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### RESEARCH ARTICLE

#### MANAGEMENT OF A MAXILLARY SECOND PREMOLAR WITH THREE ROOTS AND THREE ROOT CANALS- A RARE CASE REPORT

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#### Abstract

The probability of a maxillary second premolar with three roots is very rare. Hence, a proper clinical and radiographic interpretation is necessary before starting any endodontic treatment. Mostly their presence is noticed only after a failed endodontic treatment due to continuing postoperative pain and discomfort. For clinical success, awareness of any abnormal variation of the internal anatomy of the tooth is quintessential. The present case report describes the diagnosis and clinical management of a maxillary second premolar having 3 separate roots with a special reference to radiographic interpretation and diagnosis.

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#### Introduction:-

Variations in the root canal morphologies are the main reason for failure in the root canal treatment. For a successful endodontic treatment thorough knowledge of root anatomy is quintessential and lack of this can cause treatment failures. The root canal morphology of three rooted maxillary premolars show a close resemblance to that of maxillary molars and hence have been termed as mini-molars or as being radicularous.<sup>1,2</sup>

Maxillary second premolar most of the time have only one root and one canal in 75% of cases and one root and two canals in 25% of cases.<sup>3</sup> Few studies have revealed an incidence of three root canals between 0.3 and 2%.<sup>4</sup> in an Indian population. Maxillary premolars with a single root are dominant and three-rooted forms are rare and reported to be 2.1% in the non-Asian population and 0.6% in the Asian population.<sup>5</sup> The present case describes the management of a maxillary second premolar with three roots.

#### Case Report

A 24-year-old male reported to the clinic with a chief complaint of pain in the maxillary right posterior region since 2 weeks. The pain was dull, continuous, and mild in intensity. On intraoral examination the tooth 15 showed presence of distoproximal caries with pulp exposure. The tooth was sensitive to electric pulp testing with a delayed response indicating irreversible pulpal damage. The tooth did not show any signs of mobility and was not tender on percussion. On radiographic evaluation radiolucency was seen involving enamel, dentin, and pulp. The tooth showed presence of three roots, mesiobuccal, distobuccal and palatal (Vertucci's classification type VIII) however there was no evidence of periapical radiolucency in association with the tooth. (Figure 1) A final diagnosis of symptomatic irreversible pulpitis with 15 was made.

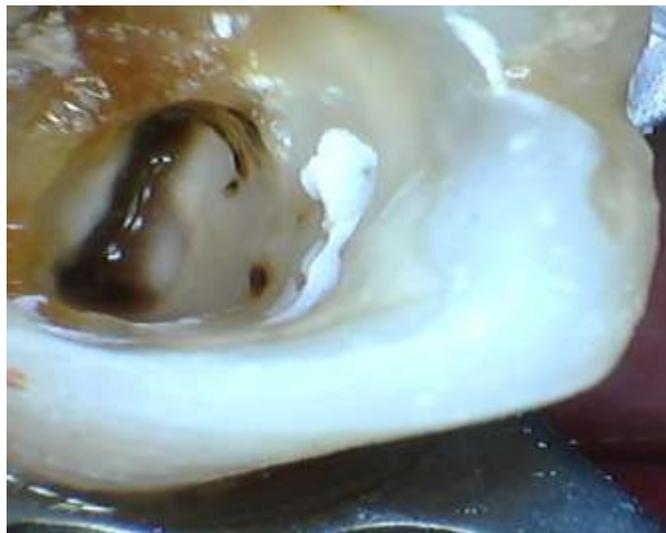
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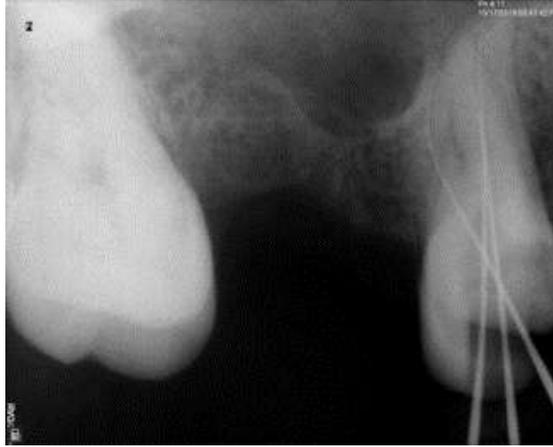
The tooth was topically anaesthetized using 15% w/w Lidocaine surface anaesthesia (ICPA Health Products Ltd, India) followed by a buccal and palatal infiltration using 1.7 ml 40mg/ml Articaine Hydrochloride with 1:1,00,000 adrenaline (Septodont, France). Under rubber dam isolation the coronal access was prepared using Endoaccess bur and access cavity was modified using EZ Bur to deroof the pulp chamber of distobuccal side to give a triangular outline and three separate root canal orifices were located using DG 16 explorer on the same level of the pulp chamber floor one mesiobuccal (MB), one distobuccal (DB) and one palatal (P) (Figure 2). The canals were negotiated with ISO size 10 K-files (Mani, Japan). The working lengths of all 3 canals were kept 1 mm short of the radiographic apex (Figure 3). All three canals were cleaned and shaped initially with hand files (Mani, Japan) upto 20 K File and then in a crown down technique using neoendo files (Orikam healthcare, London) upto a size of 25-4%. Irrigation was done using 5.25% sodium hypochlorite and EDTA (15% W/W) gel with Carbamide peroxide (10% W/W) (Dental Avenue, India) was used as a lubricant. Intracanal dressing of calcium hydroxide paste (Dental Avenue, India) was placed for one week. The canals were irrigated with 15% EDTA to remove the smear layer and final rinsing was done with 0.9% normal saline. Master cone X ray was taken. (Figure 4). The canals were dried using absorbent paper points (Meta BioMed, Korea) followed by obturation using guttapercha points (Meta BioMed, Korea) and AH plus sealer by cold lateral condensation technique. (Figure 5) Next, a final radiograph was taken, and the tooth was temporarily restored with glass ionomer restorative cement (KetacMolar, 3M ESPE, Sumar´e, SP, Brazil). A definite restoration with composite resin was done after one week (Z250, 3M ESPE, Sumar´e, SP, Brazil).



