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

Bonny Paul, Kavita Dube

ABSTRACT

Anatomic variations must be considered during endodontic therapy. Maxillary premolars have highly variable root canal morphology. The failure to locate additional root canals and extra roots is an important cause of endodontic failure. This article describes the endodontic treatment of a maxillary second premolar with three roots and three canals.

Key words: Endodontics; Root Canal; Premolar

Introduction

Non surgical root canal therapy is a routine procedure in modern dentistry. Recent scientific and technical advances have resulted in retention of millions of teeth that would have been otherwise lost.1 Knowledge of both basic root and root canal morphology as well as possible variations in them is important in achieving successful nonsurgical root canal treatment.2-3 This is followed by negotiation, thorough cleaning and shaping, and obturation of the entire root canal system in all three dimensions.4 From the work of Hess and Zurcher4,5 to the most recent studies demonstrating anatomic complexities of the root canal system, it has long been established that the root canal system, it has long been established that the root with a graceful tapering canal and a single apical foramen is the exception rather than the rule. The main reasons for endodontic failure are apical percolation and presence of microorganisms caused by incomplete cleaning, insufficent canal obturation and presence of untreated canals.6 The maxillary second premolars are among the most difficult teeth to be treated endodontically.4-7 This article describes the endodontic treatment of a maxillary second premolar with three roots and three canals.

Case Report

A fifty five year old patient with a noncontributory medical history reported to Department of Conservative Dentistry and Endodontics, Hiktigri Dental College and Hospital, Jabalpur, India with spontaneous pain in upper left second premolar. Clinical examination revealed a fractured palatal cusp with pulp exposure. Electric pulp tester elicited a painful response and also there was mild pain on percussion and absence of sinus tract. The case was diagnosed as acute irreversible pulpitis and endodontic treatment was suggested to the patient. An informed oral and written consent was obtained from the patient. After anesthesia with 2% lidocaine, a rubber dam was placed. A conventional oval access cavity was prepared. Clinical examination with a DG16 endodontic explorer revealed three orifices (two buccal and one palatal). The access cavity was modified to a triangular outline. The working length was determined using apex locator biomechanical preparation was performed by crown down technique using gate glidden drills in cervical thirds. The middle and apical third was instrumented using flexofiles. Irrigation was carried out normal saline and 3% sodium hypochlorite solution. The canals were dried using absorbent points and obturated with gutta percha cones using lateral condensation technique and resin sealer. The access cavity was sealed temporarily restored with Cavit G. The patient reported after a few days with relief of symptoms, a prefabricated metal post and full coverage porcelain fused to metal crown was placed (Figure 1,2, 3).

Discussion

The variability in root canal morphology is a normal phenomenon.8 In endodontics the possible existence of extra canals must be considered before endodontic treatment is commenced. Inability to detect, negotiate and instrument all root canals may lead to endodontic failure.2 The morphology of the root and root canals of maxillary has been reviewed extensively in literature.9,10 The prevalence of one, two and three canals has been reported in vitro and in vivo.11 Vertucci reported the occurrence of one canal at the apex in 75% and two canals at the apex at 24%.12 In the same study Vertucci found maxillary second premolars with three canals at the apex to be only 1%.13 Bellizi and Hartwell recognized the presence of three rooted premolar after endodontic therapy, when persistent post operative pain had to be evaluated.14 The incidence of three canals in maxillary second premolar reported by them was 1.1%. Pecora studied the internal anatomy of 300 maxillary second premolars in vitro, he reported the incidence of three canals in them as 0.3%.15

Walton recommended the use of two diagnostic radiographs.15,16 If a radiograph shows a sudden narrowing or even a disappearing pulp space, the canal diverges at that point into two parts that may either remain separate or merge before reaching the apex.15-18 If an eccentric orifice found, at least one more canal is present and should be searched for on the opposite side.16,19 A third canal should be suspected clinically when the pulp chamber does not appear to be aligned in its expected bucco-palatal relationship.16,18 Additionally, if the pulp chamber appears to deviate from normal configuration and seems to be either triangular in shape or too large in a mesiodistal plane, more than one root canal should be suspected.15,16,18 In the treatment of three rooted maxillary premolars the buccal orifices are close to each other and difficult to locate.20 Missed canals lead to treatment failure. Successful endodontic treatment requires knowledge of the most frequent anatomic formations and possible variations. Correctly reaching all of the root canals, cleaning and shaping followed by hermetic filling will lead the way to successful endodontic treatment.
Conclusion

In conclusion, the presence of extra canals should be expected in every tooth undergoing root canal therapy. A careful clinical examination during access cavity preparation and exploration in addition to a critical radiographic interpretation would help the clinician identify anatomic variations and modify treatment approach accordingly.

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