Endodontic management of bilateral mandibular canine with type two canals configuration

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Abstract

Successful endodontic treatment depends upon the clinician’s knowledge and ability to manage aberrant anatomy. The mandibular canine normally comprises one canal and one root but 15% may have two canals with one or two foramina and even less frequent may have two roots. This paper presents a case report of bilateral mandibular canine having two root canals which merge into one canal and one foramina.

Keywords: Bilateral, canal configuration, endodontic management, mandibular canine

Introduction

Proper diagnosis of the root canal system influences the endodontic management and its outcome.[1] Mandibular canines usually have one root and one root canal however, approximately 15% may have two canals or may have two roots.[3]

A previous study of Sikri and Kumar[3] on permanent human mandibular canines showed anatomic variation in the root canal system. They found the canal configurations (Vertucci’s). Type I (70%), Type II (4-12%), Type III (4-6%), Type IV (4-10%), Type V (2%), straight canals (53.84-60.71%), curved canals (46-39%), apical foramen centrally located (34.61-57.14%), and apical foramen laterally located (65.38-42.85%).

Various clinical cases has been reported in the literature involving anatomical variation in mandibular canines. A review of literature on previous studies of mandibular canines was shown in Table 1 (percentage of canals with Type II morphology),[3‑11] [Table 2] (Bilateral presence of two canals in a single root [case reports]),[12‑15] [Table 3] (Type II canal configuration in a single root [case reports]).[16‑21]

It was found that only one study[15] was reported with bilateral Type II morphology in mandibular canine till date. The present case report describes the bilateral mandibular canine with two canals joining short of the apex with one canal and one foramina in a single root.

Case Report

A 54-year-old woman reported to the department with discolored bilateral mandibular canines. Both the canines were carious [Figure 1]. Radiographic examination revealed bilateral mandibular canine with two canals without any periapical changes [Figures 2 and 3]. Both the canines were nonresponsive to electric pulp tester. A diagnosis of pulpal necrosis was made. As the carious lesion was on the mesio buccal surface, the carious lesion was removed and the access was made from the buccal aspect [Figure 4]. The buccal and lingual orifices were identified and negotiated with no 8 and 10 k files. The buccal canal was having a straight path and the lingual canal was curved. The GG drill no 1, 2 were used in crown down method under dental operating microscope to enlarge the orifices and to have the straight line access. The working length was measured with the help of an apex locator and verified with radiograph [Figures 2 and 3]. The lingual canal was merged with the buccal canal forming single canal at the apical third. Both the canals were instrumented and obturated by the method described by Castellucci.[22]

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used during the preparation. The canals were irrigated with 3% NaOCl and saline with each change of instrument. The buccal canal was enlarged till 25.04 Hyflex CM file (Coltene Endo). The lingual canal was prepared till 20.04 Hyflex CM file (Coltene Endo). The Ca(OH)₂ dressing were placed in the canals and the patient was called after 1 week. The patient was asymptomatic after a week and the canals were irrigated with 3% NaOCl and saline, dried with paper points and were obturated with Gutta-percha of respective size and AH plus sealer using lateral condensation. The access preparation was thereafter restored with composite resin [Figures 2 and 3].

Discussion

The root canal morphology can be complex and should be thoroughly understood prior to the endodontic treatment. Thorough evaluation of radiograph is equally important. Endodontic exploration using magnification tools such as dental operating microscope helps in the identification of an extra canal. Additional root canals if not detected, are a major reason for failure[23] of the treatment.

Mandibular canines usually have a single root with one canal; however, variation in the number of roots and root canals has been reported. Previous studies[4,5,28] reported that 15% of mandibular canines possess two canals with one or two foramen. Mandibular canine with two roots and two canals,[2] two roots and three canals with two foramina[25,26] have also been described. All these cases show complex nature of the root canal, morphology of mandibular canines. The case reported was also of complex nature showing bilateral presentation of Type II canal morphology in mandibular canines within the same patient. Root canal in a mandibular canine with a single root and single canal usually does not cause procedural errors during instrumentation. However, mandibular canines presenting with two roots or two canals poses difficulty during biomechanical preparation as the long axis of the canal meets the crown surface at the incisal edge or on the labial surface. Therefore modifications in the access preparation were needed to avoid procedural error particularly on the buccal side of the canal. In addition, in cases of two canals and two canal orifices, the closer the orifices to each other, the greater the chance of the two canals joining at some point within the body of the root.[6,8,12] In the present case, since there was carious lesion on the mesial aspect with wide buccal embrasure on both the mandibular canines, access preparation was made from the bucco-mesial aspect thereby preserving the tooth structure and making the straight line access and instrumentation of both the canals convenient and predictable.

Type II canal configuration where two canals merge into a single canal short of the apex requires meticulous adherence to technicalities. Blockage of canal may occur as the pulp tissue or organic debris may be pushed from one canal into the adjoining canal. Manual exploration of these canals should be done carefully with radiographs before the use of larger or rotary instruments to avoid procedural error. Coronal pulpal tissue removal with hand instruments should be done as much as possible prior to going down into the canal.[27]
The use of rotary instrument in such canal configuration requires precaution to avoid instrument separation as the instrument would be penetrating the joined part at a very acute angle or at a right angle, when it reaches the canal confluence. Therefore in the present case, Hyflex CM files with 4% taper were used for enlargement. Schilder suggested alternative preparation of such canals to prevent apical hourglass preparation which otherwise makes obturation difficult. Castellucci suggested the cleaning and shaping of the straight canal first till the apex followed by curved canal till the point of merging. During obturation also, the main canal should be first obturated and thereafter the second canal was obturated to the point of merging.

**Conclusion**

The knowledge of the morphologic variation is of paramount importance for the clinician for diagnosing and treating such complicated cases. Radiographs and magnification devices such as dental operating microscope are also important tools in identification and management of extra canals.

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