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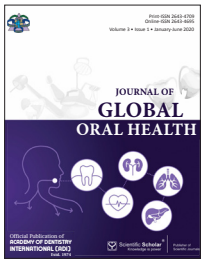

Case report

Multi-rooted canine confirmed by CBCT – A rare case report

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ABSTRACT

Patient Concerns: Patient reported with dull aching pain, sensitive to both hot and cold stimuli. On examination, deep proximal caries seen in relation to lower right first premolar which was tender on percussion.

Diagnosis: Symptomatic Apical Periodontitis

Treatment: Root canal treatment was planned.

Outcomes: Before initiating the endodontic procedure it is important to assess the root canal morphology and its variations. Inability to do so may lead to insufficient cleaning of root canal system which ultimately leads to endodontic treatment failure. Hence, early detection of such an occurrence is critical to prevent iatrogenic error during endodontic treatment.

Keywords: Endodontic treatment, Mandibular, Canine, Root canal, Two roots, CBCT

INTRODUCTION

Diagnosis and identification of the number of roots and root canals are the key factors in endodontic treatment. Mandibular canines are considered to be single-rooted and single-canalled teeth. Two root canals in a permanent canine is a rare condition. The anatomy of root canal systems dictate the condition under which root canal therapy is carried out and can directly affect its prognosis. Extra root canals if not detected are a major reason for the failure of endodontic therapy.[1] The pulp canal system in any tooth has the potential of being very complex with branching and divisions throughout the length of the root. Vertucci classified the root canal configurations of human permanent teeth into various types ranging from single to three separate and distinct canals. Mandibular canines are recognized as having one root and one root canal in the majority of cases. Investigators have reported on the anatomical variations associated with mandibular canines and that 15% of mandibular canines presented with two canals with one or two foramina.[2,3] Heling *et al.* reported a case of a root canal retreatment in a mandibular canine with two roots and three canals.[4] Orguneser and Kartal in their study recognized three canals and two foramina in a mandibular canine.[5] D'Arcangelo *et al.* also reported root canal treatment of two mandibular canines with two roots and two canals.[6] All these cases are suggested to be the result of the abnormal development of the tooth and the root.

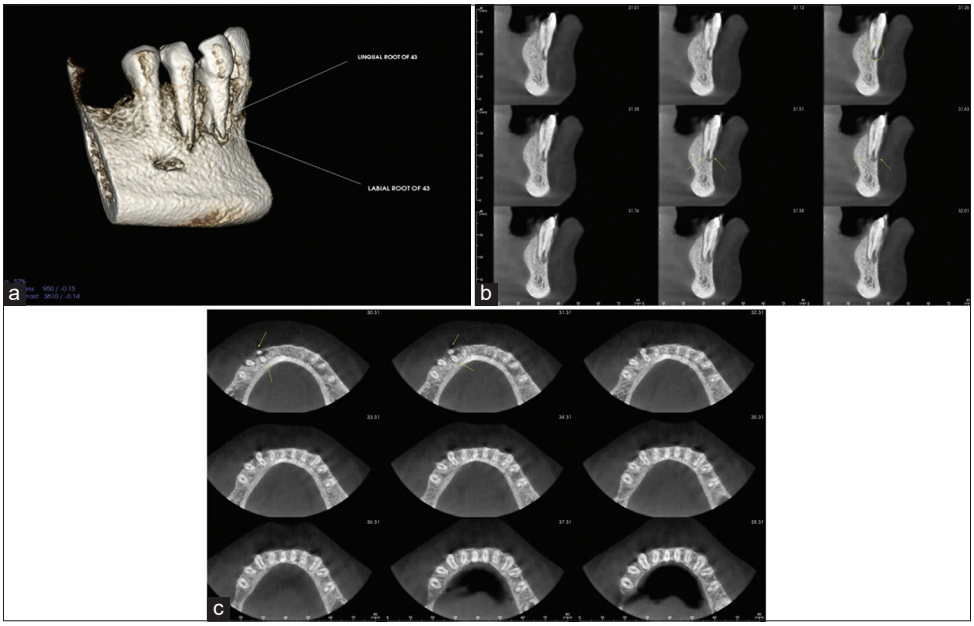

Figure 1: CBCT of mandibular canine. (a) 2D basis Image, (b) Sagittal view, (c) Axial view at different levels.

