



ISSN Print: 2394-7489  
ISSN Online: 2394-7497  
IJADS 2020; 6(1): 233-235  
© 2020 IJADS  
[www.oraljournal.com](http://www.oraljournal.com)  
Received: 16-11-2019  
Accepted: 18-12-2019

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## Endodontic management of mandibular canine with type two canal configuration: A case report

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### Abstract

Mandibular canines are usually seen with a single root and a single canal. The occurrence of two canal joining to one foramen is a rare entity with approximately 15% prevalence. Successful endodontic treatment relies on proper diagnosis, thorough cleaning and shaping followed by three dimensional obturation. It also depends upon the clinician's knowledge and ability to manage aberrant anatomy. Failure to achieve this results in post endodontic complications. This paper presents a case report of bilateral mandibular canine having two root canals which merge into one canal and one foramina.

**Keywords:** Mandibular canine, bilateral, endodontic treatment

### Introduction

According to Vertucci's classification of the root canal configurations, the human permanent teeth has various types of tooth anatomy ranging from single to three separate and distinct canals. Through many researches, morphology of pulp has shown a wide variety of shapes and the occurrence of two or even three canals in a single root. There is an increased incidence of fins which run longitudinally within the walls of the canal attributing to multiple root canals in single root teeth.

Before treatment, a clinician must have an insight into the morphology of the tooth to be treated. The product of good endodontics is appreciation of root canal anatomy and carefully performance of cleaning and shaping. This can be achieved by routine periapical radiographs to assess the number, length, curvature and aberrations of the canal system of the tooth.

Mandibular canines usually have one root and one root canal however, approximately 15% may have two canals or may have two roots<sup>[1]</sup>. Three canals and two foramina in a mandibular canine as well as two roots and two canals were also been reported<sup>[2, 3]</sup>. All these morphological variations are suggested to be the result of the abnormal development of the tooth and the root.

### Case Report

A 43-year-old men reported to the department of Conservative dentistry and Endodontics with the chief complaint of discolored lower front tooth regions. On examination, left lower lateral incisor and canine was carious and nonresponsive to electric pulp tester [Fig 1]. A diagnosis of pulpal necrosis was made irt 42, 43 and treatment plan was made as root canal therapy followed by crown. Tooth was isolated using rubber dam. The carious lesion was removed and the canine access was made from the lingual aspect. The buccal and lingual orifices were identified and negotiated with no 8 and 10 k files. The buccal canal was having a straight path till the apical third and then buccally curved canal were as the lingual canal was curved and connected the buccal canal at the starting of apical third. The GG drill no 1, 2 were used in crown down method 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 [Fig 2&3]. The lingual canal was merged with the buccal canal forming single canal at the apical third. Both the canals were instrumented and obturated. The ethylenediaminetetraacetic acid (glyde, dentsply) was 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  $\text{Ca(OH)}_2$  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 [Fig 2 & 3].

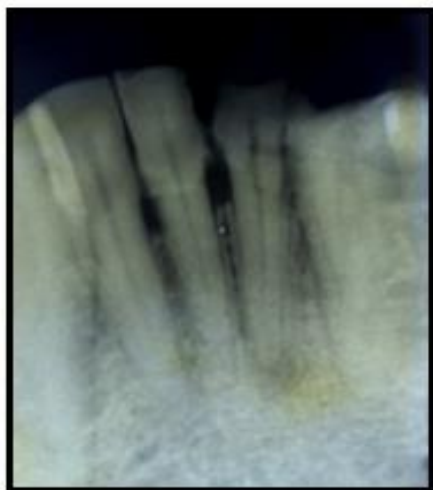


Fig 1: Preoperative IOPA



Fig 2: Access preparation showing two canal orifice irt 42



Fig 3: WL Determination

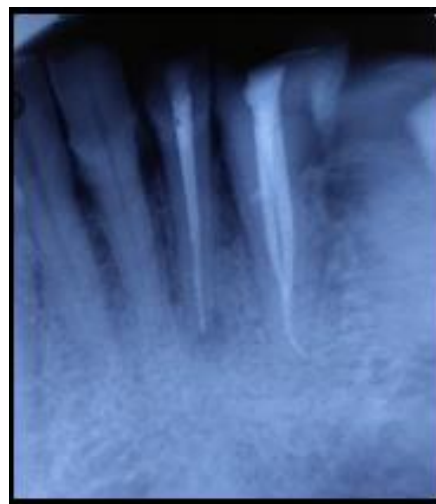


Fig 4: Obturation completion

### Discussion

With a correct diagnosis and careful clinical and radiographic inspection, the Endodontic success can be anticipated in the teeth with variations in the number and morphology of canals. To achieve tis success, the complex root canal morphology should be thoroughly understood complete evaluation of radiograph is equally important prior to the endodontic treatment. Endodontic exploration using magnification tools such as dental operating microscope helps in the identification of an extra canal. Fail to detect the additional root canals, are the major reason for the endodontic failure [4]. Mandibular canines usually have a single root with one canal; however, variation in the number of roots and root canals has been reported.

According to the study conducted by Sikri and Kumar [5] on permanent human mandibular canines 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%).

Many studies [6-8] reported that 15% of mandibular canines possess two canals with one or two foramen. The case reported was also of complex nature showing Type II canal morphology in mandibular canine. Procedural errors during instrumentation are less in case of Root canal in a mandibular canine with a single root and single canal compared to mandibular canines presenting with two roots or two canals which poses difficulty during biomechanical preparation. This is because 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, particularly on the buccal side of the canal were needed to avoid procedural. In addition to this, 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 [9-11]. In the present case, since there was carious lesion on the lingual aspect with attrited incisal edges, access preparation was made in the bucco-lingual aspect, making the straight line access and instrumentation of both the canals convenient and predictable.

The present case had a Type II canal configuration where two canals merge into a single canal short of the apex. Blockage of canal may occur as the pulp tissue or organic debris may be pushed from one canal into the adjoining canal. Hence 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 is removed as much as possible with hand instruments prior to going down into the canal <sup>[12]</sup>. Rotary instruments in such canal configuration are used with extra precaution to avoid instrument separation because the instrument would penetrate and block the connecting point of two canals. The joined part at a very acute angle or at a right angle, when it reaches the canal confluence <sup>[13]</sup>. Therefore in the present case, Hyflex CM files with 4% taper were used for enlargement. To prevent apical hourglass preparation and making obturation difficult Schilder <sup>[14]</sup> has suggested the possible alternatives. While according to Castellucci <sup>[15]</sup> the cleaning and shaping of the straight canal till the apex is done first followed by curved canal till the point of merging. Also during obturation, the main canal should be obturated first and thereafter the second canal was obturated to the point of merging. In this case report of the endodontic treatment of mandibular canine with type II canal configuration the similar procedure was followed and successful outcome was achieved.

### Conclusion

The clinician thorough knowledge of the anatomic variation is the key factor in diagnosing and treating such complicated cases. With the right use of radiographs and magnification devices (DOM), identify and management of extra canals can be a satisfactory and favourable outcomes to both clinicians and patients.

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