

## Root Canal Treatment of Maxillary Second Premolar with Two Roots and Three Canals

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### Abstract

Usually most teeth exhibit normal morphology but variation does exist. Clinician should always keep in mind that knowledge and management of these variations are must for successful endodontic treatment. This article presents a case of a maxillary second premolar with such rare variation of two roots and three canals, which underwent successful endodontic treatment by an intern at a teaching hospital in Jeddah, Saudi Arabia.

**Keywords:** Root Canal Treatment; Maxillary Second Premolar

### Introduction

Highly complex internal anatomical variations exist in teeth [1] and for the success of endodontic treatment, thorough knowledge of morphological variations is must [2]. The untreated missed canal of tooth will lead to the growth of microorganisms inside the canal, which may lead to failure of endodontic treatment [2,3].

In maxillary second premolars, usually single root is present, but two or three roots can also be found. Most common configuration for these teeth is one canal 60%, followed by two 40% and three canals 0.3% [4]. To date, only a few cases of maxillary second premolars with three canals have been reported in the literature [3].

### Purpose of the Study

The purpose of this report is to discuss a case with two roots and three canals in right maxillary second premolar, which received endodontic treatment at teaching college in Jeddah, Saudi Arabia.

### Case Report

A 63 years old male patient was referred to the Endodontic division at Batterjee Medical College from Removable Prosthetic division for intentional root canal therapy of maxillary right second premolar for overdenture. During the objective examination there was no specific finding. Radiographic examination revealed bone loss, but with no periapical pathosis (Figure 1).



**Figure 1:** Preoperative radiograph.

After infiltration with local anesthetic (4% articaine with 1:100,000 epinephrine) (Septodont, France), the tooth was isolated using rubber dam. The access cavity was prepared with Endo Access bur (Dentsply Maillefer, Switzerland) and Endo-Z bur (Dentsply Maillefer, Switzerland). Three canal orifices were located mesiobuccal (MB), distobuccal (DB) and palatal (P). The MB and DB canal are joining in apical 3<sup>rd</sup>. The pulp tissue was extirpated using barbed broaches (Dentsply Maillefer, Switzerland) and working length was determined using the apex locator (Dentaport ZX, J. Morita, Japan) and periapical radiograph (Figure 2).



Figure 2: Working length radiograph.

All the three canals were instrumented with Gates-Glidden drills (Mani, Japan) and K hand files (Dentsply Maillefer, Switzerland) using crown down technique. The master files for MB and DB were 35 and for P was 40. During instrumentation copious irrigation was done with 5.25% sodium hypochlorite (Clorox, Saudi Arabia) and 17% aqueous EDTA (Pyrax, India). After cleaning and shaping, an intracanal dressing of calcium hydroxide with iodoform (Meta Biomed Co. Ltd, Korea) was given for 1 week.

During the second visit after application of rubber dam, intra canal dressing was removed and all the three canals were irrigated with 5.25% sodium hypochlorite and dried with sterile paper points (Meta Biomed Co. Ltd, Korea). All the 3 canals were obturated with lateral condensation technique using gutta percha points (Meta Biomed Co. Ltd, Korea) and AH plus sealer (Dentsply, Germany) (Figure 3). Access opening was closed with glass ionomer restoration (GC Fuji IX, GC Corporation, Japan) and postoperative radiograph was taken.



Figure 3: Immediate postoperative radiograph.

**Discussion**

Complete canal debridement and obturation is a must for successful endodontic treatment [3], clinicians must therefore have the knowledge of normal canal configurations, its variations and also must be able to expect the unexpected root morphology [5]. The canal configuration and variation of maxillary second premolar is well documented, which shows that usually they have 1 or 2 canals, while some may have a variation of third canal. This variation is distributed among particular regions of the world, with the incidence of three canals being highest in South America followed by Middle East [3].

Comparison of maxillary second premolar canals between studies [1,5].

Study	Year	Country	Three canals (%)
Pineda and Kuttler [5]	1972	Mexico	0
Vertucci, Seelig and Gillis [5]	1972	USA	1
Green [5]	1973	USA	0
Bellizi and Hartwell [5]	1985	USA	1.1
Pecora., <i>et al.</i> [1]	1993	Brazil	0.3
Kartal., <i>et al.</i> [1]	1998	Turkey	0.66
Weng., <i>et al.</i> [1]	2009	China	0
Jayasimha Raj and Mylswamy [1]	2010	India	0.5
Al-Nazhan <i>et al.</i> [1]	2012	Saudi Arabia	0.9
Elkady and Allouba [1]	2013	Saudi Arabia	0
Yang., <i>et al.</i> [1]	2014	China	1.6
Abella., <i>et al.</i> [1]	2015	Spain	0.3
Elnour Mutasim [1]	2016	Saudi Arabia	5

**Table**

The access cavity of maxillary second premolar is usually oval with less buccolingual direction, but in this case the access cavity was modified to triangle with the base of the triangle towards the buccal side due to the third canal (Figure 4), resembling the maxillary first molar, but smaller in size [6]. One of the most common cause for the failure of root canal treatment is missed canal [3], therefore use of good magnification (surgical loops and dental operating microscope) and good lightening is must to overcome this problem and to increase the success rate [6].



**Figure 4:** Triangular access opening of premolar with 3 canals.

### Conclusion

Clinician should keep in mind that maxillary second premolars of Saudi Arabian patients have complex and variable canal morphology and therefore a careful evaluation of root canal morphology before starting the endodontic treatment is must for the success of the treatment [1].

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