

Maxillary Canine with Two Roots and Two Root Canals: A Rare Case Report

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Abstract: *Detailed examination of the root morphology and anatomy is critical for complete cleaning and shaping of the root canal system for successful outcome. The current case presentation describes a rare case of maxillary canine with two roots. While clinical examination it was reported that the offending tooth had severe pain to cold test. Detailed radiographic examination by cone-beam computed tomography (CBCT) revealed additional root in the maxillary canine. Complete root canal treatment was done and the tooth remained clinically and radiographically asymptomatic at 6 months follow-up.*

Keywords: *Maxillary canine, additional root, Root canal therapy, CBCT'*

1. INTRODUCTION

Root of the teeth and its canal system has a wide anatomical variation. The goal of Endodontic treatment is to maintain a decontaminated canal and undergo a debridement for any infectious particles to prevent any reinfection to develop.¹ Failure of endodontic therapy can take place because of multiple causes, such as diagnostic errors while locating the canals and roots, errors in cleaning and shaping of the root canal, remanence of the infection in the root canal.² These errors are common in cases where root canal is missed by the clinician because of variation in the number of roots or in canal configuration.³

With the introduction of cone beam computed tomography (CBCT's) in dentistry, dental clinicians could not only have profound knowledge of oral pathology but could also enhance the access to a detailed view of the underlying structures, their relations and root morphology. This 3D image was groundbreaking since the process of decision-making became easier, and it also provides clear diagnosis for root and root canal morphological variations.⁴

According to the available literature, maxillary permanent canine is considered to be a single root with a single canal. However, the present case report describes the treatment challenge of a rare case report of two rooted permanent maxillary canine with two root canal with help of CBCT, a three-dimension radiograph to achieve the accurate diagnosis and analysis.

2. CASE REPORT

A 57-year-old, systemically healthy male patient, visited the dental emergency clinic with a chief complaint of severe pain located in the upper right anterior teeth for two days. History of present illness revealed that the pain was localized, severe, sharp and lingering.

Clinical examination presented restored offending tooth with severe pain on percussion. No mobility was recorded with the diseased tooth. As part of the examination, a cold test was performed using an Endo Ice (frost spray -50 °C) which elicit severe sharp pain.

Moreover, a radiographic examination revealed distal radiolucency under radiopaque restoration close to the pulp and widening in periodontal ligament (PDL) space (figure. 1). On detailed radiographic examination, we observed an additional outline which was

suggestive of an additional root in the right maxillary canine. To confirm our diagnosis and to obtain a more detailed view of anatomy and morphology of the root and canal we advised patient to get 3D imaging i.e CBCT done. Surprisingly, report of CBCT confirmed two rooted permanent maxillary canine. The pulpal diagnosis for an offending tooth was symptomatic irreversible pulpitis with symptomatic apical periodontitis.⁵ (figure. 2)

After obtaining informed consent, the tooth was anesthetized by local infiltration anesthesia (Lidocain 2%) followed by rubber dam sheet (6"x6") placement for proper isolation and to prevent saliva contamination. We used Microscope (Zeiss PROergo) during the treatment to locate and visualize the canal system. Treatment started with a round bur to access the cavity and later the access was extended to palatal direction to facilitate the location of the canal. Next, Gate gladden was used up to size three to widen the canal orifices. Working length was determination by an apex locator machine (Root-ZX), and periapical radiograph was taken in straight & shift direction to confirm the measurements.⁶ (figure. 3). Chemo-mechanical preparation as completed by using a Protaper Next system. Through irrigation of the canal system was done by using 5.25% of Sodium hypochlorite (NaOCl).^{7,8} Final rinse was performed by EDTA 17% for one minute to remove the smear layer.⁹ Whereas, Sodium hypochlorite (NaOCl) was used for the final flushing.^{10,11} Obturation was done using thermoplasticized gutta-percha and zinc oxide eugenol (ZOE) sealer. Furthermore, final composite restoration was done to restore the lost tooth structure and maintain coronal seal. Six-month post-operative follow-up showed tooth remained clinically asymptomatic without any periapical radiographic changes. (figure. 4)

