

MAXILLARY FIRST PRE-MOLAR WITH THREE ROOTS - CASE REPORT

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ABSTRACT

Disparities in quantity and root canals are perhaps a few of the most commonly portrayed anomalies in studies. The occurrence of 2 canals may be deemed usual but racial disparities in the root canal anatomy of premolars have been recognized. The composition of a maxillary premolar with 3 canals: palatal, distobuccal and mesio buccal is comparable to the neighboring maxillary molars, and they are occasionally described to as small molars. A 22 years old male patient of Saudi descent presented at dental clinics of Riyadh Elm University. No medical history was reported by the patient, and he reported no use of medications or drugs. His chief dental problem was the instinctive pain around the upper left premolar #24 for a week. Intraoral examination and radiographic interpretation discovered deep disto-occlusal destruction by caries. The maxillary first premolars are amid the utmost problematic teeth to be managed endodontically for numerous causes: the quantity of roots, the quantity of canals, the direction and longitudinal depressions of the roots, the several pulp cavity formations, and also the problems in envisioning the apical limit by x-rays so it is significant for every dentist to be mindful of the variations in form and number of roots and root canals are expected to happen, and occasionally in a rare form, as in the premolar with 3 canals and 3 roots. Understanding such variations and pay more attention to the radiographs will help in diagnosing and treating endodontic cases so such alterations do not affect prognosis.

Key words: Root canals, Anatomical variation, Maxillary first premolar, Three roots, Endodontic treatment.

Introduction

The major purpose of endodontic treatment is comprehensive chemical and mechanical cleaning of the whole root canal pursued by obturation with an inert filling material and final coronal restoration [1]. The understanding of tooth morphology, cautious analysis of angulated radiographs, appropriate access cavity preparing, and a thorough discovery of the tooth interior is required to guarantee an appropriate endodontic treatment [2, 3].

Disparities in quantity and root canals are perhaps a few of the most commonly portrayed anomalies in the studies. The occurrence of 2 canals may be deemed usual but racial disparities in the root canal anatomy of premolars have been recognized [4, 5]. The composition of a maxillary premolar with 3 canals: palatal, distobuccal, and mesio buccal is comparable to the neighboring maxillary molars and is occasionally described as small molars [6].

The single root prevalence range was 22.0-49.4%; 2 roots, 50.6-72%; and 3 roots, 0-6% [7-11]. Researches related to the canal structure of the first maxillary premolars have discovered that in a majority of examples, they have 2 canals (73.3- 92%), even though teeth with 1 or 3 root canals frequently occur (8-26.2% and 0-6%, respectively). Researchers discovered 9.2% of the first maxillary premolar with 3 canals [12-14].

A study on 150 extricated maxillary 1st premolars revealed 60(40.0%) teeth with single root, 85 (56.7%) with 2 roots, and five (3.3%) with 3 roots [15].

Dentists ought to contemplate additional roots to avoid root canal-related contaminations and associated signs in dental patients [16].

This study aimed to report a clinical case with a unique anatomical modification of maxillary first premolar illustrated by having 3 root canals.

Case report

A Saudi male patient aged 22 years presented at dental clinics of Riyadh Elm University. No medical history was reported by the patient, and he reported no use of medications or drugs. His chief dental problem was the instinctive pain on the upper left premolar #24 for a week. Intraoral examination and radiographic interpretation discovered a deep disto-occlusal destruction by caries (**Figure 1**).



Figure 1. Carious lesion in a tooth #24

The tooth showed signs of pain on percussion. The radiographic finding of the periapical area was normal (**Figure 2a**). With these conclusions, a likely anatomical tooth disparity was suspected in relation to right and left first premolar region and occurrence of the third root canal reconfirmed with various angulation radiographs, a diagnostic finding of characteristic irreversible pulpitis was completed, and root canal therapy was planned (**Figure 2b**).



a)



b)

Figure 2. a) Initial Periapical x-ray, demonstrating the intricate root morphology of the maxillary first premolar indicating the presence of 3 canals. b) pre-operative bitewing radiograph, showing the extent of caries in tooth #24



Figure 3. Pre-operative OPG showing anatomical variations of bilateral multi-rooted upper and lower premolars

Access cavity was made following local anesthesia. Throughout the pulp chamber floor assessment, another canal orifice was spotted in the facial side of the tooth. The 3 canal orifices' locations were as follows: palatal, distobuccal, and mesiobuccal. The conventional access opening was modified to triangular shape with a base facing the buccal aspect (**Figure 3**).

The exploration of the canals was performed with appropriated Nickel Titanium sizes #10 and 15 K-files and the working extents of 3 root canals were measured using (DentaPort Root ZX) apex locator and verified using an x-ray (**Figures 4a and 4b**) confirmed a type VIII Vertucci root canal morphology [11]. Canals were instrumented utilizing crown down technique rotary system (ProTaper Next by Dentsply). Patency was accomplished in all canals and retained with a 15K-file (Dentsply).



a)



b)

Figure 4. a) Determination of the working lengths, b) 3 root canals' radiographical confirmation

At each instrument change, the canals were moistened with 2.5% solution of NaOCl as the key irrigant, throughout biomechanical formulation EDTA was applied to eradicate smear coating and the match rinsing was performed with a saline rinse. Subsequently, the canals were dried with absorbent paper points. RCT was finalized (**Figure 5a**) by utilizing the cold lateral condensation technique with AH Plus resin sealer and gutta-percha (**Figure 5b**).

