

A rare morphology of Lower Mandibular Canine with Two Root and Two Root Canal-A Case Report

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Abstract: The anatomy of mandibular canines is not always as simple as can be expected. Their existence of mandibular canines with two root and even more than one root canal must be taken into account in order to prevent the failure of endodontic treatment. The precise knowledge of these anatomical variations is essential for proper root canal therapy and consequently for the long term success, because the failure to detect the accessory canals and the incomplete radicular obturation leads to the infection of the periapical space, which will ultimately result in the loss of the tooth. This article presents a clinical case of a mandibular canine which displays a morphology with two root and two canals.

Keywords: Canal anatomy, mandibular canine, pro tapers, root canal therapy

INTRODUCTION

The aim of endodontic treatment is the elimination of infection from the root canal and the prevention of reinfection [1]. Root canal therapy may fail because of persistent infection of the root canal, unsatisfactory intracanal disinfection procedures that may lead to poor canal preparation, broken instruments and incomplete root canal fillings. Morphological features of the tooth may also adversely affect endodontic procedures [2]. Many clinicians have the perception that a given tooth will contain a specific number of roots and/or canals. Careful evaluation of research material has, however, shown that variations in tooth morphology are common. Knowledge of root canal anatomy is mandatory for the success of endodontic treatment [3-7]. In most cases, the mandibular canines are present only with one root. The occurrence of two roots and even more two root canals in the same root is rare, ranging from 1% to 5% [4,5]. Despite the low prevalence, clinicians should consider the possible variations in the number of roots and root canals of mandibular canines. This case report is of a patient with mandibular canines with two roots and two separate root canals.

CASE DESCRIPTION

A 39-year-old male patient reported to the Department of Conservative and Endodontics, with chief complaint of sensitivity in lower anterior teeth region since 6 months. Patient also complained of severe and continuous pain, aggravating on chewing and on consuming hot or cold beverage since 2 days. On examination, it showed attrition & tender on percussion in relation to lower right canine.

Radiographic evaluation showed loss of lamina-dura, and widened periodontal ligament space. An overlapping / rough irregular second line was seen which created doubt of the presence of an extra root. Radiograph with mesial shift 30 degree was taken to confirm the presence of the extra root (Fig. 1). Endodontic treatment was performed in a single session as the tooth was vital. A rubber dam was placed and endodontic access was performed under local anaesthesia with a #1014 round diamond point (KG Sorensen, São Paulo, SP, Brazil) and an Endo Z tapered safe-end bur (Dentsply Maillefer, Ballaigues, Switzerland). Location and negotiation of root canals were done with a size ISO 10 K-file (Maillefer, Ballaigues, Switzerland). The cervical and middle thirds were prepared with a SX file of the ProTaper® system (Dentsply Maillefer).



Fig-1: Pre-Op

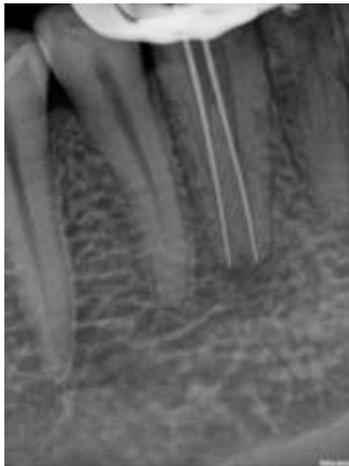


Fig-2: Working Length

Working length was determined with an electronic apex locator (Root ZX; Morita Co, Kyoto, Japan) and confirmed radiographically (Fig.2). Biomechanical preparation was performed with hand Flexofile files (DentsplyMaillefer) and irrigation with 3 % sodium hypochlorite at each change of file. Both the canals were prepared up to F2 file of the protaper system (DentsplyMaillefer). The instrumented root canals were obturated with F2 gutta-percha cones (Protaper Universal GP, Dentsply Maillefer) and an AH Plus (DentsplyMaillefer) resin-based root canal sealer and coronal restoration was done with Glass ionomer cement (Fig. 4). The 6-month follow-up showed apparent clinical and radiographic success (Fig. 5).



Fig-3: Master Cone



Fig-4: Obturation



Fig- 5: 6 month follow-up

DISCUSSION

Following the completion of crown morphogenesis and the lay down of coronal dentin and enamel extracellular matrix, the developing tooth germ begins to form root, a process that establishes connection to the surrounding alveolar bone. The mesenchyme that surrounds the enamel organ (dental sac) and that situated within the developing pulp is contiguous and derived from cranial neural crest ectomesenchyme. This mesenchyme and particularly that portion situated in the apical portion of the tooth germ, proliferates throughout the period of root development, generating not only cell populations that will contribute to the developing radicular pulp but also those that will form the developing periodontium. The epithelial rootsheath (ERS) derived from cells of the cervical loop of the enamel organ, proliferates apically, thereby establishing the demarcation between pulp and periodontium.

Diagnosis and identification of the number of roots and root canals are key factors for endodontic treatment. Bifurcations in the cervical and middle thirds may be observed radiographically when the x-ray

incidence angle does not cause superimposition of images [7]. The radiographic image should be carefully analyzed in order to interpret and identify details that may suggest the presence of bifurcations or trifurcations, such as sudden root canal discontinuity [8]. In some uncommon cases, there may be two roots, and two or three root canals [9,10]. Heling *et al.* [11] described a rare case of a root canal retreatment in a mandibular canine with two roots and three canals. Green D [3] reported two canals in a single root in 13 out of 100 mandibular canines and the presence of two canals was observed in 18% of the mandibular canines by Vertucci FJ [4]. The occurrence of two roots and two canals in mandibular canines in only 5% of all analysed teeth was reported by Ouellet R [6]. 2% of mandibular canines presented with one root and two canals and that 1% had two roots and two canals was reported [5,12]. D'Arcangelo C reported two cases of endodontic treatment of mandibular canines with two roots [12].

CONCLUSION

Failure to control infection in the root canal system has an adverse impact on outcome. Clinicians therefore should be aware of anatomical variations in the teeth they are managing, and should never assume that canal systems are simple. The majority of mandibular canines have one root and root canal, but 15% may have two canals, and a smaller number may have two distinct roots, both of which should be identified and managed.

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