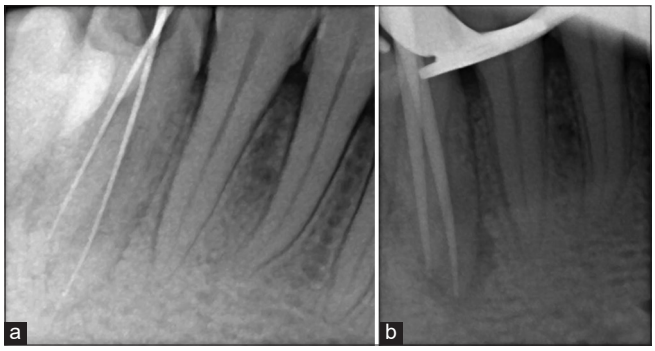

Figure 2: Working length and obturation. (a) Working length determination, (b) Obturation radiograph.

CASE REPORT

A 35-year-old female patient reported to the Department of Conservative Dentistry and Endodontics, with the chief complaint of a dull aching pain in the lower right front teeth region for 1 month. History of present illness revealed intermittent pain with hot and cold stimuli for the past 3 months. The patient's medical history was non-contributory.

On clinical examination, the mandibular right canine revealed proximal caries on the distobuccal side and the lower right first premolar revealed proximal caries on the mesiobuccal side. The teeth were not mobile and periodontal probing around the teeth was within physiological limits. Thermal tests were positive and electric pulp testing elicited a delayed response with the right mandibular canine. A diagnostic radiograph of the canine revealed a coronal disto-occlusal radiolucency involving the pulp space with the widening of the periodontal ligament space. The radiograph also revealed an unusual anatomy of the involved tooth. It showed the presence of two roots and two root canals. For further confirmation of this unusual morphology, multiple pre-operative radiographs were taken at 10–40 degree mesial and distal angulations and CBCT was done which confirmed the presence of two roots (buccal and lingual) and two root canals as shown in figure 1a demonstrating 2D basis images. Figure 1b shows sagittal view which confirms the presence of two roots-Buccal and Lingual, further confirmation proved by axial views [Figure 1c] at different levels showing buccal and lingual root.

From the clinical and radiographic findings, a diagnosis of symptomatic apical periodontitis was made and root canal treatment was planned. Treatment was scheduled and initiated after obtaining written informed consent from the patient.

Caries on the distobuccal surface were excavated. Local anesthesia was administered and access opening was done using Endo-Access Bur(DENTSPLY MAILLEFER, North America) under rubber dam isolation. The pulp chamber was opened to facilitate the location of buccal and lingual canals. Working length was established using an apex locator and also radiographically as shown in figure 2a.

The canals were instrumented using Protaper instruments (Dentsply Maillefer, Ballaigues, Switzerland). A 5.2% solution of sodium hypochlorite and 17% EDTA were used alternatively as irrigants, at each change of file. Final irrigation was done using 2% chlorhexidine. The canals were dried with absorbent paper points (Dentsply, DeTrey,

Konstanz, Germany) and obturated using Protaper gutta percha with AH Plus sealer (Dentsply, DeTrey, Konstanz, Germany). The final radiograph showed two well-obturated canals as shown in [Figure 2b]. After completion of root canal treatment, the tooth was restored using resin composite (3M ESPE, A G Seefeld, Germany).

DISCUSSION

Proper diagnosis and identification of the number of roots and root canals are key to the success of endodontic treatment. The studies of Greene, Hess, and Vertucci revealed 13%, 15%, and 18% of two canals in the single root of mandibular canines, respectively.[7] The occurrence of two roots and two separate root canals in mandibular canine is a rare entity and the literature search has revealed 5%, 1%, and 1.2% cases with two roots and two root canals, respectively. D'Arcangelo *et al*. also presented two cases of mandibular canines with two roots and two root canals.[6]

The intraoral periapical radiographs play an important role in identifying the internal anatomy of the tooth. Multiple angulated radiographs aid in locating unusual anatomical variations in the form of extra roots/canals. However, the inherent drawbacks of periapical radiography such as superimposition and two-dimensional images warrant their use in cases of unusual anatomy.

More recently, CBCT has become a boom in the field of endodontics to identify the variations in the tooth from norm, curvature, bifurcation, and to determine accurate length of the tooth in both sagittal and axial planes compared to conventional radiographs to obtain optimal success in conventional root canal therapy.[8]

This paper also presents the successful management of mandibular canine with two roots and two separate canals. Given rarity, such cases should be reported thereby enabling the clinicians to keep in mind the normal root morphology and anatomical variations.[9]

CONCLUSION

Clinicians should be aware of anatomical aberrations in the teeth; they are treating and should never assume that root canal morphology is simple. Although mandibular canines have a single root and single root canal, the search for a second canal or second root must be taken into consideration. Careful radiographic interpretation with different angulations and high-end diagnostic images may also prove vital in cases of unusual root canal morphology.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

Author Dr. Akanksha Bhatt is on the Editorial Board of the journal.

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