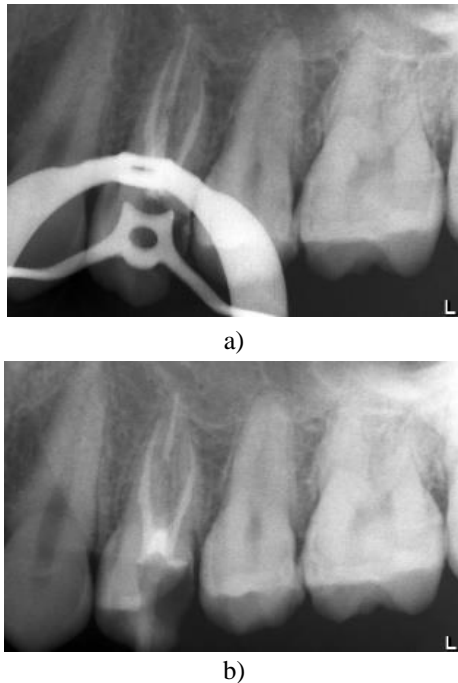
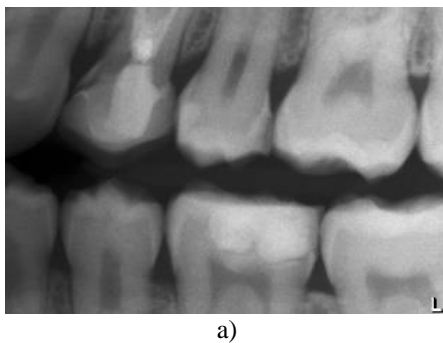


Figure 5. a) Final periapical radiograph after the obturation of tooth #24 endodontic treatment. b) Restoring the tooth with fiber post.

The RCT was achieved in two visit appointments. The pulp chamber was debrided after removing the excess sealer and gutta-percha. The tooth was restored temporarily with Cavit (Premier Dental Products) to close the cavity. After 7 days, the tooth was asymptomatic and it was definitely restored with fiber post and core and full ceramic crown (**Figures 5b and 6a**) (E.Max ivoclar). Approximately one-year follow-up showed successful outcomes (**Figure 6b**). The tooth remained asymptomatic. Based on clinical and radiographic evidence, no sign of periapical lesions nor failure in root canal filling was observed (**Figure 7**).



a)



b)

Figure 6. a) Final restoration with a full ceramic crown. b) Periapical radiograph of tooth #24 after 1 year, showing no periapical or lesions failure in filling of root canals.

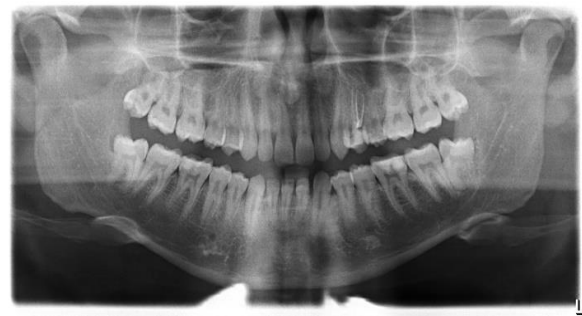


Figure 7. Post-operative OPG.

Results and Discussion

One of the main tasks in endodontic treatment is to manage teeth with varying anatomic formations.

The thorough inspection and visualization of pre-operative x-rays can often be difficult, but it is essential for successful endodontic treatment for the purpose of diagnosis, planning of treatment, and prognosis. In the course of current case reports, three roots and canals, that is a structural change in the maxillary 1st premolar.

Over the years, literature has stated the most diverse anatomical variations of several teeth, involving premolars [17]. These differences may be associated with the number of root canals, their length, form, divisions, fusions, courses, and phases of growth [18]. Previously, many dentists had handled the maxillary first premolar believing them to have only two canals [19].

When a preoperative x-ray exposed an uncharacteristic tooth shape and rare contour, additional radiographs should be taken with various angulations to confirm any rare anatomical features. A likely disparity of maxillary first premolar with 3 roots and 3 autonomous root canals is the occurrence of a mutual buccal orifice, which then separates into two discrete canals.

Numerous researches have demonstrated the occurrence of 3 rooted canals in maxillary 1st premolars is unusual, varying from 1.5% to 5% of the patients. Though the prevalence is low, the dentists ought to be ready to detect and prepare an appropriate solution for such clinical experience [20, 21]. In this situation, the premolar may be known as a “minimolar” [22].

Moreover, making a well-contoured root canal access cavity and examining its base thoroughly are helpful too in recognizing supplementary canal orifices. A study [23] stated that T designed cavity is perfect for debridement and achieving straightforward entrance three rooted premolars and canals [23].

Concerning the instrumentation utilized, the usage of hand files is well-known for the confection of apical

Stop [24-26], and ProTaper system comprises of rotary instruments that have demonstrated useful, enhanced and

easy, permitting the dentist to operate more successfully and swiftly the root canal treatment [27].

The true objective of root canal filling is to deliver a favorable environment for the body to restore tissue

with no risk of relapse [28]. The existence of an untouched canal; insufficient cleaning and partial obturation of the root canal are frequent reasons for the failure of endodontic treatment [29].

Inspection of the pulpal floor, and utilization of optical microscope throughout the process are in addition essential components that add to the detection of extra roots plus canals [30].

Conclusion

The maxillary first premolars are amid the utmost problematic teeth to be managed endodontically for numerous causes: the quantity of roots, the quantity of canals, the direction and longitudinal depressions of the roots, the several pulp cavity formations, and also the problems in envisioning the apical limit by x-rays so it is significant for every dentist to be mindful of the variations in form and number of roots and root canals are expected to happen, and occasionally in a rare form, as in the premolar with 3 roots and 3 canals. Understanding such variations and pay more attention to the radiographs will help in diagnosing and treating endodontic cases so such alterations do not affect prognosis.

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