

Management of Rare Case of Mandibular Canine with Two Roots and Two Root Canals

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Abstract

Mandibular canine commonly has one root and one root canal. However, there has been a noticeable variations in its morphology such as the presence of two roots and two root canals. In spite of the low incidence of two roots in mandibular canines (5.7%) the possibility of variations in root canal anatomy of mandibular canine should not be ignored by dentist. A 35 year old female patient reported with dull pain in mandibular left canine. Clinical and radiographic examination revealed two roots in mandibular canine 33 (Vertucci type IV) with associated periapical lesion. A complete preoperative examination and diagnosis with more than a single radiographic projection, usage of magnification aids like dental loupes, straight line access allowed for proper diagnosis and management of this type of anatomic variation. The aim of this article is to present a case of a mandibular canine with two roots and two root canals.

Keywords – mandibular canine, radiographs, two roots, two root canals.

Introduction

Endodontic failures result due to lack of knowledge of pulp cavity anatomy and failure to negotiate and obturate the root canals. Mandibular canines are recognized as having one root and one root canal in majority of cases (Vertucci Type I).[1] It has been reported that mandibular anterior teeth exhibit more anatomical variations than their maxillary counterparts.[2] The presence of two roots and two root canals in mandibular canines is a more unusual condition. In a study conducted by Quellet, about 5% of the proportion showed presence of two roots in mandibular canine.[3] A recent study assessed the anatomy of two rooted mandibular canines by using high resolution micro computed tomography showed that root bifurcation occurred in the apical and middle thirds.[4] Finding such variations is unpredictable and the clinician must assume that any mandibular canine could present

with variation, so that any treatment complications related to unusual root canal anatomy can be avoided.

Case Report

A 35-year-old female patient reported to the dental clinic with chief complaint of pain in the lower left anterior region of jaw. Patient gave history of dull pain, which relieved on having medications. No significant medical or dental history as elicited by the patient. Intra-oral findings revealed non carious teeth with Grade I mobility and tenderness to percussion of 33. Thermal test was performed to check the sensitivity of the tooth which revealed dull pain which was increased by heat and relieved by cold. Radiographic examination revealed a vague unusual morphology of the root canal system. Additional radiographs were taken at different angulations, which revealed the presence of two separate roots and root canals (Fig 1). The lingual root was associated with periapical radiolucency. The diagnosis of symptomatic irreversible pulpitis with periapical abscess was given and root canal treatment was explained to the patient. Patient maintained good oral hygiene and was highly motivated. The tooth had a good prognosis. Mesial shift radiographs showed two roots in left mandibular canine (Fig 1). An interesting finding was radiographic investigation of the contra lateral canine also showed the same root canal morphology and tooth was healthy (Fig 2). Nonsurgical endodontic therapy was initiated with the administration of local anesthesia and rubber dam isolation. The root canal treatment was performed with the aid of dental loupes 2.5 x magnification (Zeiss, Germany). Access cavity was prepared using endo access bur # 1 (Dentsply, Maillefer, Switzerland). The pulp chamber roof and the lingual cervical ridge were eliminated using long tapered fissure bur to obtain access to the second root (Fig 3). The buccal and lingual orifices were initially enlarged using precurved k files size 15, 20

(Mani, INC, Japan). The coronal flaring of orifices was carefully performed using Sx file (Dentsply, Maillefer, Switzerland) followed by working length determination using apex locator (Root ZX II, J Morita, Japan) which was confirmed with radiographs (Fig 4). The buccal and lingual canals were enlarged to the working length upto Protaper F2 (Universal Protaper, Dentsply, Tulsa) using irrigation with 5.2% sodium hypochlorite (Cmident India, Delhi). Calcium hydroxide (Prime Dent, India) was used as intra canal dressing for 2 weeks with weekly change of dressing (Fig 5).[5] After 2 weeks tooth was evaluated clinically and radiographically, the tooth was non-tender with reduced mobility. Intracanal medicament was removed using hand files and irrigation with saline. The lingual root canal was first filled, to prevent visibility obstruction, followed by the buccal root canal using Protaper F2 (Dentsply, Maillefer, Switzerland) gutta percha cones and Seal apex (Kerr Dental) as endodontic sealer. The access cavity was sealed with composite restoration and final radiograph was taken (Fig 6). Patient remained asymptomatic and remained stable with no further treatment required. Follow up was performed which showed asymptomatic tooth with no mobility and healing periapical region (Fig 7).

