

Endodontic management of a permanent maxillary canine with Vertucci's type II canal configuration: A Case Report

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Abstract

A successful root canal therapy requires an extensive knowledge of tooth anatomy and root canal morphology because of anatomical variations in root canal system. The maxillary canine is normally single-rooted with a single canal, and deviations from that are relatively rare. Vertucci¹ Classified the human permanent teeth root canal configurations into different types ranging from single to three separate and distinct canals. This article presents a case of endodontic management of a maxillary canine in which there is an additional canal. The extra canal opening was located with the help of a Dental operating microscope (DOM).

Introduction

According to reports anatomical variations of two canals associated with mandibular canines is 15% (Pineda F & Kuttler Y 1972, Vertucci FJ 1974, Sjögren U et al 1990). Two root canals in a permanent maxillary canine are considered as an unusual condition. But cases with two canals have been reported in the literature (Weisman MI 2000, Alapati S et al 2006, Bolla N & Kavuri SR 2011, Mohammed et al 2015). Variation of root canal morphology in the maxillary canine according to race has been reported in the Caucasian population (Vertucci FJ 1974) as well as in Turkish (Sert S & Bayirli GS 2004). One Study on root canal morphology of permanent canines within Indian population was done (Amardeep NS et al 2014) and according to this the incidence rate is 2.9%. This case report describes an

endodontic treatment of maxillary canine with Vertucci's type II canal configuration in an Indian male patient.

Material&Methods

A 30-year-old Indian male patient reported to the clinic with the chief complaint of pain in upper left front region since few days. Intensity of pain increased on chewing food and was relieved after removing the food lodgment and by taking medication. Clinically, a deep carious lesion was identified on the disto-palatal aspect of #23 and the tooth was tender when percussed. No significant medical history or family history was present. His dental history include prosthesis, a long span metal bridge was fabricated 5 years back in the region of #24 #25 #26. After informed consent vitality testing was performed using cold thermal test which determined that the tooth was non-vital. There was no mobility and periodontal status was normal. Pre-operative radiograph shows radiolucency involving dentine in distal surface and localised periapical radiolucency (Figure 1)

Local anaesthesia was administered (lidocaine 2% with epinephrine 1:100,000) and multiple teeth isolation was done using a 6 *6 medium thickness rubber dam (MCare). After excavation of caries (Figure 2) access to the pulp chamber was obtained using a round diamond bur (Mani Inc., Japan) under dental operating microscope.

The root canal was located and accessed using 10 no. K File and working length was

established at 25 mm following radiographic verification. After completing the biomechanical preparation of one canal with protaper gold files (Dentsply Tulsa Dental Products, Tulsa, OK, USA) while checking for final apical patency, the 10 no. K File appeared to enter another orifice located palatally, which seemed unexplored on tactile perception. To confirm a radiograph was taken using a 25/6% Gutta Percha (GP) cone in one canal and a 15 no. K File in the other. (Figure 3) File caused marks on the GP which confirmed that the canals were merging 5 mm from the apex. (Figure 4) and confirmed Vertucci's type II. Both the canals were instrumented till 25/6.

The two canals were cleaned, shaped (Figure 5), filled with calcium hydroxide paste and the tooth was temporized using Teflon tape and temporary cement. After one week the patient indicated full pain relief. Then the canals were irrigated with 5.25% sodium hypochlorite with a 5cc syringe along with EDTA liquid and saline and 30-gauge side vented needle was used under rubber dam. Irrigation activation was done using PRO AGITATOR TIP SYSTEM (PATS) (Figure 6). Canals were obturated with lateral condensation technique using gutta percha and a resin sealer (Figure 7) (Figure 8). Post obturation restoration was done using composite (Figure 9). The patient remained completely asymptomatic during follow up. Periapical healing was seen after 3 months (Figure 10). No conflict of interest exists for this case report.

Results

This case report is given to increase the awareness of clinicians and shed the light on anatomical variations in teeth morphology. It shows that special care is required to detect and treat possible additional canals as in this case a successful healing of the periapical lesion was seen.

Discussion

This case is being reported to advice all clinicians that they must remain aware with the fact that a fixed number of root/root canals in teeth is an obscure fact. Lack of locating and

filling a canal has been shown to be a causative factor in endodontic therapy failure. Over the process of nonsurgical endodontic therapy it is of utmost importance that all canals are found and treated. Although the prevalence of the root canal anomalies is rare. Radiographs of different angles with a file in place may be helpful in finding and locating extra canals. Here a careful radiographic evaluation, clinical endodontic exploration, and the use of magnification or DOM, may lead to the identification or suspicion of additional canals. These extra canals can also be identified using magnification loupes, transillumination of the pulp chamber, ultrasonic tips, Cone Beam Computed Tomography etc. The relationship of the two canal orifices to each other is also significant, as the closer the orifices are to each other, the greater the chances that the two canals join at some point within the body of the root (Pineda F & Kuttler Y 1972, Vertucci F 1984) Here we can take a confirmatory Xray with a GP cone in one canal and file in other to see the exact point where the canals merge.

References

1. Vertucci F (1984) Root canal anatomy of the human permanent teeth. *Oral Surgery, Oral Medicine, Oral Pathology, and Oral Radiology* 58, 589-599.
2. Sjögren U, Hagglund B, Sundqvist G, Wing K (1990) Factors affecting the long-term results of endodontic treatment. *Journal of Endodontics* 16, 498-504.
3. Pineda F, Kuttler Y (1972) Mesiodistal and buccolingual roentgenographic investigation of 7,275 root canals. *Oral Surgery, Oral Medicine, Oral Pathology, and Oral Radiology* 33, 101-110.
4. Vertucci FJ (1974) Root canal anatomy of the mandibular anterior teeth. *The Journal of the American Dental Association* 89, 369-37.
5. Mohammed, Nizar Mohammed & Mandorah, Ayman & Alqashqari, Tahani A (2015) Maxillary canine with two root canals. *Saudi Endodontic Journal* 5, 146.

6. Weisman MI (2000) A rare occurrence: A bi-rooted upper canine. *Australian Endodontic Journal* 26,119-120.
7. Alapati S, Zaatar EI, Shyama M, Al-Zuhair N (2006) Maxillary canine with two root canals. *Medical Principles and Practice* 15, 74-76.
8. Bolla N, Kavuri SR (2011) Maxillary canine with two root canals. *Journal of Conservative Dentistry* 14, 80-82.
9. Sert S, Bayirli GS (2004) Evaluation of the root canal configurations of the mandibular and maxillary permanent teeth by gender in the Turkish population. *Journal of Endodontics* 30, 391-398.
10. Amardeep NS, Raghu S, Natanasabapathy V (2014) Root Canal Morphology of Permanent Maxillary and Mandibular Canines in Indian Population Using Cone Beam Computed Tomography. *Anatomy Research Journal* 2014, 1-7.