

# Endodontic Management of Single-rooted Mandibular Canine with Two Canals: A Case Series

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## Abstract

The mandibular canine usually presents one root with a single large canal located centrally. The possible anatomical variation is the existence of a single root with two canals. The incidence of mandibular single-rooted canines with two canals is usually low. The clinicians should keep in mind, possible variations in the root canal anatomy to achieve predictable results.

**Key words:** Anatomic variations, Radiography, Root canal treatment

## INTRODUCTION

A thorough knowledge of the root canal morphology and its variations are an indispensable prerequisite for the success of root canal treatment. Many roots have additional canals and a variety of canal configurations.<sup>[1]</sup>

Canine is called the “cornerstone” of the mouth because of its location, which reflects its dual function to complement the incisors and premolars during mastication. These teeth are able to withstand increased lateral pressure during the act of mastication, thus being an important abutment for any prosthetic reconstruction.<sup>[2]</sup> Mandibular canines present a complex internal anatomy. In general, mandibular canines contain a single root and root canal. There are reported cases of canines with a single root and two canals, three canals, two roots, or fused roots.<sup>[3]</sup>

This paper describes successful management of two cases of single-rooted mandibular canine with two root canals joining short of the apex.

## CASE REPORT

### Case I

A 19-year-old female patient reported to the department of conservative dentistry and endodontics with the chief complaint of moderate, dull aching, and intermittent pain in the lower right front region of the teeth for 2 months. The patient medical history was non-contributory. On examination, the lower right canine revealed proximal caries on mesio Buccal and distobuccal side. The tooth was not mobile and periodontal probing around the tooth was within physiological limits. Thermal tests were positive and electric pulp testing elicited delayed response with the right mandibular canine. A diagnostic radiograph revealed a coronal mesioocclusal caries involving enamel and dentin, a coronal distoocclusal radiolucency involving the pulp space and widening of the periodontal ligament space. The radiograph also revealed an unusual anatomy of involved tooth. It showed the presence of two separate canals at the coronal and middle one-third of root and merging at the apical third of the root. Based on the clinical and

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radiographic findings, diagnosis of symptomatic apical periodontitis was rendered [Figure 1].

### Case II

A 24-year-old female patient reported to the department of conservative dentistry and endodontics with the chief complaint of dull aching pain in the lower left front region of the teeth for 2–3 months. Aggravating factor was mastication. Intraoral examination revealed extensive tooth decay and fracture of distal part of the crown. The tooth had mild tenderness to percussion. On thermal testing, the tooth was responsive. Electric pulp testing revealed delayed response. Pre-operative radiographic examination revealed proximal radiolucency on distal aspect of canine involving pulp space, discontinued lamina dura, and widening of periodontal ligament space. The radiograph also revealed an unusual anatomy of involved tooth with two separate canals at the coronal and middle one-third of root and uniting at the apical third of the root. From the clinical and radiographic findings, a diagnosis of symptomatic apical periodontitis was made.

Local anesthesia was administered and caries was removed in both the cases. Conventional access cavity preparation was done with Endo Access Round Diamond Bur (Dentsply/Maillefer, Ballaigues, Switzerland) and an Endo-Z tapered safe end bur. Lingual modification of conventional access cavity was done to locate extra canal lingual to main canal. Exploration and negotiation of two root canals were done with a size 15 K-file. Radiographic working length measurement was done with Kodak RVG 5100 Digital Dental Unit (Kodak) and confirmed using apex locator (Root ZX J Morita). Cleaning and shaping of root canals were done using K-files (Dentsply, Maillefer) by conventional method till 30 K-file. During

root canal preparation, the root canals were irrigated with sodium hypochlorite (5.2%) and normal saline solution. The root canals were dried using absorbent paper points and obturated with 2% gutta-percha cones (DIADENT Group International, Korea) and AH Plus sealer (DeTrey Dentsply, Konstanz, Germany) by lateral condensation technique. Post-endodontic restoration was done with composite resin (3 M ESPE, A G Seefeld, Germany) [Figure 2].

### DISCUSSION

Mandibular canines present a complex internal anatomy. There are reported cases of canines with a single root and two canals, three canals, two roots, or fused roots. Hence, the complex nature of root canal morphology of mandibular canines should be thoroughly understood because additional root canals if not detected, can be a major reason for failure of root canal treatment.<sup>[4]</sup>

In the majority of cases, the mandibular canines are recognized as usually having one root and one root canal. Green and Vertucci reported that 15% of mandibular canines possess two canals with one or two foramina.<sup>[5]</sup> In the Iranian population, Aminsobhani *et al.* reported single canal in 71.8% and two canals in 28.2% in mandibular canines. Green reported the presence of accessory canals in mandibular canine to be 10%.<sup>[1]</sup> Cone beam computed tomography study revealed incidence of single-rooted mandibular canines with two canals and one foramen (Type II) is 3.2% in Indian population.<sup>[1]</sup>

It is essential that clinicians know the clinical and radiographic signs that suggest the presence of extra

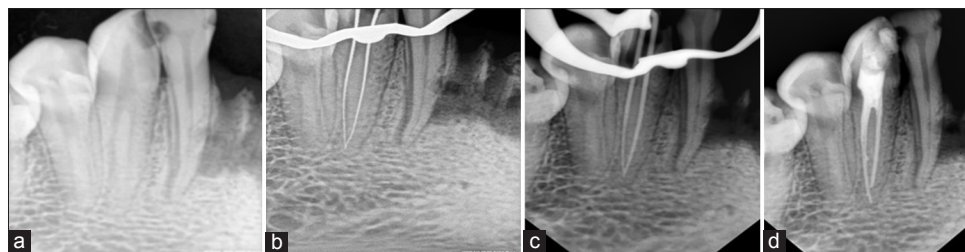


Figure 1: Case I - (a) Pre-operative image, (b) working length determination, (c) master cone selection, (d) post-obturation image



Figure 2: Case II - (a) Pre-operative image, (b) working length determination, (c) master cone selection, (d) post-obturation image

canals. The presence of continuous bleeding in teeth with pulpitis or normal pulp in spite of complete instrumentation, presence of an apical rarefaction on the lateral side of the root, extensive location of endodontic file, feeling of catch on wide and unobstructed canal during instrumentation, radiolucent line running parallel to the canal, champagne bubble test, and use of magnification are other aids of determining the presence of additional canals.<sup>[6]</sup>

## CONCLUSION

Clinicians should be aware of anatomical variations in the teeth they are managing and should never assume that canal systems are simple. Although mandibular canines have single root and single root canal, search for the second canal should be carried out. Careful clinical, as well as radiographical

examination accompanying with advance diagnostic images, should be carried out for locating extra canal.

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