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CASE REPORT

ENDODONTIC MANAGEMENT OF MAXILLARY SECOND PREMOLAR WITH THREE ROOT CANALS: A CASE REPORT

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ABSTRACT

Successful root canal therapy requires a thorough knowledge of root and root canal morphology. Indeed, the major causes of endodontic treatment failure are incorrect canal instrumentation, incomplete canal obturation, and untreated major canals. Although the occurrence of three root canals in maxillary and mandibular premolars is very rare, the clinician must be able to identify it clinically and radiographically to make the necessary changes in his shaping and obturation techniques. We present the endodontic management of a maxillary second premolar with two roots and three seperate canals, which was diagnosed with the aberrant anatomy only after the access preparation. Teeth with extra roots and/or canals pose a challenge in clinical management. Identifying them early is necessary to facilitate appropriate modifications in treatment protocol, armamentarium to be used and plan optimal number of treatment sittings.

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INTRODUCTION

- Aberrations in root canal systems are a commonly occurring phenomenon. Knowledge of the basic root canal anatomy and its variation is necessary for successful completion of endodontic treatment.
- Total extirpation of the pulp tissue and complete canal debridement is essential for the success of endodontic treatment.
- Missed canals or inadequate cleaning and shaping of the canals leads to failure of endodontic treatment.
- Therefore, clinicians should have a thorough understanding of the most common root canal morphologies as well as the less common morphological variations in the different tooth groups before initiating endodontic treatment**.**
- According to VERTUCCI, it is premolars that have most anatomic variations.
- The maxillary second premolar usually has one root and one canal in 75% of cases and one root and two canals in 25% of cases.
- The chances of maxillary second premolar having three roots and three canals are very low.

Incidence

- The literature reveals wide variations in root canal morphology of maxillary second premolars.
- Vertucci had reported an incidence of 1% of maxillary second premolars with three canals while Pecora et al reported 0.3%.
- Vertucci and associates stated that 75% of maxillary second premolars in their study had one canal at the apex, 24% had two foramina and 1% had three foramina
- This case reports the endodontic management of a maxillary second premolar with three canals in a patient with two separate roots.

CASE REPORT

A 32 year old male patient came to the department with a complaint of severe pain in upper left back teeth region.

Preoperative: One buccal and one palatal canal were located. The buccal canal that had been located was distally placed, which prompted a search for a second buccal canal in the mesial direction. The access opening was modified, the buccal half of the access opening was slightly enlarged in mesio-distal direction and this uncovered the mesio buccal canal.

DISCUSSION

Visualization

- Visualization of three canals in a maxillary premolar on pre operative radiographs can often be difficult.
- The root canal configuration resembles that of a miniature three canalled maxillary molar; the canals being classified as mesiobuccal, palatal and the distobuccal.
- Although the pre operative radiography gives a two dimensional image of a three dimensional object, there are some guides that suggest the presence of a third canal/root.
- Whenever there is an abrupt straightening or loss of radiolucent canal in the pulp cavity, a third canal should be suspected, either in the same root or in the other independent root.

Radiographic Interpretation

- Careful interpretation of the radiograph reveals external and internal anatomic details that suggest the presence of extra canals or roots. If a radiograph shows a sudden narrowing or even a disappearing pulp space, an extra canal should be suspected that could be in the same root or in separate roots.
- Sieraski *et al*. (2002), found that whenever the mesiodistal width of the mid-root image was equal to or greater than the mesiodistal width of the crown, the tooth most likely had three roots.

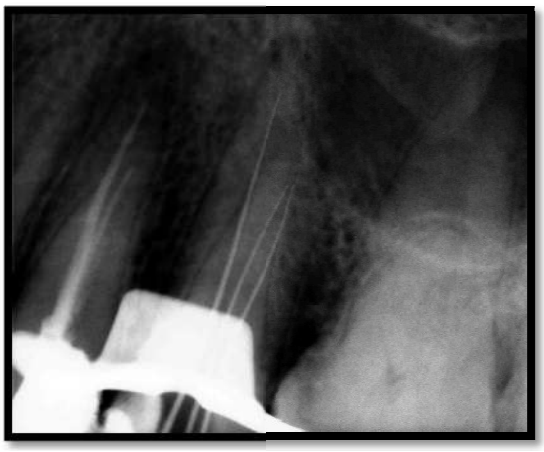
Access Preparation

The access cavity for maxillary premolars is usually oval in the bucco-palatal direction. A third root canal should be suspected clinically when the pulp chamber does not appear to be aligned in its expected bucco-palatal relationship or when an eccentric canal orifice was found. If the pulp chamber appears to be either triangular in shape or too large in a mesiodistal plane, more than one root canal should be suspected. The modified access cavity preparation in such cases should be triangular in outline, resembling the access cavity for maxillary first molar, but smaller in size. A third canal orifice should be considered, making a cut at the bucco proximal angle, from the entrance of the buccal canals to the cavosurface angle, as suggested by Balleri. The location of canal orifices is best achieved with good illumination and a dry pulp floor. Magnification with either loupes or a microscope is usually considered beneficial; however the dental operating microscope (DOM) is usually better for detecting orifices.

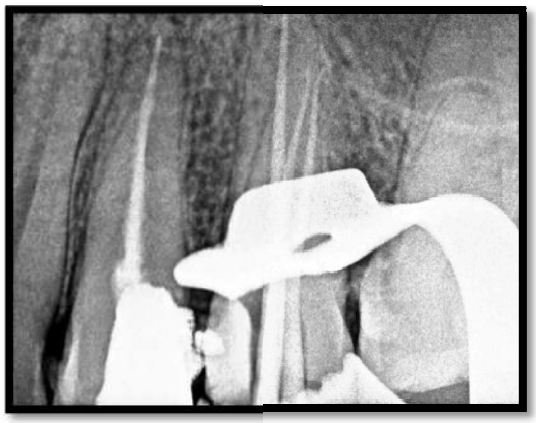
Images for the Case Report

Access Cavity Preparation

Preoperative



Working Length



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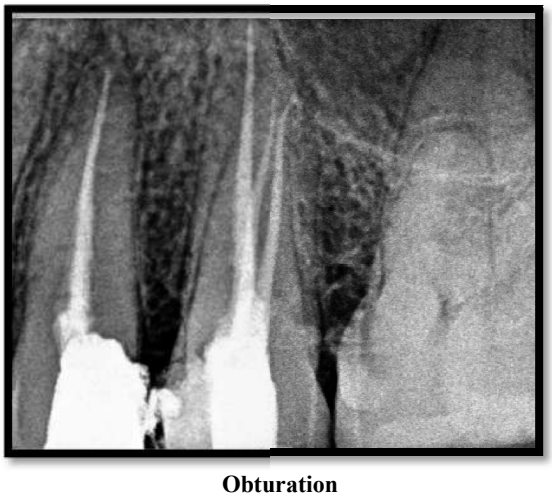

Obturation

CONCLUSION

A thorough analysis of angled radiographs, conscientious exploration of the floor of the pulp chamber, a good knowledge of the anatomical description with possible variation of the canal system and sufficient time for treatment are necessary to achieve a successful outcome in root canal therapy.

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