Endodontic Treatment of Mandibular Canine 
with Two Root Canals: A Case Report

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Abstract

The main reason for unfavorable outcome in endodontic treatment of mandibular anterior is the inability to detect the presence of second canal. Pain even after extirpation of complete pulp tissue from root canal of vital teeth is the main indication of hidden canals.

Keywords: Two root canals, Missed canals, Canine

Introduction

Additional root or root canals if not identified are a major reason behind failure of this treatment. Incomplete removal of all the irritants from the pulp space may increase the possibility of treatment failure. The principle reason for failure in root canal treatment of mandibular anteriors is the inability to recognize the presence of a second root canal, which can then not be prepared and obturated during treatment. Complete debridement and obturation of the root canal system is a key component for successful endodontic treatment. The operator should therefore have exhaustive learning of the root canal morphology of the teeth. The mandibular anterior teeth are not frequently cariously involved, but rather there are numerous situations where these teeth require endodontic treatment. It was initially believed that mandibular incisors generally have only one root canal.¹ However, studies have revealed high variety of root canal morphology among mandibular anterior teeth.² The study completed by Bellizzi et al. in 1965 demonstrated high predominance of two canals in the mandibular incisors,⁵ which stimulated further researches on the canal configuration of other teeth, especially ones with generally low endodontic success rate. These reviews, did on various populations with different techniques²,⁷-¹² demonstrated that the root canal morphology varies with race, sex, and age.³ The predominance of two canaled mandibular incisors has been accounted to be 11% in UK and 70% in Turkey.¹³,¹⁴ The presence of the second canal in mandibular canines has been reported to be 7.8% in a Brazilian population and 38% in a Turkish population.

Case Report

A 24-year-old male patient reported with chief complaint of pain in the mandibular anterior region since 1 month. The tooth was tender on percussion. In view of clinical and radiographic findings, diagnosis of irreversible pulpitis with acute apical periodontitis was made and endodontic therapy was anticipated for the same (Fig. 1). Under optra dam and local infiltration of mandibular anteriors, proper access opening was made and enlarged buccolingually and extended into cingulum gingivally, which revealed the presence of a lingual canal. The patency was checked using a No. 10 K file. Working length was dictated by placing a No. 20 K file in the buccal canal and No. 15 H file in the lingual canal, using digital radiography. The presence of separate canals was confirmed using different angulations (Fig. 2). Cleaning and shaping was carried out using conventional hand instruments. 2.5% of sodium hypochlorite and 17% EDTA were utilized for irrigation. The canals were rinsed with normal saline after each instrument change. The root canals were then filled with gutta-percha using the lateral condensation method and Apexit (VOCO GmbH, Cuxhaven, Germany) as the sealer (Fig. 4). The access cavities were restored with glass ionomer cement. Radiographs were taken with multiple angulations (20 degree right and 30 degree left horizontal beam angulation) for better identification of two canals⁷ with follow up radiograph of 3 months, 6 months, and 9 months (Fig. 5).

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Figure 1. Preoperative Radiograph

Figure 2. Working Length Determination

Figure 3. Mastercone Radiograph
Discussion

A well-designed access preparation is essential for a good endodontic outcome. Without adequate access, instruments and materials become difficult to handle properly in the highly complex and variable root canal system. Appropriate access cavity preparation provides straight or direct line access to the apical foramina or at least to the initial curvature of canal to find all root canal orifices and it also conserves sound tooth structure. Mandibular anteriors because of their small size and internal anatomy may be most difficult access cavities to prepare. Complete removal of the lingual shoulder is critical, because these teeth often have two canals that are buccolingually situated and lingual canal regularly is missed. To avoid missing this canal, the clinician ought to extend the access preparation well into cingulum gingivally, which, if present, is found directly underneath it. When there are two canals, the buccal canal is the easiest to find and is for the most part straighter than the lingual canal, which is frequently shielded by lingual shelf. In this case, extension of the access opening lingually underneath the cingulum uncovered the missed lingual canals in mandibular canine.

One of the primary explanations behind endodontic treatment failure in mandibular incisor teeth is the inability to locate, debride, and obturate the missed lingual canal. Immediate relief of pain after location and debridement of second canal affirmed the reason of pain to be the missed lingual canals.

Thus, careful interpretation of the radiographic feature taken from various angles should be done before beginning root canal treatment. One must be cautious while access opening, and initial buccolingual widening of mandibular incisors, and gingival extension beneath the cingulum must be made to scan for a possible second canal lingually. The percentage rates of two root canals (type vertucci IV) with discrete apical foramina in the mandibular central and lateral incisors are 3% and 2% respectively and in the canines it is 6%.

Conclusion

The primary reason behind failure of endodontic treatment
of mandibular canine can be because of the failure to recognize and treat second root canal, generally lingual canal. Thus, careful interpretation of radiographs taken from various angulations is essential. Practice of extension of access cavity buccolingually and gingivally underneath cingulum will help to detect extra lingual canal, if present, in each mandibular canine.

Conflict of Interest: None

References


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