

## CASE REPORT

### Mandibular first molar with multiple canals report of two cases

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#### Abstract

The aim of this case report is to describe the unusual root canal anatomy that was detected in two mandibular first molars during routine endodontic treatment. In the first case mandibular first molar has five root canals and in the second case four root canals were present.

**Key Words:** Middle Mesial Canal; Canal Complexity.

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#### Introduction

A thorough knowledge of both the external and internal anatomy of teeth is an important aspect of root canal treatment. However, in everyday endodontic practice, clinicians have to treat teeth with atypical configurations. Extra roots or root canals if not detected are a major reason for failure.(1, 2) Unusual canal anatomy associated with the mandibular first molar has been reported in several studies.(3)

In 1974, Vertucci, Williams and Barker et al. described presence of middle mesial canal.(4, 5) In a radiographic study of extracted teeth Goel et al. reported mandibular first molars had three mesial canals in 13.3% of specimens, four mesial canals in 3.3% specimens, and three distal canals in 1.7% of specimens.(6) In a clinical evaluation of 145 mandibular first molars Fabra Campos found four molars (2.07%) with five canals, i.e., three in the mesial root and two in the distal.(7)

In none of these four cases the middle mesial canal shows an independent course and foramen. The occurrence of three independent canals in the mesial root was reported by Pomeranz et al and Beatty and Krell described a mandibular first and second molar with three independent canals in the mesial root.(8, 9) The present report describes root canal treatment in a mandibular first molar containing three independent canals in the mesial root.

#### Case 1

The patient, aged 33 years was referred by her dentist for endodontic treatment of right mandibular first molar. Clinical examination showed deeply carious lesion that had invaded the pulp. The patient reported very acute pain, particularly at night and while drinking anything cold. An intra-oral radiograph of the tooth reveals a deep carious lesion in close proximity to the pulp and periapical radiolucent area (Fig 1a). On opening the tooth, three mesial canals and one

distal canal were found (Fig 1b). All canals were shaped with hand files (K-file, Malliefer) using the step-back technique. The canals were filled by the lateral condensation technique, using gutta-percha combined with AH plus sealer (Fig 1c). The patient was referred back to her dentist for crown reconstruction.



Figure 1a. Preop 1b. Working Length 1c. Final

#### Case 2

A 44 years old patient came to the clinic with spontaneous pain. The tooth was sensitive to percussion and did not present referred pain. On intra oral examination, the tooth was found to be deeply carious. Clinical and radiographic findings led to the diagnosis of chronic periapical abscess with acute exacerbation in relation to 46 (Fig 2a). The tooth was isolated using a rubber dam and an endodontic access cavity was established (Fig 2b). The canals were explored with a #15 K-file and revealed four distinct orifices, three mesially and one distally (Fig 2c). Cleaning and shaping was performed and then canals were obturated with gutta-percha and sealer AH plus using cold lateral condensation technique. The tooth was restored with composite and full coverage crown.



Figure 2a. Preop 2b. Working Length 2c. Final

#### Discussion

Many dental clinicians have the perception a given tooth will contain a predetermined number of roots and/or canals. Careful evaluation of research material has, however, shown deviations from the norm in tooth morphology are not uncommon<sup>7</sup>. Therefore, when root canal treatment is to be

performed, the clinician should be aware of abnormality in the root canal.

Middle mesial or multiple canals in the mesial root of mandibular molars have been reported in the literature as having an incidence of 2.07% up to 13.3%<sup>3,4</sup>. The canals may be independent throughout their course in the root with an apical opening of their own, or they may join either of the two or more common main canals. Many authors agree on the presence of three foramina in the mesial root but few report three independent canals, which presents itself as a rare anatomical variant.

Even though anatomical variations in mandibular first molars are documented in the literature, variations in the anatomy of these teeth are not recognized by a great many dentists<sup>10</sup>. Variations in the mesial root of mandibular first molar can be identified through very careful observation of angle radiographs. Buccolingual views, 20° from mesial and 20° from distal, reveal the basic information on the tooth's anatomy and root canal system required for endodontic treatment<sup>11</sup>.

Successful endodontic treatment depends on entering the pulp chamber, cleaning, shaping and obturating the canal system. Each of these procedures is very important, but any anatomical variation that is present in any of the teeth needs to be detected in order to avoid failure of the canal treatment. The present report confirms that the third canal in the mesial root of mandibular first molars and to locate it, it must be sought along the line between the two mesial canals after deroofting of the pulp chamber and of any cervical stenosis in this zone that might cover the opening of the canals, using burs.

#### Conclusion

This case report describes mandibular first molars with an unusual number and arrangement of canals. It is characterized by the presence of three canals in the mesial root with all canals having separate orifices in the pulp chamber floor. Each canal has its own independent course but terminates in a common apical foramen.

Usually, a prudent inspection of the pulp chamber floor by proper visualization allows the clinician to search the additional canals. Dental clinicians should keep this possibility in mind whenever they perform root canal treatment.

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