

Maxillary canine with two root canals: A case report

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ABSTRACT

Traditional endodontics has been based on feel, not sight. Tactile proprioception was the clinician's only guide as burs and files were blindly inserted into pulp chambers and root canal systems. Together with radiographs and electronic apex locators this blind approach has produced surprising success. There is, however, a significant long-term failure rate that is driving dentistry to aggressively extract natural teeth in favor of implants. The sting of clinical failure is a powerful motivator for change. A failure in endodontic treatment usually occurs because of insufficient debridement or incomplete canal obturation. In some cases, however, a root canal may be left untreated because of the failure to recognize its presence. The dentist must have a thorough knowledge of root canal morphology before he can successfully treat a tooth endodontically. A permanent maxillary canine are more common to be single-canaled teeth and two root canals is a rare condition.

Introduction

Endodontic therapy is essentially a microneurologic surgical procedure. Because the fundamental foundation on which all surgical procedures are performed is an intimate knowledge of anatomy, any attempt to perform endodontic therapy must be preceded with a thorough understanding of the anatomy of both the pulp chamber and the root-canal system.[1]

Most practitioners begin root-canal treatment with preconceived ideas about the anatomy and position of pulp chamber and root canals. It is important to be familiar with variations in tooth anatomy and characteristic features in various racial groups because such knowledge can aid location and negotiation of canals as well as their subsequent management.[1] A failure in endodontic treatment usually occurs because of insufficient debridement or incomplete canal obturation.[2]

Maxillary canines are statistically more common to be single-rooted, single-canaled teeth. Two root canals in a permanent maxillary canine is a rare condition.[2-5] Of those having two canals, majority join in apical third and exit at single apical foramen.

This report presents a case of maxillary canine having two root canals and its treatment procedures.

Material and Methods

A 26-year-old female patient was referred for endodontic diagnosis with a chief complaint of spontaneous pain associated with a maxillary right canine. The tooth was asymptomatic to palpation and responded within normal limits to electric pulp test. It responded with severe pain to percussion, severe and lingering pain

to cold thermal test. No mobility was noted. Periodontal status was within normal limits. Radiographic examination revealed a tooth with abnormal root canal morphology. The tooth was diagnosed as having irreversible pulpitis. The medical history was noncontributory. Following local anesthesia the tooth was isolated with rubber dam, and a lingual access was made. The vital pulp tissue was extirpated, and initially two canal orifices were located. The working length was determined visually by subtracting 1 mm from the length of a size 15 Kfile (Mani, Inc. Thochigi. Japan) at the apical foramen. The middle and coronal thirds were prepared using Gates Glidden drills 1- 3 (Mani, Inc. Thochigi. Japan). It was found that the palatal canal joined the buccal canal just in the apical third of the root (type II canal configuration of Vertucci classification). The two canals were shaped to a size 40 master apical file using a step-back technique. The preparation was carried out manually with pre-curving of files. One ml of 1.25% sodium hypochlorite (NaOCl) was used for irrigation between each instrument. After the final irrigation, the canals were dried with paper points and obturated with lateral condensation technique using gutta-percha (Dentsply De Trey GmbH, Konstanz, Germany) and AH Plus sealer (Dentsply De Trey GmbH, Konstanz, Germany). The tooth was restored with composite resin.

Discussion

According to study undertaken at the University, Washington School of Dentistry, nearly 95% of all endodontically treated teeth were successful. But there was also a hidden agenda to the Washington Study-to prove ourselves to a profession that, at that time, was skeptical of root canal therapy. In light of



Figure 1. Pre-operative radiograph



Figure 2. Access opening with rubber dam, showing two separate orifices



Figure 3. Working length radiograph showing the canals joining at apical third



Figure 4. post-obturation radiograph

today's knowledge, the project had some design flaws and misinterpretations and was not that well controlled, even though each phase was subjected to statistical analysis. The null hypothesis was ignored in an effort to prove a point: root canal therapy could be successful if properly done.[6]

Failure to find and fill a canal has been demonstrated to be a causative factor in the failure of endodontic therapy.[2] It is of utmost importance that all canals be located and treated during the course of nonsurgical endodontic therapy.

Systematic anatomic approach to pulp chamber, root-canal-orifice location, and the practice of endodontics can now be based on fundamental surgical anatomic principles. As in other medical specialties, knowledge of basic concepts such as these laws is more important than the tools for measurement.[1]

During the past years, there have been many studies of pulp morphology. The anatomical studies of Vertucci[2], Pineda and Kuttler[3] Black[7], and Green[8] all state that maxillary incisors have a single root 100% of the time. A study by Caliskan et al.[4] using the clearing technique has shown a different type and number of root canals, their ramifications, and frequency of apical deltas of permanent teeth in a Turkish population. The percentage of permanent maxillary canines with type V canal configuration (one canal leaves the pulp chamber and divides short of the apex into two

type V canal configuration (one canal leaves the pulp chamber and divides short of the apex into two separate and distinct canals with separate apical foramina [2]) was 2.17 and type III canal configuration (one canal leaves the pulp chamber, divides into two within the root, and merges to exit as one canal [2]) was 4.35. However, they could not find any type II canal configuration in their study.

A review of the literature revealed that Alapati et al.[5] reported a maxillary right canine with type II canal configuration and Weisman[9] reported a bi-rooted maxillary left canine. The present cases have similar characteristics to that reported by Alapati et al.[5] Two distinct canal orifices were located in a labial/palatal configuration.

In the present case the palatal canal coursed laterally and then curved back to join the buccal canal in the apical third, forming a type II canal configuration.

Teeth with type II canal configuration may present problems in treatment. Although one of the two canals, the one most continuous with the large main passage, is usually amenable to adequate enlarging and filling procedures, the preparation and filling of the other canal is often extremely difficult.

Although the prevalence of the root canal anomalies is rare, they can be detected by careful examination. Prior to the beginning of

radiographs from several different angles and a careful endodontic exploration may lead to suspicion or identification of additional canals and is certainly essential to give the highest possible chance for success.[2,5]

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