3. DISCUSSION

The objectives of endodontic treatment are to debride the root canals of pulp tissue remnants, microorganisms and bacterial products before obturation, thus inducing an appropriate environment for healing of peri-radicular tissues.^{11,12} Variations in the root anatomy and canal morphology is observed in all subset of populations together with the nationals of Saudi Arabian. Studies on root canal anatomy and morphology of permanent maxillary canine teeth are limited in the Saudi Arabian population. For that reason, clinical practitioners must always consider these variations during root canal therapy to ensure a successful outcome. Failure to trace and manage an extra root and canal is one of the most prime reasons for failures of root canal therapy.^{13,14} In the teeth particularly with additional root canals or anatomical variations, root canals are often left untreated because the clinicians fail to identify their existence.

Generally, maxillary canines are presented with single-root with single-canal,¹⁵ but cases with two roots or two canals have been reported in the literature,¹⁶ but not in the Saudi population. Most of the previously published case reports were based on the conventional periapical radiographic examinations. One of the main drawbacks of the radiographic image is a two-dimension (2D) representation of three-dimensional (3D) objects. Nevertheless, in the 21st century, due to the introduction of new technologies related to radiographic examination, there has been an evident increase in the number of clinical studies (in-vivo/in-vitro), and case reports that have revealed morphological and anatomical variations in the roots and canals.

In the present case report, we used CBCT imaging technique that provides a useful diagnostic method to analyze the root anatomy and canal morphology as well as an excellent in producing an explanatory image database. In conclusion, our case report will enhance the awareness of the clinicians and focus on anatomical variations while performing endodontic treatment. It displayed that special care is required to detect and treat possible additional root with root canals in permanent maxillary canine teeth.

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4. REFERENCES

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Figure

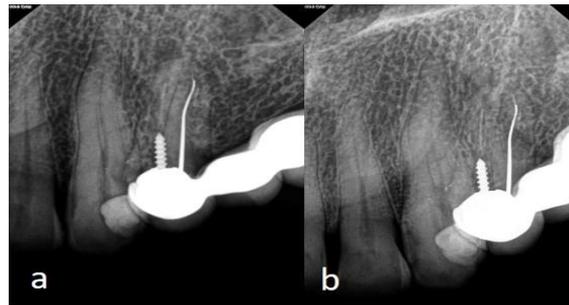


Figure 1: Preoperative radiographic view a) bisecting angle technique b) cone shift technique



Figure 2: CBCT image revealing two roots with maxillary canine

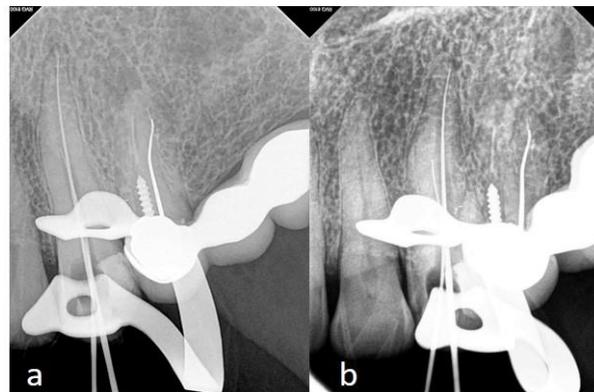


Figure 3: Working length determination a) bisecting angle technique b) cone shift technique

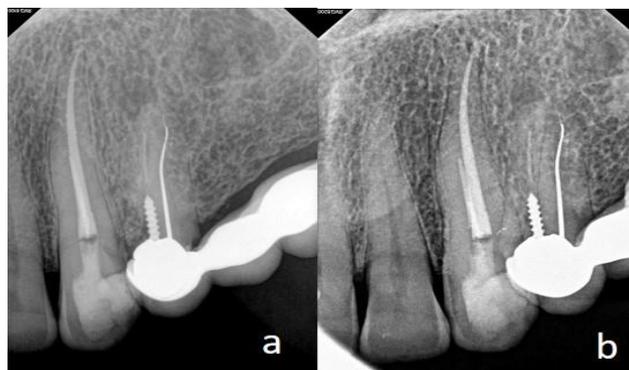


Figure 4: Final obturation a) bisecting angle technique b) cone shift technique