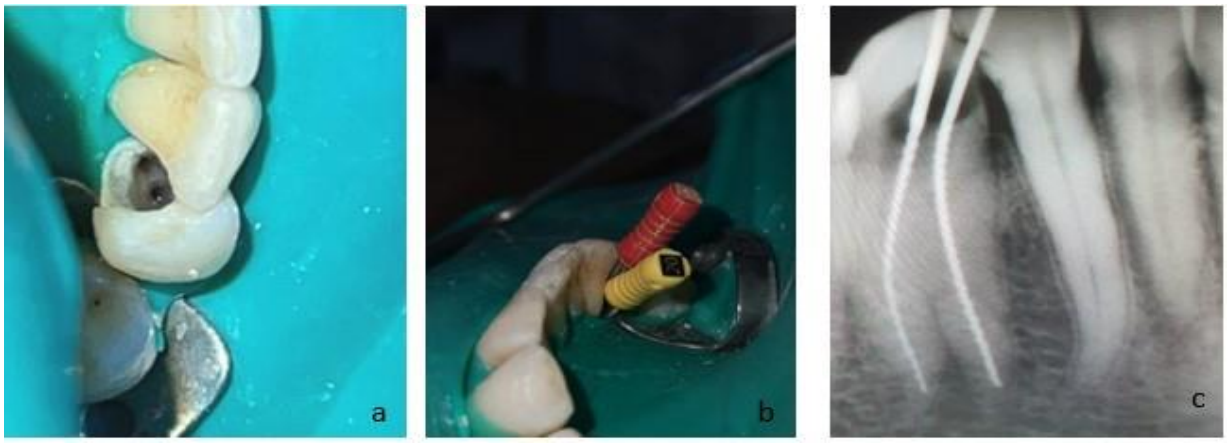

Figure 1 (a): The buccal and lingual canal orifices (b): The direction of the two root canals (c): Diagnostic length files

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(d): GP cone in buccal and lingual

(e): canal orifices after obturation

(f): final obturation of the root canal

Discussion

In the dental arch, the mandibular canine ranks as the second longest tooth. It is only 1–2 mm shorter than the upper canine. Usually, it has a single root with a single canal, but variations do exist. Green documented two canals in a single root in 13 out of 100 mandibular canines examined, aligning with the findings of Hess, who observed two canals in 15% of the cases. Vertucci reported the prevalence of two canals in 18% of the mandibular canines. However, according to Martin et al, the prevalence of two-root mandibular canines worldwide is 1.9 %. In the lower canine, a root canal is more flattened than the upper canine is quite large and usually does not cause procedural problems during instrumentation (7). According to H. Plascencia et al, the variation in mandibular canine with two roots has female predilection (2). As reported in this case report, this finding also coincides with the study conducted by T. Mushtaq et al. However, endodontic treatment of mandibular canines with two roots is challenging. The orientation of the long axis of the canal relative to the crown structure is important it typically meets at the incisal edge or on the labial surface. If this is not taken into consideration, it may lead to an improper preparation the lingual canal must always be searched for using a small file with a curved tip. The Mandibular canine is often straight, but sometimes the root tip and the canal curve distally or labially (8).

According to Piskórz M. et al. when suspected of a morphological alteration, obtaining an angled radiograph (20°–25° or Clark technique) facilitates the detection of extra canals (10, 11). In cases where conventional methods are inconclusive, the use of limited field-of-view cone beam computed tomography will help to confirm the internal variations (12). Additionally, the use of magnification tools (magnification loupe or DOM), the use of fiber optics, and the sodium hypochlorite NaOCl bubble technique may assist in locating any additional root canals (13).

Conclusion

Mandibular canines exhibit variation in morphology very rarely, however as depicted in this case mandibular canines can report unusual morphology patterns therefore clinicians should be mindful of the fact and should have keen knowledge and observation while performing endodontic treatment.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate
Approved by the department concerned. IRBEC-TC-0383/22)

Consent for publication
Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

QURRAT UL AIN (Post Graduate Trainee)
Study Design, Conception of Study, Development of Research, methodology design
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Coordination of collaborative efforts.
final approval of the manuscript.
IMAN BAIG (MPH, Post Graduate Trainee)
Review of Literature. Methodology Design, Review of manuscript, Manuscript drafting.

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