

Endodontic Management of Monoradicular Mandibular Canine Having Two Root Canals: A Rare Presentation.

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Abstract

Mandibular canines, usually, have one root with a single canal. The incidence of two roots or two canals is a rare entity with an occurrence of only 1 to 5% in literature. The anatomy of root canal morphology plays a vital role in determining the conditions under which endodontic treatment can be performed effectively.^[1] Successful endodontic treatment includes effective diagnosis and treatment planning, thorough cleaning and shaping followed by 3- dimensional obturation to seal the canals. This article reports a clinical case of endodontic treatment of mandibular canine with one root and two root canals.

Keywords: Mandibular canine, two root canals, Endodontic treatment, root canal anatomy.

Introduction

The aim of endodontic therapy is successful elimination of all pathogenic substances from the root canal space and to seal the root canal system with a 3-dimensional obturation

that provides a fluid tight seal. Morphological variations of a tooth adversely affect the outcome of endodontic procedures. Ignoring the possibilities of such variations being present and having the perception that a given tooth will contain a specific number of roots and/or canals can lead to failure of the endodontic therapy. Careful evaluation of research material has shown that variations in tooth morphology are common.^[2] In mandibular anterior teeth, prevalence of two or three root canal has been reported to be as low as 1% and as high as 43%.^[3] Although the occurrence of two roots or two canals is a rare finding in mandibular canines (1 to 5%), clinician should be aware of these anatomical variations in the number of roots & root canals for successful endodontic management.^[4]

The following paper presents a case of successful endodontic management of mandibular canine having single root with 2 root canals.

Case report

A 42-year-old female patient reported to Department of Conservative Dentistry and Endodontics with a chief complaint of pain in lower right anterior region from last 3 months. Clinical examination revealed generalized severe attrition of her teeth with tenderness to percussion on the mandibular right canine. On thermal testing, pain lingered for several minutes even after removal of stimulus. A clinical diagnosis of chronic irreversible pulpitis with symptomatic apical periodontitis was made and root canal therapy was recommended. Intraoral periapical radiographs taken in different horizontal angulations revealed one root and 2 root canals.

Local anaesthetic (1:100,000 epinephrine) was administered and a medium thickness rubber dam of 6 × 6 inches (Hygienic; Coltene Whaledent) was used for isolation. Access cavity was prepared with an endo access round diamond bur & an endo-Z tapered safe-end bur. Negotiation of root canals was done with a size 10 K file. Exploration in the access cavity demonstrated the presence of an extra canal orifice, lying palatal to the main canal. Working lengths were determined radiographically by placing H file # 20 in buccal canal and K file # 15 in the palatal canal, it was found that the palatal canal joined the buccal canal just in the apical third of the root (Vertucci's type II canal configuration)

Cleaning and shaping was done manually till # 35 k files followed by protaper rotary Ni-Ti files up to #25 (0.06 taper).

After each file, the canals were irrigated with 5.25% sodium hypochlorite and 17% ethylene diamine-tetraacetic acid (EDTA). The root canals were dried with paper points and obturated with F2 ProTaper Gutta Percha cones using AH Plus Sealer (Dentsply Maillefer, Switzerland). Temporary restoration was placed & the patient was recalled after one week for evaluation. On subsequent

appointment the patient was found to be symptomless & was referred to prosthodontic department for fixed prosthesis after post endodontic restoration.

Discussion

Morphologically, permanent mandibular canines are mostly monoradicular.^[5] Review of the current available literature suggests an apparent divergence of opinion as to the anatomy of root canal system of the human permanent dentition. The incidence of two root canals in single-rooted teeth has been reported to be as low as 0.0% and high as 6.25%.^[6,7] Different authors have put forward their view on the roots and canal morphology of mandibular canine.^[4,5,8,9] Vertucci^[10] in a study observed 18% of canines having two canals. Similarly, Green D^[6] observed two canals in a single rooted canine in 13 out of 100 teeth examined. In a study conducted on internal anatomy of mandibular canines, analysis showed that 98.3% had only one root, 4.9% two canals and one foramen, 1.2% two canals and two foramen.^[11] Kafe et al.^[12] examined 400 mandibular canines; and Pineda and Kuttler^[13] studied 187 teeth radiographically and observed number of two canals in 13 and 18.5% respectively.

