

## CASE REPORT

# MANDIBULAR CANINES WITH TWO ROOTS AND TWO ROOT CANALS: CASE REPORT

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## ABSTRACT

Usually, the mandibular canine only has one root and one root canal. There has been a noticeable increment in evidence showing variations in its morphology, such as the presence of two roots and two root canals. The aim of this article was to present a case of a mandibular canine with two roots and two root canals. Root canal treatment of tooth #33 with such morphology was performed in a 47-year-old man. Although mandibular canines with two roots and two root canals are not common, clinicians should always anticipate the presence of possible variations. Therefore, timely diagnosis and meticulous exploration of such mandibular canines allow for planning of an individualized treatment protocol, tailored to their peculiar morphology, focused on avoiding excessive weakening or even perforation of the roots.

**Keywords:** Mandibular canine, Two roots.

## INTRODUCTION

The mandibular canine is a strategically important tooth in the dental arch. Its long and stable root is useful for prosthetic support due to its proprioceptive properties that regulate or guide masticatory function, combined with its role in occlusal guidance during the eccentric movements and posterior disocclusion<sup>1</sup>. Therefore, considerable effort is directed to its preservation, even though there may be diverse morphologic challenges.

Root canal morphology plays a decisive role in determining the conditions under which the endodontic treatment can be performed effectively<sup>2,12</sup>. Successful endodontic treatment comprises proper diagnosis, meticulous cleaning and shaping and three dimensional obturation. Failure to do so may lead to postoperative diseases, pain and further complications.<sup>3,13</sup> Therefore, the clinician should be aware of any anatomical variations which may alter the prognosis for root canal therapy. One of the most common reasons for failure of endodontic treatment is a missed canal due to lack of knowledge on anatomical variations.<sup>4,14</sup>

## CASE REPORT

A 47-year-old male patient visited the Endodontic Department for check up of the tooth #33. He was referred by a general dentist, being asymptomatic, with caries located in the bucco cervical region of the crown, which had reached the pulp chamber. He had no history of

systemic or allergy problems. In the clinical examination, a dental giroversion, with a maladjusted temporary restoration surrounded by recurrent cavities, was observed. Radiographic examination revealed a sudden loss in the continuity of the canal and the presence of a groove in the outer part of the root, findings that suggest the presence of a mandibular canine with two independent, narrow, and curved canals. Radiographic images of the counterpart canine showed normal characteristics. On the basis of the clinical and radiographic findings, a diagnosis of asymptomatic irreversible pulpitis and normal periapical tissues was established, and root canal treatment was planned.

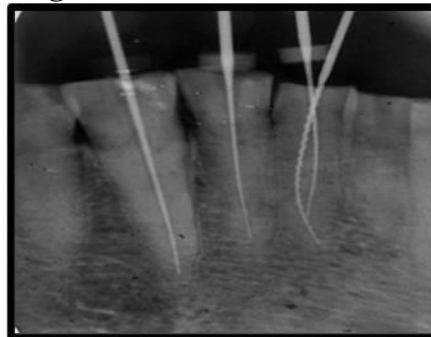
#### **Pre-operative Radiograph of #33**



After clinical examination local anaesthesia was administered. As the dental giro version impeded the lingual conventional opening, cameral access was created from the buccal side.

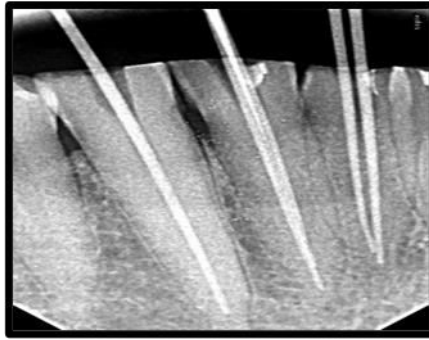
With the aid of magnification throughout the treatment, the pulp chamber roof and the lingual cervical ridge were eliminated to obtain access to the second canal. As the initial clinical and radiographic findings indicated the presence of a second root canal, the radicular pulp space was carefully screened with the DG-16 endodontic explorer, and the entrances of two root canals were found, one buccal and one lingual.

#### **Determination of Working Length**



After reaching the pulp chamber we found that there were two canal orifices situated buccal and lingual. This finding was different from the usual single orifice located in the centre of the crown/root. Hence, size Nos. 6, 8 and 10 K files were used for creating the glide path and No.15 K file was used for determining the working lengths. The radiographs were exposed in two different angulations to confirm the presence of two canals. The cervical and middle thirds were prepared with a hand file with master apical filing up to No. 35.

#### **Master cone #33**



After each file, the canals were irrigated with 5.25% sodium hypochlorite and 17% ethylene diaminetetraacetic acid (EDTA). The root canals were dried with paper points and obturated with gutta percha cones and AH-Plus Sealer using the lateral compaction technique.

### Obturation radiograph #33



## DISCUSSION AND CONCLUSION

Morphologically, mandibular canines are usually mono-radicular. The general anatomy with single root and canal is not always same for every mandibular canine. Some atypical findings like, two root canals, one or two roots with three canals; as well as two roots and two canals have been reported.<sup>5,6,7,15,16,17</sup> The complex anatomy of the mandibular canine should be thoroughly understood for proper management and a better prognosis<sup>8,9,18,19</sup>. The clinician must be mindful of variations in root canal anatomy. Mindfulness should be taken from the beginning of the treatment until its completion because endodontic treatment becomes technically difficult when unexpected complexity is found in root canal. This case reports successful management of a mandibular canine with two roots and two canals.

Intraoral periapical radiographs are essential for identifying the internal anatomy of the tooth. Radiographs taken in different horizontal angulations help in better visualization of the canals. Often a single radiograph made at the vertical and horizontal projection does not display all the roots and canals. In order to gain the access in confirming the number of root canals, tube shift technique/buccal object rule/Clark's Rule also called as SLOB (same Lingual Opposite Buccal), technique can be used. In the present case, we projected two X-rays, one at  $-20^\circ$  and the second projection was altered  $10^\circ-15^\circ$  mesially. Despite the use of different techniques for taking an intraoral periapical radiograph, there may be a chance of superimposition and distortion of the image.<sup>10</sup> The images may get foreshortened or elongated when an angle is altered while taking a radiograph. In order to overcome these shortcomings, cone beam computed tomography (CBCT) can be used for those cases to accurately determine the number of roots, curvatures, and bifurcations in both sagittal and axial planes<sup>11</sup>

Considering the facts from different studies it can be expected that the presence of root canal variations in mandibular canine is an uncommon finding, but the clinician should always be aware about anatomical diversities before endodontically treating any tooth. This case high-

lights the importance of meticulous exploration of the roots and canals during endodontic treatment of mandibular canines. When in doubt additional diagnostic techniques like tube shift techniques and cone beam computed tomography (CBCT) can be utilized for accurate identification of extra canals. Thorough knowledge of anatomical variations of root canal morphology is always essential for effective endodontic management of cases.

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