**Figure1:-** Preoperative radiograph showing radiolucency involving the pulp and showing mesiobuccal, distobuccal and palatal root.



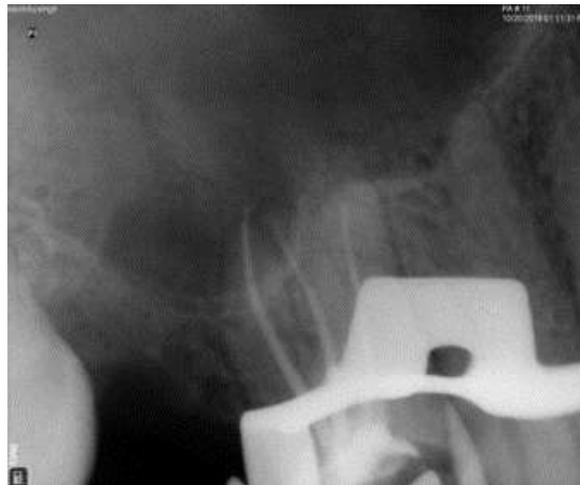
**Figure 2:-** Access opening under rubber dam isolation revealing the three orifices.



**Figure 3:-** Working length determination.



**Figure 4:-** Master cone radiograph.



**Figure 5:-** Postobturation radiograph.

**Discussion:-**

For a successful endodontic treatment, it is essential that the diagnosis made is accurate. Failure to do so in cases with anatomical variations might lead to an unnegotiated canal which in turn might cause the root canal treatment to fail. Sieraski et al<sup>6</sup> stated a general guideline for identifying maxillary premolars with three roots that, tooth has three roots if the mesio-distal width of the mid-root image appears equal to or greater than the mesio-distal width of the crown image. Hence a proper radiographic interpretation is essential before starting the treatment. In the present case the intraoral periapical radiograph revealed a three rooted premolar which was an anatomical variation that was identified. After the access opening it was observed that the buccal orifices were very close to each other and were hard to negotiate. A modification of the access cavity for negotiating all the three canals was advocated by Soares et al.<sup>7</sup> Few cases of maxillary premolars with an additional root were reported by Javidi et al<sup>8</sup> where a similar treatment protocol was followed. In the present case the access opening was created that resembled a T- shaped outline such that the mesiobuccal, distobuccal and palatal canals could be located as suggested by Balleriet al.<sup>9</sup>. Calcium hydroxide was used as an intracanal medicament due of its wide range of antimicrobial activity against common endodontic pathogens. and also it plays a major role in the disinfection of the root canal system.

Thus, properly finding all the three root canals, thorough cleaning and shaping followed by a good hermetic seal are essential for a successful treatment. Premolars consisting of three roots are rare and any such aberrant anatomy should be noted and documented.

**Conclusion:-**

Diagnosis of the underlying anomaly is important for the clinician as it can affect the prognosis of the treatment. Very few cases have been reported on a 3 rooted maxillary second premolar therefore the presence of any multiple canals and additional roots should be explored and treated accordingly. Clinicians should be on a constant lookout for 'occult' anatomy needing access cavity refinements for easy entrance into the complex anatomy and can be managed accordingly following its identification and negotiation.

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