The purpose of endodontic treatment is to completely debride pulp tissue, micro-organisms and bacterial products prior to obturation, thus creating a favourable environment for healing of peri-radicular tissues. Locating and treating all canals is pivotal for success of nonsurgical endodontic therapy. As rare as they may be, variations in root canal anatomy is prevalent and can be detected by careful endodontic exploration along with thorough knowledge of the root canal anatomy. In addition, suspicion or identification of additional root canals can be made via radiographs from several different angulations which is essential to grant the highest possible probability for success of treatment.



Figure 1 : Working Length Determination

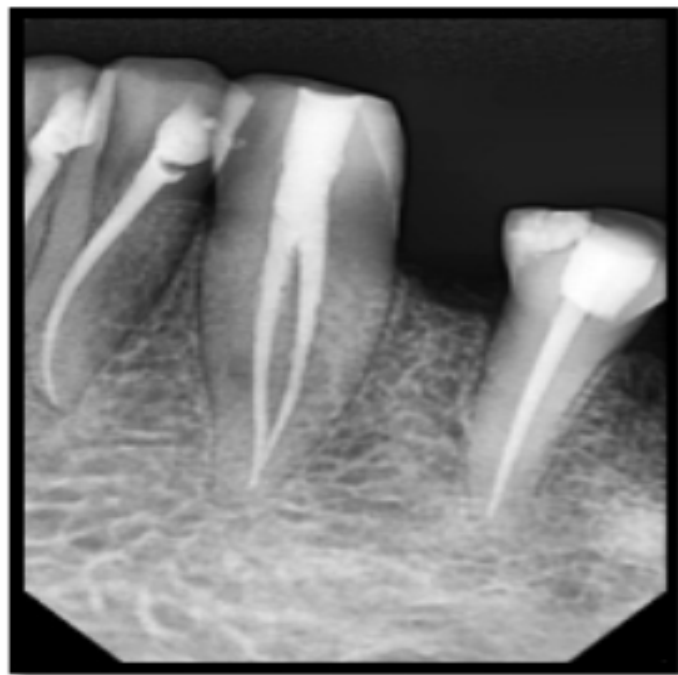


Figure 3: Post Obturation

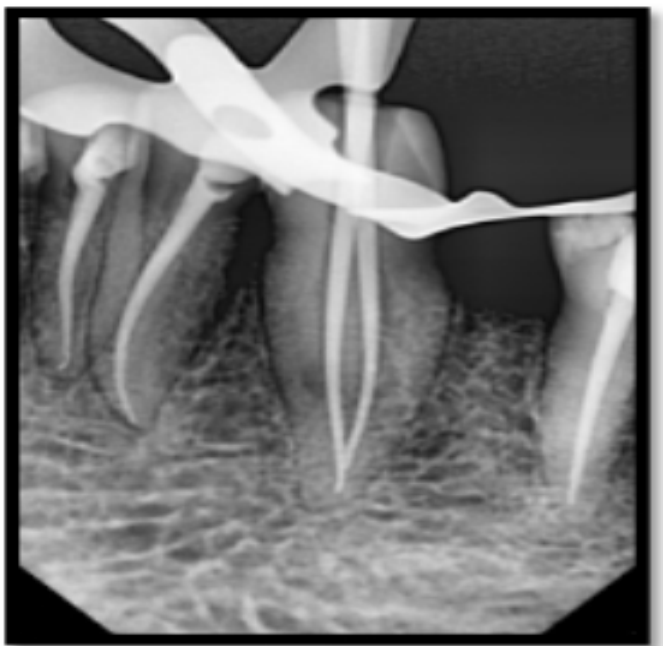


Figure 2: Master Cone Radiograph

Conclusion

Although the presence of root canal variations in mandibular canine is an uncommon finding, but anatomical diversities are prevalent & must always be looked into before commencing endodontic treatment. Significance of scrupulous exploration of the root canals is to be laid emphasis on during the course of the root canal treatment. Additional diagnostic techniques like the buccal rule of intra-oral radiography or the use of specialised radio-diagnostic techniques like the “cone beam computed tomography (CBCT)” can aid in enhancing the accuracy of identifying extra canals. Elaborate comprehension of anatomical diversities of the root canal system is invariably essential for effectual endodontic management.

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