



CASE REPORT

Root canal treatment in mandibular canines with two roots: a report of two cases

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Abstract

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Aim To highlight anatomical variation in the mandibular canine.

Summary Two clinical case reports are presented to illustrate anatomical variation in the human mandibular canine. Endodontic treatment may sometimes fail because morphological features of the tooth adversely affect the treatment procedures. Many investigators have reported the anatomical variations associated with mandibular canines. Mandibular canines are recognized as usually having one root and one root canal in most cases, although approximately 15% may have two canals or sometimes two roots. This paper describes two clinical cases of mandibular canines with two roots and two canals.

Key learning points

- Failure to control infection in the root canal system has an adverse impact on outcome.
- Clinicians 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.

Keywords: anatomy, endodontics, mandibular canine, two roots.

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Introduction

The aim of endodontic treatment is the elimination of infection from the root canal and the prevention of reinfection (Sjögren *et al.* 1990). However, root canal treatment may fail because of factors including persistent infection of the root canal, unsatisfactory intracanal 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 (Nair *et al.* 1990). Many clinicians have the perception that

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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. Many investigators have reported on the anatomical variations associated with mandibular canines (Pineda & Kuttler 1972, Green 1973, Vertucci 1984, Laurichesse *et al.* 1986, Heling *et al.* 1995). The following clinical reports describe endodontic treatment of two mandibular canines with two roots and two canals.

Case reports

Case 1

A 48-year-old female presented with severe pain in the right mandible. The diagnostic radiograph showed a periapical lesion associated with tooth 43 and the presence of two roots (Fig. 1). The tooth did not respond to pulp testing procedures. Rubber dam was placed and access was achieved using a round diamond bur (ISO 801001016, Komet, Lemgo, Switzerland). The pulp chamber was opened extensively to facilitate the location of the buccal and lingual canals. Working length was established radiographically for both canals (Fig. 2). The canals were instrumented with stainless steel K-files and reamers (Dentsply Maillefer, Ballaigues, Switzerland) using a step-back instrumentation technique (Schilder 1974). A 5.25% solution of sodium hypochlorite (NiClor 5, Ognà, Milan, Italy) and 17% E.D.T.A. + 0.2% cetrimide (Largal Ultra, Septodont, Saint Maitre, France) were used alternatively as irrigants at every change of instrument. The canals were filled by vertical condensation of warm gutta-percha (Fig. 3).

Case 2

A 60-year-old female presented with severe pain in the right mandible. Clinical examination revealed that tooth 43 had deep cervical caries, and a thermal test with ethyl chloride, and percussion test produced severe, long-lasting pain. A diagnosis of irreversible pulpitis



Figure 1 Case 1: Preoperative radiograph of tooth 43 shows a periapical lesion and two roots.



Figure 2 Case 1: Diagnostic length files have been placed in the two canals.



Figure 3 Case 1: Final obturation of the root canals using vertical condensation of warm gutta-percha.



Figure 4 Case 2: Preoperative radiograph of tooth 43, indicating two roots.



Figure 5 Case 2: Diagnostic length files have been placed in the two canals.



Figure 6 Case 2: Final obturation of the root canals using vertical condensation of warm gutta-percha.

was established. A diagnostic radiograph did not demonstrate periapical pathology but did indicate two roots (Fig. 4). Local anaesthesia was administered and a rubber dam placed. The opening of the pulp chamber was prepared using a round diamond bur (ISO 801001016, Komet, Lemgo Switzerland). The pulp chamber was opened extensively and a buccal and lingual canal were located. Working length was established radiographically for both canals (Fig. 5). The canals were prepared and filled as described previously (Fig. 6).

Discussion

Knowledge of anatomic variations is essential because endodontic success is related to a thorough debridement of the root canal system. Mandibular canines are recognized as usually having one root and one root canal in the majority of cases (Laurichesse *et al.* 1986). Pineda & Kuttler (1972), Green (1973) and Vertucci (1984) reported that 15% of mandibular canines presented with two canals with one or two foramina. In some uncommon cases, there may be two roots, and two or three root canals. Laurichesse *et al.* (1986) reported that 2% of mandibular canines presented with one root and two canals and that 1% had two roots and two canals. Heling *et al.* (1995) described a rare case of a root canal retreatment in a mandibular canine with two roots and three canals.

Conclusions

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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