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Mandibular Canine with Two Roots and Two Canals: A Case Report

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ABSTRACT
Mandibular canine usually has a single root and root canal. But these teeth can present with anatomic variations in number of roots and root canals. The current case report presents a mandibular canine with two roots and two root canals and its endodontic management. Accurate diagnosis and meticulous treatment planning is essential for achieving a predictable outcome in the endodontic therapy of such cases.
Keywords: Mandibular canine, Two roots, Two canals, endodontic therapy, root canal treatment, anatomic variations.

I. INTRODUCTION

Anatomic variations of the root and root and root canal system are often a challenge to the clinician. Success of endodontic therapy depends on complete debridement of the entire root canal system. To achieve this, identification of these anatomic variations is important.

Mandibular canines are generally considered as a single rooted tooth with one canal in most of the cases. But mandibular canines can be associated with anatomic variations with studies showing 15% having two canals with one or two foramina (1–3).Pecora JD et al reported that the incidence of two rooted canine is as low as 1.7% (4).

The present case report discusses a clinical case of mandibular canine with two roots and two canals. Such anatomic variations are unpredictable; thorough knowledge and careful preoperative evaluation of each and every case is mandatory, as missing an additional canal has a huge impact on the outcome of endodontic treatment.

II. CASE REPORT

A 45-year-old female patient reported to the Department of Conservative Dentistry and Endodontics, Government Dental College, Thiruvananthapuram for the continuation of root canal treatment of lower front tooth. The patient was referred by a general dentist who attempted root canal treatment on the tooth. She had no relevant medical or allergy history. On clinical examination, the left mandibular canine had a temporary filling. On radiographic examination 2 roots and root canals with a deep bifurcation was noted with radioopacity of the coronal filling extending to pulp chamber which suggest an attempted access opening (Fig. 1a). Continuation of root canal treatment was advised.

Local anesthesia (2% lidocaine hydrochloride with 1:80,000 epinephrine) (Lignospan Special, Septodont, Raigad, India) was administered, and a dental dam was placed. All procedures were performed under ×3.2 magnification loupe (Admetec, Israel). The temporary filling was removed and the access cavity was refined. On exploration two orifices were located, buccal and lingual. After gaining straight-line access, the root canal was irrigated with 5.25% sodium hypochlorite (Parcan, Septodont, Raigad, India), and #15 size K-files (Mani,Tochigi, Japan) were used to determine working length using electronic apex locator (Root ZX Mini, J Morita, Kyoto, Japan) which was then confirmed using radiographs (Fig 1b).

Biomechanical preparation was completed using rotary nickel-titanium files (Neoendo and Orikam Healthcare India Private Limited)) till file size #30/0.04 under abundant irrigation with 5.25% sodium hypochlorite and normal saline. It was

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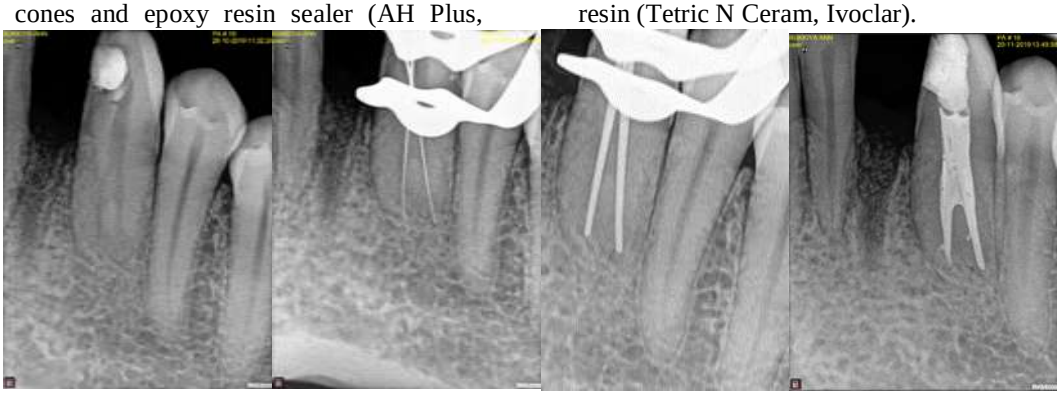
followed by irrigation with 17% EDTA to remove inorganic tissue. Master cone radiograph was taken (Fig 1c), and obturation was done using gutta-percha cones and epoxy resin sealer (AH Plus, Dentsply, Konstanz, Germany), using the lateral cold compaction technique (Fig 1d). Post endodontic restoration was done using composite resin (Tetric N Ceram, Ivoclar).



III. DISCUSSION

Mandibular canines are generally single rooted with a single canal. Vertucci et al reported 78% of the mandibular canines have type 1 configuration while 14% had type 2, 2% had type 3 and 6% had type 4 configuration (5). Laurichesse et al. reported only 1% having two roots and two canals(6). Pecora et al. studied 830 teeth and observed 1.2% had two canals with two orifices in a single root and only 1.7% had two separate roots (4). Kaffe et al. examined 400 mandibular canines and found that the number of two canals were observed in 13% of the teeth(7); and Pineda and Kuttler studied 187 teeth radiographically and reported 18.5% teeth with two canals (1).

Careful evaluation of the diagnostic radiograph is important for the early detection of multiple roots.Radiographs taken at different angulations are mandatory for identification of extra roots or canals. Clark's rule or SLOB technique can be used when morphologic variations are suspected(8). When in doubt, limited field of view Cone Beam Computed Tomography (CBCT) can help in accurate determination of the number of roots and canals, level of bifurcation etc. (8)

Our case report discusses a mandibular canine with two roots and two canals with a deep bifurcation at the apical third. Sharma R et al studied internal and external anatomy of mandibular canine with two roots and reported an apical bifurcation was seen in 56.9% of the teeth (9). Apical bifurcation poses a greater challenge in negotiation and instrumentation of the canals; so, a straight-line access is often important for better visualisation and instrumentation and an aid of magnification makes it easier. Versiani reported eccentric placement of the apical foramina in all the two rooted mandibular canines studied (10). The chances of over instrumentation are high in these cases; an accurate working length determination with the help of apex locators and a conservative preparation of the canals respecting the anatomy should always be followed.

Magnification plays a crucial role in the detection of orifices and the negotiation of canals. Studies have shown that treatment outcome in endodontics is improved with the use of magnification. Any means of magnification must be used, especially in cases with morphological variations(11,12).

IV. CONCLUSION

Identification and negotiation of additional roots and canals are important for improving the outcome of endodontic therapy. The current case report presents a case of mandibular canine with two roots and two root canals with a deep bifurcation. Thorough knowledge of such anatomic variations are crucial, careful preoperative evaluation and proper technique of instrumentation with three dimensional obturation makes the endodontic therapy more predictable.

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