Case Report

Multidisciplinary Approach for the Management of Mandibular Canines with Rare Configuration

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It is very rare (2%–6% cases) for a mandibular canine to have two root canals and the incidence of finding two roots with two root canals in a mandibular canine that too bilaterally is almost negligible. This case report discusses the presence and multidisciplinary management of such rarest configuration in both mandibular canines of a female patient. This case shows the importance of recognition of anatomical variations in successful accomplishment of root canal treatment.

KEYWORDS: Anatomic variations, endodontic treatment, mandibular canine, root canal anatomy

INTRODUCTION

Success of endodontic treatment relies heavily on the knowledge of root canal configuration and morphology. Missed canals are among the main causes of treatment failure in endodontics frequently because of failure of clinician to recognize root canal

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variations. This can adversely affect the outcome and long-term prognosis of the tooth. Mandibular canines are considered easy teeth for endodontic intervention because of their relatively simple canal configuration, that is, one root one canal in most cases (>94%). In rare cases, there can be two roots with two canals (2%–6%) and presence of this configuration bilaterally is even rarer. The following case shows the successful management of such a unique case.

**Case Report**

A 37-year-old female patient reported to the Department of Periodontology with complaint of mobile lower front teeth since 1 year. She had no contributory dental, medical, or family history. On intraoral examination, deep periodontal pockets and Grade II mobility were detected with respect to (w.r.t.) 22, 23, 24, 25, 26, and 27 (Universal Numbering System). On electric and thermal (cold) pulp testing, 22–27 teeth were found to be nonvital. Radiographic examination revealed vertical bone defects. On the basis of clinical and radiographical examination, diagnosis of primary periodontal lesion with secondary endodontic involvement w.r.t. 22, 23, 24, 25, 26, and 27 was made. Interdisciplinary approach involving root canal treatment of the involved teeth followed by periodontal flap surgery was planned for the patient. Intraoral periapical radiograph of 22 and 27 [Figures 1A and 2A] revealed sudden disappearance of root canal in the middle root indicating the possibility of presence of extra canal in the tooth. For confirmation, angulated radiographs [Figures 1B and 2B] were taken for both teeth and extra roots were found in each tooth. Informed consent for the procedure was obtained from the patient. Under L.A and rubber dam isolation access opening was carried out w.r.t. 22 and 27 using No. 2 round bur and Endo Z bur (Dentsply-Maillefer, Ballaigues, Switzerland). Root canals were negotiated with No.10 K-file and coronal flaring accomplished with orifice shaper (Protaper universal system, Dentsply Maillefer, Ballaigues, Switzerland). Working length was determined using Root ZX Apex Locator (J.Morita Corp., Kyoto, Japan) and confirmed radiographically [Figures 1C and 2C]. Two roots and two canals (buccal and lingual) were found in each tooth. Cleaning and shaping was carried out with ProTaper system up to F3 size. Canals were irrigated throughout instrumentation using 2.5% sodium hypochlorite. Calcium hydroxide (Metapex, Meta Dental Corp, Elmburt) intra-canal dressing was given for a week. After one week, obturation was done with F3 ProTaper cones [Figures 1D and 2D]. Root canal treatment was similarly performed in 23, 24, 25, and 26. Periodontal surgery was performed following root canal treatment. The periodontal defect was covered.

![Figure 1: (A) Intraoral Periapical radiograph of 22. (B) Angulated radiograph of 22. (C) Working length radiograph of 22. (D) Radiograph showing master cones in 22. (E) Radiograph after 6 months](image-url)
with a bone graft (Ossifi, Equinox MedicalTechnologies B.V., Amersfoort, Holland) and teeth were splinted for 3 weeks with Ribbond (Ribbond Inc. Seattle, WA). Patient was recalled for regular checkups. After 6 months, teeth were asymptomatic and healing was evident radiographically [Figures 1E and 2E].

**Discussion**

For a successful endodontic outcome, the knowledge of root canal anatomy and its deviations is critical.\(^1\)\(^2\) Chances of finding a single root canal in mandibular canines are very high (94%–100%) [Table 1].\(^3\)\(^–\)\(^9\) Most variations occur in the form of single root with two canals.\(^3\)\(^–\)\(^9\) Variations such as two roots–three canals,\(^10\)\(^,\)\(^11\) three canals–two foramen,\(^12\) and two roots–two canals\(^13\)\(^–\)\(^15\) and bilateral two root canals in single root\(^16\) have been reported. But findings, that is, two canals in two roots on both mandibular canines in same patient are very rare and are only reported in isolated case reports.\(^17\)\(^,\)\(^18\) Different studies and case reports performed on mandibular canine are presented in Tables 1 and 2, respectively. Missed canals because of failure to gauze the variations are among the frequent causes of the endodontic treatment failure.\(^19\)

Diagnostic radiograph is first and most important tool at the disposal of dentist, which can guide about the identification or possibility of presence of anatomical variations. Abrupt disruption of root canal in the middle of root in radiograph in present case arose the suspicion of additional canal in each tooth.\(^20\) Multiple radiographs with changed angulation were used to confirm the variation, as single radiographic view has 33% probability of failure to diagnose canal division.\(^21\) There were two distinct roots with buccal and lingual roots in both teeth as was also observed by Versiani et al.\(^22\)

Use of endodontic explorer (examination), endo-sonic tips (dentin removal), methylene blue dye, champagne bubble test, and bleeding spots observation can also aid in locating root canal openings.\(^19\) Use of magnification, that is, dental operating microscope (DOM) is another vital aid in finding and negotiating canal orifices.\(^23\) Cone beam computed tomography (CBCT) has high radiation exposure to the patient so should be used in extreme cases such as calcification of root canals.

Once canals were identified root canal treatment was performed using standard procedure. As it was a combined perio-endo lesion, root canal treatment was followed by flap surgery and bone grafting 1 week after the root canal treatment. To reduce the mobility and promote healing, physiologic splinting was carried out.
CONCLUSION

Success of endodontic treatment relies heavily on the knowledge of root canal configuration and morphology. Clinician must be aware of the possibility of finding rare configurations in seemingly “easy teeth” and should use every technology such as radiography, magnification, and CBCT at his/her disposal to avoid missed canals and thus failure. Interdisciplinary approach for the management of combined lesions is essential for the successful accomplishment of treatment.

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Conflicts of interest
There are no conflicts of interest.

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