Discussion

The present case report described treatment of a lower canine with a two-roots and two root canals configuration, Early detection of a mandibular canine with two roots and two root canals favourably influences the success rate of endodontic treatment, as it allows the use of specific diagnostic tools based on the anatomical particularity of the tooth.[6] In all endodontic cases, it is required to have a high quality intraoral periapical radiograph of the root and periradicular tissues at different angulations which can reflect the anatomy of the root canals and bifurcation in the cervical and middle third.[7] In the present case,

identification of two roots was easy in diagnostic radiograph which was taken at different angulations. The use of Cone Beam Computed Tomography will help to confirm the internal anatomy of roots that are not clearly visible in periapical radiographs, but this technique has limitations such as administration of a high radiation dose to the patient and possible artifact generation which should be considered when selecting the appropriate imaging modality.[8] Mandibular canine with two roots can present bifurcation at different root levels. When the division is located apically there is difficulty during the localization and chemo mechanical preparation of the root canals. In contrast, when the division is located more cervically there are increased risks of perforating the bifurcation during the search for the additional canal. In the present case bifurcation of root and root canal occurred at cervical 1/3 which is in accordance with previous study which states that bifurcation of such type is seen in 43% of cases.[9] Therefore, performing an access opening in a straight line is crucial, as it improves visualization of the whole pulp chamber and aids with the determination of the accurate division point. Sharma et al [9] and Versiani et al [4] studied the prevalence of lateral communications and furcation canals in canines and found the range between 68.9% and 29%. Therefore, the use of ultrasonic agitation and 17% EDTA in these cases increases the removal of organic and inorganic tissue from the zones untouched by the instruments.[10].

Conclusion

Radiographs taken at different angulations help to identify and treat extra roots and root canals. Straight line access cavity and magnification improves the visualisation of whole pulp chamber in identifying accurate division level of roots and helps in avoiding the perforation of bifurcation in search of extra canals. Timely diagnosis and meticulous exploration of the internal anatomy of tooth

allows for the planning of an individualized treatment protocol tailored to the peculiar morphology avoiding excessive weakening of roots.

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Figure Legends



Fig 1: Pre operative radiograph showing 2 roots

Fig 2: Contra lateral canine showing 2 roots



Fig 3: Access cavity with rubber dam isolation

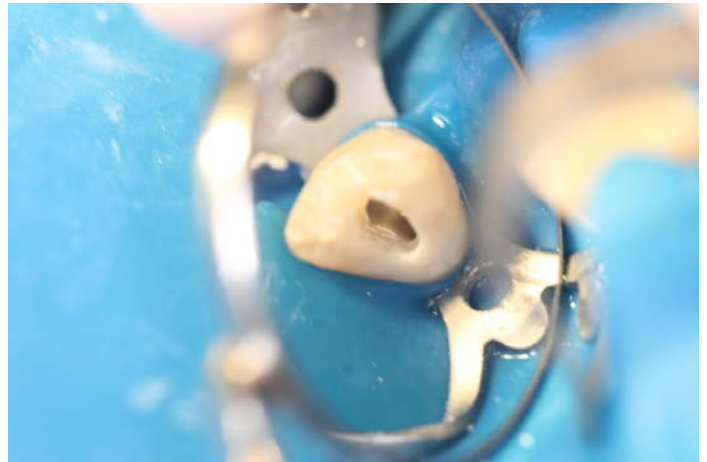


Fig 4: Working length determination (2 separate roots and root canals)

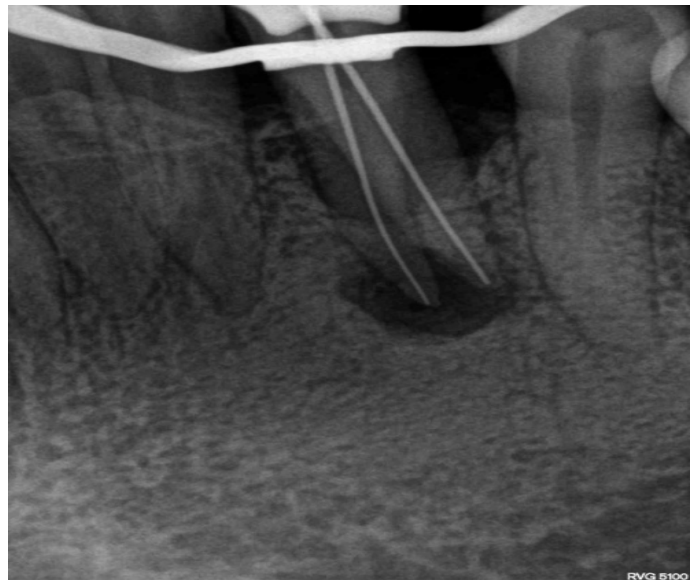


Fig 5: Calcium Hydroxide Dressing



Fig 6: Obturation radiograph



Fig 7 - 1 year follow up radiograph

