Endodontic Therapy of a Maxillary Premolar with an S-Shaped Canal

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Article ID: WMC003795
Article Type: Case Report
Article URL: http://www.webmedcentral.com/article_view/3795
Subject Categories: DENTISTRY
Keywords: "S" Shaped canal, Bayonet shaped canal, Second premolar

How to cite the article: Khandelwal V, Nayak UA, Kambalimath HV, Nyak PA. Endodontic Therapy of a Maxillary Premolar with an S-Shaped Canal. WebmedCentral DENTISTRY 2012;3(10):WMC003795

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Source(s) of Funding: None

Competing Interests: None

Additional Files:
first page
cover letter
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Abstract

Multirooted teeth represent a challenge to both endodontic diagnosis and treatment due to its complex and unusual root canal morphology in many cases and often encountered during endodontic treatment. Success depends on understanding the unusual root canal morphology. One of the variant root canal morphology is the ‘S’ shaped or bayonet shaped root canal. This case report discusses treatment of ‘S’ shaped root canal in maxillary second premolar of 21 year old female.

Introduction

Variations in root canal system occur very often, so it is considered a normally occurring phenomenon. Understanding these unusual root canal morphologies will help in proper debridement and cleaning and shaping of the root canal systems and thus contribute to success in endodontics.

Maxillary premolars are the teeth with the maximum anatomic variations. One such variation that occurs often in the maxillary premolars is the ‘S’ shaped or bayonet shaped root canal.1,2

This report talk about the endodontic management of a maxillary second premolar with an ‘S’ shaped root canal.

Case Report

A 21-year-old female patient, referred to for management of left maxillary second premolar. On clinical examination, tooth 25 had a deep carious lesion on the disto-proximal aspect. Radiographic examination of the tooth revealed radiolucency in the disto-proximal aspect, very close to the pulp space. The roots of the tooth 25 were ‘S’ shaped. On the basis, clinical and radiographic findings, a diagnosis of pulp necrosis was made and endodontic treatment was initiated.

Patient declined for rubber dam application so the treatment was performed under high vacuum suction. The completed access preparation was oval in outline, in the bucco-palatal direction.

The patency of the root canals was determined with help of 10 size nickel-titanium K-files. The buccal canal was easily negotiated to the apex, as it had one curvature, towards the distal, it was cleaned and shaped using protaper rotary instruments (MANI, Inc, Japan). Canal irrigation was done using normal saline, 3 % Sodium hypochlorite, and Ethylene diamine tetra acetic, alternately. The palatal root was negotiable only up to the middle third of the root canal, beyond that there was resistance to the movement of the patency file. The palatal root canal was enlarged with hand protaper (Sx) in a crown down motion. Once this was done, the patency file slide down easily, to the full length. The working length radiograph confirmed the same. The root canal was initially enlarged using Nickel-Titanium k files (Mani inc). The apical portion of the palatal canal was prepared using short amplitude filing. The apical portion and the middle portion were merged using circumferential filing. Root canals were obturated using 6% Gutta percha by cold lateral compaction technique.

Discussion

The variability of the root canal system of multirooted teeth represents a challenge to both endodontic diagnosis and treatment. The preoperative awareness of potential anatomic variations is essential for the success of the endodontic treatment. The only way to detect root canal morphology and anatomy is the use of a preoperative radiograph and an additional radiographic view from a 20-degree mesial or distal projection. In this respect, it becomes clear that extreme variations in root fusion are difficult to ascertain with radiographs.

The ‘S’ shaped canal has two curves, with the apical curve being very difficult to negotiate. The chances of strip perforation are very high in these root canals. Depending on the degree of the apical curvature, in a few cases it is impossible to instrument this area. Gutman3 suggested preflaring the coronal 1/3rd of the canal (at the expense of the tooth structure) to reduce the angle of curvature. Once this is done, it is easy to
negotiate the remainder of the root canal.

In our case, the buccal canal had a less severe curvature; hence this canal could be prepared in a crown-down technique using protaper rotary instrument. The palatal canal was doubly curved, thus a double flare technique was used to enlarge this canal. The access cavity was flared in the coronal-third, in order to reduce the angle of curvature; reducing the angle of curvature by flaring the access will make the approach to the second curve much easier. Once this was done, the palatal canal was negotiable, up to the apex; Nickel-titanium k files, were used to prepare the apical portion of the root canal. Short amplitude filing was done to enlarge the apical portion and also to merge it with coronal-third of the root canal. Care was taken for over-enlargement as it can easily result in perforation.

Conclusion

Understanding the complex root canal morphology and choosing a canal preparation technique, thorough irrigation, debridement and disinfection will thus ensure successful endodontic treatment in complex situations.

Reference

Illustrations

Illustration 1

Figure 1: Preoperative radiograph

Illustration 2

Figure 2: Working length radiograph
Illustration 3

Figure 3: Master-cone selection radiograph

Illustration 4

Figure 4: Post obturation radiograph
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