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Research Paper

# Root Canal Treatment of A Maxillary Canine With Two Root Canals: a Case Report

Medical Science

**KEYWORDS :** Maxillary canine, two root canals, unusual anatomy

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## ABSTRACT

*Although there is a wide range of variation regarding the frequency of occurrence of the number and shape of the canals in each tooth, reported in the literature; maxillary canine rarely shows any anatomic variability. Maxillary canine with one canal is usually seen during routine endodontic treatment. The present article describes the root canal treatment of a maxillary canine with an unusual anatomy of having two root canals.*

**Introduction:**

Normally during the routine endodontic therapy, most of the dentists sideline the much required fundamental radiographic interpretation of the involved tooth before doing endodontic therapy and begin root-canal treatment with preconceived ideas about the anatomy and position of pulp chamber and root canals. Such attempts lead to large number of endodontic failures which are mainly due to missed canals. Failure to find and fill a canal has been demonstrated to be a causative factor in the failure of endodontic therapy.[1] Thus it becomes very important that all canals be located and treated during the endodontic therapy so as to debride the root canals of pulp tissue remnants, microorganisms and bacterial products completely to ensure successful endodontics. The root canal system of any tooth has the potential of being very complex. Multiple canals and multiple roots of maxillary anterior teeth with or without any developmental anomalies have so far been reported[2].Most commonly met root anatomy of Maxillary canine is single-root with single canal. Two root canals in a permanent maxillary canine is a rare condition.[3]

This case report presents the root canal treatment of maxillary canine having two root canals.

**Case Report:**

Patient reported with chief complaint of decayed tooth in left upper front region since 6-7 months. Patient gave history of carious tooth in the maxillary left anterior region since 6-7 months. 5 months back patient started experiencing pain in the same region. The pain precipitated on exposure to hot and cold. The pain was sharp, intermittent and severe. The pain lingered on even on the removal of stimulus. The pain got relieved only on medication. The patient got the root canal treatment of the tooth started 5 months back from another dentist but once the pain got relieved, did not get the treatment complete. Since then the tooth has grossly decayed and is asymptomatic. The patient now wanted to get the treatment complete. The medical history was non-contributory. Clinical examination revealed grossly carious #23 and Class II caries 22. The tooth was asymptomatic to palpation and percussion. Mobility and depressibility were also found to be absent. Periodontal probing was within normal limits. Vitality pup testing using electric pulp tester showed #23 was non vital and #22 responded within normal limits to electric pulp test. Preoperative radiographic (Figure 1) revealed open grossly carious crown #23 with two root canals in a Vertucci Type II (2-1) pattern. #22 showed class II caries approximating the pulp chamber. No specific periapical pathosis was found #22, 23.



**Figure 1: Diagnostic Radiograph # 23**

Root canal treatment was planned #23 with coronal rehabilitation with post and core followed by Full veneer Porcelain Fused to Metal crown. Class II composite restoration with GIC base #22 was planned. The carious tooth structure was removed #23. Lingual access was refined. Two separate canal orifices were located. The working length was determined radiographically with size 15 K-file and 20 no. H-file (Dentsply Maillefer, Ballaigues, Switzerland) (Figure 2).



**Figure 2: Working Length Radiograph #23:**

The cleaning and shaping was done using the step-back technique and using sodium hypochlorite and normal saline for copious irrigation. The canals were enlarged up to a master apical size of ISO 45 K file. Coronal flaring was achieved with Gates Glidden drills (Dentsply-Maillefer) using no. 3 at the cervical and no. 2 at the middle-thirds of the root canals. The preparation was carried out with manually used nickel-titanium files. During the preparation the dentin septum between two canals

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in the coronal third got chipped away. Thus the two canals merged into single canal coronally also. An apical tug back was achieved with an ISO 45 gutta-percha cone and an IOPA was taken for confirming the master cone length. The canals were obturated using lateral condensation technique using gutta-percha points and root canal sealer (Endomethasone, Septodont). The patient refused to undergo further restoration #23 with post and core and PFM Crown as well as composite restoration #22 due to financial reasons. So #23 was restored with composite resin (Figure 3). The patient was found to be asymptomatic during the 6-month follow-up period.



**Figure 3: Post-Obturation Radiograph #23:**

**Discussion:**

Generally, it is considered that all maxillary canines only have a single canal.2, 4 However; various studies have reported that a maxillary canine is composed with two root canals in the possibility of the ranges of approximately 2 - 3%. 3,5,6 Caliskan et al.5 reported presence of type V canal and type III canal configuration in permanent maxillary canines. However, they could not find any type II canal configuration in their study. Alapati et al. 3 and Onay et al 7 reported a maxillary canine with type II canal configuration and Weisman8 reported a bi-rooted maxillary left canine. Review of literature suggests that the clinicians should increase their awareness on aberrations in tooth morphology of anterior teeth and show special care to detect and treat possible extra canals. This report describes a case of left maxillary canine with two root canals in Vertucci type II canal configuration. Later due to manual preparation both the canals merged to form single canal.

The clinician should always keep in mind that anatomic aberrations can occur in any tooth and the recognition of these is achieved by thorough examination of the internal anatomy of the tooth and its radiographs. From a clinical standpoint, when the initial radiograph shows the image of an unusual anatomic form it is recommended to take a second radiograph for additional information particularly with a mesial or distal projection.9 Yoshioka et al. have indicated that sudden narrowing of the canal system on a parallel radiograph suggests canal system multiplicity 10. Miyoshi et al, 1977 gave a general guide line is that if the mid-root image diameter appears equal to or greater than the crown image diameter, then the tooth most likely has a variation in root canal configuration11. The presence of additional canal should be suspected whenever an instrument demonstrates an eccentric direction on deeper penetration into the canal, termed directional control, as reported by Green(1973)12, or if the working length file appears off center in the radiograph. When anatomic variations are detected clinically, treatment can be performed with conventional or rotary instrumentation and root canal system filling techniques, respecting technical and biological principles.

**Conclusion:**

Diagnosis and identification of the number of roots and root canals are the key factors in endodontic treatment. Maxillary canines with two root canals are a rare condition. Failure to detect the presence of additional root canal during endodontic therapy of canine, can directly affect prognosis of treatment. A careful radiographic interpretation and endodontic exploration is essential to give the highest possible chance for success of endodontic therapy.

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